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October 2001

Legato NetWorker®

Module for Informix®

Release 2.0

UNIX® and Windows NT® Version

Administrator's Guide

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Legato NetWorker for Informix Administrator's Guide, Release 2.0, UNIX and Windows NT Version

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Preface

The *Legato NetWorker Module for Informix Administrator's Guide* contains information on how to configure and manage the Legato NetWorker Module for Informix software.

You *must* install the NetWorker Module for Informix software on your server and clients to use the information presented in this guide. If you have not yet installed the software, refer to the *Legato NetWorker Module for Informix Installation Guide* for installation instructions.

Audience


The information in this guide is intended for system administrators who are responsible for installing software and maintaining the servers and clients on a network. Operators who monitor the daily backups may also find this manual useful.

Product Documentation

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Convention	Indicates	Example
boldface	Names of DOS or UNIX line commands, daemons, options, programs, or scripts	The nsradmin command starts the command line version of the administration program.
<i>italic in text</i>	Pathnames, filenames, computer names, new terms defined in the Glossary or within the chapter, or emphasized words	Displayed messages are also written to <i>/nsr/logs/daemon.log</i> .
<i>italic in command line</i>	A variable that you need to provide in the command line	nwadmin -s <i>server-name</i>
fixed-width	Examples and information displayed on the screen	media waiting: recover waiting for 8mm 5GB tape volume name
fixed-width, boldface	Commands and options that you must type exactly as shown	nsr_shutdown -a
Menu_Name>Command	A path or an order to follow for making selections in the GUI	Volume>Change Mode>Appendable
Important:	Information that you must read and follow to ensure successful backup and recovery of your data	 Important: You must install the NetWorker Module software in the same directory where you installed the NetWorker client binaries.

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Chapter 1: Introduction



The first half of this chapter describes the features provided by the NetWorker Module for Informix and NetWorker software.

The second half of this chapter provides a technical description of the NetWorker and NetWorker Module for Informix storage management process for protecting Informix data. For details about configuring and running backups and recoveries of Informix data, see the following chapters:

- [“Chapter 3: Configuring Scheduled Backups” on page 29](#)
- [“Chapter 5: Performing On-Demand Backups” on page 55](#)
- [“Chapter 6: Performing Database Recoveries” on page 65](#)

This chapter contains the following sections:

- [“What Is NetWorker Module for Informix” on page 15](#)
- [“What is Informix ON-Bar” on page 16](#)
- [“What Is NetWorker” on page 16](#)
- [“How NetWorker Module for Informix Backs Up Data” on page 17](#)

What Is NetWorker Module for Informix

Legato NetWorker Module for Informix is an add-on module for NetWorker that provides:

- Automated backup media management
- Scheduling for ON-Bar, the Informix backup and restore utility

NetWorker Module for Informix provides:

- The ability to integrate both database and system file backups, thereby relieving the burden of backup from the database administrator while allowing the administrator to retain control of the restore process
- True “lights out” database storage management through automated scheduling, autochanger support, electronic tape labeling, and tracking
- Support for local or distributed backup to a centralized backup server
- High performance through support for multiple, concurrent high-speed devices, such as DLT drives
- Cluster support for high availability
- Sixty-four bit Informix Dynamic Server™ support

NetWorker Module for Informix, together with Legato NetWorker, provides reliable, high-performance data protection for local or distributed Informix Dynamic Server databases. NetWorker Module for Informix integrates backup and restore procedures for Informix databases with the network-wide data protection solutions that NetWorker provides.

NetWorker, in combination with the NetWorker Module for Informix, provides a storage management solution that addresses the need for cross-platform support of enterprise applications running on Windows NT and UNIX platforms.

What is Informix ON-Bar

ON-Bar is a utility, included with Dynamic Server that provides:

- Online, concurrent backups and restores of dbobjects (dbspaces, blobspaces, and logical log files)
- Automated, continuous logical log backup (recommended) or on-demand logical log backups
- An interface to popular storage management software through the X-Open Backup Service API (XBSA)

What Is NetWorker

Legato NetWorker is a network data storage management solution that protects and helps manage data across an entire network. NetWorker simplifies the storage management process and reduces the administrative burden by automating and centralizing data storage operations. As a network expands or as the amount of data grows, NetWorker provides the capacity and performance to handle the load.

With NetWorker, you can:

- Perform automated “lights out” backups during non peak hours
- Administer, configure, monitor, and control NetWorker functions from any system on a network
- Centralize and automate data management tasks
- Increase backup performance by simultaneously sending more than one savestream to the same device
- Optimize performance using parallel savestreams to a single device, or to multiple devices or storage nodes

NetWorker client/server technology uses the network protocol Remote Procedure Call (RPC) to back up data. The NetWorker server software consists of several server-side services and programs that oversee backup and recover processes. The NetWorker client software consists of client-side services and user interface programs.

The server-side services and programs perform the following functions:

- Oversee backup and restore processes
- Maintain client configuration files
- Maintain an online client index
- Maintain an online media database

How NetWorker Module for Informix Backs Up Data

When combined with NetWorker Module for Informix, NetWorker provides storage management services for your Informix data. NetWorker Module for Informix provides the services that connect NetWorker functionality to ON-Bar. NetWorker provides backup schedules, volume labels, and NetWorker client resource files.

What Happens During a NetWorker Module for Informix Backup

When a scheduled Informix backup is triggered by **nsrd** on the NetWorker server, **savegrp** executes **nsrdbmi** on the client instead of a standard **save**. The **nsrdbmi** command backs up data that is passed from ON-Bar and sends it to the NetWorker server through the NetWorker Module API. The results of the **savegrp** execution are sent to the NetWorker server and included in the savegroup completion report.

During a backup, the NetWorker server makes an entry in an online client file index and records the location of the data in an online media database. These

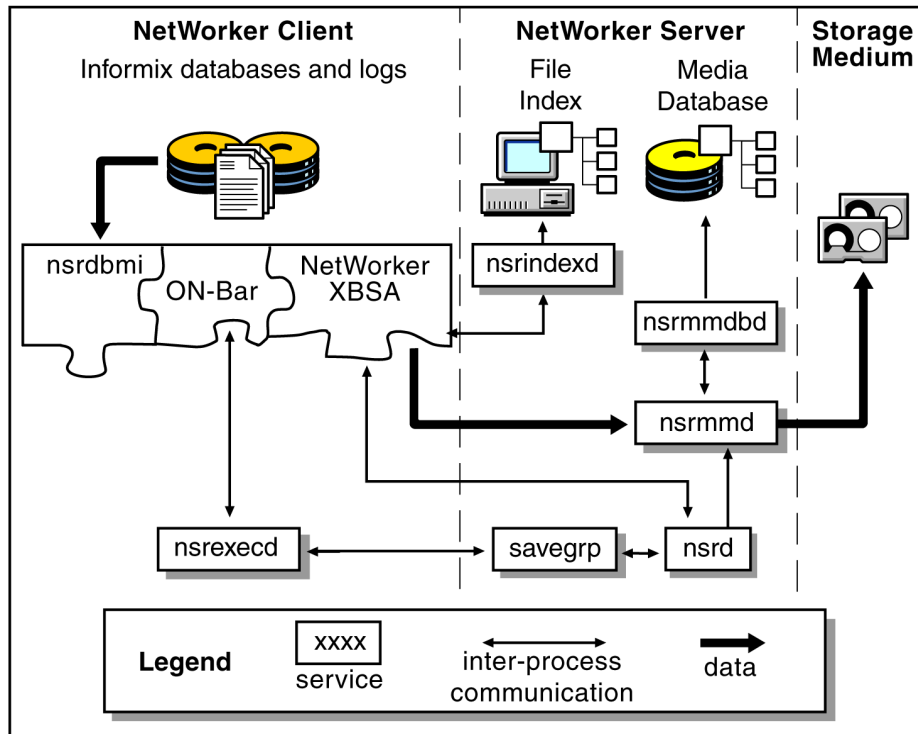
entries provide recovery information needed for every database server object backed-up. The client index entry is maintained in the index until the browse policy configured for the client's save set expires.

When the retention policy configured for the client's save set expires, the save set changes status from "recoverable" to "recyclable" in the media database. When all the save sets on the storage media change status to "recyclable," the media mode changes status to "recyclable," and the media is eligible for automatic relabeling. The save set entries, however, remain in the media database until the media is actually relabeled.

Until the media is relabeled, the data is still recoverable, using the NetWorker **scanner** command.

After a scheduled backup, NetWorker sends a record of the server's *bootstrap* file to the default printer. This is a printed record of the dates, locations, and save set ID numbers for the server's online indexes, required for restoring data. Keep the bootstrap printout on file as a quick reference in the event of a disaster, such as a disk crash or server malfunction.

[Figure 1](#) shows how data moves from the database server to your NetWorker server during an ON-Bar backup session.

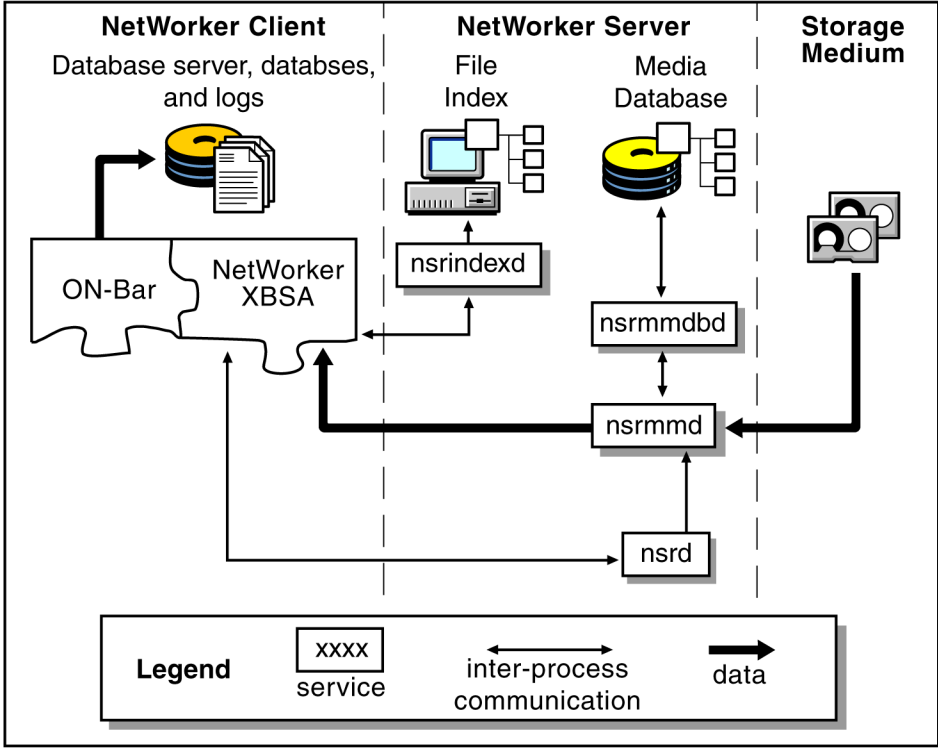
Figure 1. Backup Initiated by NetWorker Module for Informix

What Happens During a NetWorker Module for Informix Restore

When an ON-Bar restore request is initiated, the NetWorker Module API translates the object names requested by ON-Bar into a format understood by NetWorker and forwards it to the NetWorker server's **nsrd** service. The media service, **nsrmmd**, searches the NetWorker server's online media database for the media containing the object(s) requested and recovers the data to the database server.

Figure 2 shows how data moves from the NetWorker server to your database server during an ON-Bar restore session.

Figure 2. Data Movement During a Restore Initiated by ON-Bar



Chapter 2: NetWorker Configuration



This chapter describes the supported options for setting up NetWorker Module for Informix and how to configure the software.

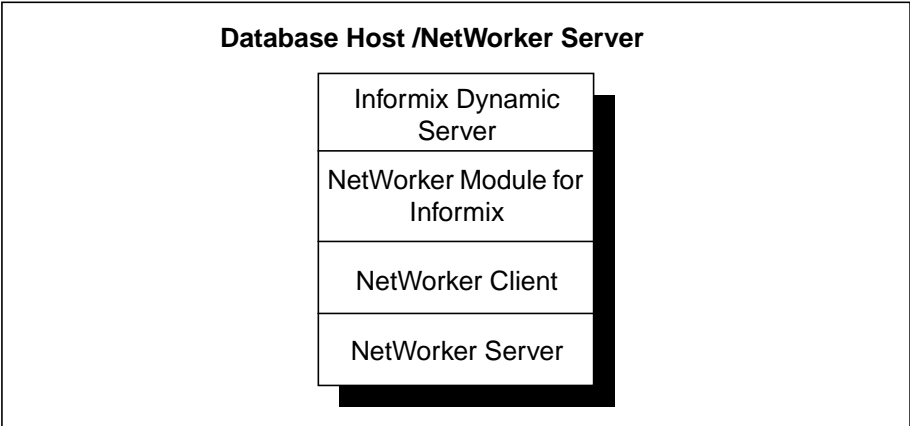
This chapter consists of the following sections:

- [“Informix Dynamic Server and NetWorker Server on the Same System” on page 21](#)
- [“Informix Dynamic Server on a Different System than NetWorker Server” on page 22](#)
- [“Installation Requirements for Multiple Database Backup” on page 23](#)
- [“Configuring the NetWorker Server” on page 24](#)
- [“Restarting the NetWorker Remote Exec Service” on page 26](#)

Informix Dynamic Server and NetWorker Server on the Same System

In this configuration, the Informix server or Informix client and the NetWorker server are installed on the same system, as shown in [Figure 3](#). The disadvantage of this configuration is the risk of a single point of failure.

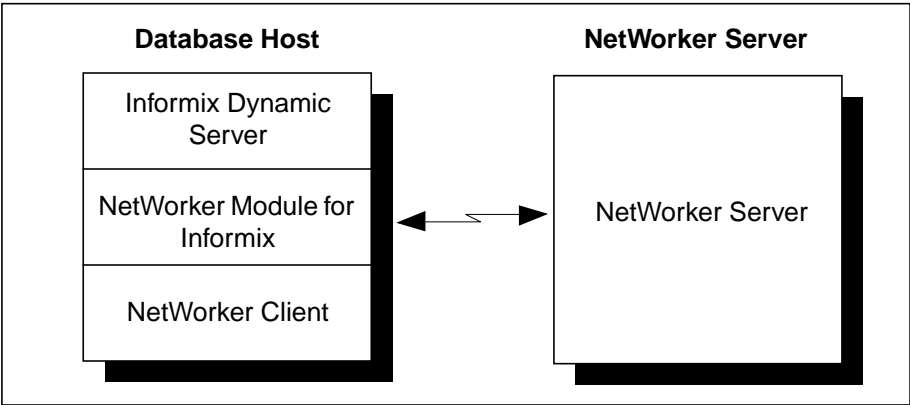
Figure 3. All Components on the Same System



Informix Dynamic Server on a Different System than NetWorker Server

In this configuration, the Informix server or Informix client and the NetWorker server are installed on separate systems, as shown in [Figure 4](#). The Informix server or Informix client is a remote NetWorker client.

Figure 4. NetWorker Server on a Separate System



Installation Requirements for Multiple Database Backup

NetWorker Module for Informix supports concurrent backup of separate Informix database files on the same system. It should be installed only once per system, regardless of the number of Informix databases to back up on the system. All Informix database files can be backed up to the same NetWorker server, located locally or over the network.

With multiple licenses, Informix databases on separate systems can be backed up concurrently to the same NetWorker server. The NetWorker server can be located on any of the systems containing Informix, or on a separate NT or UNIX system.

Figure 5 and Figure 6 illustrate examples of multiple database installations.

Figure 5. Multiple Database Backup on Same System

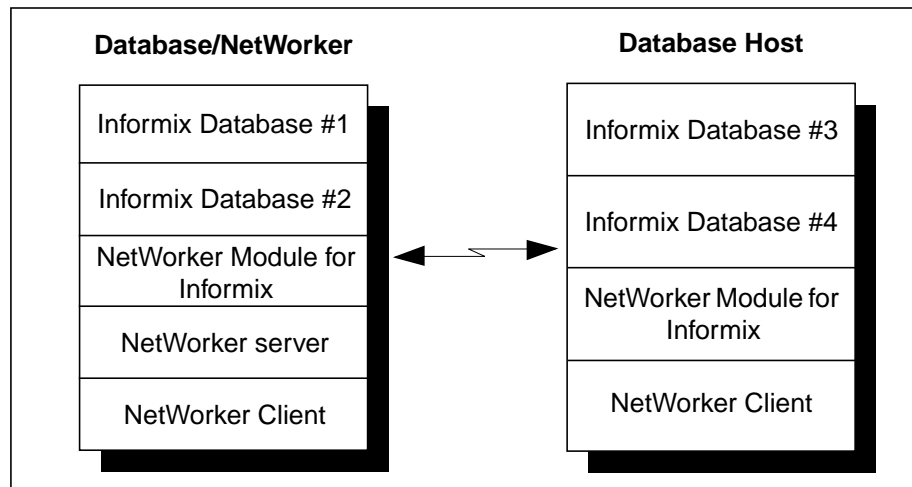
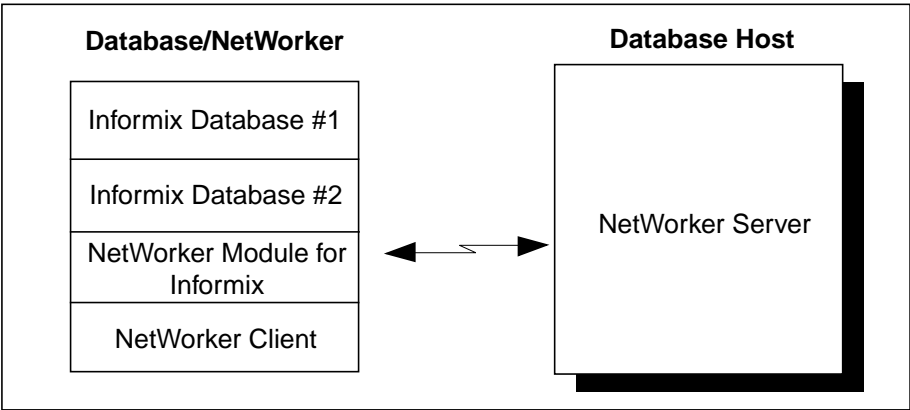


Figure 6. Multiple Database Backup on Different System



2

Configuring the NetWorker Server

To use NetWorker Module for Informix, each Informix database system requiring backup and restore services must have an associated server and client resource configured on the NetWorker server.

You can use the NetWorker Administrator program to define custom settings for backup groups and volume pools. If you do not customize the NetWorker resources settings before defining each Informix server as a NetWorker client, NetWorker will back up each Informix database system using the default settings. For example, you might want to customize the settings for backups of database files and system files to different media. For more information on defining custom NetWorker resource settings, see [“Chapter 3: Configuring Scheduled Backups” on page 29](#).

Configuring the NetWorker Server Resource

A NetWorker server resource resides on the NetWorker server and describes the specific administrator(s) who can access the NetWorker server and the number of savestreams the server will accept from any of its clients.

To configure a NetWorker server resource to accept data from an Informix client:

1. Ensure the Parallelism field is set equal to or greater than the number of savestreams being sent to the NetWorker server by the Informix client.
 - In the server application, select Setup and change the parallelism setting.

- The default setting in the parameter file is 8 and the maximum setting is 512.
2. Ensure the setting for Manual Saves is set to Enabled.

Modifying the Windows NT System Variables

During an on-demand backup from the ON-Bar command line interface or the Informix EnterpriseCommand Center (IECC), NetWorker uses the variables entered into your Windows NT system to direct your dbspaces and logical log files to the appropriate volume pools.

If you did not add NetWorker XBSA variables to your Windows NT system during installation, follow these steps:

1. Log on as *Windows NT Administrator* or equivalent.
2. Open the Windows NT Control Panel and double click on the System icon to open the System Properties dialog box.
3. Select the Environment tab to make the Environment dialog box active.
4. Add the NetWorker XBSA variables from [Table 1](#) to the System variables:
 - a. Enter the variable name in the Variable Name text box.
 - b. Enter the appropriate value in the Value text box. Be sure to enter the volume pool values exactly as shown in [Table 1](#).
 - c. Click Apply to add each change to the System variable list.

Table 1. NetWorker XBSA Variables

Variable Name	Value
<i>NSR_SERVER</i>	<i>your_NetWorker_server_name</i>
<i>NSR_DATA_VOLUME_POOL</i>	<i>DBMIData</i>
<i>NSR_LOG_VOLUME_POOL</i>	<i>DBMILogs</i>

5. Reboot your Windows NT system before running your first NetWorker backup.



Important: If you do not specify a value for the NSR_SERVER variable, NetWorker searches the network for the correct server to use. Setting the NSR_SERVER variable helps avoid a potential delay in the backup process.

2

Defining Custom Settings for NetWorker Resources

With NetWorker Module for Informix, you can back up your Informix Server databases and transaction logs according to a schedule you set up. You add your database server to the NetWorker server's list of clients, then specify which data you want backed up and the level of backup run on specific days. NetWorker backs up an Informix database server according to the configuration specified in the associated client resource. The *nsrdbmi.bat* file specifies the location of the Informix data to be backed-up.

Restarting the NetWorker Remote Exec Service

Note: This section applies only to Windows NT systems running NetWorker Module for Informix versions 5.1x and 5.2x.

Restarting the NetWorker Remote Exec Service as *informix user* ensures that the correct permissions are set when NetWorker performs a scheduled backup.

If you did not change the Log On parameter to *informix user* and restart the NetWorker Remote Exec Service under the *informix user* account during installation, follow these steps:

1. Log on as *Windows NT Administrator* or equivalent. You must have both *Administrator Group* and *informix user* authority to perform this task.
2. Open the Windows NT Control Panel.
3. Double click on the Services icon to open the Services dialog box.
4. Select the NetWorker Remote Exec Service entry in the Service list box and click the Stop button.
5. Double click on the NetWorker Remote Exec Service entry to open the Service dialog box.
6. In the Log On As group, enable the This Account radio button and enter your *informix user* account information in the text box.
7. Enter your *informix user* password in the Password text box.

8. Enter your *informix user* password a second time in the Confirm Password text box and click OK.
9. In the Services dialog box, click the Start button to restart the NetWorker Remote Exec Service.
10. Click the Close button to save your changes.

Chapter 3: Configuring Scheduled Backups

This chapter describes how to configure a NetWorker server to back up an Informix server.

You can customize how you backup your Informix databases and transaction logs, using NetWorker features called *resources*. You can specify the resource settings in the NetWorker Administration program.

If you do not create custom resource settings in the NetWorker Administration program before defining a NetWorker client, NetWorker will backup your data using its default resource settings. For additional instructions, review the information in this chapter, and the Legato NetWorker Administrator's Guide.

This chapter contains the following sections:

- [“Configuration Roadmap” on page 29](#)
- [“Backup Groups” on page 30](#)
- [“Volume Pools” on page 32](#)
- [“Specifying Browse and Retention Policies” on page 40](#)
- [“Coordinating Scheduled Backups” on page 41](#)
- [“Configuring a Database Server as a NetWorker Backup Client” on page 44](#)
- [“Storage Nodes and Remote Devices” on page 47](#)

Configuration Roadmap

To configure a NetWorker server to back up an Informix server, follow this roadmap:

1. Create a backup group specific to Informix databases. See [“Backup Groups” on page 30](#) for details.

2. Define the volume pools for Informix backups. See [“Volume Pools” on page 32](#) for details.
3. Specify a browse and retention policy. See [“Specifying Browse and Retention Policies” on page 40](#) for details.
4. Ceate or choose a backup schedule. See [“Coordinating Scheduled Backups” on page 41](#) for details.
5. Configure a client for each Informix server that requires backup and recover services. See [“Configuring a Database Server as a NetWorker Backup Client” on page 44](#) for details.
6. Configure each of your storage or remote devices, see [“Storage Nodes and Remote Devices” on page 47](#).

3

Backup Groups

NetWorker backup groups are used to specify the time of a client’s scheduled backup. Data backed up for a NetWorker group can be written to a specific set of media or combined with backup data from other groups. You can assign one or more online databases to a NetWorker backup group.

NetWorker groups enable you to distribute backups and perform scheduled backups when performance demands on your database and NetWorker server are low.

NetWorker software provides a preconfigured group named Default. To ensure that all data is backed up, NetWorker automatically adds all specified client resources to this default group.

Default Group Settings

The default group has the following attributes:

- Autostart = Disabled
- Start time = 3:33 a.m.
- Client retries = 0
- Clones = No
- Clone pool = Default Clone

You can modify the Default group’s attributes, but you cannot delete Default from the list of NetWorker groups.

Assigning Groups

To assign an Informix database server to another group with different attributes, use the NetWorker Administrator program to create a new group. You should create a new group before defining the Informix database server as a NetWorker client.

To create a group for Informix clients:

1. Create a new group with a valid name, such as InformixGroup.
2. Select Manage Clients and create a new client.
3. Associate the client with an appropriate group.
4. In the Remote tab, enter **nsrdbmi** in the Backup command field.

Customizing NetWorker Module Backup Groups

If a large number of Informix databases reside on the network, you can use the following configuration options to reduce network traffic and the load placed on the NetWorker server:

- Create backup groups with different start times. You can have any number of backup groups configured on your NetWorker server.
- Choose start times when the traffic on the network is at its lowest, such as in the evening or on weekends.
- Schedule the start times for each group far enough apart to ensure that one group completes its backup before the next group begins.

For further details on setting up a backup group, refer to the *Legato NetWorker Administrator's Guide*.



Important: Always enable the Autostart option for each group you configure, otherwise the group's scheduled backup will not occur.

Printer Configuration

To send a copy of the NetWorker server's bootstrap notification report to a specific printer, enter the name of the designated printer in the Printer attribute for the group.

To locate the printer attribute for the group, use Expert Mode. Refer to the *Legato NetWorker Administrator's Guide* for details on how to use Expert Mode.

Volume Pools

With NetWorker, you can direct backups to groups of media called pools. A volume pool is an assigned collection of storage volumes that NetWorker uses to sort and store data. Pools enable you to establish a logical and systematic method for tracking, organizing, and sorting backed-up data.

The configuration settings for each pool act as a filter that informs NetWorker of the type of data each volume will receive for storage. NetWorker uses pools together with label templates to track data associated with a specific volume.

3

NetWorker Pool Types

Volume pools provide the ability to segregate backed-up data, such as dbspaces, blobspaces, logical log files and file system data to different sets of media.

When you configure the NetWorker server to perform storage management services for the Informix database server, you can create additional pools to sort data by pool type. The pool type indicates whether the volume contains data that has been archived, backed-up, or migrated.

For NetWorker Module for Informix, there are only two valid pool types:

- Backup
- Backup clone

How NetWorker Uses Volume Pools

How a volume pool is configured determines which volumes receive which data. Each pool configuration contains a list of criteria that the data must meet for it to be written to the associated volume.

When a NetWorker Module for Informix backup occurs:

1. NetWorker sends the Online database data to the pool defined in the associated *nsrdbmi.bat* file (Windows NT) or the **nsrdbmi** script (UNIX), where DBMIData is the default for dbspaces and DBMILogs is the default for log files.

2. NetWorker then checks whether the correctly labeled volume is mounted on a storage device.
- If the appropriate volume is not mounted, NetWorker sends a request for the appropriate volume to be mounted.
- If a correctly labeled volume is mounted, NetWorker writes the backed-up data to a volume in that pool.

Sorting Backed-Up Data to Specific Storage Volumes

NetWorker uses the choices you selected when you configured your Volume Pools, to sort backed-up data to specific storage volumes labelled for the pool.

You can sort data by pool type with any combination of the following criteria:

- Object type (only with NetWorker Module)
- Group (backup group)
- NetWorker client (Informix database server)
- Backup level (full, incremental, manual)
- Save set (dbspaces and log files)

With NetWorker Module for Informix, you can use pools to separate your dbspaces, blobspaces, and logical logs from your other filesystem data. By default, NetWorker Module uses the following pools to sort your dbobject backups:

- DBMIData
- DBMILogs

Using the Default Volume Pools for Informix Database Backups

As part of the installation process, NetWorker Module for Informix creates two volume pools and their associated label templates on the NetWorker server. As part of the configuration process, the associated group and client are automatically assigned to the appropriate pool:

- DBMIData - pool and label template for selected dbspace and whole system backups
- DBMILogs - pool and label template for logical-log backups

By default, NetWorker Module for Informix installs the two volume pools, DBMIData and DBMILogs, so you can keep your dbspace and logical log backups separate from your other filesystem data.

Using Custom NetWorker Volume Pools for Informix Database Backups

When the NetWorker XBSA environment variables *NSR_DATA_VOLUME_POOL* and *NSR_LOG_VOLUME_POOL* have assigned values, NetWorker Module sorts your dbspace and logical-log backups by object type to direct the data to the appropriate volume pool.

Directing Your dbobjects to the Same Pool as Your Filesystem Data

To direct your dbspace and logical log backups to the same pool as other filesystem data, open the *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX) and delete the values assigned to the following NetWorker XBSA environment variables:

```
NSR_DATA_VOLUME_POOL  
NSR_LOG_VOLUME_POOL
```

For more information on modifying pool variables, see [“Step 3: Modify the Pool Variables in the nsrdbmi Backup File” on page 39](#).

Directing Your dbspace and Logical Log to Specific Volume Pools

If you have an entire department’s filesystem data in the same NetWorker group, you can include your dbspace and logical log backups in the same group. During a scheduled backup, NetWorker directs all the data in the group to its associated volume pool.

To direct dbspace and logical log backups to specific volume pools:

1. Open the *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX) and delete the values assigned to the following NetWorker XBSA environment variables:

```
NSR_DATA_VOLUME_POOL  
NSR_LOG_VOLUME_POOL
```

Refer to [“Step 3: Modify the Pool Variables in the nsrdbmi Backup File” on page 39](#) for details.

1. Use the Group or Client Criteria to direct dbspace and logical log backups to specific volume pools.

Refer to your *Legato NetWorker Administrator’s Guide* for the criteria NetWorker uses to sort backup data to specific volume pools.

Choosing a Custom Volume Pool for Continuous Logical Log Backups

To have ON-Bar back up logical logs automatically as they become full, modify the automatic log backup script **log_full.sh** (UNIX) or **log_full.bat** (Windows NT) on the system running OnLine Dynamic Server to include the following lines.

For UNIX:

```
NSR_LOG_VOLUME_POOL=DBMLogs
NSR_SERVER = networker_servername
export NSR_LOG_VOLUME_POOL
export NSR_SERVER
```

For Windows NT:

```
set NSR_LOG_VOLUME_POOL=DBMLogs
set NSR_SERVER = networker_servername
```

If you customize a pool for logfile backups, replace DBMILogs with the name of the customized pool.

Performing Continuous Logical Log Backups

By default, ON-Bar is configured to automatically perform a backup of logical logs once the log file is filled. After the log file is successfully backed up, ON-Bar closes the file, frees the space used by the file, and opens a new file for transaction logging. Log file backups are always performed as a level full (ON-Bar level 0).



Important: For continuous log backups, Informix recommends dedicating a backup device to the logical log backup process. This ensures that a device on the backup server is always available to receive logical log data.

Before attempting to customize pools for your dbspace and logical-log backups, try using the DBMIData and DBMILogs pools first. See the following sections for more information:

- To create a database server as a NetWorker client, see [“Creating an Informix Client Resource” on page 45](#).
- To use regular NetWorker volume pools and not the DBMIData and DBMILogs pools, see [“Directing Your dbspace and Logical Log to Specific Volume Pools” on page 34](#).

Customizing Volume Pools for Informix Database Backups

You can customize the DBMIData and DBMILogs pools like regular NetWorker pools, to suit your environment. For example, you can sort your data by department, the type of database maintained, or the level of backup.

To customize volume pools and label templates for Informix data follow the steps listed below:

1. [“Step 1: Create a Custom Label Template” on page 36](#) details how to create custom label templates for your dbspace and logical log backups.
2. [“Step 2: Create a Custom Volume Pool” on page 38](#) tells you how to create custom volume pools for your dbspace and logical log backups.
3. [“Step 3: Modify the Pool Variables in the nsrdbmi Backup File” on page 39](#) guides you through modifying the values assigned to the NetWorker XBSA variables `NSR_DATA_VOLUME_POOL` and `NSR_LOG_VOLUME_POOL`, and adding your new pool names to the `nsrdbmi.bat` batch file (Windows NT) or the `nsrdbmi` script (UNIX).

[“Creating an Informix Client Resource” on page 45](#) gives instructions for entering the name of the `nsrdbmi.bat` batch file (Windows NT) or the `nsrdbmi` script (UNIX) in the Backup command field in the Client Resource for the appropriate database instance.

When you apply the configuration, NetWorker adds the pool to its list of volume resources and to the choices available for labeling volumes. When you select a pool for labeling volumes, NetWorker uses the label template you created and assigned to the pool to display the next label available in the series.

Step 1: Create a Custom Label Template

Before customizing a volume template, you must create a new label template and associate it with the appropriate volume pool in the pool resource; otherwise, NetWorker generates a label template using the pool name.

NetWorker generates labels for volumes according to the label template rules, configured on the NetWorker server.

To add a new label template resource:

1. Create a name for the label template.
 - The label template’s name can contain *only* alphanumeric characters.
 - NetWorker does not allow the following characters in a label template’s name: `/ \ * [] $! ^ ' ; ' ~ < > & | { }`

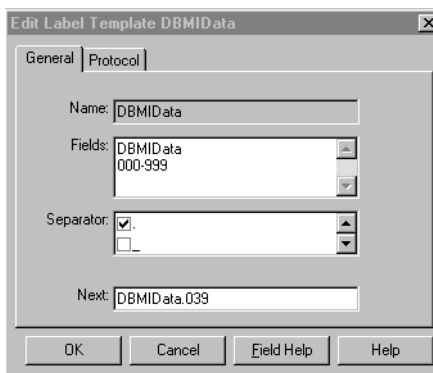
- NetWorker displays an invalid character message if you attempt to save a configuration containing a field separator in the label template name.
2. Specify the fields to use in the label. The order in which you enter the fields determines the order of the fields in the label templates.
 3. Provide the alphabetic or numeric range for the volumes.
 4. Select a separator to use between the fields. The following characters are reserved for use as field separators:
 - colon (;)
 - dash (-)
 - period (.)
 - underscore (_)

When the configuration is applied:

- NetWorker displays the label to apply to the next volume in the pool associated with the label.
- The label template is added to the label template selections that are available for NetWorker volume pools. [Figure 7](#) illustrates the label template resource on a NetWorker server.

Refer to the *Legato NetWorker Administrator's Guide* for complete instructions on using NetWorker label templates and labeling and mounting backup volumes.

Figure 7. Label Template Dialog Box



Step 2: Create a Custom Volume Pool

The NetWorker Module default configuration for volume pools is DBMIData, for dbspaces and blobspaces, and DBMILogs, for logical log files associated with the dbspace or blobspace backed up.

To create a customized volume pool for Informix database data on a NetWorker server:

1. Use a valid pool name as the entry for Name, for example:

InformixData

2. Select a Pool Type. NetWorker Module for Informix only supports "Backup" or "Backup clone" pools.
3. Select a customized Label Template or accept the one NetWorker generates, for example:

InformixData

4. Select a backup group that is unique for Informix as the choice for Groups.
5. Select a backup device from the Devices available.
6. In the Save Set field, specify the pool name.

- To backup an *instance* of all dbobjects for your database server, delete the choice "All" from the scrolling list and enter the OnLine instance name. The entry shown in the example is the equivalent of performing an **onbar -b -L <level>** on the "venus" instance:
- INFORMIX:/venus
- To backup a *selected-dbobject* for the database server instance, include the dbspace or blobspace name in the save set string. You can specify more than one dbobject by making a separate save set entry for each dbobject. The entry shown in the example is the equivalent of performing an **onbar -b -L <level> dbspace01** on the "venus" instance:

INFORMIX:/venus/dbspace01

7. Specify the level of backup for the pool, as the selection for levels.
8. Select Yes as the choice for Store Index Entries.
9. Select Yes for Enabled.
10. Save the Pool configuration.
11. Insert new media, or select another drive/slot with media available for labeling.

Step 3: Modify the Pool Variables in the nsrdbmi Backup File

To use a custom volume pool for backups of Informix database and logical log files, you must include the new values for the associated NetWorker Module pool variables in the *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX):

- NSR_DATA_VOLUME_POOL
- NSR_LOG_VOLUME_POOL

ON-Bar uses the NetWorker Module pool variables specified in the *nsrdbmi* script during backup and restore sessions. For more information, see [“How NetWorker Module for Informix Backs Up Data”](#) on page 17.

The following procedure uses DBMIacctData and DBMIacctLogs as the new pool names. When modifying the *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX), substitute your new pool's names.

To modify the pools variables in the backup *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX):

1. Copy the *nsrdbmi.bat* batch file (Windows NT) or the *nsrdbmi* script (UNIX) and give it a new name. For example, *nsr_acct.bat* (Windows NT) and *nsr_acct* (UNIX).
 - Begin the new file name with “*nsr*” or “*save*”.
 - For Windows NT, assign the new file a *.bat* extension. If you do not assign the *.bat* extension, the file will not run correctly during a scheduled backup.

2. Open the new backup file in a text editor and modify the NetWorker XBSA pool variables to use your new pool names. For example:

```
NSR_DATA_VOLUME_POOL=DBMIacctData
```

```
NSR_LOG_VOLUME_POOL=DBMIacctLogs
```

3. Save the changes.
4. In the client resource of the database server instance, enter the new backup file name in the Backup command text box, for example:
 - *nsr_acct.bat* for Windows NT
 - *nsr_acct* for UNIX
5. Run a test backup after making any pool configuration changes to ensure your backups are directed to the appropriate pools.
6. Use the Start Now feature in the Group Control window to start a scheduled backup immediately.

7. Configure your database server as a NetWorker client. For instructions, see [“Configuring a Database Server as a NetWorker Backup Client” on page 44.](#)

For complete instructions on creating NetWorker pools, refer to your *Legato NetWorker Administrator’s Guide*.

Specifying Browse and Retention Policies

To manage and reduce the size of online indexes, NetWorker uses *browse policies* for client index entries and *retention policies* for media database entries. The client resource has a default browse policy of one Month and a default retention policy of one Year.

You may choose one of the preconfigured policies or create policies on your own. A policy can be used as either a browse or a retention policy.

The browse policy determines how long the client file index maintains a browsable entry. After a browse policy expires, you must use the **scanner** program to rebuild the on-line indexes.

The retention policy determines how long the save set information is stored in the media database and how long the files remain retrievable from the backup volume. After all the retention policies for the save sets on a volume and other dependent save sets expire, the volume is given a status of recyclable. Until the volume is relabeled, you can use the **scanner** command to extract a save set from a volume and rebuild the online indexes.

Preconfigured NetWorker Policies

With NetWorker, you can customize your own browse or retention policy. Any policy can be used as either a browse or retention policy.

NetWorker provides the following preconfigured policies, shown in [Table 2](#).

Table 2. NetWorker Preconfigured Policies

Policy Name	NetWorker Behavior
Decade	Available for 10 years
Half Year	Available for 6 months

Table 2. NetWorker Preconfigured Policies

Policy Name	NetWorker Behavior
Month	Available for 1 month
Week	Available for 1 week
Year	Available for 1 year

To manage indexes manually, refer to “Manually Managing the Online Indexes” in the Legato NetWorker Administrator’s Guide.

Browse and Retention Policies Guidelines

Consider the following guidelines when assigning browse and retention policies:

- To restore Informix database files, ON-Bar requires both the NetWorker client index entries and the media database.
- To retain client indexes, always set the browse policy to an appropriate period of time.
- Keep copies of logical log file backups until the associated database file save sets have exceeded their browse policy.

Coordinating Scheduled Backups

To coordinate scheduled backup processes between NetWorker, NetWorker Module for Informix, and ON-Bar, a backup file must be installed in the same directory as the NetWorker executables. This backup file must be configured correctly in order for the scheduled backups to run.

To perform a scheduled backup, correctly configure the **nsrdbmi.bat** batch file (Windows NT) or the *nsrdbmi* script (UNIX) on each client. The backup script calls ON-Bar to run NetWorker Module for Informix backups.

Customizing the nsrdbmi Backup File

To customize your backup file:

- Set the environment variables in the **nsrdbmi.bat** batch file (Windows NT) or the *nsrdbmi* script (UNIX). The environmental variable settings are specific to NetWorker Module for Informix, and are used by ON-Bar during backup and restore sessions.

The syntax for this entry is:

- Values are always in lowercase.
- Values containing spaces must be contained in quotes.
- Uncomment all environment variables you want to use in your backup.

For example:

For UNIX:

```
environmental_variable = value  
export environmental_variable
```

For Windows NT:

```
set environmental_variable = value
```

- Specify the path where Informix resides.
ON-Bar does not pass the PATH environment variable to the NetWorker server. The syntax for this entry is:

For UNIX:

```
INFORMIXDIR=Informix_Path
```

For Windows NT:

```
SET INFORMIXDIR=Informix_Path
```

- Specify the path where the ON-Bar executable and the NetWorker **mminfo** command reside.

The **nsrexecd** does not pass the PATH environment variable to NetWorker Module for Informix. The syntax for this entry is:

For UNIX:

```
PATH=ON-Bar_executable_path;mminfo_path
```

For Windows NT:

```
SET PATH=ON-Bar_executable_path;mminfo_path
```

- Ensure that the filename of any batch file begins with either the “nsr” or “save” prefix, as in:
 - nsrinfrmix
 - saveinfrmix

Default Setting for the *nsrdbmi* Script

The default settings for the **nsrdbmi.bat** batch file (Windows NT) or the *nsrdbmi* script (UNIX) are listed below:

Note: this example shows Windows NT settings. For UNIX, do not use SET at the start of the lines.

```
SET PRECMD=
SET POSTCMD=
SET NSR_DATA_VOLUME_POOL=DBMIData
SET DO_LOGFILE_BACKUPS=YES
SET NSR_LOG_VOLUME_POOL=DBMILogs
SET NSR_COMPRESSION=FALSE
SET INFORMIXDIR=/usr/informix
SET ONCONFIG=ONCONFIG
SET PATH=$INFORMIXDIR/bin;/nsr/bin;$PATH
```

Requirements for Scheduled Backup

To run a scheduled backup:

- The Backup Command that you enter in the associated client resource file on the NetWorker server must be consistent with the filename given to the *nsrdbmi* backup file.

To set up an Informix Client Resource, see [“Creating an Informix Client Resource” on page 45](#) for details.

- The backup file (*nsrdbmi* script) must reside in the same directory as the NetWorker **save** command, for example:

/nsr/bin

Modify only copies of the original *nsrdbmi* backup file as you might want to reinstate the NetWorker Module for Informix default settings.

The original *nsrdbmi* backup file resides on the NetWorker Module CD-ROM.

- A copy of the *nsrdbmi* backup file is available on the NetWorker Module CD-ROM.
- If you downloaded NetWorker Module from *www.legato.com*, be sure to make a copy of the original *nsrdbmi* backup file.

Once all of the criteria for a *nsrdbmi* backup file have been met and the server is appropriately configured, perform a test backup before implementing it into your regular backup schedule.

- To perform a test backup, see [“Testing Scheduled Backups” on page 50](#).
- For a list of valid NetWorker environment variables and valid values, see [“Appendix A: XBSA Environment Variables” on page 93](#).

Sending E-mail Notification of the Results of a Scheduled Backup

To send an e-mail notification of the results of a scheduled backup to the owner of a save set:

1. Use the View Details option to edit the NetWorker client resource for the database server instance.
2. Edit the Owner Notification attribute and enter a notification command directed to the appropriate login ID.

For details on configuring a client, refer to the *Legato NetWorker Administrator's Guide*.

Configuring a Database Server as a NetWorker Backup Client

NetWorker uses a client/server model to provide storage management services. At least one system on the network must be designated as the NetWorker server. Systems containing data to be backed-up must be configured as clients of the NetWorker server.

A NetWorker client resource resides on the NetWorker server and describes the specific attributes assigned to a NetWorker client. This client resource provides the server with backup instructions, including the:

- Backup group to which the client belongs
- Client's save set
- Backup schedule
- Length of time to maintain entries in the online index for recovery
- Length of time to retain the volume entries in the media index

Configure NetWorker clients using the Clients Resource provided by the NetWorker Administrator program. The NetWorker server uses information contained in a client's resource during backup and restore sessions.

Creating an Informix Client Resource

To configure a system running Dynamic Server or Workgroup Edition as a NetWorker client:

1. Create a backup group following the instructions provided in [“Customizing NetWorker Module Backup Groups” on page 31.](#)
2. Create a customized backup schedule using the backup levels listed in [Table 3.](#)

Table 3. NetWorker and ON-Bar Backup Levels

ON-Bar	NetWorker	Amount of Data Backed Up
0	full	All pages containing data for the instance listed in the save set entry
1	1	Pages that have changed since the last level full backup
2	2	Pages that have changed since the last level 1 backup
skip	skip	Skip the scheduled backup

3. Create a NetWorker client using the hostname of the system running Dynamic Server or Workgroup Edition Server.
4. Specify a save set in the Save Set field. Use one of the following formats:

To backup an *instance* of all dbobjects for your database server:

- a. Delete the choice *All* from the scrolling list.
- b. Enter the Informix database server name.

The entry shown in the example is the equivalent of performing an **onbar -b -L <level>** on the “venus” instance:

```
INFORMIX:/venus
```

To backup a *selected-dboject* for the database server instance:

- Include the dbspace or blobspace name in the save set string.
- To specify more than one dbobject, make a separate save set entry for each dbobject.

The entry shown in the example is the equivalent of performing an **onbar -b -L <level> dbspace01** on the “venus” instance:

INFORMIX: /venus/dbspace01

- a. Select a Group.
 - b. Select a Schedule.
 - c. Leave the attribute for Directive blank.
 - d. Select a Browse Policy.
 - e. Select a Retention Policy.
 - f. In the Preferences tab, enter all known aliases in the Aliases field for the system where Dynamic Server software is installed.
5. In the Remote tab, enter the name of the backup file, *nsrdbmi.bat* for Windows NT or the *nsrdbmi* script for UNIX, for the Backup Command. The backup file indicates to the NetWorker server:
- The location of Informix database files on the client's system.
 - The type of backup to perform on a client's database files.



Important: If the backup file *nsrdbmi.bat* is not entered for the Backup Command, a standard NetWorker **save** will be performed. A database that has been backed-up with NetWorker **save** cannot be recovered using ON-Bar. If a client attempts to restore a database file that was backed-up with NetWorker **save**, using ON-Bar, the restore will fail.

6. For Windows NT clients only, enter *informix* as the remote user and then enter the appropriate password.
7. Leave the attributes for Remote Access blank.
8. Select Ok to save the client resource.

For details about the types of backups supported by ON-Bar, refer to the *Informix Backup and Restore Guide* included with your database server software.

Setting Up Multiple Instances of Your Database Server

To set up multiple instances of your database server:

1. Create a customized copy of the *nsrdbmi.bat* file for Windows NT or the *nsrdbmi* script for UNIX.
2. Change the value assigned to ONCONFIG to reflect the value assigned for the instance.

For details on configuring a client, refer to the *Legato NetWorker Administrator's Guide*.

Storage Nodes and Remote Devices

This section describes how to install and configure storage nodes and remote devices.

What is a Storage Node

A storage node is a computer that is connected to a NetWorker server, with one or more of its devices distributed across multiple systems. Storage nodes are used in the NetWorker backup, archive, and Hierarchical Storage Management (HSM) operations.

Storage nodes you add to your NetWorker configuration can increase the NetWorker servers's performance, give you more flexibility in designing your network, and centralize the control of data management activities to one or a few NetWorker servers.

A storage node runs special NetWorker software that controls remote devices.

3

What is a Remote Device

Devices attached to storage nodes are called remote devices because they are not physically attached to the controlling NetWorker server. The data stored on media in remote devices is tracked in the media database and online client file indexes on the controlling NetWorker server.

You can control most operations on local and remote devices, including autochangers and silos, from the NetWorker Administration program. For some remote autochanger operations, such as reset, you must use the **nsrjb** command or the **jb_config** program on the storage node system.

Configuring a Storage Node



Important: To convert an existing NetWorker server to a storage node, you must merge its resource database, media database, and client file indexes with the corresponding databases on the system controlling the NetWorker server.

To configure a storage node:

1. Install the storage node binaries from the NetWorker software distribution on the storage node computer.
2. Define the storage node's devices. The storage node's hostname is automatically added to the Administrator list in the Server resource when you add a storage node device.
3. For an autochanger or silo, define the devices in the **jbconfig** program, and manually add them to the storage node's hostname in the Administrator list.

After the storage node's hostname is added to the Administrator list, one instance of **nrsmmmd** begins on the storage node for each device that it controls.

Configuring a Remote Device

You configure remote stand-alone devices with the controlling NetWorker server the same way you configure a stand-alone device that is connected to the NetWorker server.

To configure a remote device, add the following prefix to the beginning of the storage node's host name:

rd=

For example, *rd=omega:/dev/rmt/1mbn* creates a device called */dev/rmt/1mbn* on a storage node computer called *omega*. For specific instructions, see the online help for configuring devices.

Configuring a Remote Autochanger and Silo

To configure a remote autochanger or silo device:

1. Verify that the storage node is listed in the Administrator attribute in the Server resource of the controlling server, in the form *root@hostname*, where *hostname* is the hostname of the storage node.
2. Run the **jbconfig** program on the storage node system to define each device in the autochanger or silo.

For more information on the **jbconfig** program, refer to the following sources:

- **jbconfig** man page
- *Legato NetWorker Administrator's Guide*

Chapter 4: Performing Scheduled Backups

Before using NetWorker Module for Informix, ensure that regular NetWorker filesystem backups are being completed successfully. Once the appropriate NetWorker server configuration is in place, NetWorker Module for Informix can be used to perform Informix backups.

NetWorker Module translates ON-Bar backup levels to valid NetWorker levels.



Important: NetWorker ships with several preconfigured schedules for use in backing up filesystems. These schedules support backup levels not available with ON-Bar, which means you must customize a schedule for your database server backups.

This chapter contains the following sections:

- [“Using Backup Schedules” on page 49](#)
- [“Testing Scheduled Backups” on page 50](#)
- [“Monitoring Backups” on page 52](#)

Using Backup Schedules

To schedule a backup:

1. Create a schedule for your database server backups using the information provided in [Table 3 on page 45](#).
2. Schedule a backup. For details, refer to the *Legato NetWorker Administrator's Guide*.

For example, some clients may require data backup at level “full” every three days with incremental backups in between. Other clients may have less critical data that only require a full backup once a month with incremental backups on other days.



Important: ON-Bar does not support NetWorker’s incremental backup level. If you use a value other than those listed for NetWorker in [Table 3 on page 45](#), the backup will fail and generate the error message “Only level 0 (full), 1, or 2 backups allowed.”

Testing Scheduled Backups

Once the NetWorker server is correctly configured for scheduled Informix backups, run a test of the scheduled Informix backup.

Testing on Windows NT

To test a scheduled backup:

1. Log on as Administrator on the NetWorker server.
2. Run the NetWorker Administrator GUI on the NetWorker server.

For information on running the NetWorker Administrator GUI, refer to the Legato NetWorker Administrator’s Guide, included with the NetWorker server software.

3. Select the Configure tab of the Server window to make the Configure window active.
4. Select Manage Groups to open the Groups window.
5. Right-click on the group to back up and select Start from the menu. Alternatively, highlight the Group from the Operations menu, select Start Group.

NetWorker immediately backs up the clients in the group, displaying a “clock” icon. When the backup is complete, the clock icon changes to one of the following icons:

- “!” - the backup completed with no errors
- “X” - the backup completed with errors
- “Open hand” - the backup was interrupted

Testing on UNIX

To test a scheduled backup:

1. Log on as *root* on the NetWorker server.
2. Run the NetWorker Administrator GUI on the NetWorker server.

For information on running the NetWorker Administrator GUI, refer to the Legato NetWorker Administrator’s Guide, included with the NetWorker server software.
3. In the main NetWorker Administrator window, open the Group Control window, either by choosing Group Control from the Server menu or by clicking the Group Control button.
4. In the Group Control window, highlight the correct Group name for the scheduled backup and click Start.
5. When the Status of the selected group in the Group Control window changes to Finished, the scheduled backup is complete. An e-mail Savegroup Completion message will provide a report of the scheduled backup.

Once a successful backup has been performed, a restore should then be attempted. For details, see [“Chapter 6: Performing Database Recoveries” on page 65](#).

Monitoring Backups

You can monitor a backup from either the Informix database server or the NetWorker server.

Monitoring Backups from the Informix Database Server

You may use the ON-Bar activity log to monitor a restore. As ON-Bar backs up and restores data, it periodically writes to the ON-Bar activity log. When ON-Bar encounters an error or a warning condition, it writes a message to the activity log. The activity log also documents which storage spaces and logical logs were included in a backup or restore operation and approximately how long the operation took.

Use the information in the activity log to determine whether a backup or restore operation succeeded. You may specify the location of the activity log in the `BAR_ACT_LOG` configuration parameter or use the default location:

```
/tmp/bar_act.log
```

Monitoring Backups from the NetWorker Server

NetWorker displays messages in the NetWorker Administration program for each database file backed up. This allows you to monitor the progress of a backup. After a backup is complete, a Backup Completed message displays.

If the backup is taking a long time and no new messages appear in the status window, this might indicate that either the database being backed up is very large, or that there is no backup volume mounted on the server.

To verify that a backup volume is mounted, check the pending box in the NetWorker Administration program.

NetWorker provides several reports about the results of a backup:

- An e-mail “savegroup completion” notice upon completion of a scheduled backup. You can edit the notification setup for this report, using the Customize feature of the NetWorker Administration program (UNIX NetWorker servers only). Refer to your *Legato NetWorker Administrator's Guide* for details on using the NetWorker Administrator to customize your notifications.
- A series of messages written to the NetWorker message log files. For more information about NetWorker and NetWorker XBSA messages, see [“Appendix A: XBSA Environment Variables” on page 93](#).

- A scrolling list of messages displayed in the main window of the NetWorker administrative graphical interface, such as:

```
Mon 11:56:00 media event cleared: backup to pool
'DBMIData' waiting for 1 writable backup disk or tape

Mon 11:56:39 mars:INFORMIX:/venus/dbspace01 saving to pool
'DBMIData' (DBMIData.001)

Mon 11:59:15 mars:INFORMIX:/venus/dbspace01 done saving to
pool 'DBMIData' (DBMIData.001)
```

- A scrolling list of messages displayed in the NetWorker Administrator Group Control. These messages are displayed in three lists:
 - Pending save sets
 - Completed save sets
 - Failed save sets

You have the option of printing a columnar version of the details displayed in the Group Control window.

- A printout of the NetWorker server's bootstrap file for the backup session, showing the:
 - Date
 - Time
 - Level
 - Save set ID
 - File position in the save set entry
 - Volume(s) to which the save sets were written (the last entry is for the backup of the server's bootstrap file):

```
August 26 01:30 1998 mars's bootstrap information
date   time      level ssid  file record volume
8/26/9811:59:15 full 16540 10   venus.DBMIData.001
8/26/9812:02:39 full 16564 10   venus.DBMILogs.001
8/26/9812:05:44 full 16566 10   venus.001
```

The completion reports do not show information distinguishing individual dbobject names.

To view the NetWorker server's index entries for dbobjects backed-up for a database server instance, use the **nsrinfo** command:

```
nsrinfo -s jupiter -n informix -X informix mars scanning
client `mars' for all savetimes

/venus/rootdbs/0, rootdbs, 1.2 MB, Mon Aug 26 12:05:44
1998, full

/venus/01/29, logical log, 123 KB, Mon Aug 26 12:02:39
1998, full

/venus/dbspace01/0, dbspace, 9.3 MB, Mon Aug 26
11:59:15 1998, full

3 objects found
```

In this example, NetWorker XBSA translates the dbobject's instance name, dbspace name, and level specification in the client file index entry. The last field in the client file index indicates the backup level, in this case level 0.

The entry appears in the client file index as follows:

```
/venus:/venus/dbspace01/0
```

NetWorker XBSA also translates the instance name and creates the save set name in the media database entry as follows:

```
INFORMIX:/venus
```

For complete information on using the **nsrinfo** command, refer to the following sources:

- **nsrinfo** man page (UNIX servers)
- *Legato NetWorker Administrator's Guide*

To determine which backup or restore action occurred on database objects in a database server instance, query the following ON-Bar catalog tables:

- **bar_action**
- **bar_object**

Refer to the documentation included with your database server software for details on querying catalog tables for information.

The *Legato NetWorker Administrator's Guide* provides complete details about the reports generated by NetWorker. For suggestions on using these reports as a part of your disaster recovery plan, refer to the *Legato NetWorker Disaster Recovery Guide* for details.

Chapter 5: Performing On-Demand Backups

This chapter describes how to use Legato NetWorker Module for Informix to backup Informix database and log files. Before you can perform a backup, each Informix server must be configured as a NetWorker client. See [“Configuring a Database Server as a NetWorker Backup Client” on page 44](#) for details.

The following topics are discussed in this chapter:

- [“Performing On-demand Backups Using ON-Bar” on page 55](#)
- [“Monitoring Backups” on page 61](#)

Performing On-demand Backups Using ON-Bar

ON-Bar connects to NetWorker through an XBSA API, which passes dbobjects through a shared library. When you set up a system running your database server as a client of the NetWorker server, several variable settings are configured and passed to ON-Bar by the parameter file (*nsrdbmi*), that is invoked during a scheduled backup.

Since the *nsrdbmi* file is not invoked during an on-demand NetWorker backup using ON-Bar, you must provide values for several NetWorker XBSA environment variables to ensure that NetWorker writes the backup to the appropriate volume pool.

To initiate on-demand backups of your database server, you can:

- Invoke ON-Bar from the command line interface
- Invoke ON-Bar from the Informix Enterprise Command Center (IECC)

Set the environment variables using the command-line interface.

For more information, see [“Required NetWorker XBSA Variables for On-demand Backups” on page 56](#).

To perform a whole-system backup, you must use the ON-Bar command line interface or the IECC.



Important: If you do not provide explicit settings for the required NetWorker XBSA variables, on-demand NetWorker backups default to the settings for a regular NetWorker filesystem backup. This means that the log files, dbspaces, and blobspaces might be directed to the NetWorker “Default” media pool. See [“Required NetWorker XBSA Variables for On-demand Backups” on page 56](#) for the NetWorker XBSA environment variable default settings.

During an on-demand backup, the NetWorker server makes an entry for each file in the online client file index and records the location of each save set in the online media database.

Required NetWorker XBSA Variables for On-demand Backups

During installation, NetWorker Module creates the following two volume pools on your NetWorker server for your dbspace and logical log backups:

- DBMIData
- DBMILogs

When you initiate an on-demand backup using ON-Bar, your dbspaces and logical logs are directed to these pools, just as they are during scheduled NetWorker backups.

If you created customized pools for your dbobjects:

- Make sure that the new pool names are also set in the NetWorker XBSA environment variables.
- Substitute the values shown for the NetWorker XBSA variables in the following example with the same ones you assigned for scheduled NetWorker backups of your database server, for example:

For UNIX:

```
NSR_SERVER=networker_servername
```

```
NSR_DATA_VOLUME_POOL=dbmidata_pool
```

```
NSR_LOG_VOLUME_POOL=dbmilog_pool
```

For Windows NT:

```
set NSR_SERVER=networker_servername
```



```
set NSR_DATA_VOLUME_POOL=dbmidata_pool
```

```
set NSR_LOG_VOLUME_POOL=dbmilog_pool
```

- If you leave the pool variables blank, NetWorker uses its pool settings for NetWorker filesystem backups. This means your dbspaces and logical log files might be directed to the NetWorker Default pool.
- When performing an on-demand backup, make sure that you mount the volumes from the appropriate pools on your storage devices.



Important: If you do not specify a value for the NetWorker XBSA variable `NSR_SERVER` before issuing an ON-Bar command, NetWorker searches the network for the correct server to use. Setting the `NSR_SERVER` variable helps avoid this potential delay in the backup process.

For information about the NetWorker XBSA environment variables and valid values, see [“Appendix A: XBSA Environment Variables” on page 93](#).

You must be logged in as *informix user* to use ON-Bar commands for on-demand NetWorker backups of your database server dbspaces, blobspaces, or logical log files.

On-Demand Backups from the Informix Command Line Utility

If you are using the Informix command line utility to initiate on-demand ON-Bar backups of your database server, you must modify your Windows NT system variables or the UNIX environment variables.

For UNIX:

```
NSR_SERVER=networker_servername
```

```
NSR_DATA_VOLUME_POOL=dbmidata_pool
```

```
NSR_LOG_VOLUME_POOL=dbmilog_pool
```

For Windows NT:

```
set NSR_SERVER=networker_servername
```

```
set NSR_DATA_VOLUME_POOL=dbmidata_pool
```

```
set NSR_LOG_VOLUME_POOL=dbmilog_pool
```

To modify the Windows NT system variables to include values for NSR_DEBUG_FILE and NSR_DEBUG_LEVEL:

1. Open the Windows NT Control Panel.
2. Double-click the System icon to open the System Properties dialog box.
3. Select the Environment tab to make the Environment dialog box active.
4. Add or modify the NetWorker XBSA variables from [Table 4](#) to the System variable list by entering the variable name in the Variable Name text box and the appropriate value in the Value text box.

Table 4. NetWorker XBSA Variables for Informix Command Line

Variable Name	Value
NSR_DEBUG_FILE	<i>\nsr\applogs\xbsa.messages</i>
NSR_DEBUG_LEVEL	5

5. Click Apply to add each modification to the System variable list.

During an on-demand backup, NetWorker uses these new system variables to direct your dbspaces and logical-log files to the appropriate volume pools.

On-demand Backups from the Informix Enterprise Command Center (IECC)

5

After you have installed and configured NetWorker Module for Informix, you can invoke ON-Bar from the IECC to perform on-demand NetWorker backups of your database server instances.

For NetWorker Module to connect to the IECC, you must direct your dbspace and logical log backups to custom volume pools. For details, see [“Required NetWorker XBSA Variables for On-demand Backups”](#) on page 56 .



Important: If you do not specify a value for the NetWorker XBSA variable NSR_SERVER, NetWorker searches the network for the correct server to use. Setting the NSR_SERVER variable helps avoid this potential delay in the backup process.

On-demand Backups and NetWorker Indexes

During a *scheduled* NetWorker backup, the server's **savegrp** program invokes a level 9 backup of the NetWorker server index and the server's bootstrap file when the backup completes.

When you perform an on-demand backup of your database server, the NetWorker server's bootstrap and the NetWorker server index for your database server are *not* backed-up.

If you *never* perform scheduled NetWorker backups, the NetWorker client file indexes and NetWorker server's bootstrap file are *not* backed-up for use in the event of a disaster.

The NetWorker server's index and bootstrap file are vital for restoring data to your database server in the event of a disaster. Performing regular, scheduled NetWorker backups of your database server provides maximum protection for your critical data.

Occasionally, you might need to perform an on-demand backup of your database server dbobjects by using the ON-Bar command-line interface or the ICC. After performing an on-demand backup, it is strongly recommended that you back up the NetWorker server's index and bootstrap.

Backing Up the NetWorker Server's Index and Bootstrap:

To back up NetWorker server's index and bootstrap, invoke the **savegrp** command from the NetWorker server command line, for example:

```
% savegrp -O -P printer_name -c client_name -s  
networker_servername
```

- The **-O** option indicates to **savegrp** to only backup the specified client's index and the associated NetWorker server's bootstrap.
- The **-P printer_name** option specifies the name of the printer to send the bootstrap information.
- The **-c client_name** specifies the hostname of the Informix server, whose index is to be backed up.
- The **-s networker_servername** specifies the hostname of the NetWorker server, whose bootstrap information is to be backed up.

Refer to the **savegrp** man page for a complete description of the **savegrp** command and command options.

Refer to the ON-Bar documentation provided with your database server for details on using ON-Bar commands, as well as backup strategy suggestions for protecting your database server data and the three critical Informix files.

Example of an On-demand Backup from the Command Line Interface

The commands shown in the following example:

- Perform a level 0 (NetWorker level full) backup of “dbspace01” on a database server instance named “venus”
- Back up all full logical log files associated with “dbspace01”
- Close the current logical log
- Back up the closed logical log
- Save the NetWorker sever index and bootstrap
- Save the three critical Informix files

A sample on-demand backup is:

```
set NSR_SERVER = spain
set NSR_DATA_VOLUME_POOL = DBMIData
set NSR_LOG_VOLUME_POOL = DBMILogs
set INFORMIXDIR = c:\informix
set ONCONFIG = ONCONFIG
onbar -b -L 0 dbspace01
onbar -l -c
savegrp -O -l full -P printer_name -c client_name
        group_name
save -s networker_server INFORMIXDIR\etc\ONCONFIG
INFORMIXDIR\etc\ixbar.server_number \
INFORMIXDIR\onconfig_servername.server_number
```

5

Performing Continuous Logical-log Backups

ON-Bar is configured, by default, to perform an automatic backup of logical logs once the log file is filled. After the log file is successfully backed-up, ON-Bar closes the file, frees the space used by the file, and opens a new file for transaction logging. Log file backups are always performed as a level full (ON-Bar level 0).



Important: For continuous log backups, Informix recommends dedicating a backup device to the logical log backup process. This ensures that a device on the backup server is always available to receive logical log data.

For information on performing a continuous logical log backup, see [“Choosing a Custom Volume Pool for Continuous Logical Log Backups”](#) on page 35.

Backing Up Informix Data in a Cluster Environment

To backup your Informix data in a cluster environment:

1. Install NetWorker Module for Informix on all physical nodes of the cluster. Use only the private disks on the nodes for the installation.

For details on installing NetWorker Module for Informix in a cluster environment, refer to the “Installation in a cluster Environment” section in the *NetWorker Module for Informix Installation Guide*.

2. Use Cluster Client Connections to backup a cluster client by changing the value assigned to NSR_CLIENT to the name of the virtual hostname associated with the Informix cluster service.

Monitoring Backups

You can monitor a backup from either the Informix database server or the NetWorker server.

Monitoring Backups from the Informix Database Server

You can use the On-Bar activity log to monitor a restore. As ON-Bar backs up and restores data, it periodically writes to the ON-Bar activity log. When ON-Bar encounters an error or a warning condition, it writes a message to the activity log. The activity log also documents which storage spaces and logical logs were included in a backup or restore operation and approximately how long the operation took.

Use the information in the activity log to determine whether a backup or restore operation succeeded. You can specify the location of the activity log in the BAR_ACT_LOG configuration parameter or use the default location:

```
/tmp/bar_act.log
```

Monitoring Backups from the NetWorker Server

NetWorker displays messages in the NetWorker Administration program for each database file backed up. This allows you to monitor the progress of a backup. After a backup is complete, a Backup Completed message displays.

If the backup is taking a long time and no new messages appear in the status window, this might indicate that either the database being backed up is very large, or that there is no backup volume mounted on the server.

To verify that a backup volume is mounted, check the pending box in the NetWorker Administration program.

To view the NetWorker server's index entries for dbobjects backed-up for a database server instance, use the **nsrinfo** command:

```
nsrinfo -s jupiter -n informix -X informix mars scanning
client `mars' for all savetimes

/venus/rootdbs/0, rootdbs, 1.2 MB, Mon Aug 26 12:05:44
1998, full

/venus/01/29, logical log, 123 KB, Mon Aug 26 12:02:39
1998, full

/venus/dbspace01/0, dbspace, 9.3 MB, Mon Aug 26 11:59:15
1998, full

3 objects found
```

In this example, NetWorker XBSA translates the dbject's instance name, dbspace name, and level specification in the client file index entry. The last field in the client file index indicates the backup level, in this case level 0.

The entry appears in the client file index as follows:

```
/venus:/venus/dbspace01/0
```

NetWorker XBSA also translates the instance name and creates the save set name in the media database entry as follows:

```
INFORMIX:/venus
```

For complete information on using the **nsrinfo** command, refer to the following sources:

- **nsrinfo** man page (UNIX servers)
- *Legato NetWorker Administrator's Guide*

To determine which backup or restore action occurred on database objects in a database server instance, query the following ON-Bar catalog tables:

- **bar_action**
- **bar_object**

Refer to the documentation included with your database server software for details on querying catalog tables for information.

The *Legato NetWorker Administrator's Guide* provides complete details about the reports generated by NetWorker. For suggestions on using these reports as a part of your disaster recovery plan, refer to the *Legato NetWorker Disaster Recovery Guide* for details.

Chapter 6: Performing Database Recoveries

In the event of data corruption or a disk crash, you can use NetWorker Module for Informix to restore data backed-up by NetWorker to your Informix server. With NetWorker Module, you can use the ON-Bar command-line interface or IECC to perform on-demand recovers of Informix database instances and individual database objects.

Use the information in this chapter in conjunction with the information contained in the following sources:

- *Informix Backup and Restore Guide*
- *Legato NetWorker Disaster Recovery Guide*
- **nsr_crash** Command Line Utility Help File (Windows NT servers)
- **nsr_crash** man page (UNIX servers)

This chapter contains the following sections:

- [“Configuring a Restore” on page 66](#)
- [“Restoring Data with ON-BAR” on page 66](#)
- [“Restoring Informix Data in a Cluster Environment” on page 68](#)
- [“Informix Dynamic Server Mode Restores” on page 68](#)
- [“Viewing the Index Entries” on page 69](#)
- [“Monitoring a Restore” on page 69](#)
- [“Performing an Imported Restore of a Dynamic Server” on page 70](#)

Configuring a Restore

NetWorker Module for Informix performs restores of Informix data based on the environment variable settings.

An example of a valid setting for an environment variable is:

On UNIX:

```
NSR_SERVER=bu_host
export NSR_SERVER
```

On Windows NT:

```
set NSR_SERVER=bu_host
```

The rules for setting the environment variables are:

- Option names are always lowercase.
- Values containing spaces must be in quotes.
- Uncomment all environment variables you will use in your backup.

Restoring Data with ON-BAR

ON-Bar commands can be used to restore data backed-up from a scheduled or on-demand NetWorker backup.

The shared XBSA library translates your database server instance names, passed by ON-Bar, into NetWorker save set names. These are retrieved from the NetWorker server's online client file index and restored to your database server.

Before performing a restore from either the ON-Bar command line interface or the ICC, verify that the following environment variables are set correctly:

- NSR_SERVER
- NSR_CLIENT



Important: If you do not specify a value for the NetWorker XBSA variable "NSR_SERVER" before issuing an ON-Bar command, NetWorker searches the network for the correct server to restore data from. Setting the NSR_SERVER variable helps avoid a potential delay in the restore process.

Types of Restores ON-BAR Can Perform

ON-Bar supports several types of database and dbobject restores from the backup media managed by NetWorker:

- **Physical Restore**—replaces lost or corrupted dbobjects from NetWorker backup media. A physical restore can be performed as a whole-system or selected-dbspace restore.

To perform a physical restore, use the following command:

```
set NSR_SERVER=networker_servername
set INFORMIXDIR=c:\informix
set ONCONFIG=ONCONFIG
onbar -r -p [dbspace_name]
```

- **Logical Restore**—recovers the server transactions made since the last dbobject backup, followed by a rolling forward of the logical log files backed-up for the dbobjects. If different backup sessions are involved, the log rolls forward transactions made since the backup time recorded for each dbobject restored.

To perform a logical restore, use the following command:

```
set NSR_SERVER=networker_servername
onbar -r -l
```

- **Combined Restore**—allows you to issue a single command to perform a physical restore immediately followed by a logical restore.

To perform a combined restore, use the following command:

```
set NSR_SERVER=networker_servername
onbar -r [dbspace_name]
```

- **Point-In-Time Restore**—involves performing a whole-system, physical restore of your database server data from a whole-system backup to a specified time instead of the default, which is the time of last your database server backup.

To perform a point-in-time restore, use the following command:

```
set NSR_SERVER=networker_servername
onbar -r -t time -w -p
```

Refer to your *Informix Backup and Restore Guide* for more information on using the **time** command.

Restoring Informix Data in a Cluster Environment

To restore your Informix data in a cluster environment, you must change the value assigned to `NSR_CLIENT` to the name of the virtual hostname associated with the Informix cluster service.

Informix Dynamic Server Mode Restores

You can perform restores with your database server in one of three modes: cold, warm, and mixed.

Cold Restore

A cold restore consists of a physical and logical restore of the critical dbspaces, then a physical and logical restore of the noncritical dbspaces. A cold restore is performed with the database server in offline mode. After a cold restore completes, your database server is left in quiescent mode.

A cold restore of selected dbspaces succeeds only if the critical dbspaces are included on the restore command line. Critical dbspaces are defined as the root dbspace and any dbspace containing either physical or logical logs. Refer to your *Informix Backup and Restore Guide* for details on performing cold restores of your database server.

Warm Restore

A warm restore consists of one or more physical restores, a closing and backup of the current logical log, followed by a logical-log restore. A warm restore is performed with the database server in online or quiescent mode.

Mixed Restore

A mixed restore consists of a cold restore of the critical dbspaces, with your database server in offline mode followed by a warm restore of noncritical dbspaces, with your database server in quiescent or online mode.

Using a mixed restore allows you to quickly recover critical dbspaces, plus any data to which users require immediate access. Once your database server is returned to quiescent mode, you can perform a warm restore of the other dbobjects.

Viewing the Index Entries

To view online client file index entries:

1. Select the Indexes button (UNIX) or tab (Windows NT) in the NetWorker Administrator program's main window.
2. Select an entry to view the details for. The detailed listing displayed for the entry selected shows the following information:
 - The save set ID assigned during a backup session
 - The number of files backed up, and size of the backup file
 - The date and level of the backup session

Monitoring a Restore

You can monitor a restore from either the NetWorker server or the Informix database server.

Monitoring Restores from the NetWorker Server

When a restore has begun, the Recover Status window is displayed. From here you can monitor the progress of a restore. It displays the time the restore began and the full path of each database file being recovered.

Monitoring Restores from Informix Database Server

You may use the On-Bar activity log to monitor a restore. As ON-Bar backs up and restores data, it periodically writes to the ON-Bar activity log. When ON-Bar encounters an error or a warning condition, it writes a message to the activity log. The activity log also documents which storage spaces and logical logs were included in a backup or restore operation and approximately how long the operation took.

You can use the information in the activity log to determine whether a backup or restore operation succeeded. You can specify the location of the activity log in the BAR_ACT_LOG configuration parameter or use the default location:

/tmp/bar_act.log

Performing an Imported Restore of a Dynamic Server

You can use the imported restore feature to transfer all of the data from one instance of Dynamic Server to the same instance on a foreign host. For example, you can restore objects to a different database server instance than the one it was backed up from. You can perform imported restores using either whole system (serial) or storage-space (parallel) backups. You must also use compatible versions of XBSA and NetWorker Module for Informix software for both operations.

You can use the imported restore feature under the following circumstances:

- Server upgrade
- Disaster recovery
- High Availability Data Replication (HDR) server synchronization

Use the following procedure if you need to perform an imported restore of your client files, and do not need to restore and rebuild the NetWorker server.

In order to perform an imported restore, you must first back up your database files on the original Dynamic Server, and then restore your files on your new Dynamic Server.

Backing Up Your Files on the Source Dynamic Server

To back up your files:

1. Set the following NSR environment variables:

- **NSR_SERVER** = *bu_server*
- **NSR_DATA_VOLUME_POOL** = *DBMIData*
- **NSR_LOG_VOLUME_POOL** = *DBMILogs*

2. Perform a full backup of the source database server, for example:

```
onbar -b -L 0
```

3. Back up copies of the following critical files located in the *\$INFORMIXDIR/etc* (UNIX) or *%INFORMIXDIR%\etc* (Windows NT) directory. You must restore these files when you perform an imported restore to another computer system.

For IDS, on Dynamic Server, copy the following files:

- *oncfg_source_dbservername.servernum*
- *ixbar.servernum*

On UNIX:

- `$ONCONFIG`
- `sqlhosts`

On Windows NT:

- `%ONCONFIG%`

Use **regedit** to copy the **sqlhosts** information from the source computer to the target computer. Use the following registry entry:

`HKEY_LOCAL_MACHINE/SOFTWARE/Informix/SQLHOSTS/...`

For an Extended Parallel Server, copy the following files:

- `onconfig.sourcecomputer`
- `Bixbar.hostname.servernum`

For all coserver numbers, copy the `oncfg` files

- `oncfg_source_dbservername.servernumber.coservernumber`
- `sqlhosts`
- `xcfg_sourcecomputer.servernumber`

Restoring Your Files on Your Target Dynamic Server

If your source *INFORMIXDIR* does not match your target *INFORMIXDIR*, you must create a symbolic link to recover the bootstrap from the source computer. For example, if *INFORMIXDIR* on your source computer is `/usr2/informix` and *INFORMIXDIR* on your target computer is `/usr/local/informix`, create the `/usr2` directory on the target computer and symbolic link as follows:

On UNIX:

```
mkdir /usr2
```

```
ln -s /usr/local/informix /usr2/informix
```

On Windows NT:

Create a shortcut from your source *INFORMIXDIR* to your target *INFORMIXDIR*. For information on creating a shortcut, see your operating system documentation.

For instructions on how to set up a new database, refer to your Dynamic Server *Administration Guide*.



Important: To perform an imported restore, you must use the same database server number on the target computer that was used on the source computer. You can change the database server name in an imported restore.

Make sure that you shut down the target database server before doing a restore.

For an IDS Dynamic Server, type:

```
onmode -ky
```

For an Extended Parallel Server, type:

```
xctl onmode -ky
```

To restore your files on your Target Dynamic Database Server:

1. Set up the target Dynamic Database Server with exactly the same disk layout as the one you are transferring the data from.
2. Install the NetWorker client software and install and enable NMI. Refer to the *Legato NetWorker Installation and Maintenance Guide* appropriate for your platform for detailed installation instructions.
3. Configure the following NSR environment variables, for example:
 - **NSR_CLIENT** = *source machine host name*
 - **NSR_SERVER** = *bu_server*
 - **NSR_DATA_VOLUME_POOL** = *same value in original database*
 - **NSR_LOG_VOLUME_POOL** = *same value in original database*
4. Enable remote access rights for the source Dynamic Server's client files and indexes on the NetWorker server:
 - a. Open the NetWorker Administration program.
 - b. In the Client window, select the hostname of the source Dynamic Server.
 - c. In the Remote Access list, add the hostname of your target Dynamic Server, for example:
**@tgt_dbservername*
 - d. Click the Apply button to apply the selections to the client resources.

5. Restore the following Informix critical files.

For IDS, on Dynamic Server:

- `$INFORMIXDIR/etc/oncfg_original_dbservername.servernum`
- `ixbar.servernum`
- `oncfg_source_dbservername.servernum`
- `ixbar.servernum`

For UNIX:

- `$ONCONFIG`
- `sqlhosts`

For Windows NT:

- `%ONCONFIG%`

Use **regedit** to copy the **sqlhosts** information from the source computer to the target computer. Use the following registry entry:

`HKEY_LOCAL_MACHINE/SOFTWARE/Informix/SQLHOSTS/...`

For an Extended Parallel Server:

- `onconfig.sourcecomputer`
- `Bixbar.hostname.servernum`

For all coserver numbers, copy the oncfg files

- `oncfg_source_dbservername.servernumber.coservernumber`
- `sqlhosts`
- `xcfg_sourcecomputer.servernumber`

6. Rename the `$INFORMIXDIR/etc/oncfg_original_dbservername.servernum` file and replace the source server name with the target server name, for example:

`$INFORMIXDIR/etc/oncfg_ol_tgt_dbservername.servernum`

7. Update the `sqlhosts` file and include the proper shared memory and network settings for your target Dynamic Server.

8. Update the `ONCONFIG` file and replace the source server name with the target server name, for example:

`DBSERVERNAME ol_tgt_dbservername`

9. Create your data spaces. Make sure they reside at same path location they were on the source server.

10. Perform a full system restore using the following command:

onbar -r

Performing an Imported Restore to a Remote Computer

When performing an imported restore to a remote computer, you might not want to transfer the data over a slow network. In this case, you can use the storage node feature of NetWorker to improve the restore performance.

After physically transferring the media (for example, the tapes) containing the backup of the storage spaces, as well as the logical logs, to the remote location, install the storage node on the remote computer and configure the NetWorker server to use the remote device of the storage node.

Follow the procedure described in [“Performing an Imported Restore of a Dynamic Server” on page 70](#) to perform the restore.

For more information on storage nodes, see the *Legato NetWorker Administrator's Guide*.

Chapter 7: Backing Up Extended Parallel Server

8.x

With Extended Parallel Server 8.x (XPS) you can initiate a backup or recovery from any co-server in the distributed database server. To enable backups from more than one co-server, you require the appropriate number of NetWorker client licenses installed on the NetWorker server. To configure XPS to backup and recover using several co-servers you must install the NetWorker client and BMI software on each co-server that will be used to do backups.

When the `onbar` command is issued to start a backup or restore, the server distributes the work to the `onbar_w` process which transfers the data to the NetWorker server. Therefore, you must start the `onbar_w` process with the proper environment variables to direct the backup data to the appropriate NetWorker server and the desired volume pools.

This chapter contains the following sections:

- [“Starting onbar_w Processes” on page 75](#)
- [“Configuring Scheduled Backups” on page 77](#)

Starting onbar_w Processes

There are several ways to start the `onbar_w` processes:

- start them at system start-up
- manually start them before the backup or recovery is started
- specify the ONCONFIG parameters to automatically start them

For each case, use the `$INFORMIXDIR/etc/start_worker.sh` script to start the **onbar_w** processes.

1. Modify this script on each of the co-servers that backup the database to set the environment variables.

A modified script may look like the following example:

```
#!/bin/sh
NSR_SERVER=backup_server
NSR_DATA_VOLUME_POOL=DBMIData
NSR_LOG_VOLUME_POOL=DBMILogs
export NSR_SERVER NSR_DATA_VOLUME_POOL
export NSR_LOG_VOLUME_POOL
exec $INFORMIXDIR/bin/onbar_w &
```

The following environment variables can also be set in the script:

- `NSR_SAVESET_NAME`
- `NSR_GROUP`
- `NSR_CLIENT`
- `NSR_COMPRESSION`
- `NSR_DEBUG_FILE`
- `NSR_DEBUG_LEVEL`

2. Stop and restart the **onbar_w** processes for the changes to take effect.

Manually

To start the **onbar_w** processes manually, run the `$INFORMIXDIR/etc/start_worker.sh` script from the command line.

At System Startup

To start the **onbar_w** processes at system startup, run the `$INFORMIXDIR/etc/start_worker.sh` script within a system startup script. Refer to your operating system's Administrator's Guide for complete instructions.

Automatically

To start the **onbar_w** processes automatically you must modify the following variables in the ONCONFIG file:

- **BAR_WORKER_MAX**
Specifies the maximal number of **onbar_w** processes that will start automatically. If set to 0, then the **onbar_w** processes must be started manually. It is recommended to set the count to the same parallelism count you configured your NetWorker server to.
- **BAR_IDLE_TIMEOUT**
Specifies the number of idle minutes before an **onbar_w** process is stopped. Set the value to 0 to manually stop the **onbar_w** processes.

Configuring Scheduled Backups

When creating the client resource for Informix servers, normal backups have the save set set to *INFORMIX:/ol_test*. When using XPS, you must specify an actual server name for the save set. For example:

```
INFORMIX:/ol_xps.1
```

You must also specify *NSR_SAVESET_NAME* in the *\$INFORMIXDIR/etc/start_worker.sh* script. For example:

```
NSR_SAVESET_NAME=INFORMIX:/ol_xps.1
```

Configuring the nsrdbmi Script

In addition to the information in [“Chapter 4: Performing Scheduled Backups” on page 49](#), you must also modify the following items in the **nsrdbmi**:

- Set **DO_LOGFILE_BACKUPS=** to *NO*. This option is used for backing up current logs. For XPS, this option is not supported by Informix ON-Bar.
- Set **DO_BOOTFILE_BACKUPS=** to *YES* to have XPS automatically back up critical files. Set it to *NO* to skip backing up critical files and include them in normal file system backups. If you set it to *Yes*, you must provide a list of bootfiles in a file. For example:

```
DO_BOOTFILE_BACKUPS=YES
BOOTFILE_LIST=filename
```

Where the file *filename* can contain the following:

```
$INFORMIXDIR/etc/$ONCONFIG  
Bixbar_ hostname.servernum  
Rixbar_ hostname.servernum  
Mixbar_ hostname.servernum  
$INFORMIX/etc/sm_versions  
$INFORMIXSQLHOSTS  
$INFORMIXDIR/etc/oncfg_ servername.servernum.coserverid  
$INFORMIXDIR/etc/xcfg_ servername.servernum
```

Chapter 8: Disaster Recovery

Disaster Recovery

Hardware malfunctions rarely occur at convenient times, but if you have a disaster recovery plan in place and use NetWorker Module for Informix to maintain regular backups of your Informix Dynamic Server instances and the logical logs associated with them, you are well-equipped to recover critical data in a timely manner.

The information presented in this section presumes that you have read and are familiar with the procedures outlined in your Informix Dynamic Server documentation and the information presented in the *Legato NetWorker Disaster Recovery Guide*.

Dynamic Server Disk Crash

If the primary disk containing critical Informix Dynamic Server dbobjects and NetWorker client binaries is damaged:

1. Reinstall the NetWorker client binaries, the NetWorker Module for Informix software, and the Informix Dynamic Server software, if needed. If you perform regular NetWorker backups of your system binaries, you can use NetWorker to recover the system data.
2. Use NetWorker to recover the emergency boot file and configuration file for the Informix Dynamic Server instance.

```
recover -a \  
$INFORMIXDIR/etc/sqlhosts \  
$INFORMIXDIR/etc/onconfig.std \  
$INFORMIXDIR/etc/ixbar.servernum \  
$INFORMIXDIR/oncfg_servername.servernum
```

3. If the physical media containing the logical logs must be replaced before beginning the restore, manually salvage the current logical log file.

```
onbar -l -s
```

4. Use ON-Bar to restore data from the most recent backup.

```
onbar -r
```

Once the restore completes, Informix Dynamic Server is left in quiescent mode.

NetWorker and Dynamic Server Disk Crash

If the NetWorker server's primary disk containing the online indexes (the */nsr* filesystem) and the primary disk for Informix Dynamic Server are both damaged:

1. Reinstall the NetWorker server binaries, if needed.
2. Find the latest bootstrap printout for the NetWorker server and follow the procedure outlined in "Recovering from a Disk Crash" in the *Legato NetWorker Disaster Recovery Guide* to recover the server's online indexes.



Important: Do not attempt to recover the NetWorker server's online client file index or media database to a different directory than the one they were backed up from. Once you recover the indexes to their original location, you can safely move them to another directory. Refer to the *Legato NetWorker Installation Guide* appropriate for your platform for details on moving the indexes.

3. Reinstall the NetWorker Module for Informix software and Informix Dynamic Server, if needed.
4. Use NetWorker to recover the emergency boot file and configuration file for the Informix Dynamic Server instance.

```
recover -a \  
$INFORMIXDIR/etc/sqlhosts \  
$INFORMIXDIR/etc/onconfig.std \  
$INFORMIXDIR/etc/ixbar.srvnum \  
$INFORMIXDIR/oncfg_servername.srvnum
```


5. If the physical media containing the logical logs must be replaced before beginning the restore, manually salvage the current logical log file.

```
onbar -l -s
```

6. Use ON-Bar to restore data from the most recent backup.

```
onbar -r
```

Once the restore completes, Informix Dynamic Server is left in quiescent mode.

For further information on using ON-Bar to restore data from backup media managed by NetWorker, refer to the documentation provided with your Informix Dynamic Server software, .

Chapter 9: Troubleshooting

This chapter has troubleshooting information that addresses common questions concerning operating and configuring NetWorker Module for Informix.

This chapter contains the following sections:

- [“Multiple Servers Configured for Backing up an Dynamic Server Instance” on page 83](#)
- [“No DB/BLOBspaces Found to Backup or Restore” on page 84](#)
- [“Unable to Open Connection to Server” on page 85](#)
- [“Default Value Assigned to LTAPEDEV Causes Failure” on page 85](#)
- [“Media Required for Restore is Missing or Damaged” on page 86](#)
- [“Manual Backup of Client Indexes” on page 86](#)
- [“ON-Bar Status Code 3” on page 87](#)
- [“XBSA Message Log Information” on page 90](#)

Multiple Servers Configured for Backing up an Dynamic Server Instance

A Dynamic Server instance cannot be configured for backups by multiple NetWorker servers. Configuring more than one NetWorker server to back up the same Dynamic Server instance produces unexpected results:

- Logical log backups spread across multiple NetWorker servers might render one or more dbspaces unrecoverable.
- Scheduled backups started by multiple NetWorker servers that attempt to access the same Dynamic Server instance at the same time will fail.

For example, suppose you configure one NetWorker server to perform a scheduled backup of selected dbspaces from a Dynamic Server instance named "venus" on system "mars" at 2:00 a.m. Then, you configure a different NetWorker server to back up the remaining "venus" dbspaces at 4:00 a.m.

The first NetWorker server runs out of tapes at 2:15, stalling the backup and leaving the ON-Bar backup processes waiting. At 4:00, the second NetWorker server's scheduled backup begins. Because the Dynamic Server instance "venus" is still locked by the first NetWorker server's savegroup, the second NetWorker server's savegroup fails, generating an ON-Bar error code 131.

```
NetWorker Savegroup: (notice) DBMI completed, 1 client
(mars Failed)
```

```
Start time:    Tue Sep 24 04:00:01 1998
```

```
End time:      Tue Sep 24 04:07:47 1998
```

```
--- Unsuccessful Save Sets ---
```

```
* mars:INFORMIX:/venus onbar returned status of 131
```

```
* mars:INFORMIX:/venus /usr/sbin/nsrdbmi exiting.
```

The ON-Bar error code 131 indicates that a problem occurred during the exchange of backup or restore data for dbspaces, blobspaces, or logical logs between ON-Bar and the Dynamic Server database server. The ON-Bar activity log (BAR_ACT_LOG file) may contain further information about the error.

To resolve the problem, restart the failed backup and reconfigure future backups so that all objects for a Dynamic Server instance are backed up to only one NetWorker server.

No DB/BLOBspaces Found to Backup or Restore

If you attempt to back up a dbspace or blobspace that does not exist, the savegroup completion message indicates an ON-Bar error:

```
* mars:INFORMIX:/venus/bogus_space onbar returned status
of 147
```

The ON-Bar BAR_ACT_LOG file displays a related list of messages:

```
1998-08-07 12:56:24 15612 15606 WARNING: DB/BLOBspace
bogus_space does not exist.
```

```
1998-08-07 12:56:24 15612 15606 ERROR: There are no
DB/BLOBspaces to backup/restore
```

You may also see these error messages if you attempt a point-in-time restore to a time period before the first dbspace backup for the instance occurred.

To resolve the problem, ensure that you have the correct spelling, pathname, or point-in-time, then retry the backup or restore operation.

Unable to Open Connection to Server

If you attempt to back up a Dynamic Server instance that does not exist or is in “off-line” mode during the backup, the savegroup completion message indicates an ON-Bar error:

```
* mars:INFORMIX:/venus onbar returned status of 151
```

The ON-Bar BAR_ACT_LOG file displays a related list of messages:

```
1998-08-07 13:07:29 15671 15665 onbar -b -L 0
```

```
1998-08-07 13:07:29 15671 15665
```

```
ERROR: Unable to open connection to server.
```

To resolve the problem, ensure that you have the correct spelling and pathname for the instance, check that the instance is in “on-line” mode, then retry the backup.

Default Value Assigned to LTAPEDEV Causes Failure

Setting the LTAPEDEV configuration parameter in the ONCONFIG file to */dev/null* causes logical logs to be erroneously marked as backed up (U-B----). This error occurs when Dynamic Server switches to the next log before ON-Bar has a chance to send the logical log data to the NetWorker server. With the LTAPEDEV parameter assigned the value */dev/null*, you can perform only whole system restores.

If LTAPEDEV is undefined or set to */dev/null* in the ONCONFIG file, an ON-Bar logical log backup returns the error code 131 and a message is sent to BAR_ACT_LOG:

```
1998-09-25 10:50:00 12441 12404
```

```
ERROR: Unable to start the logical log backup: Log backup  
to device /dev/null not allowed
```

The NetWorker savegroup completion message also returns an error message:

```
--- Unsuccessful Save Sets ---  
  
* mars:INFORMIX:/venus/rootdbs onbar returned status of  
131  
  
* mars:INFORMIX:/venus/rootdbs /usr/sbin/nsrdbmi exiting.
```

To ensure that your logical logs are successfully backed up, set the *LTAPEDEV* parameter in the *ONCONFIG* file to anything other than */dev/null* (for example, *"LTAPEDEV something"*).

Media Required for Restore is Missing or Damaged

If the media required for an ON-Bar restore is missing or damaged, you can still recover data. The method available depends on whether or not you have the NetWorker cloning option enabled for the backup group.

- If cloning is enabled in the NetWorker server's group resource for the backup group configured for Dynamic Server, NetWorker automatically retrieves the cloned media to complete the restore operation.
- If cloning is disabled, you can perform an ON-Bar point-in-time restore to a time close to the one you need. Refer to the following resources guides for detailed instructions on how to perform a point-in-time restore:
 - *"Chapter 6: Performing Database Recoveries" on page 65*
 - *Informix Dynamic Server Backup and Restore Guide*

Manual Backup of Client Indexes

The NetWorker server's **savegrp** program invokes a backup of the client indexes and the NetWorker server's bootstrap file each time a scheduled backup completes. The **savegrp** program is only invoked during a *scheduled* backup.

The client indexes and the server's bootstrap file are vital for restoring data to Dynamic Server in the event of a disaster. Performing regular, scheduled NetWorker backups of Dynamic Server provides maximum protection for your critical data.

Occasionally, you may need to perform an on-demand backup of Dynamic Server dbobjects by using the ON-Bar command-line interface. After performing an on-demand backup, back up the NetWorker server's client index and bootstrap manually by invoking the **savegrp** command line from the NetWorker server.

Use one of the following commands:

```
savegrp -O -l full -P printer-name -c client-name
```

or

```
savegrp -O group-name
```

Refer to the **savegrp** man page for a complete description of the **savegrp** command and command options.

ON-Bar Status Code 3

When NetWorker Module for Informix is not properly enabled and a scheduled savegroup attempts to run, the backup will fail and an "onbar returned status of 3" message is returned in the savegroup completion notice:

```
NetWorker Savegroup: (notice) DBMI1 completed, 1 client
(mars Failed)
```

```
Start time:   Wed Oct 16 00:00:00 1996
```

```
End time:     Wed Oct 16 00:01:20 1996
```

```
--- Unsuccessful Save Sets ---
```

```
* mars:INFORMIX:/venus 1 retry attempted
```

```
* mars:INFORMIX:/venus onbar returned status of 3
```

```
* mars:INFORMIX:/venus /usr/sbin/nsrdbmi.venus exiting.
```

The XBSA message file, */nsr/applogs/xbsa.messages*, verifies the error with a more specific message:

```
XBSA-1.0.1 dbmi-1.0 13158 Tue Oct 15 20:00:32 1996
```

```
_nwbsa_open_saveset_session: received a network error
```

```
(Severity 5 Number 13): BusinessSuite Module for Informix
has not been properly enabled.
```

These messages indicate a licensing problem with the NetWorker Server software and must be resolved on the NetWorker server before your database data can be backed up. There are three possible causes for these error messages:

- The NetWorker server does not have TurboPak functionality.
- NetWorker Module for Informix is not enabled.
- The wrong server operating system (OS) enabler code for NetWorker Module for Informix enabler was used.

Determining if Your NetWorker Server has Turbopak Functionality

Depending on your NetWorker server version, you may need to add the NetWorker TurboPak. To determine if you have TurboPak functionality, bring up the NetWorker administration program, then check that you have one of the following combinations of enabler codes in the Registration Window by selecting Registration from the Server pull-down list:

1. NetWorker Eval\10 (requires no enabler codes)
2. NetWorker\10 and TurboPak
3. NetWorker Advanced\10
4. NetWorker Turbo\10
5. NetWorker NetWork Edition\10 and TurboPak (if the NetWorker NetWork Edition enabler is pre-October, 1996)
6. NetWorker NetWork Edition\10 (if the NetWorker NetWork Edition enabler is post-October, 1996)

If you have configuration (b) or (e) without NetWorker TurboPak, contact Legato Sales at (415) 812-6000. NetWorker BusinessSuite[®] Module for Informix will not work correctly without TurboPak functionality.

Enabling NetWorker Module

The NetWorker Module enabler comes in both Windows NT and UNIX versions. In the Registration Window, both will display as:

NetWorker Module for Informix

If you are evaluating the NetWorker server software, you do not need any enabler codes. If you have entered an enabler code on your NetWorker server, you must also enter an enabler code for NetWorker Module. If you have purchased NetWorker Module, follow the instructions on your Enabler

Certificate. If you do not have an Enabler Certificate for NetWorker Module, you may use the temporary enabler code listed in the *Legato NetWorker Module for Informix Installation Guide* to evaluate the software for 45 days. After this evaluation period, or if you have already decided to purchase the module, contact your Legato Sales Representative to purchase a permanent enabler code.



Important: Be sure to enter the correct temporary enabler code for your NetWorker server operating system.

Ensuring NetWorker Module Is Enabled for the Correct Server OS

If you enter the Windows NT version of NetWorker Module enabler code on to a UNIX NetWorker server or the UNIX version of this enabler code on to a Windows NT NetWorker server, neither will function. Although the name attribute of the license resource is identical for both Windows NT and UNIX servers, the license type attribute is different. To view the license type attribute associated with the enabler code you are attempting to use, issue the following command at the command line, replacing `enabler_code` with the actual enabler code you are trying to use:

```
nsrccap -vn -c enabler_code
```

The **nsrccap** command must either be executed from the directory where it is physically located or be in your user search path. The default location of the **nsrccap** command for Windows NT systems is `C:\win32app\nsr\bin`. For UNIX systems, the default location is `/usr/bin` or `/usr/sbin`.

The Windows NT enabler code generates output similar to the following:

```
Read an enabler:
name:           Application Interface for Informix
enabler code:   f06b72-bb0c35-76d3ba
license type:   Z11
expires:        45 days
nsrccap:        License enabler code is valid.
```

The UNIX enabler code generates output similar to the following:

```
Read an enabler:
name:           Application Interface for Informix
enabler code:   cc494e-872811-52f796
license type:   D11
expires:        45 days
nsrccap:        License enabler code is valid.
```

Notice that for Windows NT, the license type attribute is Z11, while for UNIX the license type attribute is D11. Also note that the enabler codes listed above are identical to the temporary enabler codes located in the *BusinessSuite Module for Informix Quick Start Guide*. If you have an enabler code that is *not* for the operating system that your NetWorker server is running, contact Legato Customer Service.

XBSA Message Log Information

To have detailed information about backup and restore operations written to the `xbsa.messages` file, modify the `NSR_DEBUG_FILE` and `NSR_DEBUG_LEVEL` NetWorker XBSA environment variables. Depending on your environment, you may modify these variables in several ways. For more information on the NetWorker XBSA environment variables, see [“Appendix A: XBSA Environment Variables” on page 93](#).

Scheduled NetWorker Backups

If you are performing regularly scheduled NetWorker backups of your database data you can have the information written to the `xbsa.messages` file.

To write to the `xbsa.messages` file:

1. Open your customized version of the `nsrdbmi` file with your favorite text editor.
2. Change the value assigned to `NSR_DEBUG_FILE` to include the complete *pathname* and *file name* where the NetWorker XBSA messages should be written, for example:

```
NSR_DEBUG_FILE=\nsr\applogs\xbsa.messages
```

3. Change the value assigned to `NSR_DEBUG_LEVEL` to five:

```
NSR_DEBUG_LEVEL=5
```

4. Save the modified batch file.

5. Enter the name of your customized version of *nsrdbmi* file in the Backup command text box in the database server client resource on the NetWorker server. The next time a scheduled NetWorker backup runs for the database server, messages will be logged in the *xbsa.messages* file.

On a Windows NT system, you can also modify these values in the system variables list. If you modify *NSR_DEBUG_FILE* and *NSR_DEBUG_LEVEL* in your Windows NT system variables list, you must reboot your Windows NT system before the messages will be logged appropriately. For instructions on changing these variables on your Windows NT system, see [“On-demand Backups from the Informix Enterprise Command Center \(IECC\)”](#) on page 58.

On-Demand Backups from the Informix Command Line Utility

If you are using the Informix command line utility to initiate on-demand ON-Bar backups of your database server, you must modify your Windows NT system variables to include values for *NSR_DEBUG_FILE* and *NSR_DEBUG_LEVEL*:

1. Open the Windows NT Control Panel.
2. Double-click the System icon to open the System Properties dialog box.
3. Select the Environment tab to make the Environment dialog box active.
4. Add or modify the NetWorker XBSA variables from [Table 5](#) to the System variable list by entering the variable name in the Variable Name text box and the appropriate value in the Value text box.

Table 5. NetWorker XBSA Variables for Informix Command Line

Variable Name	Value
<i>NSR_DEBUG_FILE</i>	<i>\nsr\applogs\xbsa.messages</i>
<i>NSR_DEBUG_LEVEL</i>	5

5. Click Apply to add each modification to the System variable list.

During an on-demand backup, NetWorker uses these new system variables to direct your dbspaces and logical-log files to the appropriate volume pools.

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Appendix A: XBSA Environment Variables

This appendix lists the NetWorker XBSA environment variables, their default values, and valid options.

NetWorker XBSA

NetWorker XBSA enables you to configure environment variables to activate certain features of NetWorker not directly supported by X/Open specifications. NetWorker XBSA enables ON-Bar and NetWorker to interact during backups and restores:

- Ensuring restoration of dbobjects to the correct database server instance and to their proper sequence in the database
- Compiling a history of the objects backed up for the database server instance

For a description of error messages associated with a NetWorker XBSA session, see [“Appendix B: Error Messages” on page 99](#).

Changing NetWorker XBSA Variables

To change a value for a NetWorker XBSA variable that does not appear in the *nsrdbmi* script:



Important: If you choose continuous log file backups or perform an on-demand backup of a dbobject, the default settings for the NetWorker XBSA variables will override values set with the NetWorker Administration program. See [“Chapter 5: Performing On-Demand Backups” on page 55](#) for recommendations about NetWorker XBSA variables that you must assign explicit values for.

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1. Copy the template file `/etc/nsrdbmi.sh` to the directory where the NetWorker binaries are installed.
2. Add the NetWorker XBSA environment variable to the script and assign a valid value to the variable.
3. Add the NetWorker XBSA environment variable to the list of variables exported:

```
export_environment_variables()  
{  
  export NSR_VOLUME_POOL  
  .  
  .  
  .  
  export new_NSR_variable  
}
```

4. Save the edited script with a descriptive filename.
5. Edit the NetWorker client resource configured for the database server instance and enter the filename of the customized **nsrdbmi** script in the Backup command field.

Default Values and Valid Options

This section contains a description and valid settings for each of the NetWorker Module environment variables that can be added to a customized backup script. The environment variables described appear in the NetWorker Module libraries included with the NetWorker Module for Informix software.

Table 6. NetWorker Module Environment Variables

NetWorker Module Variable	Definition	Possible Values
NSR_BACKUP_LEVEL	Indicates the NetWorker backup level to use for the backup session.	<ul style="list-style-type: none"> • <i>full</i> - full backup • <i>incr</i> - incremental backup • <i>skip</i> - skip backup
NSR_CLIENT	Indicates the NetWorker client resource to use for the backup session.	NetWorker uses the name of the NetWorker client where the client software is installed.
NSR_COMPRESSION	Indicates whether to compress the data as it is being backed-up.	<ul style="list-style-type: none"> • <i>FALSE</i>, no compression • <i>TRUE</i>, compression
NSR_DATA_VOLUME_POOL	Indicates the volume pool to which data files will be backed-up.	Any valid NetWorker pool name.
NSR_DEBUG_FILE	Indicates the full pathname and filename where NetWorker XBSA messages will be written.	Any valid pathname or filename.

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NetWorker Module Variable	Definition	Possible Values
NSR_DEBUG_LEVEL	Indicates the level of debugging to use during the NetWorker Module backup and recover sessions.	<ul style="list-style-type: none"> • 0, no debugging information • 1, only errors causing fatal system errors • 2, all network related errors • 3, messages concerning the operation taking place • 4, all starting and ending of sessions • 5, parameters for all entries and exits from NetWorker Module • 6, all entries and exits from internal NetWorker Module functions • 7, all NetWorker Module internal errors • 8, all NetWorker Module parameters
NSR_ENCRYPTION	Indicates whether encryption of the data to be backed-up will take place.	<ul style="list-style-type: none"> • <i>NONE</i>, no encryption • <i>TRUE</i>, standard Legato encryption
NSR_ENCRYPTION_KEY	Indicates the key to use for the selected method of encryption.	Any string that conforms to the key values for the encryption method defined by NSR_ENCRYPTION.
NSR_GROUP	Indicates the group to use for a backup session.	Any valid NetWorker group name.
NSR_LOG_VOLUME_POOL	Indicates the volume pool to which logical logs will be backed-up.	Any valid NetWorker pool name.

NetWorker Module Variable	Definition	Possible Values
NSR_NO_BUSY_ERRORS	Indicates whether the NetWorker Module for NetWorker libraries will wait for a busy NetWorker server or fail immediately upon receiving a busy notification.	<ul style="list-style-type: none"> • <i>TRUE</i>, NetWorker Module will wait for the selected server to become available • <i>FALSE</i>, NetWorker Module will fail immediately if the server is not ready for a request
NSR_PROCESS_ENVIRON	Indicates whether the process that called the NetWorker Module library should be processed along with the explicit NetWorker Module environment variable.	<ul style="list-style-type: none"> • <i>TRUE</i> • <i>FALSE</i>
NSR_SAVESET_NAME	Indicates the saveset name NetWorker Module will use for a save session.	Any valid NetWorker saveset name.
NSR_SERVER	Indicates the hostname of the server NetWorker Module will use for a save session.	Check this variable by using gethostname()

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Appendix B: Error Messages

This appendix lists error messages you may encounter while using NetWorker Module for Informix and provides suggestions to resolve the problems described.

ON-Bar Messages

When ON-Bar encounters an error or condition requiring a warning, it writes a message to the assigned message file. The default message file for ON-Bar is *\$INFORMIXDIR/bar_act.log*. Refer to your ON-Bar documentation for a listing of ON-Bar messages.

NetWorker Messages

NetWorker error messages are displayed in the NetWorker Administrator windows. The display lists the messages encountered during the past 24 hours.

The messages are also written to the default messages directory for NetWorker:

/nsr/logs

NetWorker error messages appear in the format:

day hh:mm:ss service_or_program_name: message

Table 7. Error Messages Generated while Backing Up Data.

Error Message	Description	Service
cannot lock flag file for client name: reason	The flag file signifying the end of the first part of index compression is already in use by another instance of the nsrck program or by the nsrindexd service.	nsrck
checking index for clientname	Files associated with the named client are being inspected.	nsrck
completed checking count clients	Displayed when some form of checking was performed successfully.	nsrck
compressing index for clientname	Displayed when the -C option has taken effect.	nsrck
cross-checking index for clientname	Displayed when the -X option is in effect.	nsrck
more space needed to compress clientname index, size required	The nsrck program is unable to find enough disk space to hold the temporary file db.CMP.	nsrck
rolling forward index compression for clientname	Index compression completed its first copy and the compression was rolled forward.	nsrck
Warning no valid savetimes - cross-check not performed for clientname	During a cross-check, no save sets were found for this client.	nsrck
lock on filename acquired	Follows the “waiting for lock” message.	nsrindexd
waiting for lock on filename	Indicates another program is accessing the same file required by the nsrindexd service.	nsrindexd
A copy of this process is already running!	Another copy of nsrmmdbd is currently running and has exclusive access to the media database.	nsrmmdbd
Cannot open lock file	Indicates an internal error.	nsrmmdbd

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Error Message	Description	Service
media db is saving its data	The service is dumping its records to a temporary file while the database is being backed up.	nsrmmdbd
media db is recovering, this may take a while	The nsrmmdbd service is reloading its database.	nsrmmdbd
media db is cross checking the save sets	Printed each time the service is restarted.	nsrmmdbd
media dbb is open for business	Indicates the service is available.	nsrmmdbd
RPC error, details...Cannot open save session with 'server'	The save command is unable to back up data to the NetWorker server.	savefs
save: client.xxx.com is not on client's access list	Occurs when the named client has more than one name.	savefs
save: path length of n too long, directory not saved	Occurs if there is a directory tree that is very deep, or directory names are very long.	savefs
/path/savefs: Command not found /path/save: Not found	The save or savefs command could not be found in the specified path.	savefs
savefs: error starting save of filesystem	The savefs command has detected the failed save and has marked the save set as failed.	savefs
save: unknown host name: server savefs: unknown host name: server	The host table on the specified client does not include the server's name.	savefs
unknown host	The specified client is not listed in the host table on the server.	savefs
Warning: client is not in the hosts table!	The client's hostname is not listed in the host table on the client.	savefs

Error Message	Description	Service
Warning - file 'path' changed during save	Generated when save notices that the file's modification time changed while the file was being backed up.	savefs
save: path file size changed!	Generated when NetWorker backs up the message log files.	savefs
save: network error, server may be down	The backup of the named filesystem began, but the connection to the NetWorker server closed part way through.	savefs
Aborted	The savegrp that was running was stopped.	savegrp
Access violation - unknown host: client	The client's hostname and IP address are not correctly listed in one or more of /etc/host, NIS, or DNS on the server.	savegrp
asm: cannot open /path: I/O error	There may be bad blocks on the disk(s) containing the specified file or directory.	savegrp
asm: cannot stat /path: Stale NFS file handle asm: cannot stat /path: Missing file or filesystem	The save attempted to test the named directory to determine if it was a different filesystem then the one currently being saved. The filesystem was NFS-mounted, but the mount failed.	savegrp
asm: external ASM 'asm2' exited with code 1	The backup will attempt to continue and save other data.	savegrp
asm: missing hard links not found	The files were either created or removed while the backup was running.	savegrp
asm: /path was not successfully saved	The specified path within the current save set was not saved successfully.	savegrp
asm: xdr_op failed for /path	Either ASM unexpectedly exited due to a bad block on the disk or due to a bug, or the network connection to the NetWorker server was lost.	savegrp

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Error Message	Description	Service
connect to address AA.BB.CC.DD: message Trying AA.BB.CC.DD	The connection to the client failed on the address specified.	savegrp
Connection refused	The client machine is not accepting any new network connections.	savegrp
Connection timed out	The client has crashed.	savegrp
group groupname aborted, savegrp is already running	Occurs when the named group has already started or restarted.	savegrp
has been inactive for n minutes since time. client: saveset is being abandoned by savegrp	A backup of the specified save set started, but after n minutes of no activity, savegrp gave up on the save set.	savegrp
Host is unreachable	The NetWorker server is unable to make TCP/IP connections to the client.	savegrp
no cycles found in media db; doing full save	A message that is added to any save set that is saved at the level full instead of the level found in the client's schedule.	savegrp
No 'NSR client' resource for client clienthostname savefs: cannot retrieve client resources	The client's host name changed.	savegrp
no output	The saveset was completed, but returned no status output.	savegrp
filesystem: No such file or directory	An explicit save set was named in the Client Resource for the specified client, but that save set does not exist on the client.	savegrp
n retries attempted	The specified number of retries was performed before the backup of the save set succeeded or was finally marked as failed.	savegrp

Error Message	Description	Service
printer: unknown printer /path savegrp: printing bootstrap information failed	savegrp was unable to print the bootstrap on the printer.	savegrp
reading log file failed	The specified save set was completed, but savegrp was unable to read the log file of the output status from the save set.	savegrp
savegrp: client rcmd (3) problem for command	The attempt to run the specified command failed on the specified save set.	savegrp
Saving server index because server is not in an active group	Savegrp has noticed that the NetWorker server is not listed in any automatically started, enabled group.	savegrp
socket: All ports in use	The NetWorker server has run out of socket descriptions.	savegrp

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Table 8. Error Messages Generated While Restoring Data

Error Message	Description
Browsing machine's on-line file index	States which NetWorker client's index is being browsed for interactive recovers.
Cannot open recover session with server	Indicates that some problem was encountered connecting the NetWorker server on the named system.
error, name is not on client list	Indicates that the client invoking the recover command is not in the server's client list.
Message from server: Other clones exist for failed save set	The request failed on a save set that had multiple clones. The recover command will be automatically resubmitted to the server, if any files remain to be recovered.
Path name is within machine:export-point	The given pathname is mounted from a file server and the recovery will use the index for the named file server.
/path:Permission denied	The file name cannot be recovered as it is not being accessed by root or by the group operator, and the user does not have read permissions for the file.
Using server as server for client	Tells which NetWorker server was selected for the client's index.

BusinessSuite Module API Messages

During a backup or restore, NetWorker attempts to record messages generated by the BusinessSuite Module API library to the file assigned to the NSR_DEBUG_FILE environment variable. If the assigned location is invalid or unreachable, the message is written to one of the following locations:

- The alternate messages directory created during installation, */nsr/applogs*
- The temporary directory

See “Appendix B: BusinessSuite Module Variables” for descriptions of the NetWorker BusinessSuite Module variables and values.

NetWorker BusinessSuite Module error messages appear in the format:

`function_name:BSA_RC_message_code:message`

Table 9. BusinessSuite Module API Messages

Error Message	Description
BSA_RC_ABORT_ACTIVE_NOT_FOUND No active object matched the name that was specified for a BSAMarkObjectInactive	Indicates that no active object matching the given search parameters was found in the NetWorker server being used by the NetWorker BusinessSuite Module session.
BSA_RC_ABORT_SYSTEM_ERROR System detected error due to explanation. Operation aborted	Indicates that a general system error has occurred within a NetWorker BusinessSuite Module function call.
BSA_RC_APP_OBJECTOWNER_TOO_LONG The appObjectOwner field contained too many characters (n>=n)	Indicates that the appObjectOwner parameter contains too many characters and may be corrupt
BSA_RC_AUTHENTICATION_ERROR There was an authentication failure for ObjectOwner ownername	Indicates that the routine failed to authenticate a BSAObjectOwner with NetWorker server used by the NetWorker BusinessSuite Module session.
BSA_RC_BAD_CALL_SEQUENCE The sequence of API calls is incorrect. Must call item1 before item2	Indicates that an API call sequence was made that does not conform to the BusinessSuite Module Data Movement API State Diagram document.

Error Message	Description
BSA_RC_BAD_HANDLE The handle used to associate this call with a previous BSAInit() call is invalid because explanation	Indicates that the value passed into the function for bsaHandle contained a NULL pointer.
BSA_RC_BAD_PARAMETER received parameter parm with value, which is invalid	Indicates that an invalid parameter was received.
BSA_RC_BSA_OBJECTOWNER_TOO_LONG The bsaObjectOwner parameter contains too many characters and may be corrupt	Indicates that the appObjectOwner parameter contains too many characters and may be corrupt.
BSA_RC_BUFFER_TOO_SMALL Buffer is too small to hold the object entry to be returned. n bytes required for the object entry	Indicates the buffer is too small to hold the object entry to be returned.
BSA_RC_COPYGPNAME_TOO_LONG The copyGpName Field contained too many characters (n>=n)	Indicates the copyGpName parameter contains more than BSA_MAX_COPYGPNAME characters and the structure could not be used for the requested operation.
BSA_RC_DESCRIPTION_TOO_LONG The description field contained too many characters (n>=n)	Indicates the Description field in one of the supplied structures contained more than the BSA_MAX_DESC characters and the structure could not be used for the requested operation.
BSA_RC_INVALID_COPYTYPE The copyTypes parameter contained an unrecognized value of n	Indicates the copyType parameter contains a structure with values not contained within the NetWorker BusinessSuite Module libraries.
BSA_RC_INVALID_DATABLOCK The dataBlock parameter contained inconsistent values: bufferLength: n, bufferPtr:n, numBytes: n	Indicates that the fields of a supplied dataBlock parameter are not consistent.
BSA_RC_INVALID_KEYWORD an entry in the environment structure is invalid (variable=value)	Indicates that one of the environment strings passed into the function did not have a valid structure.

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Appendix C: Command Line Utilities

BusinessSuite Module for Informix ships with four new commands which are described in the Command Line Utilities Help Files (CLUHELP). The CLUHELP Files are special help files that provide highly technical information about certain NetWorker commands. Some of these commands are not represented in the Windows NT interface. In some cases, the CLUHELP Files provide additional information on using NetWorker hidden attributes. The *Legato NetWorker Administrator's Guide* provides additional information on the use of Command Line Utilities, where applicable.

The complete set of CLUHELP files is included in the `\DOCS\CLUHELP` directory on your BusinessSuite Module CD-ROM disc. If you downloaded BusinessSuite Module from <http://www.legato.com>, the `\DOCS\CLUHELP` directory was included as part of the download. The CLUHELP files are in HTML format and can be viewed using a web browser.

This appendix describes the four new Command Line Utilities included specifically for BusinessSuite Module:

- **barcnfig.bat**
- **bmicnfig.bat**
- **nsrdbmi.bat**
- **nsrifmx.exe**

For information about other NetWorker commands, refer to the complete set of CLUHELP files included in the `\DOCS\CLUHELP` directory (Windows NT NetWorker servers) or the UNIX man pages (UNIX NetWorker servers).

barcnfig.bat

The **barcnfig.bat** command is invoked during the BusinessSuite Module installation process to connect to an Informix server and insert the NetWorker XBSA values ('1', '1.0.1', 'nwbsa', '1') into the *sysutils.bar_version* table. Without the required values for NetWorker XBSA, ON-Bar commands will fail.

The Informix **dbaccess** command is used to connect to the Informix server to run the **insert** SQL command against the *sysutils.bar_version* table. You need the *informix user* password to run this command.

File	Definition
<code>\nsr\bin\barcnfig.bat.out</code>	This file logs output during barcnfig.bat execution.

If the *bar_version* table was not updated during the installation process, users can initiate this command from the command line or from the Windows NT interface by double-clicking the "NetWorker BMI ON-Bar Config" icon in the NetWorker Group folder. If you are using the NT Explorer, double-click the *barcnfig.bat* file to initiate the process. Refer to your *BusinessSuite Module for Informix Quick Start Guide* for details on the installation process.

bmicnfig.bat

The **bmicnfig.bat** command is invoked during the BusinessSuite Module installation process to connect to a NetWorker server and create the appropriate volume pool and label template resources.

Most users will need to separate their data by storing their database backups in one volume pool and their transaction log backups in another. The **bmicnfig.bat** command creates volume pool and label template resources named "DBMIData" and "DBMILogs." The **bmicnfig.bat** command uses **nsradmin** to create the resources. Two messages are displayed if this command succeeds in connecting to a NetWorker server and creating the resources, for example:

```
# bmicnfig.bat
Creating appropriate resources.
Done creating resources.
```

OPTION	
-s <i>server_name</i>	Connect to the specified NetWorker server.

FILE	
<i>\nsr\bin\bmicnfig.bat.out</i>	This file logs error conditions during bmicnfig.bat execution.

If the DBMIData and DBMILogs pools were not created during the installation process, users can initiate this command from the command line or from the Windows NT interface by double-clicking the “NetWorker BMI Config” icon in the NetWorker Group folder. If you are using the Windows NT Explorer, double-click on the **bmicnfig.bat** file to initiate the process. Refer to you *BusinessSuite Module for Informix Quick Start Guide* for details on the installation process.

nsrdbmi.bat

The **nsrdbmi.bat** batch file is used by **savegrp** to trigger **nsrifmx.exe** to do backups on an Informix server in conjunction with ON-Bar. The **nsrdbmi.bat** batch file is normally only run by **savegrp** and not run directly from the command line. To use this command for scheduled backups, the client resource should list **nsrdbmi.bat** in the Backup command text box. See [“What Happens During a NetWorker Module for Informix Backup” on page 17](#) for a discussion of how **savegrp** uses the **nsrdbmi.bat** batch file during a scheduled backup. See [“Configuring a Database Server as a NetWorker Backup Client” on page 44](#) for instructions on creating a client resource for your database server.

If you modify this command you should make a copy of the provided file *\nsr\bin\nsrdbmi.bat* first before making changes. This ensures you always have a reference to the original configuration.

There are several variables users can set in the **nsrdbmi.bat** batch file to control **nsrifmx** backups to the NetWorker server. See [“Customizing the nsrdbmi Backup File” on page 41](#) for details on modifying the **nsrdbmi.bat** batch file.

Variable	PRECMD
Default value	NONE
Description	This variable can be used to run a command before dbospace and log file backups. If this command does not run successfully (in other words, if it returns a nonzero status), nsrifmx.exe will exit.

Variable	POSTCMD
Default value	NONE
Description	This variable can be used to run a command after dbospace and log file backups have completed. This command is always run by nsrifmx.exe even if ON-Bar returns a non-zero exit code.

Variable	NSR_DATA_VOLUME_POOL
Default value	DBMIData
Description	If this variable is set to name a volume pool, then dbospace backups will be directed to the named volume pool.

Variable	DO_LOGFILE_BACKUPS
Default value	YES
Description	If this variable is set to YES, then logfile backups will be executed after dbospace backups. If set to NO, no logfile backups will occur.

Variable	NSR_LOG_VOLUME_POOL
Default value	DBMILogs
Description	If this variable is set to name a volume pool, then logfile backups will be directed to the named volume pool.

Variable	NSR_COMPRESSION
Default value	FALSE
Description	This environment variable determines if compression is performed on the data. The default value is "FALSE", indicating no compression should take place. Set this value to "TRUE" to turn on client-side compression.

Variable	PATH
Default value	%INFORMIXDIR%\bin:C:\win32app\nsr\bin:%PATH%
Description	Sets up PATH environment variable. This must be configured to include the path to the ON-Bar executable and the NetWorker program mminfo .

Variable	INFORMIXDIR
Default value	C:\informix
Description	Sets up INFORMIXDIR environment variable which lists the directory where the Informix RDBMS is installed.

Variable	ONCONFIG
Default value	ONCONFIG
Description	Lists the name of the Informix RDBMS configuration file being used. The nsrdbmi.bat command pass the user configuration variables with command options to nsrifmx.exe to do the actual backups.

nsrifmx.exe

The **nsrifmx.exe** command is used to trigger backups on an Informix database server in conjunction with ON-Bar. The **nsrifmx.exe** command is normally only invoked by **nsrdbmi.bat** and is not run directly from the command line. See [“How NetWorker Module for Informix Backs Up Data” on page 17](#) for a discussion of how NetWorker uses **nsrifmx.exe** during a scheduled backup.

The **nsrifmx.exe** command also backs up the emergency boot file and \$ONCONFIG file using the **save** command. These files will be backed-up to the same pool as the dbspace backups. If you wish to have these files sent to another pool, the command options should be provided appropriately when **nsrdbmi.bat** is invoked by **savegrp**. Refer to the **savegrp** CLUHELP file (Windows NT servers) or the **savegrp** man page (UNIX servers) for information on the options you can use with the **savegrp** command.

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Chapter 10: Glossary

This glossary contains terms and definitions found in this book. Many of the terms are specific to NetWorker.

API	An acronym for Application Programming Interface, an agreed-upon set of computer library routines to accomplish a task.
autochanger	A device that has the ability to move media among various components (including slots, media drives, media access ports, and transports) located in the device. Autochangers automate the media loading, labeling, and mounting during backups and recovers.
backup group	A NetWorker client or group of clients configured to start backing up files to the NetWorker server at a designated time of day.
blobpage	A <i>physical unit</i> of disk storage used by Dynamic Server and Dynamic Server, Workgroup Edition to store <i>blob</i> space data.
blobspace	Large objects, such as multimedia images, are stored in a <i>binary large object space</i> , a <i>logical unit</i> of storage composed of one or more <i>chunks</i> . The physical data is stored in a <i>blobpage</i> , and a pointer to the blobpage's physical location can be stored in a <i>dbspace</i> .

bootstrap	The bootstrap save set is essential for the NetWorker disaster recovery procedures. It is composed of three components that reside on the NetWorker server: the media database, the resource database, and a server index which is a file that lists all the server files that were backed up during the scheduled backup.
browse policy	A policy that determines how long entries for your backup data remain in the client file index.
catalog tables	An ON-Bar component that tracks the compatibility of component versions, as well as backup objects and instances.
chunk	A <i>physical unit</i> of disk storage allocated by the system administrator for Dynamic Server or Dynamic Server, Workgroup Edition data.
client file index	A database of information maintained by the NetWorker server that tracks every dbobject, file, or filesystem backed up. The NetWorker server maintains a single client index file for each client machine.
dbobject	Database object, a term that might refer to a <i>blob space</i> , <i>db space</i> , or logical-log file.
db space	A <i>logical unit</i> of storage that consists of one or more <i>chunks</i> . An Dynamic Server or Dynamic Server, Workgroup Edition instance might consist of one or more db spaces.
Dynamic Server	INFORMIX-OnLine Dynamic Server, considered by NetWorker as one or more instances of an INFORMIX <i>RDBMS</i> .
Dynamic Server, Workgroup Edition	INFORMIX-OnLine Workgroup Server, considered by NetWorker as one or more instances of an INFORMIX <i>RDBMS</i> .
emergency boot file	An ON-Bar ASCII file containing all of the information stored in the ON-Bar <i>catalog tables</i> that pertain to critical <i>db spaces</i> .

fast recovery	ON-Bar executes a fast recovery by using the physical log to return Dynamic Server or Dynamic Server, Workgroup Edition to the most recent point of known physical consistency. Then, the <i>logical-logs</i> are used to return the database server to logical consistency by rolling forward all committed transactions and rolling back all incomplete transactions.
fileserver	A machine with disks that provide file storage to other machines on a network.
filesystem	<ol style="list-style-type: none"> 1. A sub-tree of a UNIX file tree that is on a specific disk partition or other mount point. 2. A method for storing files.
instance name	The name of an individual Dynamic Server or Dynamic Server, Workgroup Edition running on a host. This instance name is the DBSERVERNAME parameter found in \$INFORMIXDIR/etc/\$ONCONFIG. There may be several instances of Dynamic Server or Dynamic Server, Workgroup Edition running on a single host. Each instance must have a unique name, and that name must be found in the <i>sqlhosts</i> file for that instance.
logical-log	A record of Dynamic Server and Dynamic Server, Workgroup Edition database transactions, stored in a log file to execute a <i>fast recovery</i> and roll back transactions.
logical unit	A unit of temporary storage that keeps track of where physical units are located.
man pages	For UNIX servers only. Provides a technical reference for the syntax and function of the NetWorker commands you issue from the command line. They are accessed using the man command plus the name of the command at the shell prompt.

media database	A database that contains indexed entries about the storage volume location and the lifecycle status of all data and volumes managed by the NetWorker server.
media manager	The NetWorker component that tracks save sets to backup volumes. The nsrmmdbd daemon is responsible for making entries in the NetWorker online media index.
mirroring	A storage strategy that pairs a <i>chunk</i> of one defined <i>dbspace</i> or <i>blobspace</i> with an equal-sized mirror chunk to enable users uninterrupted access should the primary database fail.
multiplex	A method of transmitting multiple streams of data simultaneously through the same channel.
NetWorker client	A machine on a network running the NetWorker client software that can access storage management services from a NetWorker server. Clients may be database servers, workstations, PC desktops, or file servers with gigabytes of data.
NetWorker server	The machine on a network running the NetWorker server software, containing the client file indexes, and providing backup and recover services to clients on a network.
ON-Bar	A backup and recover utility that provides backup and recovery service to Dynamic Server and Dynamic Server, Workgroup Edition.
page	A <i>physical unit</i> of disk storage used by Dynamic Server and Dynamic Server, Workgroup Edition to read from and write to INFORMIX databases.
physical log	A set of contiguous disk <i>pages</i> where Dynamic Server or Dynamic Server, Workgroup Edition stores “before” images of changed pages prior to physically recording the changes.

physical unit	A fixed-sized unit of disk storage allocated for data — <i>chunks</i> and <i>blobpages</i> are examples of physical units.
preconfigured	The initial default selections or configurations for several NetWorker features.
RDBMS	An acronym for Relational Database Management System.
resource	A resource represents a component of the NetWorker software that describes the NetWorker server and its clients. Devices, schedules, clients, groups, and pools are all examples of NetWorker resources. Each resource contains a list of attributes, defining the parameters to use for the specific NetWorker resource. In the NetWorker Administration program, resources are represented as windows.
retention policy	A policy that determines how long save set entries are retained in the NetWorker server's media database.
RPC	An acronym for Remote Procedure Call, a protocol which allows a program running on one host to cause code to execute on another host without needing explicitly coded instructions.
save set	A set of files or a filesystem that NetWorker has backed up onto backup media during a backup session. Save sets are assigned a "save set id," an internal number which identifies the backup session to NetWorker for subsequent restoration to primary disk.
service	A program that is not invoked explicitly, but lies dormant waiting for a specified condition(s) to occur.
shell prompt	<ol style="list-style-type: none"> 1. UNIX command line prompt, either % or \$ (or # for super-user). 2. DOS command line prompt, for example, C:\.

storage manager	An application that manages the storage devices and media used for ON-Bar backup and restore requests. BusinessSuite Module for Informix is a storage manager that connects NetWorker to ON-Bar through XBSA.
volume pool	A feature that allows the NetWorker administrator to sort backup data to selected volumes. A volume pool contains a collection of backup volumes to which specific data has been backed up.
XBSA	An acronym for X/Open [®] Backup Services Application Programming Interface, which connects NetWorker functionality to ON-Bar. For more information about X/Open, visit the X/Open website at <i>www.xopen.org</i> .

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XBSA

