Veritas NetBackup™ for PostgreSQL Administrator's Guide

Windows and Linux

Release 8.1.1
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- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
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Contents

Technical Support .............................................................................................................. 4

Chapter 1 Introduction to NetBackup for PostgreSQL ................................................. 9
  About NetBackup for PostgreSQL Agent ................................................................. 9
  Features supported by NetBackup for PostgreSQL Agent ........................................ 11
  The NetBackup for PostgreSQL Agent package .................................................... 11
  About the License for NetBackup for PostgreSQL Agent ........................................ 11
  NetBackup for PostgreSQL Agent Documentation .................................................. 12

Chapter 2 Installing the NetBackup for PostgreSQL Agent ........................................ 13
  Planning the installation of NetBackup for PostgreSQL Agent .................................. 13
  Verifying the operating systems and platforms ....................................................... 14
  Installing prerequisites for NetBackup for PostgreSQL Agent .............................. 14
  Post-installation requirements for NetBackup for PostgreSQL Agent .................... 15
  Describing the NetBackup for PostgreSQL Agent package .................................. 15
  Installing the NetBackup for PostgreSQL Agent ................................................... 16
  Authenticating the password .................................................................................... 17
  Uninstalling the NetBackup for PostgreSQL Agent ................................................. 18

Chapter 3 Configuring NetBackup for PostgreSQL ................................................. 19
  The nbpgsql.conf configuration file ........................................................................ 19
  Configuring PostgreSQL backups with DataStore policies .................................... 21

Chapter 4 The NetBackup for PostgreSQL backups and restores ............................ 23
  About PostgreSQL backups .................................................................................... 23
  The postgresql.conf configuration file .................................................................. 26
  Performing PostgreSQL backups .......................................................................... 26
  Validating the PostgreSQL backups ....................................................................... 28
  Querying the PostgreSQL backups ....................................................................... 28
  Deleting backup information from the NetBackup catalog files ......................... 29
About PostgreSQL restore ............................................................. 29
Performing the PostgreSQL restores ................................................. 31
Redirected restores ...................................................................... 31
Recovering the restores ................................................................. 32
Disaster recovery ....................................................................... 34

Chapter 5  Troubleshooting for PostgreSQL ................................. 35
Troubleshooting errors when using NetBackup for PostgreSQL Agent
............................................................................................... 35

Appendix A  NetBackup for PostgreSQL commands and conventions ........................................................................ 41
About NetBackup for PostgreSQL Agent commands ......................... 41
NetBackup for PostgreSQL Agent command conventions .................. 42

Appendix B  NetBackup for PostgreSQL commands ......................... 44

Index .......................................................................................... 50
Introduction to NetBackup for PostgreSQL

This chapter includes the following topics:

- About NetBackup for PostgreSQL Agent
- Features supported by NetBackup for PostgreSQL Agent
- The NetBackup for PostgreSQL Agent package
- About the License for NetBackup for PostgreSQL Agent
- NetBackup for PostgreSQL Agent Documentation

About NetBackup for PostgreSQL Agent

NetBackup for PostgreSQL Agent extends the capabilities of NetBackup to include backup and restore of the PostgreSQL databases. The NetBackup for PostgreSQL Agent is located on the NetBackup client and supports the operations on standalone setups. The agent supports the PostgreSQL version 9 and later.

The agent also supports to:

- Validate the backup.
- Query a backup and restore.
- Delete the backup information from the catalog files.
- Redirect restores.
The NetBackup for PostgreSQL workflow

The NetBackup for PostgreSQL Agent reads the parameters from the `nbpgsql.conf` file and initiates the operation. The `nbpgsql.conf` file contains the parameters that you must set for the `nbpgsql` command to run the respective operations.

The agent communicates with the PostgreSQL database to create a snapshot. The Volume Shadow Copy Services (VSS) for Windows or Logical Volume Manager (LVM) for Linux, takes a snapshot of the PostgreSQL database.

The agent then interacts with the NetBackup XBSA interface to update the server name, policy, and schedule type information. The NetBackup master server connects to the NetBackup client to backup or retrieve the data that you want to protect.

The agent mounts the snapshot, copies the file, and sends it to the NetBackup XBSA interface. The NetBackup XBSA interface writes this data to the mounted media or disk storage that is managed by the NetBackup media server.

Table 1-1 lists the configuration files. These files contain the parameters that you must specify for the respective operations.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>nbpgsql.conf</code></td>
<td>The <code>nbpgsql.conf</code> file contains the parameters that you must specify before you run the <code>nbpgsql</code> operations. For more information, See “The <code>nbpgsql.conf</code> configuration file” on page 19.</td>
</tr>
<tr>
<td><code>recovery.conf</code></td>
<td>The <code>recovery.conf</code> file contains the parameters that you must set for PostgreSQL to perform an archive recovery. You must set the parameters again for the subsequent recovery that you must perform. For more information, See “Recovering the restores” on page 32.</td>
</tr>
<tr>
<td><code>postgresql.conf</code></td>
<td>The <code>postgresql.conf</code> file contains the parameters that you must set to archive the Write-Ahead Logs. For more information, See “About PostgreSQL backups” on page 23.</td>
</tr>
<tr>
<td><code>pgpass.conf</code></td>
<td>The <code>pgpass.conf</code> file contains the password to connect to the database for Windows. For more information, See “Authenticating the password” on page 17.</td>
</tr>
<tr>
<td><code>.pgpass</code></td>
<td>The <code>.pgpass</code> file contains the password to connect to the PostgreSQL database for Linux operating systems. For more information, See “Authenticating the password” on page 17.</td>
</tr>
</tbody>
</table>
Note: You must set the parameters in the nbpgsql.conf file before you run the operations or provide them on the nbpgsql command line, where command line parameters take precedence.

Features supported by NetBackup for PostgreSQL Agent

Table 1-2 lists the features that are supported by the agent.

<table>
<thead>
<tr>
<th>Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup</td>
<td>The agent supports full instance backups of the PostgreSQL database.</td>
</tr>
<tr>
<td>Restore</td>
<td>The agent supports full instance restores of PostgreSQL backups.</td>
</tr>
<tr>
<td>Redirected restore</td>
<td>The agent supports restoring PostgreSQL backups to alternate NetBackup clients</td>
</tr>
</tbody>
</table>

The NetBackup for PostgreSQL Agent package

The PostgreSQL agent is packaged in NBPostgreSQLAgent_8.1.zip file and is available on my.veritas.com site.

The package file contains the following platform files:

- (Windows) NBPostgreSQLAgent_8.1_AMD64/
- (Linux RHEL) NBPostgreSQLAgent_8.1_linuxR_x86/
- (Linux SLES) NBPostgreSQLAgent_8.1_linuxS_x86/

About the License for NetBackup for PostgreSQL Agent

The NetBackup for PostgreSQL Agent is installed on the NetBackup client software and is not a separately licensed option of NetBackup. The NetBackup for PostgreSQL Agent is available to customers who are entitled with a valid license of the Application and Database License Pack. In general, licensing of the NetBackup for PostgreSQL Agent follows the existing capacity licensing models for supported database agents.
The NetBackup for PostgreSQL Agent documentation is available at the following URL:

www.veritas.com/support/en_US/article.000127661
Installing the NetBackup for PostgreSQL Agent

This chapter includes the following topics:

- Planning the installation of NetBackup for PostgreSQL Agent
- Verifying the operating systems and platforms
- Installing prerequisites for NetBackup for PostgreSQL Agent
- Post-installation requirements for NetBackup for PostgreSQL Agent
- Describing the NetBackup for PostgreSQL Agent package
- Installing the NetBackup for PostgreSQL Agent
- Authenticating the password
- Uninstalling the NetBackup for PostgreSQL Agent

Planning the installation of NetBackup for PostgreSQL Agent

Table 2-1 lists the planning steps that are mandatory for installing the agent.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Verify the operating systems.</td>
</tr>
<tr>
<td></td>
<td>For more information, See &quot;Verifying the operating systems and platforms&quot; on page 14.</td>
</tr>
</tbody>
</table>
Table 2-1 General steps for installing the agent (continued)

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Verify the prerequisites before you install the NetBackup for PostgreSQL Agent.</td>
</tr>
<tr>
<td></td>
<td>For more information, See “Installing prerequisites for NetBackup for PostgreSQL Agent” on page 14.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Install the NetBackup for PostgreSQL Agent on your operating system.</td>
</tr>
<tr>
<td></td>
<td>For more information, See “Installing the NetBackup for PostgreSQL Agent” on page 16.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Authenticate the database password for PostgreSQL backups.</td>
</tr>
<tr>
<td></td>
<td>For more information, See “Authenticating the password” on page 17.</td>
</tr>
</tbody>
</table>

Verifying the operating systems and platforms

Verify that the NetBackup for PostgreSQL Agent is supported on your operating system or platforms.

The agent supports the operations on following platforms:

- Red Hat Enterprise Linux (RHEL) 6.8 and later
- SUSE Enterprise Linux Server 11 SP3 and later
- Microsoft Windows Server 2008 R2 and later
- Microsoft Windows 8.1 and later

Installing prerequisites for NetBackup for PostgreSQL Agent

Before you install, ensure that you meet the following prerequisites:

- NetBackup 8.1 is installed and operational on the master server, media server, and the client.
- The PostgreSQL database is installed and operational on the client.
Post-installation requirements for NetBackup for PostgreSQL Agent

After you install

- (Windows) Configure the NetBackup for PostgreSQL Agent to run with administrative privileges.
- (Windows) Add the NetBackup bin directory to the PATH user environment variable.
- (Linux) Symbolic link: If a symbolic link does not exist, create libpq.so that points to libpq.so.<n>, where <n> is the PostgreSQL library version. You can create the symbolic link at your chosen directory. For example, if the PostgreSQL library version is 5, then the symbolic link libpq.so points to libpq.so.5.

**Note:** Ensure that you update the **PGSQL_LIB_INSTALL_PATH** parameter in the nbpgsql.conf with the absolute path of the symbolic link.

- (Linux) The user of the agent is a superuser or has superuser privileges.
- Set the following database user privileges:

<table>
<thead>
<tr>
<th>User</th>
<th>Privileges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup</td>
<td>LOCK TABLES, SELECT FILE, RELOAD, SUPER, UPDATE, TRIGGER, SHOW, VIEW, EXECUTE, and EVENT.</td>
</tr>
<tr>
<td>Restore</td>
<td>CREATE, DROP, INDEX, SHUTDOWN, INSERT, ALTER, DELETE, UPDATE, TRIGGER, SUPER, and CREATE VIEW.</td>
</tr>
</tbody>
</table>

To set the database user privileges, run the following PostgreSQL command:

```sql
ALTER USER<db_user> with SUPERUSER
```

For more information, see *PostgreSQL Administrator's Guide*.

Describing the NetBackup for PostgreSQL Agent package

The agent is packaged in the **NBPostgreSQLAgent_8.1.zip** file and is available on the my.veritas.com site.
The package file contains the following platform files:

- (Windows) `NBPostgreSQLAgent_8.1_AMD64/`
- (Linux RHEL) `NBPostgreSQLAgent_8.1_linuxR_x86/`
- (Linux SUSE) `NBPostgreSQLAgent_8.1_linuxS_x86/`

(Windows) `NBPostgreSQLAgent_8.1_AMD64/` includes the following files:

- `NBPostgreSQLAgent_8.1_AMD64/README.txt`
- `NBPostgreSQLAgent_8.1_AMD64/cab1.cab`
- `NBPostgreSQLAgent_8.1_AMD64/Setup.exe`
- `NBPostgreSQLAgent_8.1_AMD64/NBPgSQLAgent.msi`

(Linux RHEL) `NBPostgreSQLAgent_8.1_linuxR_x86/` includes the following files:

- `NBPostgreSQLAgent_8.1_linuxR_x86/README`
- `NBPostgreSQLAgent_8.1_linuxR_x86/install`
- `NBPostgreSQLAgent_8.1_linuxR_x86/LICENSE`
- `NBPostgreSQLAgent_8.1_linuxR_x86/pkg.tar`

(Linux SUSE) `NBPostgreSQLAgent_8.1_linuxS_x86/` includes the following files:

- `NBPostgreSQLAgent_8.1_linuxS_x86/README`
- `NBPostgreSQLAgent_8.1_linuxS_x86/install`
- `NBPostgreSQLAgent_8.1_linuxS_x86/LICENSE`
- `NBPostgreSQLAgent_8.1_linuxS_x86/pkg.tar`

When you install the agent, accept the VERITAS LICENSE AGREEMENT to proceed with installing the agent successfully.

The agent by default, gets installed at the following locations:

- (Windows) `C:\Program Files\VERITAS\NBPostgreSQLAgent`
- (Linux RHEL & SUSE) `/usr/NBPostgreSQLAgent/`

### Installing the NetBackup for PostgreSQL Agent

When you install the agent on Windows, Veritas recommends that you run the `NBPostgreSQLAgent_8.1_AMD64/Setup.exe` file.
To install the agent

1. Download the NBPostgreSQLAgent_8.1.zip file.
2. Extract the file that applies to your operating system:
   - (Windows) NBPostgreSQLAgent_8.1_AMD64/
   - (Linux RHEL) NBPostgreSQLAgent_8.1_linuxR_x86/
   - (Linux SUSE) NBPostgreSQLAgent_8.1_linuxS_x86/
3. Run the file that applies to your operating system:
   - (Windows) NBPostgreSQLAgent_8.1_AMD64/Setup.exe
   - (Linux RHEL) NBPostgreSQLAgent_8.1_linuxR_x86/install
   - (Linux SUSE) NBPostgreSQLAgent_8.1_linuxS_x86/install
4. Type \textit{y} to accept the VERITAS LICENSE AGREEMENT.

The agent gets installed at the default location.

## Authenticating the password

Authenticating the password keeps you from specifying the password every time you run a backup. The password file stores the password and the application picks the password every time you run a backup.

### The password file

The password file for Windows is \texttt{pgpass.conf} and for Linux it is \texttt{.pgpass} file.

The password file must contain the lines of the following format:

\texttt{hostname:port:database:username:password}

In Linux, after you edit the \texttt{.pgpass} file, change the \texttt{.pgpass} file permissions.

### Authenticating the password on Windows

To authenticate the password

1. Run the following command:
    
    \texttt{>echo%AppData%}

    O/P: \texttt{C:\Users\Administrator\AppData\Roaming}

2. Create \texttt{postgresql} directory in \texttt{C:\Users\Administrator\AppData\Roaming} path.

3. Create \texttt{pgpass.conf} in the \texttt{postgresql} directory.
4 In the pgpass.conf file update the following and then save the file.

   hostname:port:database:username:password

   For example, localhost:5432:*:postgres:test_123

5 Restart the postgres services.

Authenticating the password on Linux

To authenticate the password

1 Create .pgpass file in the user's home directory.

2 Edit the .pgpass file as:

   hostname:port:database_name:username:password

3 To change the .pgpass file permissions, run the following command:

   $ chmod 0600 ~/.pgpass

Uninstalling the NetBackup for PostgreSQL Agent

To uninstall the agent

1 (Windows) From the Control Panel, right-click the NBPostgreSQLAgent_8.1_AMD64/ file and Uninstall the agent.

2 (Linux RHEL) To uninstall, delete the NBPostgreSQLAgent_8.1_linuxR_x86/ directory from the installed location.

3 (Linux SUSE) To uninstall, delete the NBPostgreSQLAgent_8.1_linuxS_x86/ directory from the installed location.
Configuring NetBackup for PostgreSQL

This chapter includes the following topics:

- The nbpgsql.conf configuration file
- Configuring PostgreSQL backups with DataStore policies

The nbpgsql.conf configuration file

The NetBackup for PostgreSQL configuration (nbpgsql.conf) file contains the parameters that you must specify for the respective operations. It contains predefined settings and is located on the client. When parameters are not configured in the nbpgsql.conf file, then the default parameter value takes precedence. You can configure the parameters in the nbpgsql.conf file or set them on the command line, where the command line parameters take precedence. The nbpgsql.conf file keeps you from providing the parameters every time you run operations.

The nbpgsql.conf file is located in the following locations:

- (Windows)
  `install_path\NBPostgreSQLAgent_8.1_AMD64\nbpgsql.conf`

- (Linux RHEL)
  `install_path/NBPostgreSQLAgent_8.1_linuxR_x86/nbpgsql.conf`

- (Linux SUSE)
  `install_path/NBPostgreSQLAgent_8.1_linuxS_x86/nbpgsql.conf`

Table 3-1 lists the nbpgsql.conf file parameters:
### Table 3-1  The nbpgsql.conf parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
<th>Required parameter for</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB_PORT</td>
<td>Configures the PostgreSQL database server port number on which the backup or the restore should be performed. The port number verifies the PostgreSQL service status.</td>
<td>Backups</td>
<td>When you do not specify the port number, the default is 5432.</td>
</tr>
<tr>
<td>DB_USER</td>
<td>Configures the PostgreSQL database user name.</td>
<td>Backups</td>
<td>When you do not specify the user name, the default is postgres.</td>
</tr>
<tr>
<td>PGSQL_LIB_INSTALL_PATH</td>
<td>(Linux) Configures the libpq.so binary path.</td>
<td>Backups</td>
<td>No default value.</td>
</tr>
<tr>
<td>MASTER_SERVER_NAME</td>
<td>Specifies the NetBackup master server for backups and restores.</td>
<td>Backups and restores</td>
<td>No default value.</td>
</tr>
<tr>
<td>POLICY_NAME</td>
<td>Specifies the DataStore policy name.</td>
<td>Backups</td>
<td>No default value.</td>
</tr>
<tr>
<td>SCHEDULE_NAME</td>
<td>Identifies the backup schedule that you configured while creating the DataStore policy.</td>
<td>Backups</td>
<td>When you do not specify the policy name, the defaults is Default-Application-Backup.</td>
</tr>
<tr>
<td>CLIENT_NAME</td>
<td>Defines the NetBackup client that has the NetBackup for PostgreSQL Agent.</td>
<td>Redirected restores and query</td>
<td>When you do not specify the client name, the default is the current host.</td>
</tr>
<tr>
<td>SNAPSHOT_SIZE</td>
<td>(Linux) Specifies the snapshot size for LVM snapshots. Specify the snapshot size in kilobytes, megabytes, or gigabytes as KB, MB, or GB respectively.</td>
<td>LVM backups</td>
<td>When you do not specify the snapshot size, the default is MB.</td>
</tr>
<tr>
<td>DB_BACKUP_ID</td>
<td>DB_BACKUP_ID represents the backup image name. This parameter configures the backup file when you want to restore or delete a specific backup.</td>
<td>Restoring backups using the backup image name.</td>
<td>No default value.</td>
</tr>
<tr>
<td>PGSQL_TARGET_DIRECTORY</td>
<td>Specifies the destination directory where you want to restore the backups.</td>
<td>Restores</td>
<td>No default value.</td>
</tr>
</tbody>
</table>
### Table 3-1  The nbpgsql.conf parameters (continued)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
<th>Required parameter for</th>
<th>Default value</th>
</tr>
</thead>
</table>
| **NBPGSQL_LOG_LEVEL**     | The `NBPGSQL_LOG_LEVEL` parameter lets you set the logging level for the `nbpgsql` logs. For a particular logging level, all details at that level or lower are logged. The `nbpgsql` debug logs includes the following verbose levels:  
  ■ **1 – ERROR**: Conditions that should be corrected, such as configuration errors.  
  ■ **2 – WARN**: Conditions that are not errors, but that might require special handling.  
  ■ **3 – INFO**: Informational messages.  
  ■ **4 – DEBUG**: Debugging the messages that is used for troubleshooting. | The log levels help to control the amount of information that you want to access for troubleshooting errors. | When you do not specify the log level, the default is level 1. |
| **NBPGSQL_LOG_SIZE**      | Configures the `nbpgsql` log size in MB. The maximum size is 10MB. When the log size reaches the `NBPGSQL_LOG_SIZE`, it creates a new log with timestamp. | You can specify the value according to the events that you want to write into the logs. | When you do not specify the log size, the default is 10MB. |

### Configuring PostgreSQL backups with DataStore policies

The agent uses the DataStore policies to define the attributes, schedules, clients list, and backup selections.
To configure the PostgreSQL database backups with DataStore policies, complete the following steps:

1. Log on to the master server as an administrator (Windows) or root (Linux).

2. In the NetBackup Administration Console, expand NetBackup Management, and then click Policies.

3. In All Policies pane, right-click Summary of All Policies, and then click New Policy.

4. In Add a New Policy dialog box, enter the unique policy name.

5. In the Change Policy dialog box, select DataStore Policy from the Policy Type drop-down list.

6. From the Policy Storage list, select a disk-based storage unit for storage.

7. To select the schedule type, under the Schedules tab, click OK to select the Default Application Backup schedule type.

---

Note: The XBSA framework supports the Default Application backup schedule type only.

---

8. In the Clients tab, click New and then add the NetBackup client that has the NetBackup for PostgreSQL Agent.

9. In the Add Client screen, click New, and then in the Client Name field, type the name of the client.

10. In the NetBackup Administration Console, click NetBackup Management > Policies to view the policy in the existing policies list.

11. Before performing the backup, review the settings in the nbpgsql.conf file.

For more information, see See “The nbpgsql.conf configuration file” on page 19.
The NetBackup for PostgreSQL backups and restores

This chapter includes the following topics:

- About PostgreSQL backups
- Performing PostgreSQL backups
- Validating the PostgreSQL backups
- Querying the PostgreSQL backups
- Deleting backup information from the NetBackup catalog files
- About PostgreSQL restore
- Performing the PostgreSQL restores
- Redirected restores
- Recovering the restores
- Disaster recovery

About PostgreSQL backups

The `nbpgsql -o backup` command for backup initiates the backup operation using the `-S`, `-P`, and `-s` as the required parameters. The parameters `-l` and `-z` are the required parameters for Linux operating systems.
The parameters `portnum` and `-u` are optional parameters. You can configure these parameters in the `nbpgsql.conf` file or specify on the `nbpgsql` command line.

After you set the parameters for the backup, the agent reads the parameters and starts the backup according to the specified parameters. The agent writes the data that you want to protect into the WAL files.

These WAL files are then archived in the archive directory that you can create at your chosen location.

When you create the archive or WAL directory, Veritas recommends that you create outside the data directory.

Ensure that before you run a backup, set the parameters in the `postgresql.conf` file to enable WAL archiving.

For more information, see See “The `postgresql.conf` configuration file” on page 26.

The agent protects the following files:

- Schema files that are associated with all database tables.
- Files that are associated with the database tables.
- Data and index files.
The NetBackup for PostgreSQL workflow

When you run the backup, the agent connects to the PostgreSQL database to execute a flush and read only lock on all tables. The agent then reads the associated PostgreSQL database files from the mounted directory and initiates the backup.

The LVM or VSS, creates a snapshot, and mounts the snapshot. The associated files (whole instance) are archived into file. The agent copies the archived file into the XBSA data object and sends to the NetBackup XBSA interface.

The NetBackup XBSA interface writes this data to the mounted media or disk storage managed by the NetBackup media server.

The command prompt displays the successful completion status of the backup. The Activity Monitor also displays the status for the backup job.
The postgresql.conf configuration file

The `postgresql.conf` file contains the parameters that you must set to enable WAL archiving before you run a backup.

Table 4-1 lists the parameters that you must set to archive the WAL logs.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>wal_level</code></td>
<td>This parameter determines how much information is written to the WAL files.</td>
</tr>
<tr>
<td><code>archive_mode</code></td>
<td>This parameter enables the archive mode so that the WAL logs get stored in the archive directory using the <code>archive_command</code>.</td>
</tr>
<tr>
<td><code>archive_timeout</code></td>
<td>This parameter sets the number of seconds after which the log file segment will switch to a new segment.</td>
</tr>
<tr>
<td><code>statement_timeout</code></td>
<td>This parameter aborts any statement that takes more than the set number of milliseconds.</td>
</tr>
</tbody>
</table>

Performing PostgreSQL backups

This topic lists the prerequisites for the backup, describes the procedure to run a backup, and the information to schedule the backup from NetBackup.

Prerequisites

Before you run the backup, ensure that you meet the following prerequisites:

- (Windows) Set the `NetBackup\bin` directory in the environment variable. For example, `Path =C:\Program Files\Veritas\Netbackup\bin`
- (Windows) Set the `PostgreSQL\bin` directory in user environment variable. For example, `Path=C:\Program Files\PostgreSQL\bin`
- (Linux) Symbolic link: If a symbolic link does not exist, create the symbolic link `libpq.so` and ensure that it points to the valid `libpq .so.<n>`, where `n` is the PostgreSQL library version. For more information, see “Post-installation requirements for NetBackup for PostgreSQL Agent” on page 15.
- Set the following parameters in the `nbpgsql.conf` file:
  - `DB_USER`
  - `DB_PORT`
Create the archivedir directory and then set the following parameters in the postgresql.conf file:

- \texttt{wal\_level = archive}
- \texttt{archive\_mode = on}
- \texttt{archive\_timeout =0}
- \texttt{statement\_timeout=0}

\textbf{Note:} Ensure that you add the time in \textit{milliseconds}. The recommended time is 30000 milliseconds (30 seconds).

- Mention the following changes for \texttt{archive\_command}
  - (Windows) \texttt{'copy ' "%p" "C:\\archivedir\\%f"'}
  - (Linux) \texttt{test! -f <archive\_path>/%f&&cp\%p <archive\_path>/%f}

- (Linux) After creating the \texttt{archivedir} directory, change the group and ownership to PostgreSQL user.

- Restart the PostgreSQL services.

- Configure PostgreSQL backups with \textbf{DataStore} policies.
  For more information, See “Configuring PostgreSQL backups with DataStore policies” on page 21.

- Verify the installation prerequisites and the post-installation requirements.
  For more information, See “Installing prerequisites for NetBackup for PostgreSQL Agent” on page 14.
  For more information, See “Post-installation requirements for NetBackup for PostgreSQL Agent” on page 15.
To run the backup

1. Run the following command:

   `nbpgsql -o backup
   -S master_server
   -P policy_name
   -s schedule_name
   (Linux)-z snapshot_size
   (Linux)-l postgresql_library_path
   [-portnum db_port]
   [-u dbuser]

2. (Optional) Type the database password, when the command line prompts for a password. NetBackup connects to the database and initiates the backup.

Scheduling PostgreSQL backups from NetBackup

You can schedule the PostgreSQL backups from the NetBackup Administration Console using the DataStore policy to call a backup script.

For more information, see https://www.veritas.com/support/en_US/article.100041371

Validating the PostgreSQL backups

After a successful backup, you can view and verify the backup information using the following command:

   `nbpgsql -o query`

Querying the PostgreSQL backups

The `nbpgsql -o query` command lists previously backed up files according to the options that you specify. You can configure these parameters from the `nbpgsql.conf` file or set the parameters using the `nbpgsql` command.

The parameter `-S` is the required parameter. You can use the `-C` and `-P` options to define a different client and policy.

By default, NetBackup uses the values that you have configured in the `nbpgsql.conf` file.

Before you run a query, you must set the following parameter in the `nbpgsql.conf` file or provide on the command line:
To query a backup

1. Configure the parameters, in the `postgresql.conf` file or provide on the command line.

2. Run the following command:

   ```bash
   nbpgsql -o query -S master_server [-C client_name] [-P policy_name]
   ```

   For example, to query a backup from client `ClientA`, run the following command:

   ```bash
   nbpgsql -o query -S master_server [-C ClientA]
   ```

   For example, to list backup files with the policy name `policy_name`, run the following command:

   ```bash
   nbpgsql -o query -S master_server [-P policy_name]
   ```

Deleting backup information from the NetBackup catalog files

The `nbpgsql -o delete` command, removes the backup information from the catalog files but retains the backup files on the NetBackup media server. The parameter `-S` is required parameter. You can use the `-id` option to delete a backup by specifying its backup image name.

Specify the following parameter in the `nbpgsql.conf` file or on the command line:

- **DB_BACKUP_ID**

To delete the backup information

1. Configure the parameters, in the `postgresql.conf` file or provide on the command line.

2. Run the following command:

   ```bash
   nbpgsql -o delete -S master_server [-id db_backup_id].
   ```

About PostgreSQL restore

The `nbpgsql -o restore` command for restore initiates the restore operation using `-S` and `-t` as the required parameters. The parameters `-id` and `-C` are optional parameters.
The parameter `-id` restores the backup using the specified backup image name. The parameter `-C` lists all the backups that exist on the specified client. When you do not specify `-C`, it defaults to NetBackup master server.

**Figure 4-2**  NetBackup for PostgreSQL restore workflow

The NetBackup for PostgreSQL restore workflow

After you specify the parameters, the agent reads the command line arguments and parses the `nbpgsql.conf` configuration file. The agent then interacts with the NetBackup XBSA interface to retrieve the backup using the specified parameters.

The NetBackup XBSA interface reads the progress files to receive the PostgreSQL backup files to restore them to the target directory.

The command prompt indicates the successful completion status of the restore. The **Activity Monitor** displays the status for the restore job.

In Linux operating systems, after a successful restore, the owner and group of the restored data defaults to `postgres`. You must change the ownership to PostgreSQL user and modify the settings according to your environment.
In Linux operating system, if the data directory contains symbolic link, the backup does not retain the link information. The symbolic link gets backed up as a normal data directory and is restored as a normal directory. To restore the link, you must reconfigure the symbolic link.

**Note:** Ensure that the target directory is valid and empty.

**Prerequisites**

Before you run a restore, ensure that you meet the following prerequisites:

- (LVM users) Ensure that data logs and the logs directory reside on logical volumes.
- Set the following parameters in the `nbpgsql.conf` file:
  - `PGSQL_TARGET_DIRECTORY`
  - `MASTER_SERVER_NAME`
  - `DB_PORT`
  - `CLIENT_NAME`
  - `DB_BACKUP_ID`

**Performing the PostgreSQL restores**

To restore the backup

1. Configure the parameters in the `nbpgsql.conf` file, or provide them on the command line.

2. Run the following command:

   ```bash
   nbpgsql -o restore -S master_server -t target_directory [-id db_backup_id] [-C client_name]
   ```

**Redirected restores**

Redirected restores lets you restore backup files to a client different from the client that originally performed the backup. The new location can be a different host or a different file path using a different name for the redirected restore. To redirect a restore to a different host, include the destination client name in the `install_path\NetBackup\db\altnames` directory.
Performing redirected restores

To redirect a restore to a different host

1. Update the `nbpgsql.conf` file with the NetBackup client name as the host and the PostgreSQL target directory as the directory where you want to redirect the restore.

2. On the NetBackup master server, create an `altnames` directory for the host that you want to have permission to perform the redirected restore. For example, to give Host B permissions to restore from another host, create the following file:
   - (Windows) `install_path\NetBackup\db\altnames\HostB`
   - (Linux RHEL and SLES) `/usr/openv/netbackup/db/altnames/HostB`

3. In the `altnames` directory, add the names of the client(s) whose files the requesting client wants to restore. For example, if you want Host B to have permissions to redirect restores from Host A, add Host A to the Host B file.

4. Run the following command:
   ```
   nbpgsql -o restore -S master_server_name -t target_directory -portnum db_port [-id db_backup_id] [-C client_name]
   ```

5. After a successful redirected restore, undo the changes that you made on the master server and the client.

To redirect a restore to a different file path

1. Run the following command:
   ```
   nbpgsql -o restore -S master_server_name -t target_directory -portnum database_server_port [-id db_backup_id] [-C client_name]
   ```

2. Copy the restore data to the data directory.

3. After a successful restore, change the ownership of data directory to PostgreSQL user and modify the settings according to your environment.

Recovering the restores

After a successful restore, to recover the restore, copy the `recovery.conf.sample` file to the PostgreSQL data directory. The `recovery.conf.sample` is available at the PostgreSQL install path. Ensure that after you copy the recovery file, remove the `.sample` extension.
When you set the parameters and restart the PostgreSQL services, the server goes into the recovery mode and reads the archived WAL files. If the recovery gets terminated, you can restart the server to continue the recovery process.

After successful completion, the server renames the `recovery.conf` file to `recovery.done` to prevent re-entering into the recovery mode.

In Linux operating system, the owner and group defaults to `postgres` after a successful restore. You must change the ownership to PostgreSQL owner and modify the settings according to your environment.

**The recovery.conf configuration file**

The `recovery.conf` file contains the parameters that you must set to enable archive recovery or act as a replication standby. The parameters must be set again for the subsequent recovery that you must perform.

Table 4-2 lists the parameters that you must set to enable archive recovery.

### Table 4-2

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>restore_command</code></td>
<td>This parameter specifies the shell command that is executed to copy log files back from archival storage. This parameter is required for archival storage but is optional for streaming replication. The command string may contain <code>%f</code> that is replaced by the name of the desired log file and <code>%p</code> is replaced by the absolute path to copy the log file to.</td>
</tr>
</tbody>
</table>

| `recovery_target` | This parameter stops the roll-forward at a specific point. By default, the recovery rolls forward to the end of the WAL log. |

**Performing the restore recovery**

**To recover the restore**

1. Stop the PostgreSQL services.
2. Copy the restore data into the PostgreSQL data directory.
3. (Linux) Change the ownership to PostgreSQL user.
4. Copy the `recovery.conf` file to the PostgreSQL data directory and remove the `.sample` extension.
5. (Linux) Change the ownership to the PostgreSQL user and modify the settings according to your environment.
6. Edit the `recovery.conf` file to set the following:
(Windows) Mention the `restore_command` parameter as `cp
"<PostgreSQL-data-directory>\pgarchive\%f" "%p"

(Linux) Mention the `restore_command` as `cp
<PostgreSQL-data-directory>/pgarchive/%f %p

Remove the `pause_recovery_target` parameter.

7 Start the PostgreSQL services.
8 After successful recovery, delete the `pgarchive` directory and the `recovery.done` file.

Disaster recovery

Disaster recovery is a plan to recover the data that can get lost in a disaster event. The agent supports redirected restore as a disaster recovery strategy.

For more information, See "Redirected restores" on page 31.
Troubleshooting for PostgreSQL

This chapter includes the following topics:

- Troubleshooting errors when using NetBackup for PostgreSQL Agent

Troubleshooting errors when using NetBackup for PostgreSQL Agent

General guidelines to resolve problems

The following table includes steps that help you resolve problems you may encounter while using NetBackup for PostgreSQL Agent.

Table 5-1 General steps to resolve problems

<table>
<thead>
<tr>
<th>Steps</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step1</td>
<td>Remember the error message</td>
<td>Error messages are usually the vehicles for telling you something went wrong. If you do not see an error on the command line, but still suspect a problem, check the logs and the reports. These can provide an error message that directly points to the problem. The logs and reports are essential troubleshooting tools.</td>
</tr>
</tbody>
</table>
Table 5-1  General steps to resolve problems *(continued)*

<table>
<thead>
<tr>
<th>Steps</th>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Identify what you were doing when the problem occurred.</td>
<td>Ask the following questions:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ What operation was tried?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ What method did you use?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ What type of server platform and operating system was involved?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ If your site uses both master server and media server, was it a master</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ server or a media server?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ If a client was involved, what type of client was it?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Have you performed the operation successfully in the past? If so, what</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ is different now?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ What is the service pack level?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Do you use operating system software with the latest fixes supplied,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ especially those required for use with NetBackup?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ Is your device firmware at a level, or higher than the level, at which it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ has been tested according to the posted device compatibility lists?</td>
</tr>
<tr>
<td>Step 3</td>
<td>Record all information</td>
<td>Capture potentially valuable information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The NetBackup logs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The logs specific to NetBackup for PostgreSQL Agent logs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>■ The logs specific to NetBackup XBSA.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Correct the problem</td>
<td>After you define the problem, use the information to correct it.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Contact Technical Support</td>
<td>If you cannot solve the troubleshooting, contact the Technical support.</td>
</tr>
</tbody>
</table>

**Troubleshooting errors using logs and reports**

To troubleshoot the errors, you can refer to the NetBackup logs, NetBackup for PostgreSQL Agent logs, and the NetBackup XBSA logs. These logs are located at the following locations:

The NetBackup logs are located at:

- `install_path\NetBackup\logs\bprd`
- `install_path\NetBackup\logs\bpcd`
- `install_path\NetBackup\logs\user_ops\dbext\logs`

You must enable the `bprd` and the `bpcd` log files. For more information, see the *NetBackup Troubleshooting Guide*.

The logs that are specific to NetBackup for PostgreSQL Agent are located at:

- `install_path\nbpgresql.log`
The logs that are specific to NetBackup XBSA are located at:

- `<NetBackup_install_path>/netbackup/logs/exten_client`

### Troubleshooting NetBackup errors

For troubleshooting NetBackup errors, see Veritas NetBackup Troubleshooting Guide and the Veritas NetBackup Commands Reference Guide.

### Troubleshooting NetBackup for PostgreSQL Agent errors

Table 5-2 lists and describes the errors and the solutions to troubleshoot the problems while running the operations.

<table>
<thead>
<tr>
<th>Problems</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The `nbpgsql` backup fails with the following error: **Unable to load postgresql library** | You may encounter this problem when the `nbpgsql.conf` file is not updated with the following:

  - postgresql library file location
  - `PGSQL_LIB_INSTALL_PATH` does not point to correct `libpq.so` library version. |
| | Verify the following and then run the backup again:

  - Add or update the PostgreSQL library file location in the `nbpgsql.conf` file.

  - Ensure that the `PGSQL_LIB_INSTALL_PATH` is set to the correct path. It should point to `libpq.so` library version.

  - Create a symbolic link `libpq.so` that points to the `libpq.so.<n>` where `n` is the PostgreSQL library version.

  For more information, see “Post-installation requirements for NetBackup for PostgreSQL Agent” on page 15. |
| The `nbpgsql` backup fails with the following error: **Unable to connect to the database** | The `nbpgsql` backup fails when the `nbpgsql.conf` file is updated with invalid username or port number. |
| | To add the appropriate database user name and port number

  - Configure the appropriate database user name and port number in the `nbpgsql.conf` file or provide the appropriate options with the `nbpgsql` command.

  For more information, see “The `nbpgsql.conf` configuration file” on page 19. |
| The `nbpgsql` backup fails with the following error: **Unable to load xbsa.dll** | The `nbpgsql` backup fails if the environment variable path is not updated with NetBackup bin directory. |
| | To run a `nbpgsql` backup successfully

  - Update the environment variable path with NetBackup install_path/bin. |
<table>
<thead>
<tr>
<th>Problems</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
</table>
| **The nbpgsql backup fails with the following error:**                 | **The nbpgsql backup fails if the nbpgsql.conf file is not updated with the required parameters.** | To run the nbpgsql backup successfully  
  - Configure the valid master server name, policy name, schedule type in the nbpgsql.conf file or from the command line.  
  - Verify if there are communication errors between the nbpgsql agent and the NetBackup master server. For more information see the NetBackup Administration guide. |
| XBSA initiation failed                                                 |                                                                                                 |                                                                                               |
| **(Windows)VSS snapshot creation failed**                              | **The nbpgsql backup may fail when the user does not have the privileges to run the nbpgsql operations.** | Run cmd.exe in Administrator mode.                                                              |
| **The nbpgsql restore operation does not restore any data from the target NetBackup client.** | **The nbpgsql restore fails if the nbpgsql.conf file is not updated with the NetBackup client name and the target directory.** | For a successful restore  
  - Verify that the target directory is valid and empty.  
  - Initiate the restore from the NetBackup source client.  
  - Set the NetBackup client name and target directory parameters in the nbpgsql.conf file. |
| **The nbpgsql backup fails with the following error:**                 | **The nbpgsql backup may fail when the volume group does not have sufficient space for the snapshot.** | To verify the space in the volume group  
  1. Run the following command:  
     $vgs  
     The command displays the volume group details.  
  2. Update the nbpgsql.conf file with the appropriate snapshot size. The snapshot should be equivalent to or more than the instance size. |
| (Linux)Error creating LVM snapshot                                     |                                                                                                 |                                                                                               |
## Table 5-2  Troubleshooting NetBackup for PostgreSQL errors (continued)

<table>
<thead>
<tr>
<th>Problems</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
</table>
| Error messages after a successful backup:                                | The `nbpgsql` backup gives these errors when the volume group contains the snapshots. You can list the snapshots and then remove them before you run the backup again. **Note:** `nbpgsql` created LVM snapshot names are prefixed with `pgsqlsnap` | To remove the snapshots:  
1. Run the following command to list the existing snapshot:  
   ```bash
   $ lvs
   ```  
   The command displays the snapshot details.  
2. To remove the snapshots, run the following command:  
   ```bash
   $ lvremove -f <volume_group>/<snapshot_name>
   ``` |
| <volume_group>/<snapshot_name> Read failure after 0 of 4096 at 29393616896: input or output error. |                                                                            |                                                                          |
| **OR**                                                                  |                                                                            |                                                                          |
| <volume_group>/<snapshot_name>: read failure after 0 of 4096 at 4096: input or output error. |                                                                            |                                                                          |
| The `nbpgsql` backup fails with the following error:                      | You may encounter this problem when the `nbpgsql.conf` file is not updated with the following:  
  - PostgreSQL library file location.  
  - The `PGSQL_LIB_INSTALL_PATH` does not point to `libpq.so`. | Verify the following and then run the backup again:  
  - Add or update the PostgreSQL library file location in the `nbpgsql.conf` file.  
    For more information, See “The `nbpgsql.conf` configuration file” on page 19.  
  - Ensure that the `PGSQL_LIB_INSTALL_PATH` is set to the correct path. It should point to `libpq.so.<n>`, where `<n>` is the PostgreSQL library version.  
  - Create a symbolic link `libpq.so` that points to the `libpq.so.<n>`, where `<n>` is the PostgreSQL library version. |
Table 5-2  Troubleshooting NetBackup for PostgreSQL errors (continued)

<table>
<thead>
<tr>
<th>Problems</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
</table>
| The nbpgsql backup on Linux (LVM), fails with the following error:  
*Error unmounting the snapshot-Device or resource busy*  
OR  
*Error removing the snapshot-pgsqlsnap_<timestamp>*  
**Note:** <timestamp> is the LVM snapshot time | The nbpgsql backup fails during an attempt to unmount the snapshot, the device, or when you remove the existing snapshots. | To unmount the snapshot  
1. Run the following command to list all mounted file systems:  
   $ mount -l  
2. If the snapshot still exists, create a mount directory using the following command:  
   $mount <mount_directory>  
   **Note:** This directory is created in /mnt/<snapshot_name>. The prefix names for snapshot are pgsqlsnap.  
3. Run the following command to remove the mount directory:  
   $rm -rf <mount_directory>  
4. Run the following command to remove the snapshot manually:  
   1vremove -f <volume_group>/<snapshot_name> |
NetBackup for PostgreSQL commands and conventions

This appendix includes the following topics:

- About NetBackup for PostgreSQL Agent commands
- NetBackup for PostgreSQL Agent command conventions

About NetBackup for PostgreSQL Agent commands

This section describes the commands, options, and parameters that are available to run the `nbpgsql` operations. Each command contains a brief description, required parameters, and optional parameters for the respective operations. The NetBackup for PostgreSQL Agent supports only those commands, options, and parameters that are mentioned in this document.

Observe for the following:

- Specify the parameters in the `nbpgsql.conf` file or provide them on the command line.
- The parameter on the command line take precedence over the `nbpgsql.conf` file.
- Specify the operation type `-o` on the `nbmysql` command line.
- Specify the parameters and options for the respective operations in the `nbpgsql.conf` file or on the command line.
### The NetBackup for PostgreSQL Agent command options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-C</td>
<td>Configures the NetBackup client name for redirected restores.</td>
</tr>
<tr>
<td>-h</td>
<td>Displays the Help usage, when it is the only option on the <code>nbpgsql</code> command line.</td>
</tr>
<tr>
<td>-id</td>
<td>Configures the specified backup.</td>
</tr>
<tr>
<td>-I</td>
<td>Configures the PostgreSQL library path. (Linux)</td>
</tr>
<tr>
<td>-o</td>
<td>Configures the operation type (backup, restore, query, and delete).</td>
</tr>
<tr>
<td>-P</td>
<td>Configures the <code>DataStore</code> policy.</td>
</tr>
<tr>
<td>-portnum</td>
<td>Configures the database server port number that identifies the PostgreSQL instance on which the backup or restore is performed.</td>
</tr>
<tr>
<td>-s</td>
<td>Configures the NetBackup schedule.</td>
</tr>
<tr>
<td>-S</td>
<td>Configures the NetBackup master server.</td>
</tr>
<tr>
<td>-t</td>
<td>Configures the target directory to restore the data.</td>
</tr>
<tr>
<td>-u</td>
<td>Configures the database user name.</td>
</tr>
<tr>
<td>-z</td>
<td>Configures the LVM snapshot size.</td>
</tr>
</tbody>
</table>

### NetBackup for PostgreSQL Agent command conventions

This document uses the following conventions when describing commands that are specific to the agent.

Run the following commands in the command line interface to see the results:

- The `-help` command (`-h`) option prints a command-line usage message when it is the only option on the command line. For example,

```
nbpgsql -h
```

- Brackets `[ ]` indicate that the enclosed component of the command line is optional. Other parameters are required.
Italics indicate that the information is user supplied. For example, you may provide the client name and the schedule name for a backup operation.

nbpsql -o backup -S master_server -P policy_name -s schedule_name
NetBackup for PostgreSQL commands

This appendix includes the following topics:

- `nbpgsql -o backup`
- `nbpgsql -o restore`
- `nbpgsql -o query`
- `nbpgsql -o delete`
nbpgsql -o backup

nbpgsql -o backup – runs the backup operation from the NetBackup client.

SYNOPSIS

nbpgsql -o backup
-S master_server
-F policy_name
-s schedule_name
(Windows) -l postgresql_library_path
(Windows) -z snapshot_size
[-portnum db_port]
[-database_user]

Description

This command invokes the backup operation from the NetBackup client using the NetBackup DataStore policy name and the schedule type. The parameter -S and -P are required parameters for Windows. The parameters -l and -z are required parameters for Linux. The -portnum and -u are the optional parameters.

On Linux systems, the directory path is /usr/NBPostgreSQLAgent/.

On Windows, the directory path is install_path\NBPostgreSQLAgent\.

Options

-1
    (Linux) Configures the PostgreSQL library directory

-portnum
    Configures the database port number that identifies the PostgreSQL instance on which the backup is performed.

-F
    Configures the NetBackup DataStore policy name.

-S
    Configures the NetBackup server name.
-s
  Specifies the schedule name that you have configure for the DataStore policy.

-u
  Configures the database user name.

-z
  (Linux) Specifies the LVM snapshot size.
nbpgsql -o restore

nbpgsql -o restore – restores the backup files from the NetBackup server.

SYNOPSIS

nbpgsql -o restore -S master_server -t target_directory [-id db_backup_id] [-C client_name]

Description

The nbpgsql command restores the backup file using -t and -S as the required parameters. The -id and -C are optional parameters.

On Linux systems, the directory path to this command is /usr/NBPostgreSQLAgent/

On Windows systems, the directory path to this command is install_path/NBPostgreSQLAgent/

Options

-C
   Specifies the client name.
-id
   Specifies the backup image name.
-S
   Configures the NetBackup master server.
-t
   Configures the target directory where the backups are restored.
nbpgsql -o query

nbpgsql -o query - query the backup.

SYNOPSIS

nbpgsql -o query -S master_server [-C NetBackup_client_name] [-P policy_name]

Description

The nbpgsql -o query command gets the backup using -S as the required parameter and -C and -P as optional parameters.

On Linux systems, the directory path to this command is /usr/PostgreSQLAgent/

On Windows systems, the directory path to this command is install_path/NBPostgreSQLAgent/

Options

- C Retrieves and lists all the backups of the specified client.
- P Retrieves and lists all backups with the specified policy name.
- S Configures the NetBackup master server.
nbpgsql -o delete

nbpgsql -o delete – deletes the backup information from the NetBackup catalog files.

SYNOPSIS

nbpgsql -o delete -S master_server[-id db_backup_id]

Description

The nbpgsql -o delete command deletes the backup information from the NetBackup catalog files, but retains the backups in the storage media. The parameter -S is a required parameter and -id is the optional parameter.

Options

-id

Specifies the backup image name to delete the specified backup information.

-S

Configures the NetBackup master server.
authenticating password 13

backups
archive directory 24
delete 24
query 24
schema files 24
symbolic link 24
Write-Ahead logs level 24

installation
privileges 13
symbolic link 13

nbpgsql file
configuration file 19
configuration parameters 19
database server port 19
log level 19
log size 19

PostgreSQL Agent
components 9
features 9
license 9
package 9

redirected restore
altnames 31
different file path 31
different host 31
restore
target directory 31

restores
recovery 31
redirected restore 31

uninstall 13