



NetVault[®]: Backup

User's Guide

for the

NetVault
APM for Informix

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NetVault APM for Informix - User's Guide

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NetVault®: Backup

User's Guide

The NetVault:Backup APM for Informix

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IX.0.0 About the Informix Application Plugin Module

As Informix™ storage environments experience rapid growth, so has the importance of data management and storage. The increasing size and number of Informix applications brings to the forefront the need for a storage management solution that protects important corporate assets while keeping the Informix application running and available. The **NetVault:Backup APM for Informix** (hereinafter referred to as the “**Informix APM**”, and **NetVault:Backup** is simply referred to as “**NetVault**”) provides a high performance, reliable and easy-to-use Informix-specific backup solution for protecting corporate data. The **Informix APM** increases application availability by providing fast, online backup of databases in both Linux/UNIX-based and Windows-based environments. The main features in the APM include the following:

- **Hot Backup:** With the **Informix APM**, user databases remain online and fully accessible during backup operations, minimizing down time for users.
- **Multiple Residency Support:** The **Informix APM** displays all available server instances, including multiple single-machine instances. The APM allows backup operations to be applied to one or more Informix database server instances.
- **Multiple Backup Modes:** The **Informix APM** supports the Informix “**Level 0 Full Backup**” mode which is used to record all selected data, as well as “Level 1” and “Level 2” forms of incremental backup that are used to record only changes that have occurred since previous backups. Logical logs are also backed up as required, when the Informix database triggers a backup request due to logical logs becoming full. Whole system backups are possible, when necessary, to provide a complete database representation.
- **Selectable Database Backup Operations:** The **Informix APM** makes it possible to backup only what is needed. With the easy-to-use, point and click Informix-specific user interface, administrators can select precisely what needs to be backed up, including the whole system, individual data spaces or Informix binary large object (“BLOB”) spaces and logical logs.
- **Native Informix Interfaces:** The **Informix APM** also uses the XBSA or OnBar Interface for Informix-specific functionality and scalability.

IX.0.1 Target Audience

Informix DBA skills are required for installation and initial configuration. In addition, although this skill level is not required for routine backup operations, it is highly recommended. Lastly, DBA skills are definitely required for recovery operations, as they are handled by the Informix application itself (and not the NetVault GUI).

IX.1.0 Installing the Informix APM

Installed via the **Client Management** window of NetVault, an installation environment for the APM can be set up in one of two ways, depending on hardware availability and each system's overall resources.

- **Server-Only Environment** - In this environment, the NetVault Server and the Informix dynamic server softwares are installed on the same machine. This configuration allows for the NetVault Server to act as a Client to itself and backup Informix data locally.
 - ❖ **Benefit** - Less hardware is required. (Only a single server machine to house both pieces of software is required.)
 - ❖ **Drawback** - Having both software items on the same system may dramatically impact system resources and performance, so a high-end machine is required.
- **Client-Server Environment** - In this environment, the machine acting as the NetVault Server is an entirely different machine than the one acting as the Informix dynamic server.
 - ❖ **Benefit** - Has less impact on both machines in use so more resources are available for other operations, or lower-end machines may be used for each purpose. Also, additional Informix dynamic servers can be easily added as need arises.
 - ❖ **Drawback** - Additional hardware is required.

Important: NetVault's **Encryption Plugin** can not be used in conjunction with the **NetVault:Backup APM for Informix**. Due to the nature of the **Encryption Plugin**, it conflicts with **NetVault:Backup APM for Informix** data transfer during restore operations. If the **Encryption Plugin** is enabled, a backup of Informix data will be encrypted as expected, but the restore process **will not** decrypt the data stream and the restore will fail. Therefore, it is recommended that the **Encryption Plugin** be disabled on the Informix Server (i.e., the system that utilizes the **NetVault APM for Informix**) in order to perform backups or restores. Based on the version of NetVault in use, instructions on disabling this functionality will vary:

- **NetVault 7.3.x (and earlier)** - Encryption functionality is offered as an installable plugin. See the *Encryption Plugin User's Guide* for instructions on disabling this functionality.
- **NetVault 7.4.x (and later)** - Encryption functionality is automatically installed. Additional information on the use of this functionality, including how it is disabled, can be found in the *NetVault:Backup - Administrator's Guide* for version 7.4.x.

IX.1.1 Installation Synopsis: Installation Environments

This section offers a synopsis of what is necessary to establish either of the above mentioned installation environments.

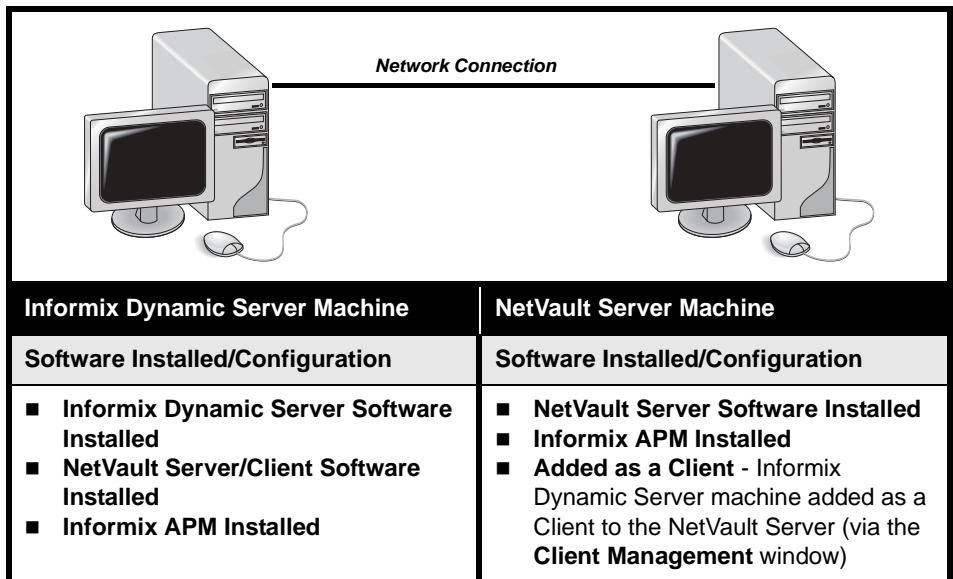
IX.1.1.a Server-Only Environment

As explained above, a server-only environment allows for one machine to function as the NetVault Server machine and Informix dynamic server machine. The following table gives a brief outline of the software requirements necessary to create this type of environment.

NetVault/Informix Server	
Software Installed:	
<ul style="list-style-type: none"> ■ Informix Dynamic Server Software Installed ■ NetVault Server Software Installed ■ Informix APM Installed 	

IX.1.1.b Client-Server Environment

As noted in an earlier section, a client-server environment is one in which the NetVault Server and the Informix dynamic server are two different machines, with the Informix server acting as a NetVault Client. The table below gives a brief outline of the software requirements and configuration steps that are necessary to create this type of environment.





IX.1.2 Pre-Installation Requirements

Pre-installation requirements vary based on the desired installation environment. The following sections offer details on these requirements.

IX.1.2.a Server-Only Environment

- **Informix Dynamic Server Software Installed** - This software must be successfully installed on the machine *before* the **Informix APM** is installed.
- **NetVault Server Software Installed** - Ensure that server version of NetVault is properly installed on the machine.
- **Informix ESQL Client Software Installed (Recommended) - Linux/UNIX-based O/S ONLY** - Failure to install may result in error messages during database browsing in the **Backup** window of NetVault. The procedure covered in the section *Informix ESQL Client Software* on page 22 can be used to bypass this if installation of this component is not desired/possible.

IX.1.2.b Client-Server Environment

The Informix Dynamic Server Machine

- **Informix Dynamic Server Software Installed** - This software must be successfully installed and running *before* the **Informix APM** is installed.
- **NetVault Client/Server Software Installed** - Ensure that at least the client version of NetVault is properly installed on this machine.
- **Informix ESQL Client Software (Recommended) - Linux/UNIX-based O/S ONLY** - It is recommended that this software application be installed. Failure to install may result in error messages during database browsing in the **Backup** window of NetVault. The procedure covered in the section *Informix ESQL Client Software* on page 22 can be used to bypass this if installation of this component is not desired.

The NetVault Server Machine

- **NetVault Server Software Installed** - Ensure that the server version of NetVault is properly installed and running on this machine.
- **Informix ESQL Client Software Installed (Recommended) - Linux/UNIX-based O/S ONLY** - Failure to install may result in error messages during database browsing in the **Backup** window of NetVault. The procedure covered in the section *Informix ESQL Client Software* on page 22 can be used to bypass this if installation of this component is not desired/possible.

Important: For complete details on adding Clients to the NetVault Server, please see the *NetVault®: Backup - Administrator's Guide*.

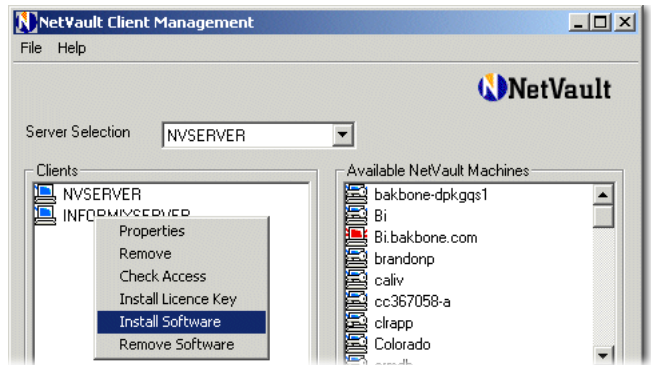
IX.1.3 Installation Procedure

Important:

1. If working with a client-server environment, it is important to note that the **Informix APM** *must be* installed on **both** the Informix dynamic server **and** the NetVault Server.
2. Based on the operating system in use, the directory path for the installation software for this APM may vary, but the file required for installation should be entitled “**infxxxx.npk**” (where “xxxx” represents various software platforms and version numbers).

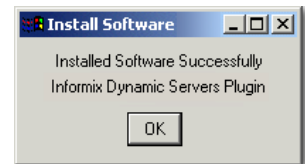
Figure IX-1:
The Client Management window of NetVault: Backup

1. From the machine acting as the NetVault Server, open the NetVault **Client Management** window by clicking the **Client Management** button on the NetVault GUI (or select **Client Management** from the **Administration** pull-down menu).



2. In the **Clients** window locate and right-click on the NetVault machine acting as the Informix dynamic server. (This is the NetVault Server itself, if working with a server-only environment, or a separate machine added via the **Client Management** window for a client-server environment.) From the pop-up menu that appears, select the **Install Software** command.
3. Navigate to the location of the “.npk” installation file (e.g., the NetVault APM Installation CD or the directory where the file was downloaded). Select the file (e.g., **infxxxx.npk**), click on **Open** and the installation process will begin.
4. Once the installation has completed, a successful installation message will appear in the **Install Software** dialog box.
5. With this, installation is complete. Based on the environment in use (server-only vs. client-server), it may be necessary to complete some additional steps, as detailed in the following section.

Figure IX-2:
The dialog box launched upon the successful installation of the APM



IX.1.3.a Installation Completion

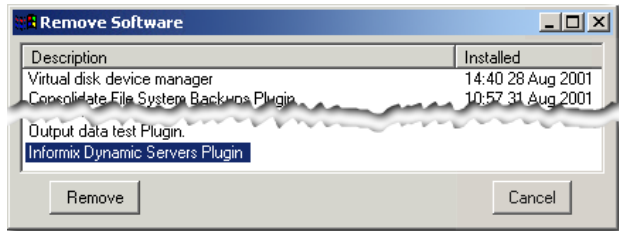
Completing the installation of this APM may vary based on the installation environment in use.

- **Server-Only Environment** - The installation is now complete and the APM is ready for use.
- **Client-Server Environment** - With the APM successfully installed on the Informix dynamic server machine, it must now be installed on the NetVault Server itself. A different **.npk** file may be required for the NetVault Server if the server has a different O/S than the Informix server. Repeat the complete installation process, but when the **Clients** window of the **Client Management** window appears (**Step 2.**), right-click on the NetVault Server machine and select **Install Software**. Continue with the process until completion. Once this has been performed, the APM is ready for use.

IX.1.4 Removing the Informix APM

Figure IX-3:
The Remove Software window with the Informix Dynamic Servers Plugin selected for removal

1. From the machine acting as the NetVault Server, open the NetVault **Client Management** window by clicking the **Client Management** button on the NetVault GUI (or select **Client Management** from the **Administration** pull-down menu).



2. Right-click on the NetVault Server in the **Clients** list to reveal the pop-up menu and select **Remove Software**. From here, select the **Informix APM** item from the displayed list and click the **Remove** button.
3. A dialog box will appear asking for confirmation of the remove command. Click on **OK** to proceed (or **Cancel** to abort). Clicking **OK** results in the removal of the software and a confirmation message will appear. Click **OK** to close this dialog box and return to the **Client Management** window.

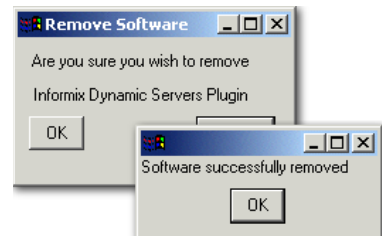


Figure IX-4:
The two dialog boxes issued during the removal process for this APM

Important: This procedure must be followed on every machine the APM was installed on to remove it completely. (In a client-server environment, this procedure would need to be performed on both the NetVault Server and any Clients it was installed on.)

IX.2.0 Configuring the Informix APM

In order for the **Informix APM** to function properly, various configuration steps must be performed in the NetVault GUI itself, as well as in other areas. For details on these required configuration steps, please review the sections that follow.

IX.2.1 Configuring the APM in the NetVault GUI

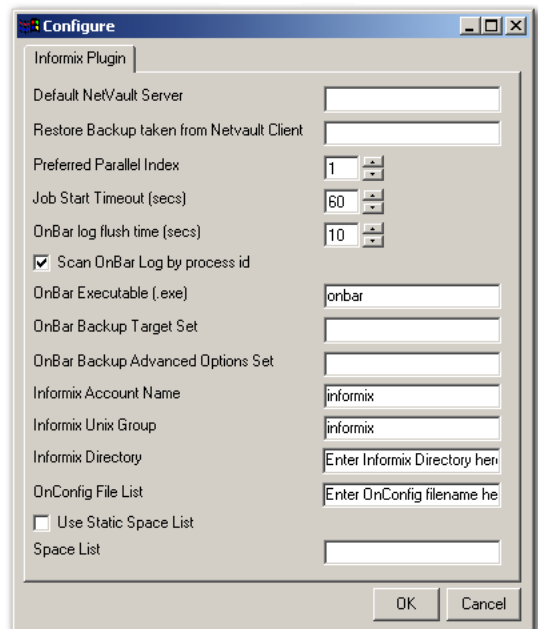
Based on environment in use (i.e., server-only vs. client-server) accessing and setting configuration options successfully for this APM may vary. This section offers instructions on how to properly set these options for both environment types.

IX.2.1.a Setting Options in a Server-Only Environment

In an environment in which the NetVault Server and the Informix dynamic server are the **same** machine, use the steps below to set configuration options for the **Informix APM** in the NetVault GUI.

Figure IX-5:
The Configure window for the Informix APM

1. With the NetVault GUI open, access the **Backup** window by clicking on the **Backup** button in the command toolbar (or by selecting **Backup** from the **Operations** pull-down menu).
2. From the **Selections** tab, locate the machine that has been set up to serve as both the Informix dynamic server and NetVault Server and right-click on it. From the pop-up menu that appears, select the **Configure** command.
3. The **Configure** window will launch, displaying the following options:
 - **Default NetVault Server** - This field must correctly display the **NetVault name** of the NetVault Server which is used to control NetVault Informix backup or restore processes.
 - **Restore Backup Taken from NetVault Client** - (**Informix APM** ver. 3.1 and Later **ONLY**) This field is used to input the **NetVault name** of the Client machine that a backup was taken from for the purpose of restoring a whole system backup to a different Informix machine. For complete



details on this process (and the use of this option), please see the section *Restoring to a Different Informix Server* on page 37.

- **Preferred Parallel Index** - In the event that a backup of an Informix dynamic server was duplicated (via NetVault's native **Data Copy Plugin**), the index file which labels this backup would also be duplicated, but assigned a different numerical value marking it as a duplicate, rather than the original backup. This number increases in an increment of one each time a new duplicate is generated. This index mirroring is referred to as a **Parallel Index**. Therefore, this field can be used to input the number of the **Parallel Index** that references a specific backup (either the original backup or one of the duplicates) to be used. This can be beneficial if attempting to perform multiple restores of the same Informix server (i.e., through different duplicate backups) to multiple machines in order to save time. This can also be beneficial in relation to media life. For example, if three duplicates of an Informix backup were performed and the original piece of media which contained the original backup had expired, one of these duplicates could be used, and its **Parallel Index** input in this field.
- **Job Start Timeout (secs)** - The time that **OnBar** will wait for NetVault to respond when starting a job (the default is 60 seconds).
- **OnBar log flush time (secs)** - The time that NetVault waits for **OnBar** to complete writing log data at job completion before closing the job channel (default 10 seconds). This should be correctly set to ensure that all **OnBar** activity is listed in the NetVault Job Log.
- **Scan OnBar Log by Process ID** - Once selected, the **OnBar** log will be scanned and only entries identified by the **OnBar** Process ID will be included in the NetVault Logs for each backup job. If this option is de-selected, activity for all processes will be included in the NetVault Logs.
- **OnBar Executable (.exe)** - The name of the **OnBar** executable. This is normally "onbar_d" for Informix version 7.30 (and later) on Windows NT 4.0, and is "OnBar" for other Windows-based and Linux/UNIX-based operating systems.
- **OnBar Backup Target Set** - The name of the **OnBar** Target Set to be used with the backup.
- **OnBar Backup Advanced Options Set** - The name of the **OnBar** Advanced Options Set to be used with the backup.
- **Informix Account Name** - *Must be* the correct account name, as configured in the Informix software installed on the selected NetVault Client. The default is "informix". This option is required for *all* jobs.
- **Informix Unix Group (Linux/UNIX-based Informix Servers, ONLY)** - In the event that the Informix Server is installed on a Linux/UNIX-based machine, input the name of the Informix Group to which the Account named in the previous field belongs (if applicable).

- **Informix Directory** - Must be the correct path of the Informix directory (e.g., “C:\INFORMIX” for a Windows-based O/S and “/home/informix” for a Linux/UNIX-based one). This option is required for *all* jobs.
- **ONCONFIG File List (Linux/UNIX-based O/S ONLY)** - This field should contain a list of the names of the **ONCONFIG** files for all Informix database server instances on the machine, separated by spaces. If the Informix machine is hosting two or more Informix database server instances (e.g., multiple residency), this field alerts NetVault of this.
- **Use Static Space List** - NetVault attempts to use SQL commands to determine the list of data spaces and blob spaces on the Informix dynamic servers. In the event of a failure of this process, this information must be manually input. Check this box to prompt NetVault to utilize the information input in the **Space List** window.
- **Space List (Default Empty)** - Only used if the **Use Static Space List** check box is selected. If necessary, list the entry for each “db_space” or “blob” space, each separated by a space.

Important:

1. Once an option is set in this window, it will become the default setting until changed by accessing this window again. Therefore it is recommended that this window be accessed and option settings verified on a per job basis.
2. Pre-configured Set values (e.g., as required in the **OnBar Backup Target Set** and **OnBar Advanced Options Set** fields) must be used in these fields. If a Set name that does not exist, or is improperly configured, is input in this field, the job will fail. For details on the generation of NetVault Sets, please see the *NetVault®: Backup - Administrator's Guide*.
3. During installation, the NetVault **Informix APM** will automatically configure some of these fields in the Informix **ONCONFIG** file, which should be checked for accuracy when installation is complete. If these values have been checked and any are incorrect, see the section *Troubleshooting* on page 40 for details on resolving them.
4. If the **ONCONFIG** file on a NetVault Server is not running the Informix dynamic server software (i.e., if utilizing a client-server installation environment), only the Informix server machine is relevant, and it must be correct.

IX.2.1.b Setting Options in a Client-Server Environment

In an environment in which the NetVault Server and the Informix Database Server are set up as *two different* machines, use the steps below to set configuration options for the **Informix APM** in the NetVault GUI.

1. With the NetVault GUI open, access the **Backup** window by clicking on the **Backup** button in the command toolbar (or by selecting **Backup** from the **Operations** pull-down menu).

Figure IX-6:
The options in
the Configure
window that
are to be set
for the
NetVault:
Backup
Server's
installation of
the Informix
APM

- From the **Selections** tab, locate the machine acting as the **NetVault Server** and right-click on it. From the pop-up menu that appears, select the **Configure** command.
- In the **Configure** window that appears, set the following options:

- **Default NetVault Server -**
This field must correctly display the **NetVault name**

of the NetVault Server which is used to control the Informix backup/restore processes (i.e., the NetVault name for this machine should appear here).

- **Restore Backup Taken from NetVault Client - (Informix APM ver. 3.1 and Later ONLY)** This field is used to input the **NetVault name** of the Client machine that a backup was taken from for the purpose of restoring a whole system backup to a different Informix machine. For complete details on this process (and the use of this option), please see the section *Restoring to a Different Informix Server* on page 37. In this case, it would be the NetVault name of the machine configured as the Informix dynamic server.

- All other options can be left at their default settings. Click on **OK** to commit these settings and close the window.

- Back in the **Selections** tab of the **Backup** window, locate the NetVault Client configured as the Informix dynamic server and right-click on it. In the pop-up menu that appears, select the **Configure** command. The **Configure** window, contains the following options:

- **Default NetVault Server -**
This field must correctly display the **NetVault name** of the NetVault Server which is used to control NetVault Informix backup or restore processes (i.e., the same name value input when setting options for the NetVault Server should appear here).

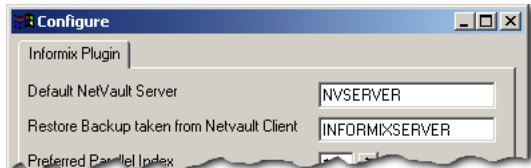
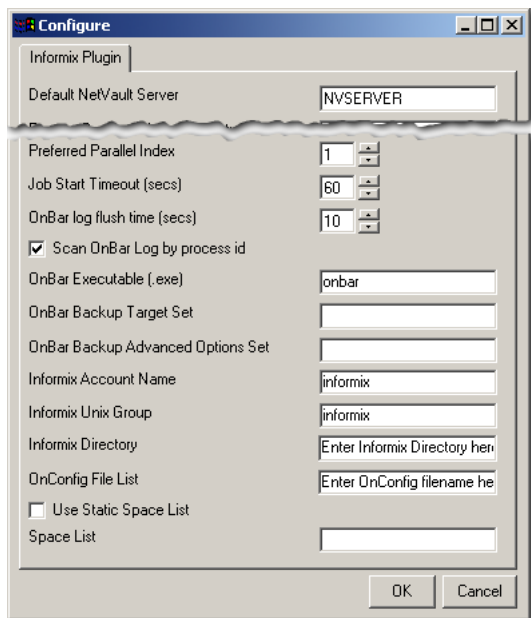


Figure IX-7:
The options
that are to be
set for the
NetVault:
Backup
Client's (i.e.,
the Informix
Dynamic
Server)
installation of
the Informix
APM



- **Preferred Parallel Index** - In the event that a backup of an Informix dynamic server was duplicated (via NetVault's native **Data Copy Plugin**), the index file which labels this backup would also be duplicated, but assigned a different numerical value marking it as a duplicate, rather than the original backup. This number increases in an increment of one each time a new duplicate is generated. This index mirroring is referred to as a **Parallel Index**. Therefore, this field can be used to input the number of the **Parallel Index** that references a specific backup (either the original backup or one of the duplicates) to be used. This can be beneficial if attempting to perform multiple restores of the same Informix server (i.e., through different duplicate backups) to multiple machines in order to save time. This can also be beneficial in relation to media life. For example, if three duplicates of an Informix backup were performed and the original piece of media which contained the original backup had expired, one of these duplicates could be used, and its **Parallel Index** input in this field. This option can be set on a per job basis, as required.
- **Job Start Timeout (secs)** - The time that **OnBar** will wait for NetVault to respond when starting a job (the default is 60 seconds).
- **OnBar log flush time (secs)** - The time that NetVault waits for **OnBar** to complete writing log data at job completion before closing the job channel (default 10 seconds). This should be correctly set to ensure that all **OnBar** activity is listed in the NetVault Job Log.
- **Scan OnBar Log by Process ID** - Once selected, the **OnBar** log will be scanned and only entries identified by the **OnBar** Process ID will be included in the NetVault Logs for each backup job. If this option is de-selected, activity for all processes will be included in the NetVault Logs.
- **OnBar Executable (.exe)** - The name of the **OnBar** executable. This is normally "onbar_d" for Informix version 7.30 (and later) on Windows NT 4.0, and is "OnBar" for other Windows-based and Linux/UNIX-based operating systems.
- **OnBar Backup Target Set** - The name of the **OnBar** Target Set to be used with the backup.
- **OnBar Backup Advanced Options Set** - The name of the **OnBar** Advanced Options Set to be used with the backup.
- **Informix Account Name** - *Must be* the correct account name, as configured in the Informix software installed on the selected NetVault Client. The default is "informix". This option is required for *all* jobs.
- **Informix Unix Group (Linux/UNIX-based Informix Servers, ONLY)** - In the event that the Informix Server is installed on a Linux/UNIX-based machine, input the name of the Informix Group to which the Account named in the previous field belongs (if applicable).

- **Informix Directory** - Must be the correct path of the Informix directory (e.g., “C:\INFORMIX” for a Windows-based O/S and “/home/informix” for a Linux/UNIX-based one). This option is required for *all* jobs.
- **ONCONFIG File List (Linux/UNIX-based O/S ONLY)** - This field should contain a list of the names of the **ONCONFIG** files for all Informix database server instances on the machine, separated by spaces. If the Informix machine is hosting two or more Informix database server instances (e.g., multiple residency), this field alerts NetVault of this.
- **Use Static Space List** - NetVault attempts to use SQL commands to determine the list of data spaces and blob spaces on the Informix dynamic servers. In the event of a failure of this process, this information must be manually input. Check this box to prompt NetVault to utilize the information input in the **Space List** window.
- **Space List (Default Empty)** - Only used if the **Use Static Space List** check box is selected. If necessary, list the entry for each db_space or blob space, each separated by a space.

Important:

1. Once an option is set in this window, it will become the default setting until changed by accessing this window again. Therefore it is recommended that this window be accessed and option settings verified on a per job basis.
2. Pre-configured Set values (e.g., as required in the **OnBar Backup Target Set** and **OnBar Advanced Options Set** fields) must be used in these fields. If a Set name that does not exist, or is improperly configured, is input in this field, the job will fail. For details on the generation of NetVault Sets, please see the *NetVault®: Backup - Administrator's Guide*.
3. During installation, the NetVault **Informix APM** will automatically configure some of these fields in the Informix **ONCONFIG** file, which should be checked for accuracy when installation is complete. If these values have been checked and any are incorrect, see the section *Troubleshooting* on page 40 for details on resolving them.
4. If the **ONCONFIG** file on a NetVault Server is not running the Informix dynamic server software (i.e., if utilizing a client-server installation environment), only the Informix server machine is relevant, and it must be correct.

IX.2.1.c Configure Window Option Setting Synopsis

The table that follows gives an outline of the previous two sections in regards to which options accessed from the **Configure** window should be set on which NetVault machine, based on the environment in use (i.e., server-only vs. client-server).

Configure Window Option	Server-Only Environment	Client-Server Environment	
	NetVault Server (NetVault Server AND Informix Server)	NetVault Server	NetVault Client (Informix Dynamic Server)
Default NetVault Server	Yes*	Yes*	Yes*
Restore Backup Taken from NetVault Client	Yes	Yes	No
Preferred Parallel Index	Yes	No	Yes
Job Start Timeout (secs)	Yes	No	Yes
OnBar log Flush Time (secs)	Yes	No	Yes
Scan OnBar Log by Process ID	Yes	No	Yes
OnBar Executable (.exe)	Yes*	No	Yes*
OnBar Backup Target Set	Yes	No	Yes
OnBar Backup Advanced Options Set	Yes	No	Yes
Informix Account Name	Yes*	No	Yes*
Informix Directory	Yes*	No	Yes*
ONCONFIG File List (Linux/UNIX-based O/S ONLY)	Yes*	No	Yes*
Use Static Space List	Yes	No	Yes
Space List	Yes	No	Yes

* This option is fixed (i.e., it only needs to be set once on the named machine) and the correct value must be input to enable the Informix APM.

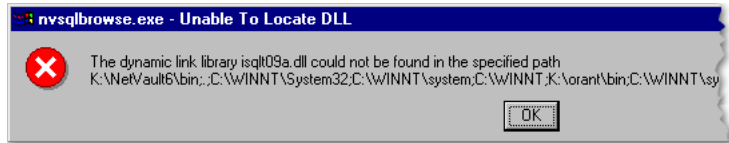
IX.2.2 Verifying the PATH System Variable (Windows-based O/S Only)

In a Windows-based operating system, it is necessary to ensure that the correct path for the **Informix\bin** directory is included in the **PATH** system variable's **Value** field. An example path for this variable might be:

%SystemRoot%\system32;%SystemRoot%;N:\INFORMIX\BIN

Figure IX-8:
The error message issued when the path for the Informix\bin directory is incorrect

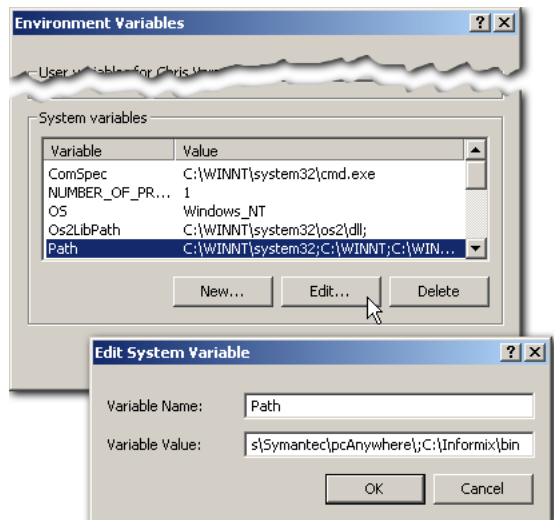
If this value is incorrect, Informix backup/restore operations run from the NetVault



GUI will fail and an error message will be displayed (as shown in the figure). The steps to perform this action are outlined below:

1. Access the **Control Panel** window.
2. Locate the **System** icon and double-click on it to open it. With this window active, select the **Advanced** tab.
3. From the **Advanced** tab, locate the **Environmental Variables** frame and click on the **Environmental Variables** button.
4. The **Environmental Variables** window will launch. In the **System Variables** frame, locate the list of variables contained within. Scroll through this list and select the **Path** variable.
5. At the bottom of the window, locate the **Edit** button to launch a dialog box to allow for the editing of this variable.
6. With the variable opened for editing, its name will appear in the **Variable Name** field and the current path value for it will be revealed in the **Variable Value** field. Scroll through the path value to locate the Informix path and perform one of the following:
 - **If the Informix Path IS found** - Verify that it is correct and make any modifications as necessary.
 - **If the Informix Path IS NOT Found** - Append the correct Informix path information to the existing path in the **Variable Value** field, ensuring that it is separated from any other entry by prefacing it with a semicolon (“;”).

Figure IX-9:
With a System Variable selected, clicking on the Edit button will launch the Edit System Variable window allowing the user to verify the correct path information in the Variable Value field



7. With the path properly input, click on **OK** to close this window, and confirm the change. As well, close any other remaining windows to exit the **System Properties** window.

IX.2.3 Checking the ONCONFIG File

The “**ONCONFIG**” file (typically **ONCONFIG.ol<servername>**), located in the “**etc**” subdirectory of the Informix directory (e.g., “**...Informix\etc**”), should be checked to ensure that all entries are valid, particularly entries for the sections detailed in the following sections.

IX.2.3.a Verifying Tape Device Entries

Figure IX-10:
Examples of
tape device
entry
information
from the
command line

```
# System Archive Tape Device
TAPEDEV <device_path> # Tape device path
.
# Log Archive Tape Device
LTAPEDEV <device_path> # Log tape device path
```

It is recommended that the **<device_path>** variable (shown in the example above) is checked to ensure that an entry exists and that it is correct. Although this entry is not used by NetVault for either backup or restore operations, an Informix backup or restore operation will fail if any of the following is true:

- No entry (nothing between **TAPEDEV**, **LTAPEDEV** and the “**#**” comment).
- **nul** or **NUL** appears in an entry.
- A device path (e.g., **<device_path>** above) results in the entry “**/dev/null**”.

Acceptable Entries

Based on the operating system in use, acceptable entries are revealed in the figures below.

■ Windows-based O/S

```
TAPEDEV \\.\TAPE0 # Tape device path
```

■ Linux/UNIX-based O/S

```
TAPEDEV \dev\tapedev # Tape device path
```

Figure IX-11:
Suitable
entries for a
Windows
installation

Figure IX-12:
Suitable
entries for a
Linux/UNIX
installation

In the Event That No Suitable Entries are Found

If no entries are present at the time of install of the **Informix APM**, NetVault will replace a vacant **<device_path>** variable with the value **NetVault**.

Figure IX-13:
If no entries
are present at
the time of
install,
NetVault:
Backup will
input a value

```
TAPEDEV      NetVault      # Tape device path
```

IX.2.3.b**Correct Linking Information for the ISM XBSA DLL File**

An installation of the **Informix APM** should automatically update various links to this file in the **ONCONFIG** file. Based on the operating system in use, the content of this file, and what should be verified may vary.

Windows-based O/S

It is recommended that the path to the **msmdll.dll** file be verified to ensure that it is correct and contains no spaces. Otherwise, Informix backup and restore operations will fail. When the **Informix APM** is installed on a Windows-based system, NetVault will add the value **<windir>\system32\msmdll.dll** for this path, which is the location of **ISM XBSA DLL** (e.g., this will replace the “**<path_of_msmdll.dll>**” variable shown in the example that follows).

Figure IX-14:
Verifying that
the correct
links exist in a
Windows
environment

```
# Backup/Restore variables
.
.
.
BAR_BSALIB_PATH <path_to_msmdll.dll> # Location of ISM XBSA DLL
```

Therefore, the line for a Windows-based installation of the APM should appear as follows:

```
BAR_BSALIB_PATH C:\Winnt\system32\msmdll.dll
```

Linux/UNIX-based O/S

When the **Informix APM** is installed on a Linux/UNIX-based machine, NetVault will add a symbolic link from the directory “**/usr/lib**” to the necessary library file (**msmdll<x>** -- where “**<x>**” refers to varying file name and extension information) in a sub-directory of the NetVault installation directory. In addition, a link will be established between this same NetVault library file and the Informix library within the Informix installation directory. These links are then added as necessary entries in the **ISM XBSA DLL** file. Ensure that the following links are present:

- **NetVault Installation Directory Links** (where “.<X>” refers to any of the following possible file extensions, “.a”, “.o”, “.sl” or “.so”):
 - ❖ `/usr/lib/msmdll.<X> --> <NetVault Install Dir>/lib/msmdll.<X>`
 - ❖ `/usr/lib/ibsad001.<X> --> <NetVault Install Dir>/lib/msmdll.<X>`
(32/64-bit O/S)
 - ❖ `/usr/lib/ibsad001_64.<X> --> <NetVault Install Dir>/lib/msmdll.64<X>` (64-bit O/S *ONLY*)
- **Informix Installation Directory Links:**
 - ❖ `<Informix Install Dir>/lib/insad001.<X> --> <NetVault Install Dir>/lib/msmdll.<X>` (32/64-bit O/S)
 - ❖ `<Informix Install Dir>/lib/insad001.<X> --> <NetVault Install Dir>/lib/msmdll64.<X>` (64-bit O/S *ONLY*)

To verify where a symbolic link is actually pointing, it is possible to initiate a terminal session and issue the command:

```
ls -l /usr/lib/ibsad*
```

In the event that the above mentioned links do not exist, they can be created by issuing the following commands from a terminal session:

- **NetVault Installation Directory Link Generation:**
 - ❖ `ln -s <NetVault Install Dir>/lib/msmdll.a /usr/lib/ibsad001.o`
(32/64-bit O/S)
 - ❖ `ln -s <NetVault Install Dir>/lib/msmdll64a.a /usr/lib/ibsad001_64.o`
(64-bit O/S *ONLY*)
- **Informix Installation Directory Link Generation:**
 - ❖ `ln -s /<NetVault Install Dir>/lib/msmdll.sl <Informix Install Dir>/lib/ibsad001.sl` (32/64-bit O/S)
 - ❖ `ln -s /<NetVault Install Dir>/lib/msmdll64.sl <Informix Install Dir>/lib/ibsad001.sl` (64-bit O/S *ONLY*)

IX.2.3.c The BAR_MAX_BACKUP Variable

In order to perform a restore of any data backed up with this APM via the NetVault GUI, this variable, contained in the **ONCONFIG** file (e.g., “...Informix/etc/**\$ONCONFIG**”), **must be** modified from its default value of zero (“0”), to one (“1”).

Editing this Value to Perform a Parallel Backup (version 3.2 or later of this APM only)

In the event that multiple devices are available to serve as backup targets (i.e., multiple drives are available in a single library at the same time), additional “**onbar_d**” child processes can be opened to allow for multiple streams of data to be sent to these devices. Also referred to as a **Parallel Backup**, it is accomplished by first increasing the **BAR_MAX_BACKUP Variable** to a value equal to the number of necessary streams (i.e., available devices) before initiating the backup job. Use the process above to access this variable and edit it accordingly to account for the total number of available drives. For information on performing these type of backups and restores, please see the section *Performing a Parallel Backup* on page 35 and the section *Restoring from a Parallel Backup* on page 36.

Important: This functionality **only works** in conjunction with backups performed of **individual dbspace** items (i.e., not the **root dbspace** item). Backups and restores performed of the **root dbspace** item should always have this variable set to **one** (“1”). For more details on items available for selection in a backup job, please see the section *Backing Up Data with the Informix APM* on page 29.

IX.2.3.d Informix ESQL Client Software

Important: This section applies **ONLY** to **Linux/UNIX**-based operating systems.

Under normal circumstances, an installation of the **Informix APM** will update the Informix server with the necessary storage manager information. If this update is not done, this information must be added using the **dbaccess** utility and information gathered from the installation of the **Informix APM**. The conditions under which the **Informix APM** does not insert this information (i.e., the required “**bar_version**” entry) can occur if the Informix ESQL Client software **has not been** installed. If this is the case, use the steps below to properly edit this variable.

1. Access the NetVault GUI and open the **Backup** window. From the **Selections** tab, double-click on a machine with the **Informix APM** installed to open it. Locate the APM and right-click on it to access a pop-up menu. From this menu select the **About** command, and in the window that appears, note the version number of the APM.

2. Initiate a session of the **dbaccess** utility. With it running, locate and select the database entitled “**sysutils**”.
3. Issue the following SQL query in order to view the existing contents of the “**bar_version**” table for this database:

```
select * from bar_version
```

If the resulting value is equal to the version number in the **About** window in NetVault, the configuration of this variable is correct. If it is not correct, continue to step 4.

4. If the variable does not match the version number, remove the existing entry by using the SQL query:

```
delete from bar_version
```

5. Run the SQL query with the following command (where the “n.n” value shown refers to the version number of the APM installed, as obtained in **Step 1.**):

```
insert into bar_version values (“1”, “1.1.1”, “nvnfx”, “n.n”)
```

IX.2.3.e The BAR_BSALIB_PATH Parameter

Important: This section applies **ONLY** to **Solaris 64-bit O/S** users, using the **Informix IDS 64-bit** server software, and **version 3.2 (or later)** of this APM.

For users of a Solaris 64-bit operating system who are employing version 3.2 (or later) of this APM, it is necessary to set the parameter for the **BAR_BSALIB_PATH** variable (i.e., located in the “**\$INFORMIXDIR/etc/\$ONCONFIG**” file) to the full path name of the “**xbsa**” library. This variable would be set as follows:

```
BAR_BSALIB_PATH /usr/lib/64/ibsad001.so
```

IX.2.4 Configuring for Restores (and CLI-based Backups)

Important: This section applies **ONLY** to **NetVault versions 7.0 and later**.

To enable all restores (as well as Command Line Interface (CLI) backups) using the Informix **OnBar** utility, a tool must be run on the NetVault Server to enable the APM with the security clearance required. This tool is in the “**.../NetVault(x)/util**” directory after a successful upgrade/install (where “**(x)**” represents “**6**” for an upgrade install or **no value** for straight installations). Features are detailed below:

CLI Command	Specifics
nvpluginaccess	Description:
	Use this command to enable off-server CLI invoked backups and restore (but not actually perform them).
	Syntax:
	nvpluginaccess -client <client name> -account <account name> -password <password>
	<ul style="list-style-type: none"> ■ -client: The name of the NetVault Client that the plugin to be used is installed on (e.g., the NetVault name of the machine). ■ -account: Pertains to Access Control account used to log on to the NetVault Server (if applicable). If Access Control is not in use, input "default" for this value. ■ -password: Also used for Access Control, the password associated with the account input (if applicable). If Access Control is not in use, do not use this switch.
Important: A space must be inserted between each item in the above command syntax to be properly recognized.	

Once the command has been issued properly, it will invoke a prompt requesting the desired plugins to which the specified Client should have access. Please see the procedures that follow for more details.

IX.2.4.a Step 1: Configuring for the NetVault Server

It is first necessary to run the "nvpluginaccess" command for the NetVault Server itself. Follow the steps below to successfully accomplish this:

1. Initiate a command line session and navigate to the following directory:

.../netvault/util

(where "..." represents the path to the NetVault installation directory)

2. Issue the following command at the prompt:

nvpluginaccess -client <NetVault Server Name>

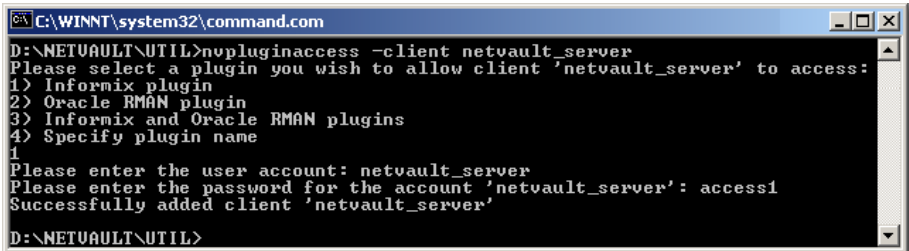
3. A list of available plugin(s) will be displayed. Type the number that corresponds to the desired plugin in the list and press **Enter**.
4. The next prompt will request an account name that has been set up via NetVault's Access Control functionality that allows for access to NetVault on the target machine (i.e., a NetVault Administrator-level user). Type the name of a qualifying user account and press **Enter**.
5. The final prompt will request the password that is associated with the account named in the previous prompt. This is the password value assigned to this user account. Type the value and press **Enter** to continue.

Important:

1. For complete details on NetVault's Access Control functionality, including the creation of user accounts, please see the *NetVault®: Backup - Administrator's Guide*.
2. In the event that NetVault's Access Control functionality has not been set up for use on the target machine (i.e., the functionality is not used), the pre-set NetVault user account that grants the correct level of access can be used when requested (e.g., Account Name = **Default**; Password = **<no value>**).
3. **Steps 3 and 4** above can be skipped if desired, by adding the following switches to the **nvpluginaccess** command:
 - **-account <Applicable Access Control User Account>** followed by
 - **-password <Access Control User Account Password>**As an end result, the input command would appear as follows:
nvpluginaccess -client <client> -account <account> -password <password>
4. Password values are case-sensitive. Ensure that the exact value used to originally set up this account is input.
5. When a password value is entered at the provided prompt, it will be visible (i.e., when entered, the actual characters will be revealed and not replaced with "*" characters). If password secrecy is necessary, ensure that the proper precautions are taken when entering this value during this procedure.

6. A confirmation message will be displayed stating that access has been granted for the named machine.

Figure IX-15:
A command line session in which the `nvpluginaccess` utility has been successfully run for the NetVault: Backup Server



```
C:\WINNT\system32\command.com
D:\NETVAULT\UTIL>nvpluginaccess -client netvault_server
Please select a plugin you wish to allow client 'netvault_server' to access:
1) Informix plugin
2) Oracle RMAN plugin
3) Informix and Oracle RMAN plugins
4) Specify plugin name
1
Please enter the user account: netvault_server
Please enter the password for the account 'netvault_server': access1
Successfully added client 'netvault_server'
D:\NETVAULT\UTIL>
```

IX.2.4.b Step 2: Configuration of Each NetVault Client

The same procedure outlined in the section *Step 1: Configuring for the NetVault Server* on page 24 is to be followed from the NetVault Server for **each** Client machine on which the **Informix APM** is installed. The following information will be required per Client machine:

- **Client Machine's NetVault Name** - This is required for the “-client” variable (i.e., as revealed in **Step 2.** of the previous procedure).
- **Client Machine's User Account Name** - This is required for the “-account” variable used in the command to gain user account access to NetVault on the Client machine (i.e., as illustrated in **Step 3.** of the previous procedure).
- **Client Machine's User Account Password** - This is the password value associated with the **User Account** that was input (i.e., as illustrated in Step 4. of the previous procedure). This is input along with the “-password” variable.

Important: This procedure *must be* run from the NetVault Server **for each Informix APM Client** to be backed by the NetVault Server.

IX.3.0 Using the Informix APM: An Overview

Used for backup and recovery of Informix dynamic server data, the use of the **Informix APM** varies slightly, based on operating system environment. The following sections offer a brief synopsis on how to initially access the APM as well as what type of operations are controlled by the APM. More detail on specific backup and restore operations can be found in their respective sections.

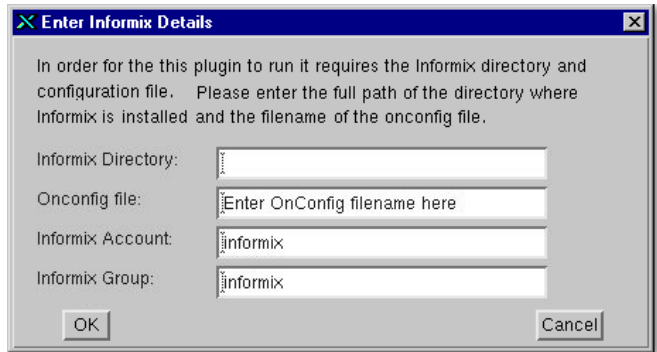
IX.3.1 Accessing the Informix APM for the First Time

The **Informix APM** is accessed from the **Selections** tab of the **Backup** window. To access the APM for an initial backup operation, follow the steps below.

1. Launch the NetVault GUI and access the **Backup** window by clicking on the **Backup** button in the command toolbar (or by selecting **Backup** from the **Operations** pull-down menu).
2. From the **Selections** tab, locate the machine acting as the Informix dynamic server (based on the installation environment in use) and right-click on it. From the pop-up menu that appears, select the **Open** command.
3. If the proper values have not been previously input in the **Configure** window (as explained in the section *Configuring the Informix APM* on page 11), the **Enter Informix Details** window will appear (which is covered in the following step). If configuration was successfully performed, this window will not appear and the following step can be skipped.

Figure IX-16:
The Enter Informix
Details window

4. As noted in this window, various values **must be** input. Enter the correct path to the **Informix Directory** and the name of the **ONCONFIG** file.
5. In addition to these two fields, the following fields are made available:
 - **Informix Account** - Input the name of an Informix DBA-level account that will allow access to the databases available on the Informix Server. This account should have sufficient rights to conduct backups of Informix database data.
 - **Informix Group (Linux/UNIX-based Informix Server, ONLY)**- In put the name of the Informix group to wich the above named account belongs to allow access to Informix data for a backup (if applicable).
6. When first opening the APM it is necessary to supply account details in the **Enter Account Details** window. Based on the operating system in use, this window will appear as shown in the table that follows.



Windows-based Installation	Linux/UNIX-based Installation
Required Operation	Required Operation
<p>Enter an Account and Password that will grant the user access to the Informix account on the target machine and click OK. This must be the Informix account for this process to function correctly.</p>	<p>Enter the Account and Unix Group to which the account belongs, and click OK. In the UNIX operating system, the Account must be "informix" in order for the APM to run the Informix OnBar utility in conjunction with the NetVault Server.</p>

Important:

1. For users of **version 3.1 and later of this APM**, the **Password** field mentioned in the above table is replaced with a **Group** field in which proper name for the **Group** that the **Account** is associated with must be input.
2. **Windows-based O/S ONLY:** When **changing** the **Informix User Password**, it is necessary to re-enter the new password in this **Enter Account Details** configuration. Lastly, ensure the **Informix IDS** logon account found in **Windows Services** has been updated with this new password as well.

IX.3.2 Backup/Recovery on Windows-based Systems

Backup and Recovery operations on a Windows-based system serving as the Informix dynamic server are handled as follows:

- **Backup** - Backups can be performed either using the NetVault GUI to select and submit jobs, or the via the **Informix Command Center (IECC)** utility.
- **Restore** - Restore operations **must be** run via the **IECC** utility.

IX.3.3 Backup/Recovery on Linux/UNIX-based Systems

Backup and Recovery operations on a Linux/UNIX-based system serving as the Informix dynamic server are handled as follows:

- **Backup** - Backups can be performed either using the NetVault GUI to select and submit jobs, or the via the Informix's **OnBar** utility.
- **Restore** - All restore operations **must be** run via Informix's native **OnBar** utility software.

IX.3.4 Backup Method Comparison

Since it is possible to perform a backup of Informix data with both the NetVault GUI and Informix's resident utilities, a table is provided to show the relative merits of each backup method. While this list is not comprehensive, it provides information that will help to select a backup method.

Facility	Informix Software Backup Submission Method	NetVault Backup Submission Method
Submit backup from local/remote Informix Server software	Yes	No
Submit backup from local/remote NetVault Server software	No	Yes
Backup to specific target device	No	Yes
Backup to specific target media	No	Yes

Facility	Informix Software Backup Submission Method	NetVault Backup Submission Method
Submit backup via remote NetVault Domain Control (via NetVault interface linked to Domain Controllable Server)	No	Yes
Remotely put Informix Server online and submit backup from same window	Yes	No
Easily schedule with other backup jobs	No	Yes
Easily monitor progress from same window as other backup jobs	No	Yes
Easily incorporate pre and post scripts for backup job	No	Yes

IX.4.0 Backing Up Data with the Informix APM

Important:

1. It is strongly recommended that the Informix Backup and Restore Guide be reviewed thoroughly for complete instructions on performing backup (and restore) operations. For a first encounter with Informix, it is recommended that a practice backup (and restore) be performed to familiarize the user with the procedures involved in a backup and recovery of Informix databases.
2. Prior to performing a backup of Informix data with the NetVault GUI, the **BAR_MAX_BACKUP Variable** must be set to a value of at least **one ("1")**, unless parallel backups are being performed. If this is not completed, when a restore of this data is performed, an error will occur and the data will not be restored. For complete details on setting this variable, see the section *The BAR_MAX_BACKUP Variable* on page 22.

To set up a backup job using the **Informix APM**, follow these steps:

1. With the NetVault GUI open, access the **Backup** window by clicking on the **Backup** button in the command toolbar (or by selecting the **Backup** command from the **Operations** pull-down menu).
2. From the **Selections** tab, locate the machine acting as the Informix dynamic server (based on the installation environment in use) and right-click on it. From the pop-up menu that appears, select the **Open** command.
3. Double click the **Informix Dynamic Servers** icon to display the database server instances available for backup.

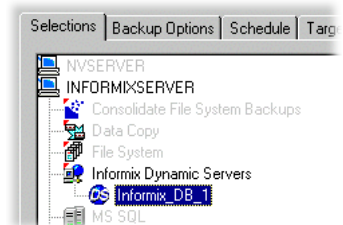
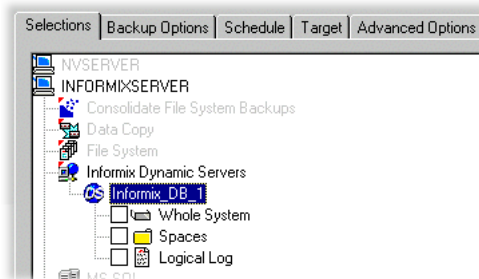


Figure IX-17:
The Selections tab of the Backup window with the Informix APM opened to reveal its contents

Figure IX-18:
The Selections
tab displaying
the three
available
backup targets

4. With the database open, three available backup targets will be revealed, allowing for the selection of **one** of the following:
 - **Whole System** - Select this item to perform an Informix whole system backup.
 - **Spaces** - This folder item contains all of the individual spaces that make up the Informix database. The entire item can be selected (to include all spaces) or it can be opened (by double-clicking on it) to select individual ones.
 - **Logical Log** - Select this item to backup the Logical Log entry for this instance.



Important:

1. When attempting a **Whole System** backup, it is necessary to manually backup various Informix “critical files”. Before attempting a backup of this type, it is necessary to follow the steps in the section *Backing up Critical Files* on page 32.
2. Before attempting to open the **Spaces** folder, ensure that the Informix server is online or a NetVault error message will be issued. Do not attempt to backup **Spaces** unless a whole system backup has been performed first. In the event that individual **Spaces** are to be backed up, perform an initial backup of the root “**db_space**” alone, without any of its associated individual dbspace items.
3. An automatic backup of the logical logs information for an Informix database server instance can be set up to avoid the need to manually select this item for a backup. For information on setting up this operation, see the section *Backing Up Logical Logs Automatically* on page 34.

Figure IX-19:
With the
Spaces item
selected (or
opened and its
individual
contents
selected) the
remaining
backup targets
are greyed-out
and
unavailable

5. Once a desired root level item is selected (or the **Spaces** folder is opened and individual items within are selected), the remaining selectable items will be greyed-out (and made unavailable). If the selected item is not what is desired, de-select it and the remaining items will be made available again (or de-select any individual **Spaces** and close the **Spaces** folder).

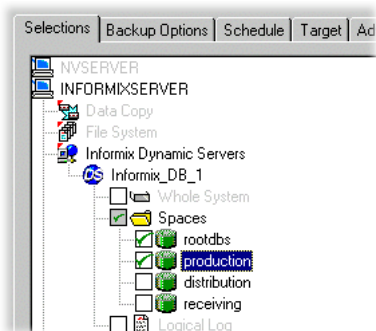
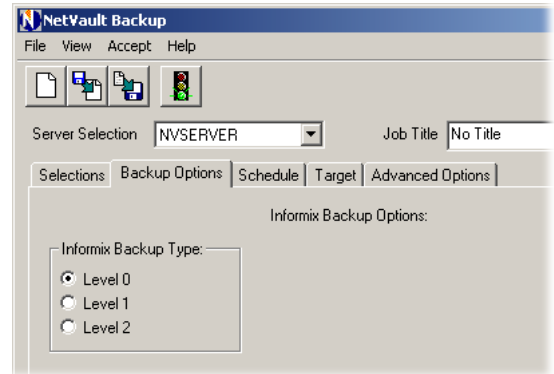


Figure IX-20:
The Backup
Options tab

6. Click the **Backup Options** tab in order to set these options as desired. This window is comprised of the following frame:

- **Informix Backup Type Frame** - This frame makes it possible to select the level of backup desired, based on the following types:

- ❖ **Level 0 - Level 0** performs full backup of all the selected items. It backs up all the used pages containing data for the selected storage spaces.
- ❖ **Level 1 - Level 1** backs up only the data that has changed since the last **Level 0** backup of the selected storage spaces. It contains all the table and index pages in a storage space (including those with deleted data) that has changed since the last **Level 0** backup.
- ❖ **Level 2 - Level 2** backs up only the data that has changed since the last **Level 1** backup of the selected storage spaces. It contains all the table and index pages in a storage space that has changed since the last **Level 1** backup.



Important:

1. Only complete databases can be selected for a **Level 1** (Incremental) backup. It is not possible to select individual tablespaces for inclusion in this type of backup.
2. For additional information on the use of the various Informix backup types, it is recommended that the relevant Informix documentation be consulted.

7. The remaining tab selections (e.g., **Schedule**, **Target** and **Advanced Options**) contain additional options that can be set as desired. The options available in these tabs are not unique to the **Informix APM**, and for more information on their use, please see the *NetVault®: Backup - Administrator's Guide*.
8. Enter a name for the job in the **Job Title** box. It is highly recommended that a name be assigned that will differentiate this job from any others performed with this APM. This will allow for easier recognition of the job during restore.
9. Submit the job by clicking the **Submit** button on the command toolbar.
10. Monitor the job as desired. See the *NetVault®: Backup - Administrator's Guide* for information on viewing the job status, progress and log entries.

IX.4.1 Backing up Critical Files

When an Informix whole system backup is performed using the NetVault backup submission method, it is necessary to backup various critical files after this backup has completed (on both Windows and Linux/UNIX-based operating systems). The sections below offer instructions on how this is accomplished, based on the O/S in use.

Important: These files *must be* backed up in order to successfully recover an Informix system.

IX.4.1.a Backing Up Critical Files on Windows-based Systems

Once a whole system backup has been performed with the NetVault GUI, it is recommended that the **Bar Wizard** application located in the **IECC** utility be used to backup these critical files (as an alternative to manually backing up these files with the NetVault GUI). When used, the **IECC Bar Wizard** will prompt the user to insert a floppy disk so that these critical files can be backed up to it. For complete details on using the **IECC Bar Wizard** to accomplish this, please see the relevant Informix documentation. As well, an additional example method is offered below that can be used to backup these files.

IX.4.1.b Backing Up Critical Files on Linux/UNIX-based Systems

Once a whole system backup has completed on a Linux/UNIX-based system, the log entry for the job will include the following message:

"You must now backup ixbar.<serverid>, ismixd.<serverid> and your ONCONFIG files to complete the whole system backup. These files must be restored in case of hard disk failure or file corruption."

These individual critical files must be backed up in order to have all the necessary files for a successful recovery. The section below offers an example method for the backup of these critical files.

IX.4.1.c Example Critical File Backup Method

Important: In order for the example detailed below to work properly, all steps must be performed *before* an Informix Whole System backup is submitted.

To backup 'critical files', a standard NetVault **File System** backup can be utilized. The example below also offers how to set up this job to automatically run via a **Post Script**. Critical files that need to be backed up for this purpose include:

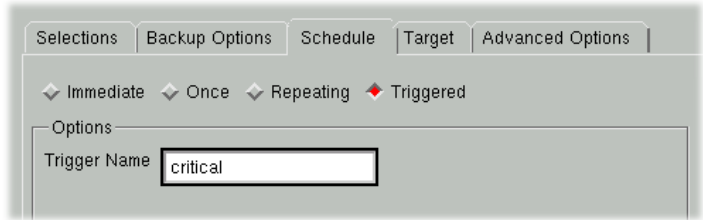
- **ixbar.<serverid>**
- **ismixd.<serverid>**
- **ONCONFIG Files** (all files of this type must be included)

The following steps offer full details on how this can be accomplished.

1. With the **Backup** window of NetVault accessed and the **Selections** tab selected, double-click on the machine configured as the Informix dynamic server in order to open it.
2. Locate the **File System** plugin and double-click on it to open it. From the selection tree that is revealed, continue to open folder items to navigate to the Informix directory. Select the individual files named above.

Figure IX-21:
From the Schedule tab, the Triggered Schedule type is selected and a relevant name is given to the Trigger

3. With all of the necessary files selected for a backup, select the **Schedule** tab and select **Triggered** for the schedule



4. Input a suitable name for the trigger in the **Trigger Name** field that appears in the accompanying frame **Schedule Type** frame.
5. Assign a suitable name to this job in the **Job Title** field and save it.
5. In an external text editing software, generate a script that contains the following line (based on O/S in use):
 - **Linux/UNIX-based O/S** - “`$NV_HOME/bin/nvtrigger <triggername>`”
 - **Windows-based O/S** - “`%NV_HOME%\bin\nvtrigger <triggername>`”
6. Save the script with a suitable name as an executable-type file (e.g., as “**critical.bat**” or “**critical.cmd**” in a Windows environment or as “**critical.sh**” in a UNIX environment). This file must reside in the NetVault Scripts directory (e.g., “**...\netvault\scripts**” for new installations of NetVault 7.x, or “**...\netvault6\scripts**” for upgrade or earlier versions).

Important:

1. The “**\$NV_HOME**” (for Linux/UNIX) and “**%NV_HOME%**” (for Windows) values used in this script are NetVault-specific environmental variables that reference the installation directory for the software. It is critical that these variable appear exactly as shown above, or the script file will not function properly (and this backup job will not occur).
2. The aforementioned script **must reside** in the NetVault Scripts directory. If this script does not exist in the proper directory, this operation will not function properly.

7. Return to the **Backup** window of NetVault and create a whole system backup job. (From the **Selections** tab, access the **Informix APM** on the machine serving as the Informix dynamic server and select the **Whole System** item for a backup. For more details, please see the section *Backing Up Data with the Informix APM* on page 29.)

Figure IX-22:
The Pre and Post Scripts frame with a file designated for use as a Post Script on a UNIX installation of the APM

8. While still in the **Backup** window, select the **Advanced Options** tab

and locate the **Pre and Post Scripts** frame. In this frame, select the **Use Post Script** option and input the name of the previously generated script file in the accompanying field.

9. The job creation process is now complete and this whole system backup can be submitted, barring the setting of any other desired options in regards to the tabs available in the **Backup** window—**Backup Options**, **Schedule**, **Target** and **Advanced Options**. (See the section *Backing Up Data with the Informix APM* on page 29 for information on the **Backup Options** tab, otherwise see the *NetVault®: Backup - Administrator's Guide* for information on the remaining tabs.)
10. Each time this specific backup job is run, the Post Script will be activated and the **File System** job set up to backup the aforementioned critical files will be run (via the **nvtrigger** command set in the script).

Important: For the purpose of re-running a specific whole system backup job, it can be noted by its given **Job Title** or the **Job ID** assigned by NetVault when the job is initially run.

IX.4.2 Backing Up Logical Logs Automatically

Informix makes it possible to set up an automatic backup for logical log entries as they become full. If no provision is made for automatic logical log backups, it will be necessary for an administrator to schedule logical log backups manually using NetVault (i.e., via the procedure outlined in *the section Backing Up Data with the Informix APM* on page 29, and manually selecting the desired logical log items).

IX.4.2.a Setting Up in a Windows-based O/S

Follow the steps below to configure this on a Windows-based machine:

1. Launch the **IECC** utility.
2. With the utility running, select the **Bar Wizard** command for the selected database server and then select the **Back Up Logical Log** option.

IX.4.2.b Setting Up in a Linux/UNIX-based O/S

Follow the steps below to configure this on a Linux/UNIX-based machine:

1. From a terminal session, navigate to the **ONCONFIG** file (in the “**...Informix/etc**” directory).
2. Browse this file to locate an entry entitled “**ALARMPROGRAM**”. Browse this entry to verify that it calls the script file entitled “**logs_full.sh**”, which is used to call Informix’s **OnBar** utility to perform a logical log backup.

IX.4.3 Performing a Parallel Backup

As explained in the section *The BAR_MAX_BACKUP Variable* on page 22, this variable can be edited in order to allow for a backup of Informix data along multiple streams to multiple available devices. This process, referred to as a **Parallel Backup**, requires that the following operations be performed (in the order listed):

1. The **BAR_MAX_BACKUP** variable must be successfully edited to accommodate for the appropriate number of data streams (i.e., available devices).
2. These devices must be readily accessible to the NetVault Server (i.e., added to it via NetVault's **Device Management** window).
3. If including the **root dbspace** item in a backup, perform an initial backup of this item alone, **without** any of its associated individual dbspace items.
4. A secondary backup performed of all desired individual dbspace items.

Important: In the event that the **root dbspace** item is not to be included in a backup, it is not necessary to perform two separate backup jobs.

IX.5.0 Restoring Informix APM Backups

Important:

1. Prior to performing a restore (regardless if the backup was performed via the command line (e.g., OnBar) or with the NetVault GUI), the "**BAR_MAX_BACKUP**" variable **must be** set to a value of at least **one** ("1"). If this is not completed, when the restore is performed, an error will occur and the data will not be restored. For complete details on setting this variable, see the section *The BAR_MAX_BACKUP Variable* on page 22.
2. As noted in the section *Backing Up Data with the Informix APM*, it is strongly recommended that the Informix Backup and Restore Guide be reviewed thoroughly for complete instructions on performing backup and restore operations.
3. **For Users of NetVault 7.0 and Later** - Before restoring a backup performed with the **Informix APM**, it is of critical importance that the section *Configuring for Restores (and CLI-based Backups)* on page 23 be reviewed and its steps followed.
4. In the event that a **Parallel Backup** is to be recovered, the **BAR_MAX_BACKUP Variable** should be set to mirror the setting used for the backup. See the section *Restoring from a Parallel Backup* on page 36 for more information on this form of restore.

To restore any data from an Informix backup (whether performed via Informix's native backup and recovery tools or with the NetVault GUI and the **Informix APM**), it is necessary to use Informix's native recovery software. See the relevant Informix documentation for complete restore instructions.

The Informix software used to recover backed up data varies based on the operating system in use.

- **Windows-based O/S** - Uses the **Bar Wizard** application available in the **IECC Console** to perform restores.
- **Linux/UNIX-based O/S** - Uses the **OnBar** utility from the command line to restore.

IX.5.1 Full System Recovery

In order to successfully recover a full system from a backup performed with the NetVault GUI (i.e., a whole system backup), various “critical files” must also be recovered. These files could have been backed up in one of two ways:

- **With Informix’s Native Backup Software** - This operation would have been performed outside of NetVault after the whole system backup was performed.
- **Through a Separate File System Plugin Backup** - Through the use of NetVault’s native **File System Plugin**, these critical files could have been manually selected for a backup (or backed up automatically through the use of a **Post Script**, as described in the section *Example Critical File Backup Method* on page 32).

Important: Regardless of how these files were backed up, they **must be** recovered **after** the initial **Whole System** backup is recovered in order to bring an Informix system successfully back online.

IX.5.2 Restoring from a Parallel Backup

A **Parallel Backup**, one that was performed along multiple data streams to multiple devices, requires that a restore be performed as follows:

1. The value set for the **BAR_MAX_BACKUP** variable should be set to the same number used to perform the backup. (For example, if three device streams were available for the backup, and this value was set up to utilize all three, this variable should also be set to three for the restore.) For more information on editing this variable, please see the section *The BAR_MAX_BACKUP Variable* on page 22.
2. Based on the operating system in use, (Linux/UNIX-based vs. Windows-based), the necessary recovery procedure will vary.
 - **Linux/UNIX-based O/S** - Perform the steps to recover the root dbspace item in a separate, stand alone restore **first**, followed by performing a secondary restore to recover any associated individual dbspace items (see the section *Restoring Informix APM Backups* on page 35).
 - **Windows-based O/S** - Perform a single restore as detailed in the section *Restoring Informix APM Backups* on page 35. No separate restore procedures are required.

Important: In the event that the **root dbspace** was not included in a backup (and therefore will not be restored), it is not necessary to perform two separate restore jobs.

IX.5.3 Restoring to a Different Informix Server

Important: Informix APM version 3.1 or later is required for this feature.

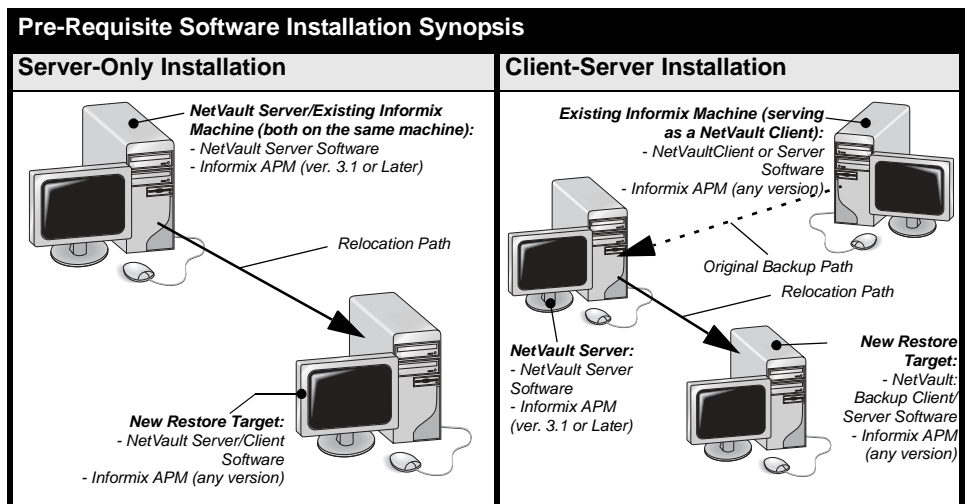
The **Informix APM** makes it possible to restore an Informix whole system backup to a different machine than the original backup target (i.e., if the Informix dynamic server is to be relocated to a different machine). Specific steps must be followed in order to accomplish this, which are detailed in the sections that follow.

Important: Although this process explains how to restore a backup to a different Informix machine, the instructions provided only detail the configuration steps required to perform the operation. The actual restore of data is still performed with Informix's native software utilities. (See *the section Restoring Informix APM Backups* on page 35 for more information on the tools required to perform an Informix restore.)

IX.5.3.a Software Installation/Configuration Pre-Requisites

Installation pre-requisites must take place prior to attempting this procedure.

Figure IX-23:
The table at right gives a brief synopsis of the software installation required to perform an Informix Whole System backup relocation



- NetVault Software and the Informix APM Installed on ALL Clients -**
 NetVault (client or server version) and the **Informix APM** (not version dependent) must be installed on both Client machines in use for this operation (i.e., the *Existing Informix Machine* and the *New Restore Target*).

- **Informix APM (ver. 3.1 or Later) Installed on the NetVault Server** - This version of the software *must be* installed on the machine serving as the NetVault Server (regardless of installation environment in use).
- **All Client Machines Added to the NetVault Server** - With all software installation requirements met, all NetVault Client machines must be added to the NetVault Server via the **Client Management** window of the NetVault GUI (e.g., the *Existing Informix Machine* **and** the *New Restore Target*, if using a client-server installation environment, or simply the *New Restore Target* if using a server-only environment).

IX.5.3.b Setting Up the Restore

With all of the pre-requisites successfully performed, the following steps can be followed to restore an **Informix whole system** backup to a different machine.

1. It is first necessary to manually create the necessary **dbspaces** on the *New Restore Target*. To accomplish this, access the *Existing Informix Machine* and obtain specific information on desired **dbspaces** to be restored, and recreate this same information on the *New Restore Target*. For example, the “**rootdbs**” **dbspaces** item is to be restored to the *New Restore Target* machine, so it would be necessary to perform the following steps.
 - a. Locate the path to this item in the *Existing Informix Machine* (e.g., “/usr/informix/data/rootdbs”).
 - b. On the *New Restore Target*, create the **dbspace** “**rootdbs**” with this path information (e.g., “/usr/informix/data/rootdbs”).
2. Locate the Informix critical files listed below on the *Existing Informix Machine* and note the exact path to each file.
 - **ixbar.<x>**
 - **ONCONFIG (oncfg_<server name>.<server ID>)**
3. Launch the NetVault GUI and access the **Backup** window. Locate the *Existing Informix Machine* in the list of Clients displayed in the **Selections** tab and double-click on it to open it.
4. Double-click on the **File System Plugin** to open it and navigate through the selection tree of items to the paths noted in **Step 2.**, above. Select both of these items for a backup, give the job an appropriate name in the **Job Title** field and submit the job.
5. Access the *New Restore Target* and create directories to mirror the paths as noted in **Step 2.**, above.
6. Return to the NetVault Server and access the **Restore** window. In the **Selections** tab, double-click on the **File System Plugin** icon to open it and reveal any backup savesets created by this plugin.

7. Locate the critical file backup (based on the title given to the backup job) and double-click on it to open it. Select the root level item in order to choose all backed up items for a recovery.
8. Select the **Target Client** tab and in the list displayed, select the machine serving as the *New Restore Target*. Give a suitable name to the job in the **Job Title** field and submit it.

Important: If the sub-directory paths (detailed in **Step 5.**, above) are not properly created and the **Target Client** tab is not accessed and the *New Restore Target* selected (as in **Step 8.**, above), this operation will fail.

9. These files will be restored to the *New Restore Target*. Access this machine and navigate to the directory containing the **ONCONFIG** file (e.g., **oncfg_<server name>.<server ID>**). Rename this file to correspond to its new server information. For example, the **ONCONFIG** file recovered from the *Existing Informix Machine* was named “**oncfg_serverA.1**” (e.g., where “**serverA**” represents the server name and “**1**” represents its ID). The *New Restore Target* server’s name is “**serverB**” and its ID is also “**1**”; therefore, the file would be renamed as follows:

oncnfg_serverA.1 => oncnfg_serverB.1

10. Change the permissions and owner of these files, if necessary. (See the relevant Informix documentation for details on this procedure.)
11. From the NetVault Server, launch the **Backup** window. Access the *Existing Informix Machine*’s installation of the **Informix APM** and right-click on it. From the pop-up menu that appears, select the **Configure** command.
12. In the **Configure** window, take note of all of the settings made here. Close this window and the *Existing Informix Machine*.
13. Open the *New Target Machine* and access the **Configure** window as described above. In the **Restore Backup Taken from NetVault Client** option, ensure that the **NetVault name** of the *Existing Informix Machine* is input.
14. Input settings in this window to **exactly match** those configured for the *Existing Informix Machine*.
15. Click on **OK** to apply any changes made and close the **Configure** window.
16. With these steps completed, the preparation process is now complete and the restore can now be initiated on the *New Target Machine* (e.g., using Informix’s **OnBar** utility).



Figure IX-24:
The Restore Backup Taken from NetVault: Backup Client field

IX.5.3.c Post-Restore Requirements

Once the restore has successfully completed, the following must be performed to successfully complete the process:

Remove the Existing “ixbar.<serverid>” File

As a new backup of the Informix server is performed this file will be regenerated and a conflict may occur if the existing file is not deleted. To accomplish this, follow the steps below:

1. Initiate a terminal session and navigate to the Informix sub-directory which houses this file. (This directory should have been noted in a previous step.)
2. From the proper directory, input the following and press **Enter** to execute it:

```
rm ixbar.<serverid>
```

3. With the file successfully removed, a new “**ixbar.<serverid>**” file will be created once a new backup is performed (as previously noted).

IX.6.0 Troubleshooting

The following table describes commonly encountered problems and possible solutions. Informix’s **OnBar** utility maintains an activity log which details all the actions that it is performing. This log is particularly useful in determining why difficulties with backup or restore operations may occur. This section offers instructions on how to view this file, based on operating system in use as well as a table giving some brief explanations of known issues.

IX.6.1 Accessing the Activity Log in a Windows-based O/S

The necessary activity file will be entitled “**bar_<InformixServerName>.log**” and is located in the Informix directory, for example:

```
bar_ol_server1.log.
```

IX.6.2 Accessing the Activity Log in a Linux/UNIX-based O/S

The necessary activity file will be entitled “**bar_act.log**” and is usually located in the “**/tmp**” directory (or wherever it may have been set to exist in the **ONCONFIG** file’s “**BAR_MSG_PATH**” variable).

IX.6.3 Troubleshooting Table

The table below lists several errors that may be experienced when using the **Informix APM** as well as a possible solution for each.

Symptom	Error	Explanation
Backup fails to run (Activity Log indicates that OnBar did not run)	PATH system variable does not include INFORMIX/bin.	OnBar executable cannot be found to be run.
Backup fails to run (Activity Log indicates that OnBar did not run)	OnBar executable name is incorrect.	Correct OnBar executable cannot be found to be run.
Backup fails to run (Activity Log indicates that OnBar did not run)	Environment variables are not set correctly.	Unable to determine and provide correct environment for OnBar to run.
Backup fails to run (Activity Log indicates that OnBar did not run)	bar_act.log contains message: Error: You must be Informix user to run OnBar	Incorrect Informix user name and/or password.
Backup fails to run (Activity Log indicates that OnBar did not run)	bar_act.log contains message: Error: Unable to open connection to server: Informix Dynamic Server Stopped	Informix must be online to enable backup or browsing. Restores require Informix to be offline.
Backup fails to run (Activity Log indicates that OnBar did not run)	bar_act.log contains message: Error: There are no DB/BLOB spaces to backup/restore	Check that the backup window can be used to successfully browse the selected server's "Spaces" node. If not, then check that the Informix user name and/or password are correct.
Backup fails to run (Activity Log indicates that OnBar did not run)	bar_act.log contains message: Error: Unable to find file '.....\msmdll.dll'	Check that Windows NT Informix server has the correct entry for " BAR_BSALIB_PATH " in the ONCONFIG file and that the DLL is present in the expected location.
Backup fails to run (Activity Log indicates that OnBar did not run)	OnBar ran but crashed/stopped immediately	Unable to load the DLL msmdll.dll / shared library ibsad...so; check the path to the library is correct and does not contain spaces.

Symptom	Error	Explanation
Backup fails to run	OnBar fails to connect to NetVault.	Check to make sure there is an allowable entry for <device_path> i.e., TAPEDEV or LTAPEDEV.
Backup/Restore Fails (When attempting a command line invoked backup/restore)	The Activity Log (bar_act.log) contains the entry: "XBSA Error (BSACreateObject): A system error occurred. Aborting XBSA session"	The nvpluginaccess utility has not been run on the NetVault Server. See the section <i>Configuring for Restores (and CLI-based Backups)</i> on page 23 for details on running this utility.
Restore Fails (When attempting to restore a backup performed from one Informix Database Server to another)	The Activity Log (bar_act.log) contains the entry: "XBSA Error (BSAQueryObject) Backup object does not exist in Storage Manager"	The value set in the Configure window field, Restore Backup Taken from NetVault Client is set incorrectly on the NetVault Server. The default value for this field is blank, and NetVault requires that the correct name of Client be input (i.e., the original Informix Database machine name that is being restored to another machine).