

**EMC<sup>®</sup> NetWorker<sup>®</sup>**  
**Module for Informix**  
Release 3.0  
UNIX and Windows Version

**Administration Guide**  
300-004-710  
REV A01

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Published June, 2007

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**Audience**

This document is part of the NetWorker Module for Informix documentation set, and is intended for use by the system administrator during configuration and setup of the product.

Readers of this document are expected to be familiar with the following topics:

- ◆ EMC NetWorker software
- ◆ Informix database software

**Related documentation**

Related documents include:

- ◆ *EMC NetWorker Module for Informix, Release 3.0, Multiplatform Version, Installation Guide*
- ◆ *EMC NetWorker Module for Informix, Release 3.0, Multiplatform Version, Release Notes*
- ◆ *EMC NetWorker Administration Guide Multiplatform Version*
- ◆ *EMC NetWorker Release Notes*
- ◆ UNIX man pages
- ◆ *EMC Command Reference Guide*
- ◆ *EMC Information Protection Software Compatibility Guide*

**Conventions used in this document**

EMC uses the following conventions for special notices.

**Note:** A note presents information that is important, but not hazard-related.



**IMPORTANT**

**An important notice contains information essential to operation of the software.**



## WARNING

**A caution contains information essential to avoid data loss or damage to the system configuration.**

### Typographical conventions

EMC uses the following type style conventions in this document:

<b>Normal:</b>	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> <li>Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus)</li> <li>Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, filenames, functions, utilities</li> <li>URLs, pathnames, filenames, directory names, computer names, links, groups, service keys, file systems, notifications</li> </ul>
<b>Bold:</b>	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> <li>Names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system call, man pages</li> </ul> Used in procedures for: <ul style="list-style-type: none"> <li>Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus)</li> <li>What user specifically selects, clicks, presses, or types</li> </ul>
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<code>Courier:</code>	Used for: <ul style="list-style-type: none"> <li>System output, such as an error message or script</li> <li>URLs, complete paths, filenames, prompts, and syntax when shown outside of running text</li> </ul>
<b>Courier bold:</b>	Used for: <ul style="list-style-type: none"> <li>Specific user input (such as commands)</li> </ul>
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< >	Angle brackets enclose parameter or variable values supplied by the user
[ ]	Square brackets enclose optional values
	Vertical bar indicates alternate selections - the bar means "or"
{ }	Braces indicate content that you must specify (that is, x or y or z)
...	Ellipses indicate nonessential information omitted from the example



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This chapter describes the features provided by the NetWorker Module for Informix and NetWorker software. It also provides a technical description of the NetWorker and NetWorker Module for Informix storage management process for protecting Informix data.

This chapter contains the following sections:

- ◆ [What is NetWorker Module for Informix](#) ..... 12
- ◆ [What is Informix ON-Bar](#) ..... 13
- ◆ [What is NetWorker](#) ..... 14
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- ◆ [AES encryption support](#) ..... 17
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## What is NetWorker Module for Informix

EMC® 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 EMC 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 Microsoft Windows and UNIX platforms.

---

## What is Informix ON-Bar

ON-Bar is a utility included with Dynamic Server. It 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

EMC NetWorker is a network data storage management solution that protects and helps manage data across an entire network. NetWorker software 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 backups during nonpeak 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 save stream to the same device.
- ◆ Optimize performance using parallel save streams 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

During a scheduled Informix backup:

1. The **nsrd** command on the NetWorker server triggers a scheduled Informix backup.
2. **savegrp** executes **nsrdbmi** on the client instead of a standard **save**.
3. The **nsrdbmi** command backs up data that is passed from ON-Bar and sends it to the NetWorker server through the NetWorker Module API.
4. 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 that is backed up. The client index entry is maintained in the index until expiration of the browse policy configured for the client save set.

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 can be recovered, 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.

[on page 16](#) shows how data moves from the database server to your NetWorker server during an ON-Bar backup session.

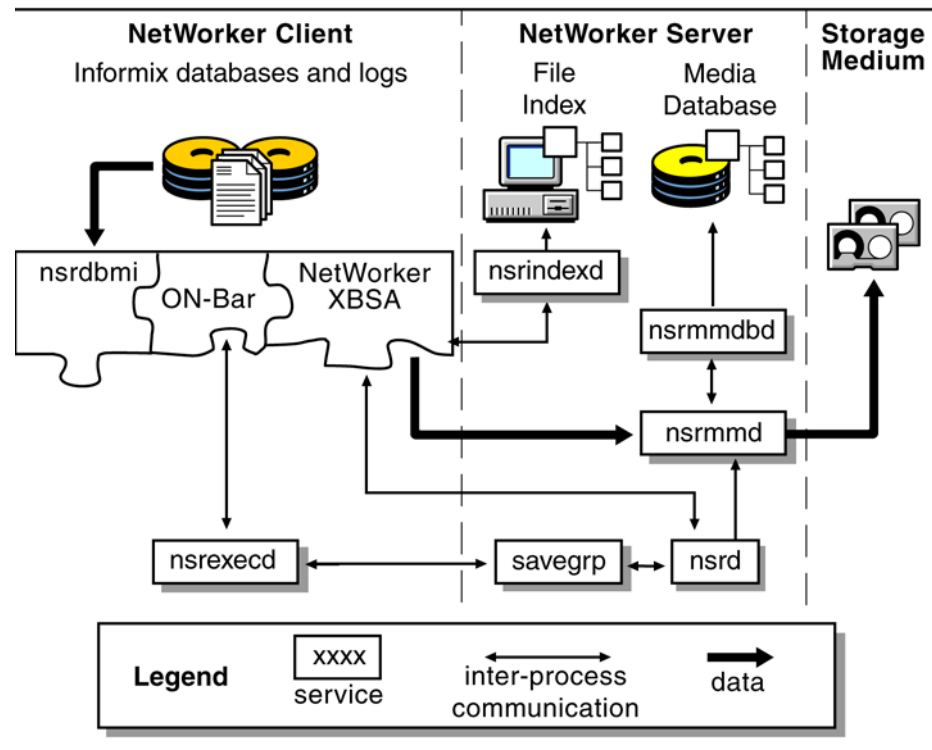


Figure 1 Backup initiated by NetWorker Module for Informix

## What happens during a NetWorker Module for Informix restore

When an ON-Bar restore request is initiated:

1. The NetWorker Module API translates the object names requested by ON-Bar into a format understood by NetWorker.
2. The NetWorker Module forwards it to the NetWorker server's `nsrd` service.
3. The `nsrmmd` media service searches the NetWorker server's online media database for the media containing the object(s) requested.
4. The media service recovers the data to the database server.



## AES encryption support

Enabling AES encryption improves the security of NetWorker Module backups. AES encryption is enabled by setting the `NSR_AES_ENCRYPTION` parameter to `TRUE`. AES encryption uses a key that is set in the Datazone passphrase field of the NSR resource on the NetWorker server.

Although the NetWorker module still supports ASM for encryption, do not set both ASM and AES encryption. The following error message will appear:

```
Both NSR_ENCRYPTION and NSR_AES_ENCRYPTION variables cannot be set simultaneously. Using NSR_AES_ENCRYPTION for backup
```

The `NSR_AES_ENCRYPTION` parameter for backup, and the `NSR_ENCRYPTION_PHRASES` parameter for restore, are used to configure AES encryption. The `NSR_AES_ENCRYPTION` parameter is set in `nsrdbmi` file for scheduled backup, and as an environment variable for on-demand backup. The passphrase for AES encryption is picked up from the passphrase set on the NetWorker server.

[“XBSA Environment Variables” on page 79](#) provides details on these parameters.

If AES encryption fails, NetWorker Module for Informix (NMI) exits and prints the cause of the failure. To ensure that the error is also written to the debug file, set the `NSR_DEBUG_FILE` variable.

## Internationalization support

The internationalization support available in this release of NetWorker Module for Informix allows it to operate in non-ASCII environments.

For the NMI software to operate in non-ASCII environments, you must have the following configuration:

- ◆ NetWorker 7.4.x client
- ◆ Supported OS configured to operate in a non-ASCII locale
- ◆ Informix Dynamic Server (IDS) installation configured with a non-ASCII character

NetWorker Module for Informix extends the internationalization support available in NetWorker, release 7.4. NetWorker software supports systems running in different locales (that is, multilocale data zones). When non-ASCII text data is transmitted between systems or processes no data loss will occur in NetWorker as a result of locale differences.

NMI accepts non-ASCII characters through its interface. All operational messages, such as debug messages appear in non-ASCII format; however, debug messages appear in ASCII format.

NMI logs operational messages are displayed in a locale-independent format. A log viewer, the NetWorker utility `nsr_render_log`, reads and interprets the messages based on the user locale setting at the time of rendering the log messages. The viewer then translates the messages using the appropriate message catalog that resides in language-specific directories. Catalogs are encoded in UTF-8. If a localized version of a message is not found, the log viewer displays the message in English.

NMI provides error messages in the non-ASCII language if the appropriate language pack is installed. For example, if a French language pack is installed and NetWorker Module for Informix is running in the French environment, then the messages returned to the Informix backup server by NetWorker Module for Informix are in French. However, if the language pack is not installed, then messages are returned to the Informix backup server in English only.

Non-ASCII filenames can be passed as command line options to the following ON-Bar commands:

- ◆ `onbar -b -f 'filename'`
- ◆ `onbar -r -f 'filename'`
- ◆ `onbar -v -f 'filename'`

When entering ON-Bar commands, the username, password and database names can be non-ASCII. The keyword must be ASCII.

You can specify non-ASCII characters for the following environment variables in the `nsrdbmi` script:

- ◆ `BOOTFILE_LIST`
- ◆ `INFORMIXDIR`, `INFORMIXDIR` and `ONCONFIG`
- ◆ `POSTCOMD`
- ◆ `PRECMD`
- ◆ `NSR_DEBUG_FILE`

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

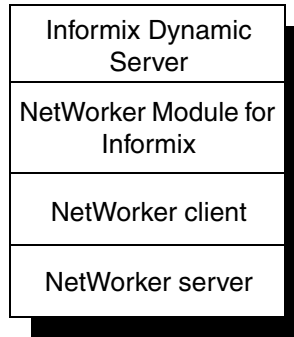
This chapter consists of the following sections:

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- ◆ Installation requirements for multiple database backup..... 22
- ◆ Configuring the NetWorker server ..... 23
- ◆ Restarting the NetWorker Remote Exec Service..... 25

## 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 2 on page 20](#). The disadvantage of this configuration is the risk of a single point of failure.

### Database host /NetWorker server



**Figure 2** 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 3 on page 21](#). The Informix server or Informix client is a remote NetWorker client.

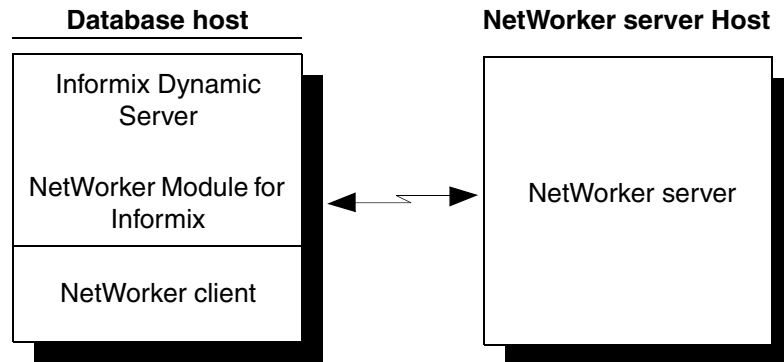


Figure 3 NetWorker server on a separate system

## Installation requirements for multiple database backup

NetWorker Module for Informix supports concurrent backups of separate Informix database files on the same system. The module should be installed only once per system, regardless of the number of Informix databases requiring backup. All Informix database files can be backed up to the same NetWorker server, local or remote.

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 Informix database computer, or on a separate Windows or UNIX system.

Figure 4 on page 22 and Figure 5 on page 22 illustrate examples of multiple database installations.

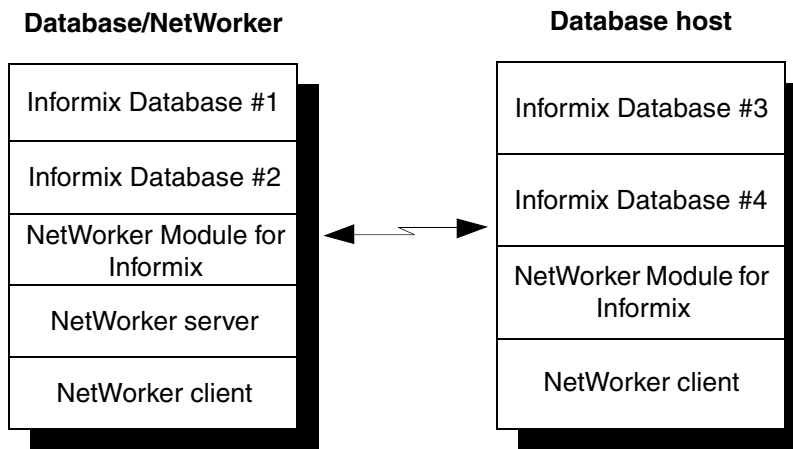


Figure 4 Multiple database backup on same system

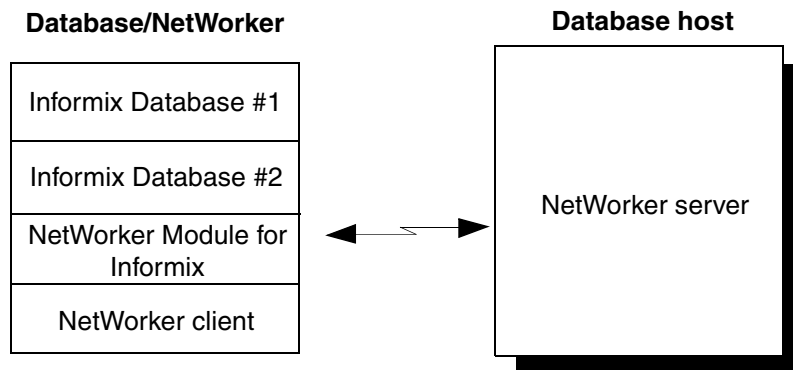


Figure 5 Multiple database backup on different system

## Configuring the NetWorker server

To use NetWorker Module for Informix, each Informix database system requiring backup and restore services must have associated Server and Client resources configured on the NetWorker server.

Use the NetWorker Management Console to define custom settings for backup groups and volume pools. If the NetWorker resources settings are not customized before defining each Informix server as a NetWorker client, NetWorker will use the default settings during backup. For example, customize the settings for backups of database files and system files to different media. [Chapter 3, "Ad hoc Backups,"](#) information on defining custom NetWorker resource settings.

### Configuring the Server resource

Configuring the NetWorker Server resource involves the following:

- ◆ ["Customizing settings in the Server resource" on page 23](#)
- ◆ ["Modifying the Windows system variables" on page 23](#)
- ◆ ["Adding the Informix database server to the NetWorker list of clients" on page 24](#)

### Customizing settings in the Server resource

To configure a Server resource to back up the Informix client:

1. In the Server resource, select Setup to display the **Parallelism** attribute.
2. Set the **Parallelism** to a value that is equal to or greater than the number of save streams that the Informix client sends to the NetWorker server. The value can be from from 1 to 512.
3. Enable **Manual Saves** by selecting the checkbox.
4. Save your changes and exit the Server resource.

### Modifying the Windows system variables

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

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

1. Log in as Windows Administrator or equivalent.
2. Open the Windows Control Panel and double-click the **System** icon to open the **System Properties** dialog box.
3. Click the **Environment** tab to display the **Environment** dialog box.
4. Add the NetWorker XBSA variables from [Table 1 on page 24](#) to the system variables:
  - a. Type the variable name in the **Variable Name** box.
  - b. Type the appropriate value in the **Value** box. Enter the volume pool values exactly as shown in [Table 1 on page 24](#).
  - c. Click **Apply** to add each change to the system variable list.

t.

**Table 1 NetWorker XBSA variables**

Variable name	Value
NSR_SERVER	your_NetWorker_server_name
NSR_DATA_VOLUME_POOL	DBMIData
NSR_LOG_VOLUME_POOL	DBMILogs

5. Reboot before running the first 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.**

**Adding the Informix database server to the NetWorker list of clients**

With NetWorker Module for Informix, the Informix Server databases and transaction logs can be backed up according to a user-defined schedule. Add the database server to the NetWorker server's list of clients, and then specify the data to be backed up and the backup level on specific days. NetWorker backs up the 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 systems running Informix database versions 9.4 or 10.

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 in as Windows Administrator or equivalent. You must have both Administrator Group and *informix user* authority to perform this task.
2. Open the Windows Control Panel.
3. Double-click the **Services** icon to open the **Services** dialog box.
4. Select the **NetWorker Remote Exec Service** entry in the Service list box and click **Stop**.
5. Double-click the **NetWorker Remote Exec Service** entry to open the **Service** dialog box.
6. In the **Log On As** group, select **This Account** and type the *informix user* account information in the box.
7. Type the *informix user* password in the **Password** box.
8. Type the *informix user* password a second time in the **Confirm Password** box and click **OK**.
9. In the **Services** dialog box, click **Start** to restart the **NetWorker Remote Exec Service**.
10. Click **Close** to save the changes.



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

Informix database and transaction log backups can be customized using NetWorker *resources*. The resource settings are specified in the NetWorker Management Console (NMC).

If the resource settings are not customized before defining a NetWorker client, the backup uses default resource settings. For additional instructions, review the information in this chapter, and the *EMC NetWorker Administration Guide*.

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## 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. [“Backup groups” on page 29](#) provides details.
2. Define the volume pools for Informix backups. [“Volume pools” on page 31](#) provides details.
3. Specify a browse and retention policy. [“Specifying browse and retention policies” on page 37](#) provides details.
4. Create or choose a backup schedule. [“Keep copies of logical log file backups until the associated database file save sets have exceeded their browse policy.” on page 38](#) provides details.
5. Configure a client for each Informix server that requires backup and recover services. [“Configuring a database server as a NetWorker backup client” on page 39](#) provides details.
6. Configure each of your storage or remote devices. [“Storage nodes and remote devices” on page 42](#) provides details.

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## Backup groups

NetWorker backup groups are used to specify the time of a scheduled client 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. 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

The Default group's attributes can be modified, but Default cannot be deleted from the list of NetWorker groups.

---

### Assigning groups

To assign an Informix database server to another group with different attributes, use the NetWorker Management Console. 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.
2. Select **Manage Clients** and create a new client.
3. Associate the client with an appropriate group.
4. In the **Remote** tab, type **nsrdbmi** in the **Backup command** field.

The *EMC NetWorker Administration Guide* provides details on creating up a backup group.

---

### Customizing backup groups

If a large number of Informix databases reside on the network, 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 the 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 time for each group far enough apart to ensure that one group completes a backup before the next begins.

The *EMC NetWorker Administration Guide* provides details on setting up a backup group.



**IMPORTANT**

**Always enable the Autostart option for each group configured, otherwise the scheduled group backup will not occur.**

---

**Printer configuration**

To send a copy of the NetWorker server 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. The *EMC NetWorker Administration Guide* provides details on how to use Expert Mode.

---

## Volume pools

With NetWorker, backups can be directed to groups of media called pools. A volume pool is an assigned collection of storage volumes NetWorker uses to sort and store data. Pools enable logical and systematic methods to be established for tracking, organizing, and sorting backup 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.

---

### NetWorker pool types

Volume pools provide the ability to segregate backup 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 archived, backed up, or migrated data.

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

- ◆ Backup
- ◆ Backup clone

The *NetWorker Administration Guide* provides detailed information on pool types.

---

### 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) or the nsrdbmi script (UNIX), where DBMIData is the default for dbspaces and DBMILogs is the default for log files.
2. NetWorker 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 selected during the configuration of volume pools, to sort backup data to specific storage volumes labeled 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, etc.)
- ◆ Save set (dbspaces and log files)

With NetWorker Module for Informix, pools are used to separate dbspaces, blobspaces, and logical logs from other file system data. By default, NetWorker Module uses the following pools to sort dbject 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 is pool and label template for selected dbspace and whole system backups
- ◆ DBMILogs is pool and label template for logical log backups.

---

## 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 dbspace and logical log backups by object type to direct the data to the appropriate volume pool.

### Directing dbjects to the same pool as file system data

To direct dbspace and logical log backups to the same pool as other file system data, open the `nsrdbmi.bat` batch file (Windows) 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
```

[“Step 3: Modify the pool variables in the nsrdbmi backup file” on page 36](#) provides more information on modifying pool variables.

### Directing dbspace and logical log backups to specific volume pools

If an entire department’s file system data is in the same NetWorker group, dbspace and logical log backups are included 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) 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
```

[“Step 3: Modify the pool variables in the nsrdbmi backup file” on page 36](#) provides details.



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

The *EMC NetWorker Administration Guide* provides information on 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 automatically back up logical logs as they become full, modify the automatic log backup script, `log_full.sh` (UNIX) or `log_full.bat` (Windows) on the OnLine Dynamic Server machine 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:

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

For customized logfile backups, be sure to replace DBMILogs with the name of the customized pool.

---

### Performing continuous logical log backups

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.**

---

### Customizing volume pools for Informix database backups

The DBMIData and DBMILogs pools can be customized for the environment, just as NetWorker pools. For example, sort by department, type of database maintained, or backup level.

To customize volume pools and label templates for Informix data:

1. [“Step 1: Create a custom label template” on page 34](#) explains how to create custom label templates for your dbspace and logical log backups.
2. [“Step 2: Create a custom volume pool” on page 35](#) explains how to create custom volume pools for dbspace and logical log backups.
3. [“Step 3: Modify the pool variables in the nsrdbmi backup file” on page 36](#) provides instructions on modifying the values assigned to the NetWorker XBSA variables `NSR_DATA_VOLUME_POOL` and `NSR_LOG_VOLUME_POOL`, and adding new pool names to the `nsrdbmi.bat` batch file (Windows) or the `nsrdbmi` script (UNIX).

[“Creating an Informix Client resource” on page 39](#) provides instructions for entering the name of the `nsrdbmi.bat` batch file (Windows) or the `nsrdbmi.sh` script (UNIX) in

the Backup command field in the Client resource for the appropriate database instance.

During configuration, NetWorker adds the pool to its list of Volume resources and to the choices available for labeling volumes. When a pool is selected for labeling volumes, NetWorker uses the label template 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, 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. Complete details on label templates are provided in the *NetWorker Administration Guide*.

To create a label template:

1. In the **Administration** window, click **Media**.
2. In the expanded left pane, select **Label Templates**.
3. From the **File** menu, select **New**.
4. Enter the components for the label template:
  - **Name:** The name of the new label template. Label template names can contain *only* alphanumeric characters.
  - **Comment:** Any user-defined description or explanatory remarks about the label.
  - **Fields:** A list of label components.
  - **Separator:** The character to be inserted between label components. If no symbol is selected, the components will have no separators, such as hostarchive[001-999].
  - **Next:** (Optional) Enter the next label to be generated by the template.
  - Click **OK**.
  - NetWorker does not allow the following characters in a label template name:  
 / \ \* [ ] \$ ! ^ ' ; ' ~ < > & | { }

NetWorker displays an invalid character message if you attempt to save a configuration containing a field separator in the label template name.
5. 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.
6. Provide the alphabetic or numeric range for the volumes.
7. 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.

The *EMC NetWorker Administration Guide* provides instructions on using NetWorker label templates and labeling and mounting backup volumes.

## 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. In the NetWorker Management Console (NMC) **Administration** window, click **Media**.
2. In the left pane, select **Media Pools**.
3. From the **File** menu, select **New**.
4. In the **Name** attribute, enter a name for the media pool such as InformixData.
5. Select a pool type. NetWorker Module for Informix supports **Backup** or **Backup clone** pools.
6. Select a customized **Label Template** or accept the one NetWorker generates.
7. Select a backup group that is unique for Informix as the choice for **Groups**.
8. Select a backup device from the **Devices** list.
9. Type the pool name in the **Save Set** field.
  - To back up an instance of all dbobjects for the database server, delete the choice **All** from the scrolling list and enter the OnLine Dynamic Server instance name.
  - To back up 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 is the equivalent of performing an **onbar -b -L <level> dbspace01** on the venus instance:
 

```
INFORMIX: /venus/dbspace01
```
10. In the **Levels** field, specify the level of backup for the pool.
11. Select **Yes** as the choice for **Store Index Entries**.
12. Select **Yes** for **Enabled**.
13. Save the pool configuration.

### 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, Be sure to include the new values for the associated NetWorker Module pool variables in the nsrdbmi.bat batch file (Windows) 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.

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

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

1. Copy the nsrdbmi.bat batch file (Windows) or the nsrdbmi script (UNIX) and give it a new name. For example, nsr\_acct.bat (Windows) or nsr\_acct (UNIX).
  - Begin the new filename with nsr or save.
  - For Windows, assign the new file a .bat extension. If the .bat extension is not used, 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 the 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 filename in the **Backup Command** box, for example:
  - nsr\_acct.bat for Windows
  - nsr\_acct for UNIX
5. Run a test backup after making any pool configuration changes to ensure that 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 the database server as a NetWorker client. [“Configuring a database server as a NetWorker backup client” on page 39](#) provides instructions.

The *EMC NetWorker Administration Guide* provides complete instructions on creating NetWorker pools.

## 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.

Saveset browse and retention time can be specified while taking backups using ON-Bar. You must use two environment variables, NSR\_SAVESET\_BROWSE and NSR\_SAVESET\_RETENTION to set the browse and retention time respectively. The policy must be specified in the formats used by nsr\_getdate. The *EMC NetWorker Administration Guide* provides details on nsr\_getdate.

The browse policy determines how long the client file index maintains a browsable entry. After a browse policy expires, use the **scanner** program to rebuild the online 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. Upon expiration of all the retention policies for the save sets on a volume and other dependent save sets, the volume is given a status of recyclable. Until the volume is relabeled, use the **scanner** command to extract a save set from a volume and rebuild the online indexes.

### Preconfigured NetWorker policies

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

NetWorker provides the preconfigured policies shown in [Table 2 on page 37](#).

**Table 2** NetWorker preconfigured policies

Policy name	NetWorker behavior
Decade	Available for 10 years
Half Year	Available for 6 months
Month	Available for 1 month
Week	Available for 1 week
Year	Available for 1 year

“Manually Managing the online Indexes” in the *EMC NetWorker Administration Guide* provides instructions on managing indexes manually.

---

## 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.

## 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 to which the save set belongs.
- ◆ 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 Client resource provided by the NMC. The NetWorker server uses information contained in a Client resource during backup and restore sessions.

### Creating an Informix Client resource

To configure a system running Dynamic Server as a NetWorker client:

1. Create a backup group following the instructions provided in [“Customizing backup groups” on page 29](#).
2. Create a customized backup schedule using the backup levels listed in [Table 3 on page 39](#).

**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



#### **IMPORTANT**

**ON-Bar does not support the NetWorker 3-9 backup levels. If you use a value other than those listed for ON-Bar in [Table 3 on page 39](#), ON-Bar will revert and use level 0 (full), 1, or 2.**

3. Create a NetWorker client using the hostname of the system running Dynamic Server.

4. Specify a saveset in the **Save Set** field. Use one of the following formats:

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

- a. Delete t **All** from the list.
- b. Enter the Informix database server name:

**INFORMIX:/venus**

The entry in this example is the equivalent of performing an **onbar -b -L level** on the venus instance.

To back up a *selected-dbobject* for the database server instance:

- Select a group.
- Select a schedule.
- Leave the attribute for **Directive** blank.
- Select a browse policy.
- Select a retention policy.
- In the **Preferences** tab, enter all known aliases in the **Aliases** field for the system where Dynamic Server software is installed.
- Include the dbspace or blobspace name in the save set string.
- To specify more than one dbject, make a separate save set entry for each dbject:

**INFORMIX:/venus/dbspace01**

The entry shown in this example is the equivalent of performing an **onbar -b -L level dbspace01** on the venus instance.

5. In the **Remote** tab, enter the name of the backup file, nsrdbmi.bat for Windows or the nsrdbmi.sh script for UNIX, for the backup command. The backup file indicates to the NetWorker server:
- The location of Informix database files on the client.
  - 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 clients only, enter **informix** as the remote user, and enter the appropriate password.
7. Leave the **Remote Access** attribute blank.
8. Click **OK** to save the Client resource.

The *Informix Backup and Restore Guide* included with the database server software provides details about the types of backups supported by ON-Bar.



---

## 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 or the nsrdbmi.sh script for UNIX.
2. Change the value assigned to ONCONFIG to reflect the value assigned for the instance.

The *EMC NetWorker Administration Guide* provides complete details on configuring a client.

---

## 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 added to your NetWorker configuration can increase the NetWorker servers's performance, provide more flexibility in designing the 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.

---

### 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.

Use NMC to control operations on local and remote devices, including autochangers and silos.

---

### 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 adding a storage node device.
3. For an autochanger or silo, define the devices in the NMC, 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

Configure remote stand-alone devices with the controlling NetWorker server just as you would configure stand-alone devices that are connected to the 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`. The NetWorker online help for configuring devices provides specific instructions.

---

## 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 NMC on the storage node system to define each device in the autochanger or silo.

The *EMC NetWorker Administration Guide* provides more information on configuring remote autochanger or silo.



---

This chapter describes how to configure and perform scheduled Informix backups. It outlines the procedures for testing and monitoring scheduled backups that use the NetWorker Management Console (NMC).

This chapter contains the following sections:

- ◆ [Creating scheduled backups.....](#) 46
- ◆ [Testing scheduled backups .....](#) 49
- ◆ [Monitoring backups.....](#) 50

## Creating scheduled backups

To create scheduled backups and coordinate the 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, configure the `nsrdbmi.bat` batch file (Windows) 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) 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.

When entering values for environment variable, use the following guidelines:

- Values must be lowercase
- Values containing spaces must be contained in quotes
- Uncomment all environment variables used for backups

For example:

For UNIX:

```
environmental_variable = value
export environmental_variable
```

For Windows:

```
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:

```
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:

```
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) or the nsrdbmi script (UNIX) are as follows:

**Note:** this example shows Windows settings. For UNIX, do not use SET in front of the variable.

```
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 backups

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.
 

[“Creating an Informix Client resource” on page 39](#) provides details on creating an Informix Client resource.
- ◆ The backup file (nsrdbmi script) must reside in the same directory as the NetWorker **save** command, for example:
 

```
/nsr/bin
```
- ◆ The nsrdbmi backup file is available with the NetWorker Module software. Be sure to make a copy of the downloaded original nsrdbmi backup file. Modify only copies of the original nsrdbmi backup file, as the NetWorker Module for Informix default settings might require reinstating.

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

- ◆ [“Testing scheduled backups” on page 49](#) explains how to perform a test backup.
- ◆ [Appendix A, page 79](#) provides a list of valid NetWorker environment variables and valid values.

---

## Sending email notification of the results of a scheduled backup

To send an email 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.

The *EMC NetWorker Administration Guide* provides details on configuring a client.

---

## 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.

The “Installation in a cluster Environment” section in the *NetWorker Module for Informix Installation Guide* provides details on installing NetWorker Module for Informix in a cluster environment.

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. [Appendix A, page 79](#) provides details on setting environment variables.



---

## Testing scheduled backups

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

---

### Testing on Windows

To test a scheduled backup:

1. Log in as Administrator on the NetWorker server.
2. Start NMC.

The *EMC NetWorker Administration Guide* provides information on using the NMC.

3. From the **Administration** window, click **Configuration**.
4. In the expanded left pane, select **Groups**.
5. Right-click the group and select **Backup**.

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

[Chapter 6, "Performing Database Restores,"](#) provides details on performing a recovery.

---

### Testing on UNIX

To test a scheduled backup:

1. Log in as *root* on the NetWorker server.
2. Run the NMC on the NetWorker server.

The *EMC NetWorker Administration Guide* provides information on running the NMC.

3. From the **Administration** window, click **Configuration**.
4. In the expanded left pane, select **Groups**.
5. Right-click the group and select **Backup**.

[Chapter 6, "Performing Database Restores,"](#) provides details on performing a recovery.

## 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. Specify the location of the activity log in the `BAR_ACT_LOG` configuration parameter defined in the `IDS ONCONFIG` file, or use the default location:

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

### Monitoring backups from the NetWorker server

NetWorker displays messages in the NMC 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 no backup volume is mounted on the server.

To verify that a backup volume is mounted, check the **Pending** box in the NMC.

NetWorker provides several reports about the results of a backup:

- ◆ An email “savegroup completion” notice upon completion of a scheduled backup. You can edit the notification setup for this report using the **Customize** feature of the NMC (UNIX NetWorker servers only). The *EMC NetWorker Administration Guide* provides details on using the NMC to customize your notifications.
- ◆ A series of messages written to the NetWorker message log files. [Appendix A, “XBSA Environment Variables,”](#) provides more information about the NetWorker software and NetWorker XBSA messages.
- ◆ A list of messages is displayed in the NMC, for example:

```
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 list of messages is displayed in the NMC Group Control window. These messages are displayed in three lists:

- Pending save sets
- Completed save sets
- Failed save sets

A columnar version of the details displayed in the Group Control window is available.

- ◆ A printout of the NetWorker server's bootstrap file for the backup session, showing the following:
  - 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 bootstrap file):

```
August 26 01:30 2006 mars's bootstrap information
date  time      level ssidfile record volume
8/26/9811:59:15 full 1654010 venus.DBMIData.001
8/26/9812:02:39 full 16564 10venus.DBMILogs.001
8/26/9812:05:44 full 1656610venus.001
```

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

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

```
nsrinfo -s jupiter -n informix -X
nformix mars scanning client `mars' for all savetimes
/venus/rootdbs/0, rootdbs, 1.2 MB, Mon Aug 26 12:05:44 2006, full
/venus/01/29, logical log, 123 KB, Mon Aug 26 12:02:39 2006, full
/venus/dbspace01/0, dbspace, 9.3 MB, Mon Aug 26 11:59:15 2006, 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
```

The following sources provide complete information on using the **nsrinfo** command:

- ◆ **nsrinfo** man page (UNIX servers)
- ◆ *EMC NetWorker Administration 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

The documentation included with Informix server software provides details on querying catalog tables for information.

The *EMC NetWorker Administration Guide* provides complete details about the reports generated by NetWorker. The *EMC NetWorker Disaster Recovery Guide* provides suggestions on using these reports as a part of your disaster recovery plan.

---

This chapter describes how to use EMC 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. “[Configuring a database server as a NetWorker backup client](#)” on page 39 provides details.

The following topics are discussed in this chapter:

- ◆ [Performing on-demand backups using ON-Bar](#)..... 54
- ◆ [Monitoring backups](#)..... 58

## Performing on-demand backups using ON-Bar

When you initiate an on-demand backup, ON-Bar connects to NetWorker through an XBSA API, which passes dbobjects through a shared library. 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.

When setting up a system running a database server as a client of the NetWorker server, several variable settings are configured and passed to ON-Bar by the parameter file (nsrdbmi). The nsrdbmi file is invoked during a scheduled backup but not during an on-demand NetWorker backup using ON-Bar. In this case you should provide values for several NetWorker XBSA environment variables to ensure that NetWorker writes the backup to the appropriate volume pool. [“Required NetWorker XBSA variables for on-demand backups” on page 54](#) provides more information on setting XBSA variables.

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

To initiate on-demand backups of your database server, you can do one of the following:

- ◆ Invoke ON-Bar from the IECC. [“On-demand backups from the Informix Enterprise Command Center” on page 56](#) provides details.
- ◆ Invoke ON-Bar from the command line interface. [“On-demand backups from the Informix command line interface” on page 55](#) provides details.

You can set the environment variables using the command line interface.



### **IMPORTANT**

**If explicit settings are not provided for the required NetWorker XBSA variables, on-demand NetWorker backups use the default NetWorker backup settings. This means that the log files, dbspaces, and blobspaces might be directed to the NetWorker Default media pool.**

## Required NetWorker XBSA variables for on-demand backups

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

- ◆ DBMIData
- ◆ DBMILogs

When initiating 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 there are customized pools for dbobjects:

- ◆ Make sure that the new pool names are also set in the NetWorker XBSA environment variables.
- ◆ Set values for the following NetWorker XBSA variables using the same values assigned for scheduled NetWorker backups of the database server:

For UNIX:

```
NSR_SERVER=networker_servername
NSR_DATA_VOLUME_POOL=dbmidata_pool
NSR_LOG_VOLUME_POOL=dbmilog_pool
```

For Windows:

```
set NSR_SERVER=networker_servername
set NSR_DATA_VOLUME_POOL=dbmidata_pool
set NSR_LOG_VOLUME_POOL=dbmilog_pool
```

- ◆ If the pool variables remain blank, NetWorker uses its pool settings for NetWorker file system 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 volumes mount from the appropriate pools on storage devices.



### IMPORTANT

**If a value is not specified for the NetWorker XBSA variable NSR\_SERVER before issuing an ON-Bar command, NetWorker searches for the correct server to use. Setting the NSR\_SERVER variable helps avoid potential delay in the backup process.**

[Appendix A, “XBSA Environment Variables,”](#) provides information about the NetWorker XBSA environment variables and valid values.

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

## On-demand backups from the Informix command line interface

in addition to the variables listed in the previous section, you should include the following two Windows system variables for on-demand backups initiated from the Informix command line interface. In addition to the variables described in the previous section, you must modify the NSR\_DEBUG\_FILE and NSR\_DEBUG\_LEVEL variables. Modify the values to include:

“[On-demand backups from the Informix command line interface](#)” on page 55 explains how to start an on-demand backup from the command line.

If using the Informix command line interface to initiate on-demand ON-Bar backups of the database server, modify the Windows system variables or the UNIX environment variables.

For UNIX:

```
NSR_DEBUG_FILE=/nsr/applogs/xbsa.messages
NSR_DEBUG_LEVEL=5
```

For Windows:

```
set NSR_SERVER=\nsr\applogs\xbsa.messages
set NSR_DATA_VOLUME_POOL=5
```

To modify the Windows system variables to include values for NSR\_DEBUG\_FILE and NSR\_DEBUG\_LEVEL:

1. Open the Windows **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** box and the appropriate value in the **Value** box.

**Table 4 NetWorker XBSA variables for Informix command line**

Variable name	Value
NSR_DEBUG_FILE	\\nsr\applogs\xbsa.messages
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

After installing and configuring NetWorker Module for Informix, invoke ON-Bar from the IECC to perform on-demand NetWorker backups of your database server instances. The *Informix Backup and Restore Guide* provides details on using the IECC.

For NetWorker Module to connect to the IECC, direct dbspace and logical log backups to custom volume pools, required environment variables must be set. [“Required NetWorker XBSA variables for on-demand backups” on page 54](#) provides details.

## On-demand backups and NetWorker 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.



### **IMPORTANT**

**Performing regular, scheduled NetWorker backups of the database server provides maximum protection for 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
savegrp -o group-name
```

The **savegrp** man page provides a complete description of the **savegrp** command and command options..



## 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 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
```

## Monitoring backups

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

### Monitoring backups from the Informix database server

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 in the `IDS ONCONFIG` file, or use the default location:

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

### Monitoring backups from the NetWorker server

NetWorker displays messages in the NMC 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 NMC.

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 2006, full  
/venus/01/29, logical log, 123 KB, Mon Aug 26 12:02:39 2006, full  
/venus/dbspace01/0, dbspace, 9.3 MB, Mon Aug 26 11:59:15 2006, 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
```

The following sources provide information on using the `nsrinfo` command:

- ◆ `nsrinfo` man page (UNIX servers)
- ◆ *EMC NetWorker Administration 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

The database server software documentation provides details on querying catalog tables for information.

The *EMC NetWorker Administration Guide* provides complete details about the reports generated by NetWorker. The *EMC NetWorker Disaster Recovery Guide* provides suggestions on using these reports as a part of the disaster recovery plan.



In the event of data corruption or a disk crash, use NetWorker Module for Informix to restore data backed up by NetWorker to your Informix server. With NetWorker Module, use the ON-Bar command line interface or IECC to perform on-demand restores 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*
- ◆ *EMC NetWorker Disaster Recovery Guide*
- ◆ **nsr\_crash** Command line utility help file (Windows servers)
- ◆ **nsr\_crash** man page (UNIX servers)

This chapter contains the following sections:

- ◆ [Configuring a restore](#) ..... 62
- ◆ [Restoring data with ON-Bar](#) ..... 62
- ◆ [Restoring Informix data in a cluster environment](#) ..... 63
- ◆ [Informix Dynamic Server mode restores](#) ..... 63
- ◆ [Viewing the index entries](#)..... 64
- ◆ [Monitoring a restore](#) ..... 65
- ◆ [Performing an imported restore of a Dynamic Server](#)..... 66

## 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:

```
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 IECC, verify that the following environment variables are set correctly:

- ◆ NSR\_SERVER
- ◆ NSR\_CLIENT

The *Informix Backup and Restore Guide* provides details on using the IECC.



### **IMPORTANT**

**If a value is not specified for the NetWorker XBSA variable NSR\_SERVER before issuing an ON-Bar command, NetWorker searches the network for the correct server from which to restore data. 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 dbject restores from the backup media managed by NetWorker:

- ◆ **Physical Restorev**— replaces lost or corrupted dbjects 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 commands:

```
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 dbject backup, followed by a rolling forward of the logical log files backed up for the dbjects. If different backup sessions are involved, the log rolls forward transactions made since the backup time recorded for each dbject restored.

To perform a logical restore, use the following commands:

```
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 commands:

```
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 commands:

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

The *Informix Backup and Restore Guide* provides additional 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 using the database server in one of three modes:

- ◆ [“Cold restore” on page 64](#)
- ◆ [“Warm restore” on page 64](#)
- ◆ [“Mixed restore” on page 64](#)

The Informix utility, ON-Bar maintains a history of backup and restore operations in the sysutils database, and stores an extra copy of the backup history in the emergency boot file. ON-Bar uses the sysutils database in a warm restore (which restores noncritical data while the Dynamic Server is online or quiescent) when only a portion of the data is lost. ON-Bar uses the emergency boot file in a cold restore (which restores noncritical data when the Dynamic Server is offline) when the sysutils database cannot be accessed.

The Informix IDS `onsmsync` utility is used to regenerate the emergency boot file and expire the old backups. Depending on the command options used, the `onsmsync` utility removes the following items from the `sysutils` database and the emergency boot file:

- ◆ Backups that the storage manager has expired
- ◆ Old backups based on the age of backup
- ◆ Old backups based on the number of times they were backed up

For example, if the following command is used, then backups that started before November 24, 2000 and are expired, would be removed:

```
onsmsync -t "2000-11-24 00:00"
```

---

## 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. The *Informix Backup and Restore Guide* provides 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. Click the **Indexes** button (UNIX) or tab (Windows) in the NetWorker Management Console (NMC) **Administration** window.
2. Select the entry for which you want to view the details. The listing displayed for the entry 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 begins, the Recover Status window appears in order to 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

The On-Bar activity log can be used 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.

The information in the activity log can 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

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

Use the imported restore feature under the following circumstances:

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

Use the following procedure 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, first back up your database files on the original Dynamic Server, and then restore files on the 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) 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:
    - *%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 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:

Create a shortcut from your source INFORMIXDIR to your target INFORMIXDIR. The operating system documentation provides information on creating a shortcut.

The *Dynamic Server Administration Guide* provides instructions on how to set up a new database.



### **IMPORTANT**

**To perform an imported restore, use the same database server number on the target computer that was used on the source computer. The database server name can be changed in an imported restore.**

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

For an IDS Dynamic Server, type:

```
onmode -ky
```

To restore your files on the target Dynamic Server:

1. Set up the target Dynamic Server with exactly the same disk layout as the one from which you are transferring the data.
2. Install the NetWorker client software and install and enable the NetWorker module. The platform-appropriate *EMC NetWorker Installation Guide* provides 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 by adding the server to the Remote Access list in the Client resource. For example:

```
*@tgt_dbservername
```

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:
  - %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 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

To avoid transferring data over a slow network when performing an imported restore to a remote computer, use the storage node feature of NetWorker to improve the performance.

First, you must physically transfer the media (for example, the tapes) containing the backup of the storage spaces, as well as the logical logs, to the remote location. Then, install the storage node on the remote computer. Configure the NetWorker server to use the remote device of the storage node.

[“Performing an imported restore of a Dynamic Server” on page 66](#) describes how to perform a restore operation.

The *EMC NetWorker Administration Guide* provides information on storage nodes.

---

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 associated logical logs, you are 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 *EMC NetWorker Disaster Recovery Guide*.

This chapter contains the following sections:

- ◆ [Dynamic Server disk crash .....](#) 70
- ◆ [NetWorker and Dynamic Server disk crash.....](#) 70

## 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 file system) 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 *EMC 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. The *EMC NetWorker Installation Guide* appropriate for your platform provides 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.servernum \
$INFORMIXDIR/oncfg_servername.servernum
```

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.

The documentation provided with your Informix Dynamic Server software provides additional information on using ON-Bar to restore data from backup media managed by NetWorker.





---

This chapter has troubleshooting information that addresses issues that might arise while operating and configuring NetWorker Module for Informix software.

This chapter contains the following sections:

- ◆ Multiple servers configured for backing up an Dynamic Server instance ..... 74
- ◆ No dbspaces/blobspaces found to back up or restore ..... 74
- ◆ Unable to open connection to server ..... 75
- ◆ Default value assigned to LTAPEDEV causes failure ..... 75
- ◆ Media required for restore is missing or damaged ..... 75
- ◆ ON-Bar status code 3 ..... 76
- ◆ XBSA message log information ..... 77

## 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 2006
End time: Tue Sep 24 04:07:47 2006
--- 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 dbspaces/blobspaces found to back up 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:

```
2006-08-07 12:56:24 15612 15606 WARNING: DB/BLOBspace bogus_space
does not exist.
2006-08-07 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 offline 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:

```
2006-08-07 13:07:29 15671 15665 onbar -b -L 0
2006-08-07 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 online mode, and 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:

```
2006-09-25 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.

## 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 you have the NetWorker cloning option enabled for the backup group.

- ◆ If cloning is enabled in the NetWorker server 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. The following resources provide detailed instructions on how to perform a point in time restore:
  - [Chapter 6, "Performing Database Restores,"](#)
  - *Informix Dynamic Server Backup and Restore Guide*

## 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 the following 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): NetWorker 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.

## Enabling NetWorker Module

The NetWorker Module enabler comes in both Windows and UNIX versions. In the Registration Window, both appear 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 *EMC 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 EMC 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 operating system

If you enter the Windows version of NetWorker Module enabler code on to a UNIX NetWorker server or the UNIX version of this enabler code on to a Windows NetWorker server, neither will function. Although the name attribute of the License resource is identical for both Windows 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, 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 it must be in your user search path. The default location of the `nsrccap` command for Windows is `C:\win32app\nsr\bin`. For UNIX, the default location is `/usr/bin` or `/usr/sbin`.

The Windows 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, the license type attribute is Z11, while for UNIX the license type attribute is D11. Also note that the enabler codes in the previous example are identical to the temporary enabler codes located in the *NetWorker 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 EMC Customer Service.

## XBSA message log information

valuable troubleshooting information can be found in the `xbsa.messages` file, which requires the `NSR_DEBUG_FILE` and `NSR_DEBUG_LEVEL` variables to be set. [Appendix A, "XBSA Environment Variables,"](#) provides instructions on setting these variables.

## 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 the customized version of the `nsrdbmi` file with a text editor.

2. Change the value assigned to NSR\_DEBUG\_FILE to include the complete pathname and filename 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:

```
NSR_DEBUG_LEVEL=5
```

Set the variable to 9, to print all messages.

4. Save the modified file.
5. Enter the name of the customized nsrdbmi file in the **Backup command** 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 Windows, you can also modify these values in the system variables list. If you modify NSR\_DEBUG\_FILE and NSR\_DEBUG\_LEVEL in Windows system variables list, you reboot for the changes to take effect. Set the level to 9, to print all messages. [“On-demand backups from the Informix Enterprise Command Center” on page 56](#) provides instructions on changing variables on Windows.

---

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

This appendix contains the following sections:

- ◆ [NetWorker XBSA..... 80](#)
- ◆ [Changing NetWorker XBSA variables ..... 80](#)

## NetWorker XBSA

NetWorker XBSA enables the configuration of 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 dbjects 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.

[Appendix B, “Error Messages,”](#) provides descriptions of error messages associated with a NetWorker XBSA session.

## Changing NetWorker XBSA variables

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



### IMPORTANT

**With continuous log file backups or an on-demand backup of a dbject, the default settings for the NetWorker XBSA variables override values set with the NetWorker Management console. [Chapter 5, “Performing On-Demand Backups,”](#) provides recommendations about NetWorker XBSA variables that must be assigned explicit values.**

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 5 NetWorker Module environment variables**

NetWorker module variable	Definition	Possible values
NSR_AES_ENCRYPTION	Set this variable to TRUE in the nsrdbmi file to enable AES encryption. Export it into the environment to enable it during a manual backup.	<ul style="list-style-type: none"> <li>TRUE, encryption</li> <li>FALSE, no encryption (default value)</li> </ul>
NSR_BACKUP_LEVEL	Indicates the NetWorker backup level to use for the backup session.	<ul style="list-style-type: none"> <li>full, full backup</li> <li>incr, incremental backup</li> <li>skip, skip backup</li> </ul>
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"> <li>FALSE, no compression</li> <li>TRUE, compression</li> </ul>
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.
NSR_DEBUG_LEVEL	Indicates the level of debugging to use during the NetWorker Module backup and recover sessions.	<ul style="list-style-type: none"> <li>0, no debugging information</li> <li>1, only errors causing fatal system errors</li> <li>2, all network-related errors</li> <li>3, messages concerning the operation taking place</li> <li>4, all starting and ending of sessions</li> <li>5, parameters for all entries and exits from NetWorker Module</li> <li>6, all entries and exits from internal NetWorker Module functions</li> <li>7, all NetWorker Module internal errors</li> <li>8, all NetWorker Module parameters</li> </ul>
NSR_ENCRYPTION	Indicates whether encryption of the data to be backed up will take place.	<ul style="list-style-type: none"> <li>NONE, no encryption</li> <li>TRUE, standard EMC encryption</li> </ul>
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_ENCRYPTION_PHRASES	<p>This variable needs to be exported into the environment during restore operations.</p> <p>If an incorrect value is given during restore, the following error message is displayed: no decryption key available!</p>	<ul style="list-style-type: none"> <li>passphrase</li> <li>Specify several passphrases by using commas</li> </ul> <p>If the actual passphrase contains a comma, use forward slash (/) before the comma. In this case, the comma loses its meaning as a separator and is considered a part of passphrase. If the passphrase contains a forward slash, then use two forward slashes.</p>

Table 5 NetWorker Module environment variables (continued)

NetWorker module variable	Definition	Possible values
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.
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"> <li>• TRUE, NetWorker Module will wait for the selected server to become available</li> <li>• FALSE, NetWorker Module will fail immediately if the server is not ready for a request</li> </ul>
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"> <li>• TRUE</li> <li>• FALSE</li> </ul>
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.	View the current setting of this variable by using <b>gethostname()</b> .

---

This appendix lists error messages you may encounter while using NetWorker Module for Informix.

This appendix contains the following sections:

- ◆ [ON-Bar messages](#) ..... 84
- ◆ [NetWorker messages](#) ..... 84

## 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. The ON-Bar documentation lists 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 6** 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 <b>nsrck</b> program or by the <b>nsrindexd</b> service.	nsrck
checking index for clientname	Files associated with the named client are being inspected.	nsrck
completed checking count clients	Checking is successful.	nsrck
compressing index for clientname	The -C option is in effect.	nsrck
cross-checking index for clientname	The -X option is in effect.	nsrck
more space needed to compress clientname index, size required	The <b>nsrck</b> 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	Another program is accessing the same file required by the <b>nsrindexd</b> service.	nsrindexd
A copy of this process is already running!	Another copy of <b>nsrmmdbd</b> is currently running and has exclusive access to the media database.	nsrmmdbd
Cannot open lock file	An internal error has occurred.	nsrmmdbd
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 <b>nsrmmdbd</b> service is reloading its database.	nsrmmdbd
media db is cross checking the save sets	The service is restarted.	nsrmmdbd

Table 6 Error messages generated while backing up data (continued)

Error message	Description	Service
media dbb is open for business	Indicates the service is available.	nsrmmdbd
RPC error, details...Cannot open save session with 'server'	The <b>save</b> command is unable to back up data to the NetWorker server.	savefs
save: client.xxx.com is not on client's access list	The named client has more than one name.	savefs
save: path length of n too long, directory not saved	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 <b>save</b> or <b>savefs</b> command could not be found in the specified path.	savefs
savefs: error starting save of file system	The <b>savefs</b> 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
Warning - file 'path' changed during save	The <b>save</b> noticed that the file's modification time changed while the file was being backed up.	savefs
save: path file size changed!	NetWorker has backed up the message log files.	savefs
save: network error, server may be down	The named file system began, but the connection to the NetWorker server closed part way through.	savefs
Aborted	The <b>savegrp</b> 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 file system	The <b>save</b> attempted to test the named directory to determine if it was a different file system than the one currently being saved. The file system 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

Table 6 Error messages generated while backing up data (continued)

Error message	Description	Service
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
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	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 save set has been saved at the level full instead of the level found in the client's schedule.	savegrp
No 'NSR client' resource for client clienthostname saves: cannot retrieve Client resources	The client's hostname changed.	savegrp
no output	The saveset completed, but returned no status output.	savegrp
file system: 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
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	<b>Savegrp</b> 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

Table 7 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 filename 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.

## NetWorker module API messages

During a backup or restore, NetWorker attempts to record messages generated by the NetWorker 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

[“Changing NetWorker XBSA variables” on page 80](#) provides descriptions of the NetWorker NetWorker Module variables and values.

NetWorker NetWorker Module error messages appear in the format:

```
function_name:BSA_RC_message_code:message
```

Table 8 NetWorker module API messages

Error message	Description
BSA_RC_ABORT_ACTIVE_NOT_FOUND No active object matched the name that was specified for a BSAMarkObjectInactive	No active object matching the given search parameters was found in the NetWorker server being used by the NetWorker NetWorker Module session.
BSA_RC_ABORT_SYSTEM_ERROR System detected error due to explanation. Operation aborted	A general system error has occurred within a NetWorker NetWorker Module function call.
BSA_RC_APP_OBJECTOWNER_TOO_LONG The appObjectOwner field contained too many characters (n>=n)	The bsaObjectOwner parameter contains too many characters and may be corrupt
BSA_RC_AUTHENTICATION_ERROR There was an authentication failure for ObjectOwner ownername	The routine failed to authenticate a bsaObjectOwner with NetWorker server used by the NetWorker NetWorker Module session.

Table 8 NetWorker module API messages (continued)

Error message	Description
BSA_RC_BAD_CALL_SEQUENCE The sequence of API calls is incorrect. Must call item1 before item2	An API call sequence was made that does not conform to the NetWorker Module Data Movement API State Diagram document.
BSA_RC_BAD_HANDLE The handle used to associate this call with a previous BSAInit() call is invalid because explanation	The value passed into the function for bsaHandle contained a NULL pointer.
BSA_RC_BAD_PARAMETER received parameter parm with value, which is invalid	An invalid parameter was received.
BSA_RC_BSA_OBJECTOWNER_TOO_LONG The bsaObjectOwner parameter contains too many characters and may be corrupt	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	The buffer is too small to hold the object entry to be returned.
BSA_RC_COPYGPNNAME_TOO_LONG The copyGpName field contained too many characters (n>=n)	The copyGpName parameter contains more than BSA_MAX_COPYGNAME 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)	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	The copyTypes parameter contains a structure with values not contained within the NetWorker NetWorker Module libraries.
BSA_RC_INVALID_DATABLOCK The dataBlock parameter contained inconsistent values: bufferLength: n, bufferPtr:n, numBytes: n	The fields of a supplied dataBlock parameter are not consistent.
BSA_RC_INVALID_KEYWORD an entry in the environment structure is invalid (variable=value)	An environment string passed into the function did not have a valid structure.



NetWorker Module for Informix ships with four new commands described in the command line utilities help files (CLUHELP files). The CLUHELP files provide highly technical information about NetWorker commands. Some of these commands are not available in the Windows interface. In some cases, the CLUHELP files provide additional information on using NetWorker hidden attributes. The *EMC NetWorker Administration Guide* provides additional information on the use of command line utilities.

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

This appendix describes the four new commands included specifically for NetWorker Module:

- ◆ `barcnfig.bat`
- ◆ `bmicnfig.bat`
- ◆ `nsrdbmi.bat`
- ◆ `nsrifmx.exe`

This appendix contains the following sections:

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◆ <code>bmicnfig.bat</code> .....	90
◆ <code>nsrdbmi.bat</code> .....	90
◆ <code>nsrifmx.exe</code> .....	92

## barcnfig.bat

The **barcnfig.bat** command is invoked during the NetWorker 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. The informix user password is required to run this command. The \nsr\bin\barcnfig.bat.out 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 interface by double-clicking the NetWorker **BMI ON-Bar Config** icon in the NetWorker Group folder. If you are using the Windows Explorer, double-click the **barcnfig.bat** file to initiate the process. The *NetWorker Module for Informix Quick Start Guide* provides details on the installation process.

## bmicnfig.bat

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

Typically you must separate your data by storing their database backups in one volume pool and your 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.
```

Use the **-s server\_name** option to connect to the specified NetWorker server, and the \nsr\bin\bmicnfig.bat.out file to log 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 interface by double-clicking the **NetWorker BMI Config** icon in the NetWorker Group folder. If you are using the Windows Explorer, double-click the **bmicnfig.bat** file to initiate the process. The *NetWorker Module for Informix Quick Start Guide* provides details on the installation process.

## nsrdbmi.bat

The **nsrdbmi.bat** file is used by **savegrp** to trigger **nsrifmx.exe** to do backups on an Informix server in conjunction with ON-Bar. The **nsrdbmi.bat** 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** box. [“What happens during a NetWorker Module for Informix backup” on page 15](#) provides information on how a **savegrp** uses the **nsrdbmi.bat** batch file during a scheduled backup. [“Configuring a database server as a NetWorker backup](#)

[client](#) on page 39 provides instructions on creating a Client resource for the 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 you can set in the `nsrdbmi.bat` file to control `nsrifmx` backups to the NetWorker server. [“Customizing the nsrdbmi backup file”](#) on page 46 provides details on modifying the `nsrdbmi.bat` file.

Table 9

Variable	PRECMD
Default value	NONE
Description	Runs a command before dbspace and log file backups. If this command does not run successfully (in other words, if it returns a nonzero status), <code>nsrifmx.exe</code> will exit.

Table 10

Variable	POSTCMD
Default value	NONE
Description	Runs a command after dbspace and log file backups have completed. This command is always run by <code>nsrifmx.exe</code> even if ON-Bar returns a nonzero exit code.

Table 11

Variable	NSR_DATA_VOLUME_POOL
Default value	DBMIData
Description	Directs dbspace backups to the named volume pool.

Table 12

Variable	DO_LOGFILE_BACKUPS
Default value	YES
Description	If set to YES, then logfile backups will be executed after dbspace backups. If set to NO, <b>ON-Bar -p</b> is supported with the installed IDS version.

Table 13

Variable	NSR_LOG_VOLUME_POOL
Default value	DBMILogs
Description	Logfile backups are directed to the named volume pool.

Table 14

<b>Variable</b>	<b>NSR_COMPRESSION</b>
Default value	FALSE
Description	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.

Table 15

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

Table 16

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

Table 17

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

Table 18

<b>Variable</b>	<b>NSR_AES_ENCRYPTION</b>
Default value	FALSE
Description	If set to TRUE, then 256 bit encryption is enabled.

Table 19

<b>Variable</b>	<b>DO_WHOLE_SYSTEM_BACKUP</b>
Default value	NO
Description	If set to YES, then the entire system backup is executed.

## 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. [“How NetWorker Module for Informix backs up data” on page 15](#) provides details on 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 dbospace backups. If you want these files to be used for another pool, provide the appropriate command options when **nsrdbmi.bat** is invoked by **savegrp**. The **savegrp** CLUHELP file (Windows servers) or the **savegrp** man page (UNIX servers) provides information on the options you can use with the **savegrp** command.



This glossary contains terms related to disk storage subsystems. Many of these terms are used in this manual.

## A

- 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.

## B

- 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 *physical unit* of disk storage used by Dynamic Server and Dynamic Server, Workgroup Edition to store *blob*space data.
- blob**space Large objects, such as multimedia images, are stored in a *binary large object space*, a *logical unit* of storage consisting of one or more *chunks*. The physical data is stored in a *blobpage*, and a pointer to the blobpage's physical location can be stored in a *db*space.
- bootstrap** The bootstrap save set consists of three components that reside on the NetWorker server: the media database, the resource database, and a server index. The server index file lists all the server files that were backed up during the scheduled backup. The bootstrap is essential for the NetWorker disaster recovery procedures.
- browse policy** A policy that determines how long entries for your backup data remain in the client file index.

## C

- catalog tables** An ON-Bar component that tracks the compatibility of component versions, as well as backup objects and instances.
- chunk** A *physical unit* 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 *db*object, file, or file system backed up. The NetWorker server maintains a single client index file for each client machine.

**D**

<b>dbobject</b>	Database object, a term that might refer to a <i>blob</i> space, <i>db</i> space, or logical log file.
<b>dbspace</b>	A <i>logical unit</i> of storage that consists of one or more <i>chunks</i> . A Dynamic Server or Dynamic Server, Workgroup Edition instance might consist of one or more <i>db</i> spaces.
<b>Dynamic Server</b>	INFORMIX-OnLine Dynamic Server, considered by NetWorker as one or more instances of an INFORMIX <i>RDBMS</i> .
<b>Dynamic Server, Workgroup Edition</b>	INFORMIX-OnLine Workgroup Server, considered by NetWorker as one or more instances of an INFORMIX <i>RDBMS</i> .

**E**

<b>emergency boot file</b>	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</i> spaces.
----------------------------	--

**F**

<b>fast recovery</b>	Type of recovery that ON-Bar executes 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.
----------------------	---

<b>fileserver</b>	A machine with disks that provide file storage to other machines on a network.
-------------------	--

<b>file system</b>	<ol style="list-style-type: none"> <li>1. A sub tree of a UNIX file tree that is on a specific disk partition or other mount point.</li> <li>2. A method for storing files.</li> </ol>
--------------------	--

**I**

<b>instance name</b>	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 sqlhosts file for that instance.
----------------------	---

**L**

<b>logical log</b>	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.
--------------------	--

<b>logical unit</b>	A unit of temporary storage that keeps track of where physical units are located.
---------------------	---

**M**

<b>man pages</b>	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 <b>man</b> command plus the name of the command at the shell prompt.
------------------	---



<b>media database</b>	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.
<b>media manager</b>	The NetWorker component that tracks save sets to backup volumes. The <b>nsrmmdbd</b> daemon is responsible for making entries in the NetWorker online media index.
<b>mirroring</b>	A storage strategy that pairs a <i>chunk</i> of one defined <i>dbspace</i> or <i>blobospace</i> with an equal-sized mirror chunk to enable users uninterrupted access should the primary database fail.
<b>multiplex</b>	A method of transmitting multiple streams of data simultaneously through the same channel.
<b>N</b>	
<b>NetWorker client</b>	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.
<b>NetWorker server</b>	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.
<b>O</b>	
<b>ON-Bar</b>	A backup and recover utility that provides backup and recovery service to Dynamic Server and Dynamic Server, Workgroup Edition.
<b>P</b>	
<b>page</b>	A <i>physical unit</i> of disk storage used by Dynamic Server and Dynamic Server, Workgroup Edition to read from and write to databases.
<b>physical log</b>	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.
<b>physical unit</b>	A fixed-sized unit of disk storage allocated for data — <i>chunks</i> and <i>blobpages</i> are examples of physical units.
<b>preconfigured</b>	The initial default selections or configurations for several NetWorker features.
<b>R</b>	
<b>RDBMS</b>	An acronym for Relational Database Management System.
<b>resource</b>	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 Management Console, resources are represented as windows.
<b>retention policy</b>	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.

## S

**save set** A set of files or a file system 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**

1. UNIX command line prompt, either % or \$ (or # for superuser).
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. NetWorker Module for Informix is a storage manager that connects NetWorker to ON-Bar through XBSA.

## V

**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.

## X

**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 [www.xopen.org](http://www.xopen.org).

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