

Greenplum Database 4.3 Connectivity Tools for Windows

Rev: A06

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Overview

Greenplum provides database drivers and a C API for connecting to Greenplum Database. In this version 4.3 distribution, the following connectivity tools are provided for Windows. See the *Greenplum Database Release Notes* for the list of currently supported platforms for the Connectivity Tools.

- `psqlODBC`
- PostgreSQL JDBC Interface
- `libpq`

Note: If your Java application connects to Greenplum Database with Kerberos authentication, see *Configuring a Client System for Kerberos Authentication*.

psqlODBC

`psqlODBC` is the official PostgreSQL ODBC Driver. The driver is currently maintained by a number of contributors to the PostgreSQL project at <http://pgfoundry.org/projects/psqlodbc>. It is developed and supported through the `pgsql-odbc@postgresql.org` mailing list. `psqlODBC` is released under the Library General Public Licence, or LGPL.

PostgreSQL JDBC Interface

The PostgreSQL JDB interface is the official PostgreSQL JDBC driver. The driver is currently maintained by a number of contributors to the PostgreSQL project at <http://jdbc.postgresql.org>. JDBC is a core API of Java 1.1 and later. It provides a standard set of interfaces to SQL-compliant databases. PostgreSQL provides a type 4 JDBC driver. Type 4 indicates that the driver is written in Pure Java, and communicates in the database system's own network protocol. Because of this, the driver is platform independent; once compiled, the driver can be used on any system. The PostgreSQL JDBC Interface has not been modified from the original PostgreSQL distribution.

libpq

`libpq` is the C application programmer's interface (API) to PostgreSQL (and Greenplum Database). `libpq` is a set of library functions that allow client programs to pass queries to the PostgreSQL backend server and to receive the results of these queries.

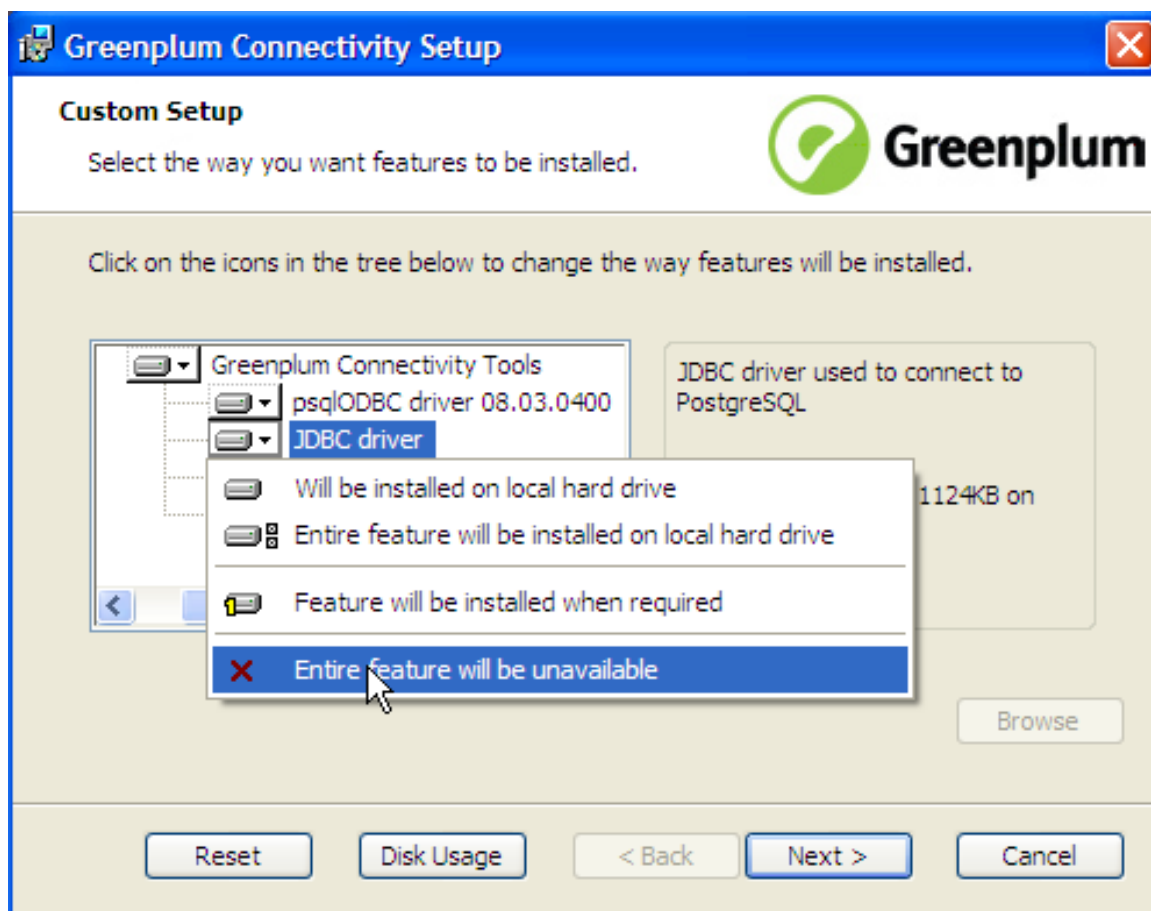
For more information on using `libpq`, see *libpq - C Library* in the PostgreSQL documentation.

Running the Connectivity Tools Installer

You can choose to install all connectivity tools or a subset. After installing, some connectivity tools require additional installation or configuration steps.

To install the Greenplum Database Connectivity Tools

1. Download the `greenplum-connectivity-4.3.x.x-WinXP-x86_32.msi` package from *Pivotal Network*.
2. Double-click on the `greenplum-connectivity-4.3.x.x-WinXP-x86_32.msi` package to launch the installer.
3. Click **Next** on the Welcome screen.
4. Click **I Agree** on the License Agreement screen.
5. On the **Custom Setup** screen, deselect the components you do not want to install. By default, all components will be installed.



6. By default, the Greenplum Database connectivity tools will be installed into `C:\Program Files\Greenplum\greenplum-drivers-4.3.x.x`. Click **Browse** to choose another location.
7. Click **Next** when you have chosen the components and install path you want.
8. Click **Install** to begin the installation.
9. Click **Finish** to exit the installer.

About Your Installation

Your Greenplum Database connectivity tools installation contains the following files and directories:

- `GP_ConnectWin.pdf` — the documentation file for connectivity tools
- `greenplum_connectivity_path.bat` — script to set environment variables. This script is run automatically as part of the installation.
- `drivers` — PostgreSQL ODBC and JDBC database drivers
- `include` — libpq C header files

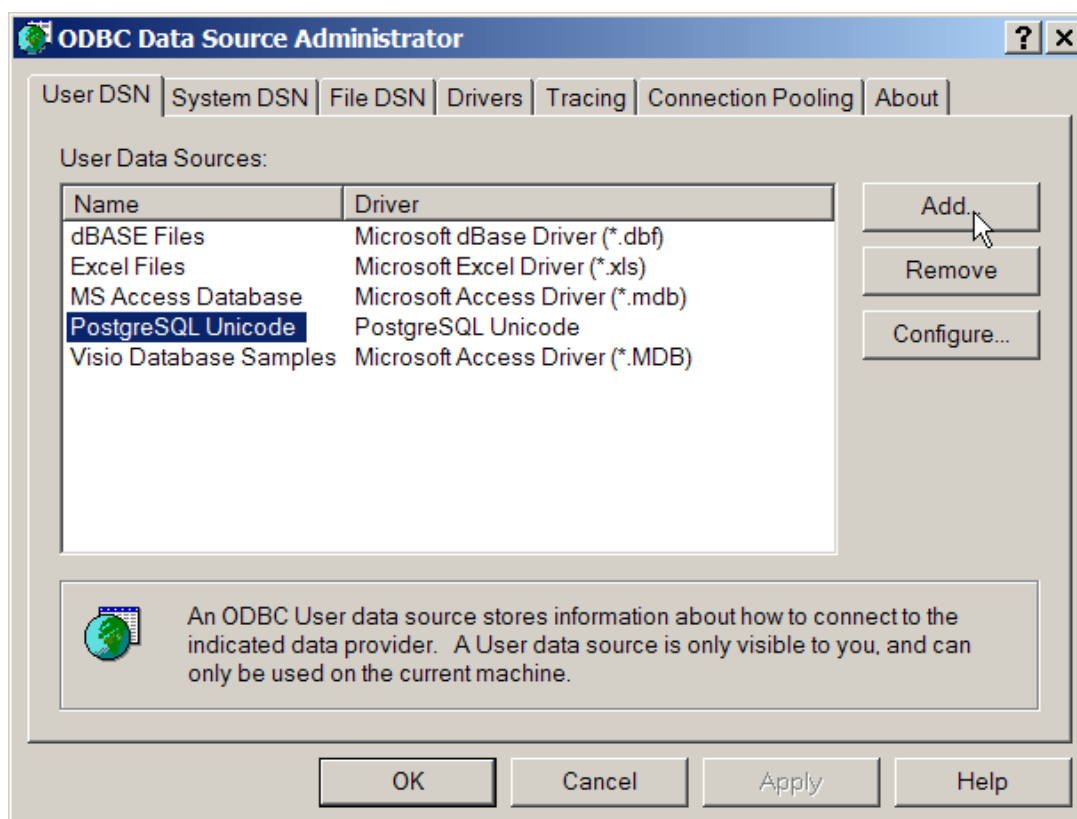
- `lib` — shared object files and other library files to support the drivers

Creating an ODBC Data Source

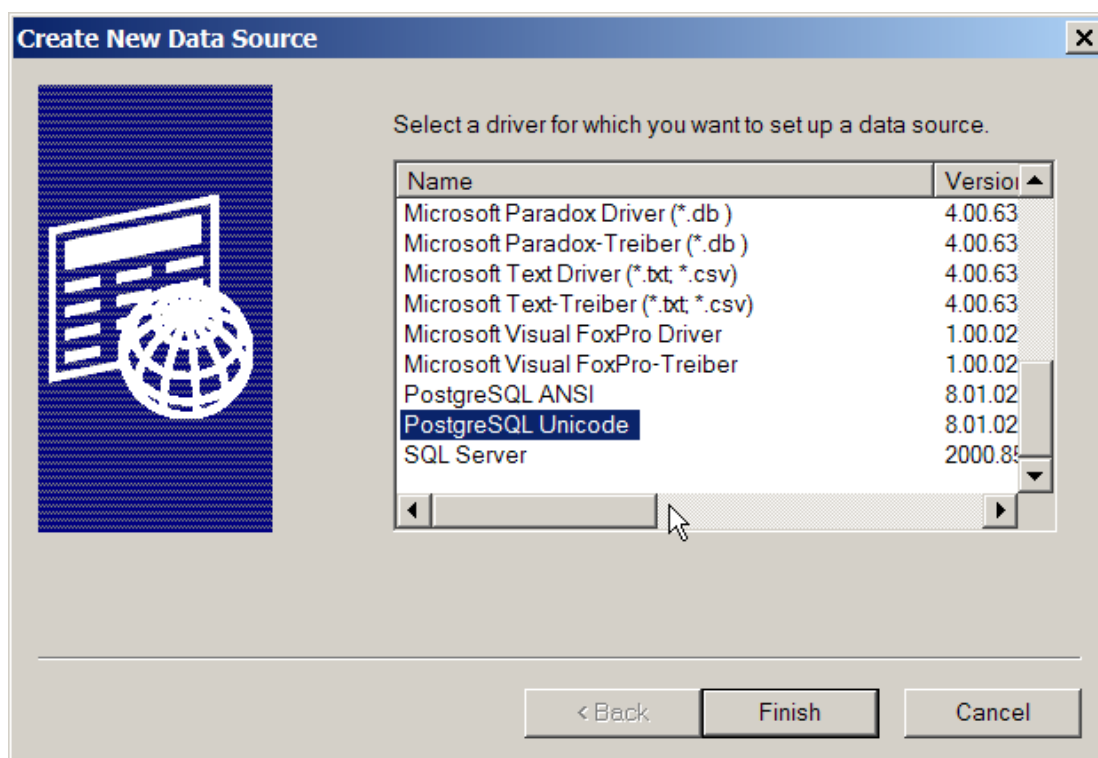
A data source configures your ODBC driver to connect to a particular database. For Greenplum Database you should configure your data source to connect to the master instance.

To configure a data source

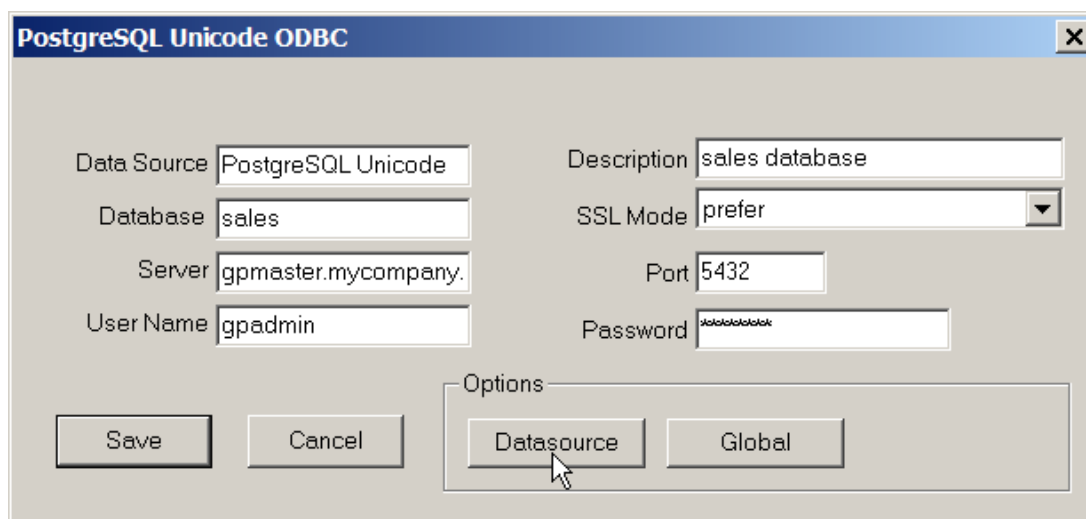
1. In Windows Explorer, go to `C:\Control Panel`.
2. Double-click the **Administrative Tools** icon.
3. Double-click **Data Sources (ODBC)** to open the ODBC Data Source Administrator.
4. Select **PostgreSQL Unicode** and click **Add** to add a new data source.



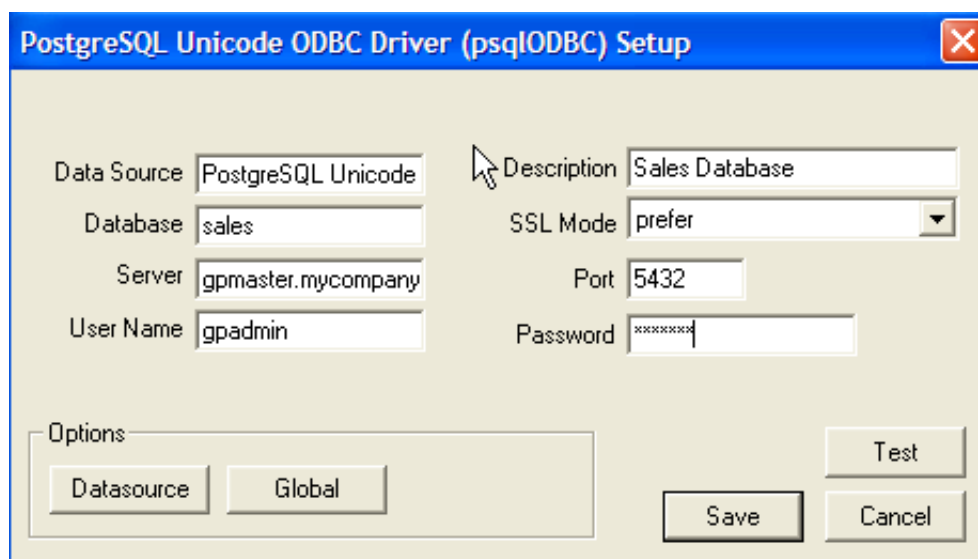
5. For the driver, **PostgreSQL Unicode** is the recommended choice. Unicode (UTF-8) is the default database encoding for Greenplum Database. There is also a **PostgreSQL ANSI** driver which can handle some multi-byte character sets and LATIN character sets.



6. Fill in the connection information for your database (on the Greenplum Database master instance).



7. Click **Datasource** to access the Advanced Options. The following settings are recommended for Greenplum Database:



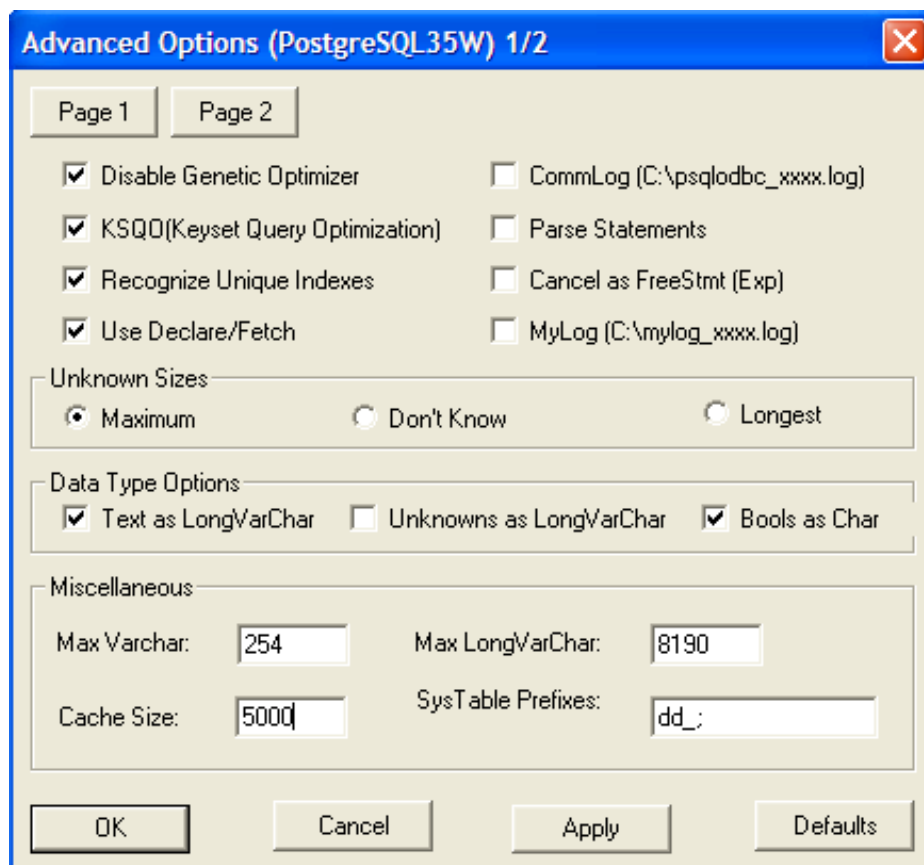
The dialog box is titled "PostgreSQL Unicode ODBC Driver (psqlODBC) Setup". It contains several input fields and buttons. The "Data Source" field is set to "PostgreSQL Unicode". The "Database" field is set to "sales". The "Server" field is set to "gpmaster.mycompany". The "User Name" field is set to "gpadmin". The "Description" field is set to "Sales Database". The "SSL Mode" dropdown is set to "prefer". The "Port" field is set to "5432". The "Password" field is masked with "xxxxxxx". There are two buttons for "Options": "Datasource" and "Global". There are also "Test", "Save", and "Cancel" buttons.

Data Source	PostgreSQL Unicode	Description	Sales Database
Database	sales	SSL Mode	prefer
Server	gpmaster.mycompany	Port	5432
User Name	gpadmin	Password	xxxxxxx

Options: [Datasource] [Global]

[Test] [Save] [Cancel]

8. Click **Page 2**. The following settings are recommended for Greenplum Database:



The dialog box is titled "Advanced Options (PostgreSQL35W) 1/2". It has two tabs: "Page 1" and "Page 2". The "Page 2" tab is selected. It contains several checkboxes and radio buttons. The "Disable Genetic Optimizer" checkbox is checked. The "CommLog (C:\psqlodbc_XXXX.log)" checkbox is unchecked. The "KSQO(Keyset Query Optimization)" checkbox is checked. The "Parse Statements" checkbox is unchecked. The "Recognize Unique Indexes" checkbox is checked. The "Cancel as FreeStmt (Exp)" checkbox is unchecked. The "Use Declare/Fetch" checkbox is checked. The "MyLog (C:\mylog_XXXX.log)" checkbox is unchecked. There are three radio buttons for "Unknown Sizes": "Maximum" (selected), "Don't Know", and "Longest". There are three checkboxes for "Data Type Options": "Text as LongVarChar" (checked), "Unknowns as LongVarChar" (unchecked), and "Bools as Char" (checked). There are four input fields for "Miscellaneous": "Max Varchar" (254), "Max LongVarChar" (8190), "Cache Size" (5000), and "SysTable Prefixes" (dd_). There are four buttons: "OK", "Cancel", "Apply", and "Defaults".

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☒ Disable Genetic Optimizer ☐ CommLog (C:\psqlodbc_XXXX.log)

☒ KSQO(Keyset Query Optimization) ☐ Parse Statements

☒ Recognize Unique Indexes ☐ Cancel as FreeStmt (Exp)

☒ Use Declare/Fetch ☐ MyLog (C:\mylog_XXXX.log)

Unknown Sizes

☒ Maximum ☐ Don't Know ☐ Longest

Data Type Options

☒ Text as LongVarChar ☐ Unknowns as LongVarChar ☒ Bools as Char

Miscellaneous

Max Varchar: 254 Max LongVarChar: 8190

Cache Size: 5000 SysTable Prefixes: dd_

[OK] [Cancel] [Apply] [Defaults]

9. Click **OK**.
10. Click **Save**.

Configuring the PostgreSQL JDBC Driver

The PostgreSQL JDBC driver is installed by the connectivity tools installer into `C:\Program Files\Greenplum\greenplum-drivers-4.3.x.x\drivers\jdbc`. In order to use the driver, you must add its jar files to your `CLASSPATH` environment variable.

To edit the CLASSPATH on Windows XP

1. In Windows Explorer, go to `C:\Control Panel`.
2. Double-click the **System** icon.
3. On the **Advanced** tab, click **Environment Variables** (bottom).
4. Find the `CLASSPATH` environment variable and double-click on it to edit it (if not there, click **New** to create it).
5. Add the path to the JDBC driver jar file directory at the end of the current class path. For example:

```
C:\Program Files\Java\jdk1.5.0_02\bin;greenplum-drivers-4.3.x.x\drivers\jdbc\*
```

6. Click **OK**.

Note: To use a JDBC 4 driver, you use the jar file based on the Java version being used:

- For Java 1.6, use the JDBC4 driver `postgresql-9.4-1208.jdbc4.jar`.
- For Java 1.7, use the JDBC41 driver `postgresql-9.4-1208.jdbc41.jar`.
- For Java 1.8, use the JDBC42 driver `postgresql-9.4-1208.jdbc42.jar`.

About greenplum_connectivity_path.bat

The installer automatically creates the necessary environment variables needed for the connectivity tools. As a convenience, the script `greenplum_connectivity_path.bat` is provided in your connectivity tools installation directory. This script sets the following environment variables:

`GPHOME_CONNECTIVITY` — The installation directory of the Greenplum Database connectivity tools.

`PATH` — To allow access to the connectivity tools from any directory, the `PATH` environment variable is modified to add `GPHOME_CONNECTIVITY\bin` and `GPHOME_CONNECTIVITY\lib`.

If you do not need to modify these environment variables, you do not need to run this script.

Configuring a Client System for Kerberos Authentication

If your JDBC application uses Kerberos authentication to connect to your Greenplum Database, your client system must be configured to use Kerberos authentication. If you are not using Kerberos authentication to connect to a Greenplum Database, Kerberos is not needed on your client system.

- *Requirements*
- *Setting Up Client System with Kerberos Authentication*
- *Running a Java Application*

For information about enabling Kerberos authentication with Greenplum Database, see the chapter "Setting Up Kerberos Authentication" in the *Greenplum Database Administrator Guide*.

Requirements

The following are requirements to connect to a Greenplum Database that is enabled with Kerberos authentication from a client system with a JDBC application.

- *Prerequisites*
- *Required Software on the Client Machine*
- *User Environment Variables*

Prerequisites

- Kerberos must be installed and configured on the Greenplum Database master host. Greenplum Database must be configured so that a remote user can connect to Greenplum Database with Kerberos authentication. Authorization to access Greenplum Database is controlled by the `pg_hba.conf` file. For details, see "Editing the `pg_hba.conf` File" in the *Greenplum Database Administration Guide*, and also see the *Greenplum Database Security Configuration Guide*.
- The client system requires the Kerberos configuration file `krb5.conf` from the Greenplum Database master.
- The client system requires a Kerberos keytab file that contains the authentication credentials for the Greenplum Database user that is used to log into the database.
- The client machine must be able to connect to Greenplum Database master host. If necessary, add the Greenplum Database master host name and IP address to the system `hosts` file. On Windows 7 systems, the `hosts` file is in `C:\Windows\System32\drivers\etc\`.

Required Software on the Client Machine

- The Kerberos `kinit` utility is required on the client machine. The `kinit.exe` utility is available with Kerberos for Windows. Greenplum Database supports Kerberos for Windows version 3.2.2. Kerberos for Windows is available from the Kerberos web site <http://web.mit.edu/kerberos/>. When you install the Kerberos software, you can use other Kerberos utilities such as `klist` to display Kerberos ticket information.
- For Windows or Linux connectivity: Java JDK Java JDK 1.7.0_21 is supported on Windows.

User Environment Variables

- `KRB5CCNAME` - A Kerberos environment variable that specifies the location of the Kerberos ticket cache. For example, in "*Setting Up Client System with Kerberos Authentication*," the ticket cache is `C:\Users\gpadmin\cache.txt`.
- `JAVA_HOME` is set to the installation directory of the supported Java JDK.
- Ensure that in the batch file `greenplum_connectivity_path.bat`, the `GP_JDBC_JARFILE` environment variable specifies the location of the Greenplum Database JDBC driver `postgresql-8.4-701.jdbc4.jar`.

Setting Up Client System with Kerberos Authentication

To connect to Greenplum Database with Kerberos authentication requires a Kerberos ticket. On client systems, tickets are generated from Kerberos keytab files with the `kinit` utility and are stored in a cache file.

1. Install a copy of the Kerberos configuration file `krb5.conf` from the Greenplum Database master. The file is used by the Greenplum Database client software and the Kerberos utilities. Rename `krb5.conf` to `krb5.ini` and move it to the Windows directory. On Windows 7, the Windows directory is `C:\Windows`.

If needed, add the parameter `default_ccache_name` to the `[libdefaults]` section of the `krb5.ini` file and specify location of the Kerberos ticket cache file on the client system.

2. Obtain a Kerberos keytab file that contains the authentication credentials for the Greenplum Database user.
3. Run `kinit` specifying the keytab file to create a ticket on the client machine. For this example on a Windows system, the keytab file `gpdb-kerberos.keytab` is in the same directory as `kinit.exe`. The ticket cache file is in the Windows `gpadmin` user home directory.

```
> kinit -k -t gpdb-kerberos.keytab -c C:\Users\gpadmin\cache.txt
gpadmin/kerberos-gpdb@KRB.EXAMPLE.COM
```

Running a Java Application

Accessing Greenplum Database from a Java application with Kerberos authentication uses the Java Authentication and Authorization Service (JAAS)

1. Create the file `.java.login.config` in the user home folder. For example, on a Linux system, the home folder is similar to `/home/gpadmin`.

Add the following text to the file:

```
pgjdbc {
    com.sun.security.auth.module.Krb5LoginModule required
    doNotPrompt=true
    useTicketCache=true
    ticketCache = "C:\\Users\\gpadmin\\cache.txt"
    debug=true
    client=true;
};
```

2. Create a Java application that connects to Greenplum Database using Kerberos authentication and run the application as the user.

This example database connection URL uses a PostgreSQL JDBC driver and specifies parameters for Kerberos authentication.

```
jdbc:postgresql://kerberos-gpdb:5432/mytest?
kerberosServerName=postgres&jaasApplicationName=pgjdbc&
user=gpadmin/kerberos-gpdb
```

The parameter names and values specified depend on how the Java application performs Kerberos authentication.

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