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Introduction

Welcome to the Cloudera ODBC Driver for Hive. ODBC is one the most established and widely supported APIs for connecting to and working with databases. At the heart of the technology is the ODBC driver, which connects an application to the database.

Cloudera ODBC Driver for Hive is used for direct SQL and HiveQL access to Apache Hadoop / Hive distributions, enabling Business Intelligence (BI), analytics and reporting on Hadoop / Hive-based data. The driver efficiently transforms an application’s SQL query into the equivalent form in HiveQL. Hive Query Language is a subset of SQL-92. If an application is Hive-aware, then the driver is configurable to pass the query through. The driver interrogates Hive to obtain schema information to present to a SQL-based application. Queries, including joins, are translated from SQL to HiveQL. For more information about the differences between HiveQL and SQL, refer to the section “Features” on page 14.

Cloudera ODBC Driver for Hive is available for Microsoft Windows, Linux, and Mac OS X. It complies with the ODBC 3.52 data standard and adds important functionality such as Unicode and 32- and 64-bit support for high-performance computing environments on all platforms. Any version of the ODBC driver will connect to a Hive server irrespective of the server’s host OS.

This guide is suitable for users who are looking to access data residing within Hive from their desktop environment. Application developers may also find the information helpful. Refer to your application for details on connecting via ODBC.

Windows Driver

System Requirements

You install Cloudera ODBC Driver for Hive on client computers accessing data in a Hadoop cluster with the Hive service installed and running. Each computer where you install the driver must meet the following minimum system requirements:

- One of the following operating systems (32- and 64-bit editions are supported):
  - Windows® XP with SP3
  - Windows® Vista
  - Windows® 7 Professional
  - Windows® Server 2008 R2
- 25 MB of available disk space

The driver is suitable for use with all versions of Apache Hive.

Important:
To install the driver, you need Administrator privileges on the computer.
Installing the Driver

On 64-bit Windows operating systems, you can execute 32- and 64-bit applications transparently. You must use the version of the driver matching the bitness of the client application accessing data in Hadoop / Hive:

- ClouderaHiveODBC32.msi for 32-bit applications
- ClouderaHiveODBC64.msi for 64-bit applications

You can install both versions of the driver on the same computer.

Note:

To install Cloudera ODBC Driver for Hive:

1. Depending on the bitness of your client application, double-click to run ClouderaHiveODBC32.msi or ClouderaHiveODBC64.msi.
2. Click Next.
3. Select the check box to accept the terms of the License Agreement if you agree, and then click Next.
4. To change the installation location, click the Change button, then browse to the desired folder, and then click OK. To accept the installation location, click Next.
5. Click Install.
6. When the installation completes, click Finish.
7. If you are installing a driver with an evaluation license and you have purchased a perpetual license, then copy the License.lic file you received via e-mail into the \lib subfolder in the installation folder you selected in step 4.

Configuring ODBC Connections

To create a Data Source Name (DSN):

1. Click the Start button.
2. Click All Programs.
3. Click the Cloudera ODBC Driver for Apache Hive 2.5 (64-bit) or the Cloudera ODBC Driver for Apache Hive 2.5 (32-bit) program group. If you installed both versions of the driver, you will see two program groups.

Because DSNs are bit-specific, select the version that matches the bitness of your application. For example, a DSN that is defined for the 32-bit driver will only be accessible from 32-bit applications.
4. Click 64-bit ODBC Administrator or 32-bit ODBC Administrator. The ODBC Data Source Administrator window opens.

5. Click the Drivers tab and verify that the Cloudera Hive ODBC Driver appears in the list of ODBC drivers that are installed on your system.

6. Click the System DSN tab to create a system DSN or click the User DSN tab to create a user DSN.

**Note:**
A system DSN can be seen by all users that login to a workstation. A user DSN is specific to a user on the workstation. It can only be seen by the user who creates it.

7. Click Add. The Create New Data Source window opens.

8. Select Cloudera ODBC Driver for Apache Hive and then click Finish. The Cloudera Hive ODBC Driver DSN Setup window opens.

9. In the Data Source Name text box, type a name for your DSN.

10. Optionally, enter a description in the Description text box.

11. In the Host text box, type the IP address or hostname of the Hive server.

12. In the Port text box, type the listening port for the service.

13. In the Database text box, type the name of the database schema to use when a schema is not explicitly specified in a query. Queries on other schemas can still be issued by explicitly specifying the schema in the query. To determine the appropriate database schema to use, type the show databases command at the Hive command prompt to inspect your databases.

14. For the Hive Server Type, select either HiveServer1 or HiveServer2.

15. Optionally, if you selected HiveServer2 as the Hive server type, you can configure authentication. For detailed instructions, refer to the section "Configuring Authentication" on page 5.

16. Optionally, click Advanced Options. In the Advanced Options window:
   a) Select the Use Native Query checkbox to disable the SQL Connector feature.

   **Note:**
   The SQL Connector feature has been added to the driver to apply transformations to the queries emitted by an application to convert them into an equivalent form in HiveQL. If the application is Hive aware and already emits HiveQL, then turning off the SQL Connector feature avoids the extra overhead of query transformation.

   b) Select the Fast SQLPrepare checkbox to defer query execution to SQLExecute.

   **Note:**
   When using Native Query mode, the driver will execute the HiveQL query to retrieve
the result set metadata for SQLPrepare. As a result, SQLPrepare might be slow. If the result set metadata is not required after calling SQLPrepare, then enable this option.

c) In the **Rows Fetched Per Block** field, type the number of rows to be fetched per block.

**Note:**
Any positive 32-bit integer is a valid value but testing has shown that performance gains are marginal beyond the default value of 10000 rows.

d) In the **Default String Column Length** field, type the default string column length to use.

**Note:**
Hive does not provide the length for String columns in its column metadata. This option allows you to tune the length of String columns.

e) In the **Decimal Column Scale** field, type the maximum number of digits to the right of the decimal point for numeric data types.

f) To create a server-side property, click the **Add** button, then type appropriate values in the Key and Value fields, and then click **OK**.

   OR

   To edit a server-side property, select the property to edit in the **Server Side Properties** area, then click the **Edit** button, then update the Key and Value fields as needed, and then click **OK**.

   OR

   To delete a server-side property, select the property to remove it in the **Server Side Properties** area, and then click the **Remove** button. In the confirmation dialog, click **Yes**.

**Note:**
For a list of all Hadoop and Hive server-side properties that your implementation supports, type `set -v` at the Hive CLI command line or Beeline. You can also execute the `set -v` query after connecting using the driver.

g) If you selected HiveServer2 as the Hive server type, then select or clear the **Apply Server Side Properties with Queries** check box as needed.

**Note:**
If you selected HiveServer2, then the Apply Server Side Properties with Queries check box is selected by default. Selecting the check box configures the driver to apply each server-side property you set by executing a query when opening a session to the Hive
Clearing the check box configures the driver to use a more efficient method to apply server-side properties that does not involve additional network round tripping. Some HiveServer2 builds are not compatible with the more efficient method. If the server-side properties you set do not take effect when the check box is clear, then select the check box. If you selected HiveServer1 as the Hive server type, then the Apply Server Side Properties with Queries check box is selected and unavailable.

17. Click **Test** to test the connection and then click **OK**.

**Configuring Authentication**

For details on selecting the appropriate authentication for a DSN using Cloudera ODBC Driver for Hive, see “Appendix A: Authentication Options” on page 17. The authentication methods available are as follows:

- No Authentication
- User Name
- Kerberos

**Using No Authentication**

No additional details are required when using **No Authentication**.

**Using User Name**

For **User Name** authentication, select **User Name** in the **Mechanism** field in the Cloudera Hive ODBC Driver dialog box, and then type a user name in the **User Name** field.

**Using Kerberos**

To use **Kerberos** authentication, Kerberos must be configured prior to use. See “Appendix B: Configuring Kerberos Authentication for Windows” on page 19 for details.

After Kerberos has been installed and configured, then set the following options in the **Authentication** group in the Cloudera Hive ODBC Driver dialog box:

1. In the **Mechanism** field, select **Kerberos**.
2. If there is no default realm configured for your Kerberos setup, then type the value for the Kerberos realm of the HiveServer2 host. Otherwise leave it blank. The **Realm** is only needed if your Kerberos setup does not define a default realm or if the realm of your HiveServer2 is not the default.
3. In the **Host FQDN** field, type the value for the fully qualified domain name of the HiveServer2 host.
4. In the **Service Name** field, type the value for the service name of the Hive Server 2. For example, if the principle for the HiveServer2 is "hive/fully.qualified.domain.name@YOUR-REALM.COM", then the value in the service name field should be **hive**. If you are unsure of the correct service name to use for your particular Hadoop deployment, see your Hadoop administrator.
Configuring DSN-Less Authentication

Some client applications, such as Tableau, provide some support for connecting to a data source using a driver without a DSN.

Applications that connect using ODBC data sources work with HiveServer2 by sending the appropriate authentication credentials defined in the data source. Applications that are HiveServer1 aware but not HiveServer2 aware and that connect using a DSN-less connection will not have a facility for sending authentication credentials to HiveServer2. However, you can configure Cloudera ODBC Driver for Hive with authentication credentials using the Driver Configuration tool.

**Important:**

Credentials defined in a data source take precedence over credentials configured using the Driver Configuration tool. Credentials configured using the Driver Configuration tool apply for all connections made using a DSN-less connection unless the client application is HiveServer2 aware and requests credentials from the user.

To configure driver authentication for a DSN-less connection:

1. Click the **Start** button.
2. Click **All Programs**.
3. Click the **Cloudera ODBC Driver for Apache Hive 2.5 (64-bit)** or the **Cloudera ODBC Driver for Apache Hive 2.5 (32-bit)** program group. If you installed both versions of the driver, you will see two program groups.
   
   Because drivers are bit-specific, select the version that matches the bitness of your application. For example, a 32-bit driver will only be accessible from 32-bit applications.

4. Click **Driver Configuration**, and then click **OK** if prompted for administrator permission to make modifications to the computer.

**Note:**

You must have administrator access to the computer in order to run this application because it makes changes to the registry.

5. As needed, edit the **Rows fetched per block** field to control the amount of result set data the driver requests from the Hive Server in each fetch call.

6. Follow the procedure in the section “Configuring Authentication” on page 5 to complete the Cloudera Hive ODBC Driver Configuration dialog.

7. In the Cloudera Hive ODBC Driver Configuration dialog, click **OK**.
Linux Driver

System Requirements

- Red Hat® Enterprise Linux® (RHEL) 5.0/6.0, CentOS 5.0/6.0 or SUSE Linux Enterprise Server (SLES) 11. Both 32 and 64-bit editions are supported.
- 45 MB of available disk space.
- An installed ODBC driver manager:
  - iODBC 3.52.7 or above
  - OR
  - unixODBC 2.2.12 or above

Cloudera ODBC Driver for Hive requires a Hadoop cluster with the Hive service installed and running. Cloudera ODBC Driver for Hive is suitable for use with all versions of Hive.

Installation

There are two versions of the driver for Linux:

- ClouderaHiveODBC-Version-Release.i686.rpm for 32-bit
- ClouderaHiveODBC-Version-Release.x86_64.rpm for 64-bit

The version of the driver that you select should match the bitness of the client application accessing your Hadoop / Hive-based data. For example, if the client application is 64-bit, then you should install the 64-bit driver. Note that 64-bit editions of Linux support both 32- and 64-bit applications. Verify the bitness of your intended application and install the appropriate version of the driver.

Important:
Ensure that you install the driver using the RPM corresponding to your Linux distribution.

Cloudera ODBC Driver for Hive driver files are installed in the following directories:

- /opt/cloudera/hiveodbc/ErrorMessages – Error messages files directory
- /opt/cloudera/hiveodbc/Setup – Sample configuration files directory
- /opt/cloudera/hiveodbc/lib/32 – 32-bit shared libraries directory
- /opt/cloudera/hiveodbc/lib/64 – 64-bit shared libraries directory
To install Cloudera ODBC Driver for Hive:

1. In Red Hat Enterprise Linux 5.0/6.0 or CentOS 5.0/6.0, log in as the root user, then navigate to the folder containing the driver RPM packages to install, and then type the following at the command line, where `RPMFileName` is the file name of the RPM package containing the version of the driver that you want to install:

   ```bash
   yum --nogpgcheck localinstall RPMFileName
   ```

   OR

   In SUSE Linux Enterprise Server 11, log in as the root user, then navigate to the folder containing the driver RPM packages to install, and then type the following at the command line, where `RPMFileName` is the file name of the RPM package containing the version of the driver that you want to install:

   ```bash
   zypper install RPMFileName
   ```

2. If you are installing a driver with an evaluation license and you have purchased a perpetual license, then copy the License.lic file you received via e-mail into the `/opt/cloudera/hiveodbc/lib/32` or `/opt/cloudera/hiveodbc/lib/64` folder, depending on the version of the driver you installed.

Cloudera ODBC Driver for Hive depends on the following resources:

- cyrus-sasl-2.1.22-7 or above
- cyrus-sasl-gssapi-2.1.22-7 or above
- cyrus-sasl-plain-2.1.22-7 or above

If the package manager in your Linux distribution cannot resolve the dependencies automatically when installing the driver, then download and manually install the packages required by the version of the driver that you want to install.

**Setting the LD_LIBRARY_PATH Environment Variable**

The `LD_LIBRARY_PATH` environment variable must include the paths to:

- Installed ODBC driver manager libraries
- Installed Cloudera ODBC Driver for Hive shared libraries

**Important:**

While you can have both 32- and 64-bit versions of the driver installed at the same time on the same computer, do not include the paths to both 32- and 64-bit shared libraries in `LD_LIBRARY_PATH` at the same time. Only include the path to the shared libraries corresponding to the driver matching the bitness of the client application used.
For example, if you are using a 64-bit client application and ODBC driver manager libraries are installed in /usr/local/lib, then set LD_LIBRARY_PATH as follows:

```
export LD_LIBRARY_PATH=/usr/local/lib/opt/cloudera/hiveodbc/lib/64
```

Refer to your Linux shell documentation for details on how to set environment variables permanently.

For details on creating ODBC connections using Cloudera ODBC Driver for Hive, see “Configuring ODBC Connections for Linux and Mac OS X” on page 10.

**Mac OS X Driver**

**System Requirements**

- Mac OS X version 10.6.8 or later
- 100 MB of available disk space
- iODBC 3.52.7 or above

Cloudera ODBC Driver for Hive requires a Hadoop cluster with the Hive service installed and running. Cloudera ODBC Driver for Hive is suitable for use with all versions of Hive. The driver supports both 32- and 64-bit client applications.

**Installation**

Cloudera ODBC Driver for Hive driver files are installed in the following directories:

- `/opt/cloudera/hiveodbc/ErrorMessages` – Error messages files directory
- `/opt/cloudera/hiveodbc/Setup` – Sample configuration files directory
- `/opt/cloudera/hiveodbc/lib/universal` – Binaries directory

To install Cloudera ODBC Driver for Hive:

1. Double-click to mount the `ClouderaHiveODBC.dmg` disk image.
2. Double-click `ClouderaHiveODBC.pkg` to run the Installer.
3. Follow the instructions in the Installer to complete the installation process.
4. When the installation completes, click Close.
5. If you are installing a driver with an evaluation license and you have purchased a perpetual license, then copy the License.lic file you received via e-mail into the `/opt/cloudera/hiveodbc/lib/universal` folder.
Setting the DYLD_LIBRARY_PATH Environment Variable

The DYLD_LIBRARY_PATH environment variable must include the paths to:

- Installed ODBC driver manager libraries
- Installed Cloudera ODBC Driver for Hive shared libraries

For example, if ODBC driver manager libraries are installed in /usr/local/lib, then set DYLD_LIBRARY_PATH as follows:

```
export DYLD_LIBRARY_PATH=/usr/local/lib/opt/cloudera/hiveodbc/lib/universal
```

Refer to your Mac OS X shell documentation for details on how to set environment variables permanently.

For details on creating ODBC connections using Cloudera ODBC Driver for Hive, see “Configuring ODBC Connections for Linux and Mac OS X” on page 10.

Configuring ODBC Connections for Linux and Mac OS X

Files

ODBC driver managers use configuration files to define and configure ODBC data sources and drivers. By default, the following configuration files residing in the user’s home directory are used:

- .odbc.ini – The file used to define ODBC data sources (required)
- .odbcinst.ini – The file used to define ODBC drivers (optional)
- .cloudera.hiveodbc.ini – The file used to configure Cloudera ODBC Driver for Hive (required)

Sample Files

The driver installation contains the following sample configuration files in the Setup directory:

- odbc.ini
- odbcinst.ini
- cloudera.hiveodbc.ini

The names of the sample configuration files do not begin with a period (.) so that they will appear in directory listings by default. A filename beginning with a period (.) is hidden. For odbc.ini and odbcinst.ini, if the default location is used, then the filenames must begin with a period (.). For cloudera.hiveodbc.ini, the filename must begin with a period (.) and must reside in the user’s home directory.

If the configuration files do not already exist in the user’s home directory, then the sample configuration files can be copied to that directory and renamed. If the configuration files already exist in the user’s home directory, then the sample configuration files should be used as a guide for modifying the existing configuration files.
Configuring ODBC Connections for Linux and Mac OS X

Configuring the Environment

By default, the configuration files reside in the user’s home directory. However, two environment variables, ODBCINI and ODBCSYSINI, can be used to specify different locations for the odbc.ini and odbcinst.ini configuration files. Set ODBCINI to point to your odbc.ini file. Set ODBCSYSINI to point to the directory containing the odbcinst.ini file. For example, if your odbc.ini file is located in /etc and your odbcinst.ini file is located in /usr/local/odbc, then set the environment variables as follows:

```
export ODBCINI=/etc/odbc.ini
export ODBCSYSINI=/usr/local/odbc
```

Configuring the odbc.ini File

ODBC Data Sources are defined in the odbc.ini configuration file. The file is divided into several sections:

- **[ODBC]** is optional and used to control global ODBC configuration, such as ODBC tracing.
- **[ODBC Data Sources]** is required, listing DSNs and associating DSNs with a driver.
- A section having the same name as the data source specified in the [ODBC Data Sources] section is required to configure the data source.

Here is an example odbc.ini configuration file for Linux:

```
[ODBC Data Sources]
Sample Cloudera Hive DSN 32=Cloudera Hive ODBC Driver 32-bit

[Sample Cloudera Hive DSN 32]
Driver=/opt/cloudera/hiveodbc/lib/32/libclouderahiveodbc32.so
HOST=MyHiveServer
PORT=10000
```

Here is an example odbc.ini configuration file for Mac OS X:

```
[ODBC Data Sources]
Sample Cloudera Hive DSN=Cloudera Hive ODBC Driver

[Sample Cloudera Hive DSN]
Driver=/opt/cloudera/hiveodbc/lib/universal/libclouderahiveodbc.dylib
HOST=MyHiveServer
PORT=10000
```

To create a data source:

1. Open the .odbc.ini configuration file in a text editor.
2. Add a new entry to the [ODBC Data Sources] section. Type the data source name (DSN) and the driver name.

3. To set configuration options, add a new section that has a name that matches the data source name (DSN) you specified in step 2. Specify configuration options as key-value pairs.

4. Save the .odbc.ini configuration file.

For details on configuration options available to control the behavior of DSNs using Cloudera ODBC Driver for Hive, see “Appendix C: Driver Configuration Options” on page 22.

Configuring the odbcinst.ini File

ODBC Drivers are defined in the odbcinst.ini configuration file. The configuration file is optional because drivers can be specified directly in the odbc.ini configuration file, as described in “Configuring the odbc.ini File” on page 11.

The odbcinst.ini file is divided into the following sections:

- **[ODBC Drivers]** lists the names of all the installed ODBC drivers.
- A section having the same name as the driver name specified in the [ODBC Drivers] section lists driver attributes and values.

Here is an example odbcinst.ini file for Linux:

```
[ODBC Drivers]
Cloudera Hive ODBC Driver 32-bit=Installed
Cloudera Hive ODBC Driver 64-bit=Installed

[Cloudera Hive ODBC Driver 32-bit]
Description=Cloudera Hive ODBC Driver (32-bit)
Driver=/opt/cloudera/hiveodbc/lib/32/libclouderahiveodbc32.so

[Cloudera Hive ODBC Driver 64-bit]
Description=Cloudera Hive ODBC Driver (64-bit)
Driver=/opt/cloudera/hiveodbc/lib/64/libclouderahiveodbc64.so
```

Here is an example odbcinst.ini file for Mac OS X:

```
[ODBC Drivers]
Cloudera Hive ODBC Driver=Installed

[Cloudera Hive ODBC Driver]
Description=Cloudera Hive ODBC Driver
Driver=/opt/cloudera/hiveodbc/lib/universal/libclouderahiveodbc.dylib
```
Configuring ODBC Connections for Linux and Mac OS X

To define a driver:

1. Open the .odbcinst.ini configuration file in a text editor.
2. Add a new entry to the [ODBC Drivers] section. Type the driver name, and then type the following:  
   =Installed

   **Note:**
   Assign the driver name as the value of the Driver attribute in the data source definition instead of the driver shared library name.

3. In .odbcinst.ini, add a new section that has a name that matches the driver name you typed in step 2, and then add configuration options to the section based on the sample odbcinst.ini file provided with Cloudera ODBC Driver for Hive in the Setup directory. Specify configuration options as key-value pairs.
4. Save the .odbcinst.ini configuration file.

Configuring the cloudera.hiveodbc.ini File

To configure Cloudera ODBC Driver for Hive to work with your ODBC driver manager:

1. Open the .cloudera.hiveodbc.ini configuration file in a text editor.
2. Edit the DriverManagerEncoding setting. The value usually must be **UTF-16** or **UTF-32**, depending on the ODBC driver manager you use. iODBC uses **UTF-32** and unixODBC uses **UTF-16**. Consult your ODBC Driver Manager documentation for the correct setting to use.
3. Edit the ODBCInstLib setting. The value is the name of the ODBCInst shared library for the ODBC driver manager you use. The configuration file defaults to the shared library for iODBC. In Linux, the shared library name for iODBC is libiodbcinst.so. In Mac OS X, the shared library name for iODBC is libiodbcinst.dylib.

   **Note:**
   Consult your ODBC driver manager documentation for the correct library to specify. You can specify an absolute or relative filename for the library. If you intend to use the relative filename, then the path to the library must be included in the library path environment variable. In Linux, the library path environment variable is named LD_LIBRARY_PATH. In Mac OS X, the library path environment variable is named DYLD_LIBRARY_PATH.

4. Save the .cloudera.hiveodbc.ini configuration file.

Configuring Authentication

For details on selecting the appropriate authentication for a DSN using Cloudera ODBC Driver for Hive, see “Appendix A: Authentication Options” on page 17.
For details on the keys involved in configuring authentication, see “Appendix C: Driver Configuration Options for Linux and Mac OS X” on page 22. The authentication methods available are as follows:

- No Authentication
- User Name
- Kerberos

**Using No Authentication**

No additional details are required when using **No Authentication**.

**Using User Name**

**To configure User Name authentication:**

1. Set the HS2AuthMech configuration key for the DSN to 2.
2. Set the UserName key to the appropriate credential recognized by the Hive server.

**Using Kerberos**

For information on operating Kerberos, refer to the documentation for your operating system.

**To configure a DSN using Cloudera ODBC Driver for Hive to use Kerberos authentication:**

1. Set the H2SAuthMech configuration key for the DSN to 1.
2. If your Kerberos setup does not define a default realm or if the realm of your Hive server is not the default, then set the appropriate realm using the HS2KrbRealm key.
3. Set the HS2HostFQDN key to the fully qualified domain name of the HiveServer2 host.
4. Set the HS2KrbServiceName key to the service name of the Hive Server 2. For example, if the principle for the HiveServer2 is "hive/fully.qualified.domain.name@YOUR-REALM.COM", then the value in the service name field should be **hive**. If you are unsure of the correct service name to use for your particular Hadoop deployment, see your Hadoop administrator.

**Features**

**SQL Query versus HiveQL Query**

The native query language supported by Hive is HiveQL. For simple queries, HiveQL is a subset of SQL-92. However, for most applications, the syntax is different enough that most applications do not work with native HiveQL.

**SQL Connector**

To bridge the difference between SQL and HiveQL, the SQL Connector feature translates standard SQL-92 queries into equivalent HiveQL queries. The SQL Connector performs syntactical translations and structural transformations. For example:
Features

- **Quoted Identifiers**—When quoting identifiers, HiveQL uses back quotes (`) while SQL uses double quotes ("). Even when a driver reports the back quote as the quote character, some applications still generate double-quoted identifiers.

- **Table Aliases**—HiveQL does not support the AS keyword between a table reference and its alias.

- **JOIN, INNER JOIN and CROSS JOIN**—SQL INNER JOIN and CROSS JOIN syntax is translated to HiveQL JOIN syntax.

- **TOP N/LIMIT**—SQL TOP N queries are transformed to HiveQL LIMIT queries.

Data Types

The following data types are supported:

- TINYINT
- SMALLINT
- INT
- BIGINT
- FLOAT
- DOUBLE
- DECIMAL
- BOOLEAN
- STRING
- TIMESTAMP

**Note:**

The aggregate types (ARRAY, MAP and STRUCT) are not yet supported. Columns of aggregate types are treated as STRING columns.

Catalog and Schema Support

Cloudera ODBC Driver for Hive supports both catalogs and schemas in order to make it easy for the driver to work with various ODBC applications. Since Hive only organizes tables into schema/database, we have added a synthetic catalog, called “HIVE” under which all of the schemas/databases are organized. The driver also maps the ODBC schema to the Hive schema/database.

Hive System Table

A pseudo-table called **HIVE_SYSTEM** can be used to query for Hive cluster system environment information. The pseudo table is under the pseudo schema **HIVE_SYSTEM**. The table has two String type columns **ENVKEY** and **ENVVALUE**. Standard SQL can be executed against the Hive system table. For example:

```
SELECT * FROM HIVE_SYSTEM.HIVE_SYSTEM WHERE ENVKEY LIKE '%hive%'
```
The example query returns all of the Hive system environment entries whose key contains the word "hive." A special query, `"set -v"`, is executed to fetch system environment information and is not supported by all Hive versions. For versions of Hive that do not support querying system environment information, the driver returns an empty result set.

Server-side Properties

The Cloudera ODBC Driver for Hive allows you to set server-side properties via a DSN. Server-side properties specified in a DSN affect only the connection established using the DSN.

For details on setting server-side properties for a DSN using the Windows driver, see Configuring ODBC Connections on page 2. For details related to the Linux and Mac OS X drivers, see Appendix C: Driver Configuration Options for Linux and Mac OS X on page 22.

Contact Us

If you have difficulty using the driver, you can contact Cloudera Technical Support. We welcome your questions, comments and feature requests.

**Important:**

To help us assist you, prior to contacting Technical Support please prepare a detailed summary of the client and server environment including operating system version, patch level and configuration.

For details on contacting Technical Support, see [http://www.cloudera.com/content/cloudera/en/products/cloudera-support.html](http://www.cloudera.com/content/cloudera/en/products/cloudera-support.html)
Appendix A: Authentication Options

Note:
Authentication is only available for servers of type HiveServer2. Authentication is not available for servers of type HiveServer1.

HiveServer2 supports multiple authentication mechanisms. You must determine the authentication type your server is using. The authentication methods available are as follows:

- No Authentication
- User Name
- Kerberos

To discover how your HiveServer2 is configured, examine your hive-site.xml file. Examine the following properties to determine which authentication mechanism your server is set to use:

- hive.server2.authentication
- hive.server2.enable.doAs

<table>
<thead>
<tr>
<th>hive.server2.authentication</th>
<th>hive.server2.enable.doAs</th>
<th>Driver Authentication Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOSASL</td>
<td>False</td>
<td>No Authentication</td>
</tr>
<tr>
<td>KERBEROS</td>
<td>True or False</td>
<td>Kerberos</td>
</tr>
<tr>
<td>NONE</td>
<td>True or False</td>
<td>User Name</td>
</tr>
</tbody>
</table>

Note:
It is an error to set hive.server2.authentication to NOSASL and hive.server2.enable.doAs to true. This configuration will not prevent the service from starting up but results in an unusable service.

For more detail on authentication mechanisms, see the documentation for your Hadoop / Hive distribution. See also “Running Hadoop in Secure Mode” at http://hadoop.apache.org/docs/r0.23.7/hadoop-project-dist/hadoop-common/ClusterSetup.html#Running_Hadoop_in_Secure_Mode

Using No Authentication

When hive.server2.authentication is set to NOSASL, you must configure your connection to use No Authentication.
Appendix A: Authentication Options

**Using User Name**

When hive.server2.authentication is set to NONE, you must configure your connection to use **User Name**. Validation of the credentials that you include depends on hive.server2.enable.doAs:

- If hive.server2.enable.doAs is set to true, then the User Name in the DSN or driver configuration must be an **existing OS user** on the host running HiveServer2.
- If hive.server2.enable.doAs is set to false, then the User Name in the DSN or driver configuration is ignored.

If the User Name in the DSN or driver configuration is not supplied, then the driver defaults to using “anonymous” as the user name.

**Note:**

If you deploy Hadoop using Apache Ambari, then by default the authentication method is **User Name**.

**Using Kerberos**

When hive.server2.authentication is set to KERBEROS, then you must configure your connection to use **Kerberos**.
Appendix B: Configuring Kerberos Authentication for Windows

Download and install MIT Kerberos for Windows 4.0.1

1. For 64-bit computers: http://web.mit.edu/kerberos/dist/kfw/4.0/kfw-4.0.1-amd64.msi. The installer includes both 32-bit and 64-bit libraries.

2. For 32-bit computers: http://web.mit.edu/kerberos/dist/kfw/4.0/kfw-4.0.1-i386.msi. The installer includes 32-bit libraries only.

Set up the Kerberos configuration file in the default location

1. Obtain a krb5.conf configuration file from your Kerberos administrator. The configuration file should also be present at /etc/krb5.conf on the machine hosting the HiveServer2.

2. The default location is C:\ProgramData\MIT\Kerberos5 but this is normally a hidden directory. Consult your Windows documentation if you wish to view and use this hidden directory.

3. Rename the configuration file from krb5.conf to krb5.ini.

4. Copy krb5.ini to the default location and overwrite the empty sample file.

Consult the MIT Kerberos documentation for more information on configuration.

Set up the Kerberos configuration file in another location

If you do not want to put the Kerberos configuration file in the default location then you can use another location. The steps required to do this are as follows:

1. Obtain a krb5.conf configuration file for your Kerberos setup.

2. Store krb5.conf in an accessible directory and make note of the full path name.

3. Click the Windows Start menu.

4. Right-click Computer.

5. Click Properties.

6. Click Advanced system settings.

7. Click Environment Variables.

8. Click New for System variables.

9. In the Variable Name field, type KRBS_CONFIG.

10. In the Variable Value field, type the absolute path to the krb5.conf file you stored in step 2.

11. Click OK to save the new variable.

12. Ensure the variable is listed in the System variables list.

13. Click OK to close Environment Variables Window.

14. Click OK to close System Properties Window.
Appendix B: Configuring Kerberos Authentication for Windows

Set up the Kerberos credential cache file

1. Create a new directory where you want to save the Kerberos credential cache file. For example, you may create the C:\temp directory.
2. Click the Windows Start menu.
3. Right-click Computer.
4. Click Properties.
5. Click Advanced system settings.
6. Click Environment Variables.
7. Click New for System variables.
8. In the Variable Name field, type KRB5CCNAME
9. In the Variable Value field, type the path to the directory you created in step 1, and then append the file name krb5cache. For example, if you created the C:\temp directory in step 1, then type: C:\temp krbcache

Note:
krb5cache is a file—not a directory—managed by the Kerberos software and should not be created by the user. If you receive a permission error when you first use Kerberos, check to ensure that the krb5cache file does not exist as a file or a directory.

10. Click OK to save the new variable.
11. Ensure the variable appears in the System variables list.
12. Click OK to close Environment Variables Window.
13. Click OK to close System Properties Window.
14. Restart your computer to ensure that MIT Kerberos for Windows uses the new settings.

Obtain a ticket for a Kerberos principal using password

Note:
If your Kerberos environment uses keytab files please see the next section.

1. Click the Start button.
2. Click All Programs.
3. Click the Kerberos for Windows (64-bit) or the Kerberos for Windows (32-bit) program group.
4. Use MIT Kerberos Ticket Manager to obtain a ticket for the principal that will be connecting to HiveServer2.
Obtain a ticket for a Kerberos principal using a keytab file

1. Click the Start button.
2. Click All Programs.
3. Click Accessories.
4. Click Command Prompt.
5. Type: `kinit -k -t <keytab pathname> <principal>`
   
   `<keytab pathname>` is the full pathname to the keytab file. For example, `C:\mykeytabs\hiveserver2.keytab`
   
   `<principal>` is the Kerberos principal to use for authentication. For example, `hive/hiveserver2.example.com@EXAMPLE.COM`

Obtain a ticket for a Kerberos principal using the default keytab file

A default keytab file can be set for your Kerberos configuration. Consult the MIT Kerberos documentation for instructions on configuring a default keytab file.

1. Click the Start button.
2. Click All Programs.
3. Click Accessories.
4. Click Command Prompt.
5. Type: `kinit -k <principal>`
   
   `<principal>` is the Kerberos principal to use for authentication. For example, `hive/hiveserver2.example.com@EXAMPLE.COM`
Appendix C: Driver Configuration Options for Linux and Mac OS X

The configuration options available to control the behavior of Cloudera ODBC Driver for Hive are listed and described in Table 1.

Note:
You can set configuration options in your odbc.ini and .cloudera.hiveodbc.ini files. Configuration options set in a .cloudera.hiveodbc.ini file apply to all connections, whereas configuration options set in an odbc.ini file are specific to a connection. Configuration options set in odbc.ini take precedence over configuration options set in .cloudera.hiveodbc.ini.

Table 1 Driver Configuration Options for Linux and Mac OS

<table>
<thead>
<tr>
<th>Key</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td></td>
<td>The location of the Cloudera ODBC Driver for Hive shared object file</td>
</tr>
<tr>
<td>HOST</td>
<td></td>
<td>The IP address or hostname of the Hive server</td>
</tr>
<tr>
<td>PORT</td>
<td>10000</td>
<td>The listening port for the service</td>
</tr>
<tr>
<td>Schema</td>
<td>default</td>
<td>The name of the database schema to use when a schema is not explicitly specified in a query.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: Queries on other schemas can still be issued by explicitly specifying the schema in the query. To determine the appropriate database schema to use, type show databases at the Hive command prompt to inspect your databases.</td>
</tr>
<tr>
<td>DefaultStringLength</td>
<td>255</td>
<td>The default string column length to use. Hive does not provide the length for String columns in its column metadata. The option allows you to tune the length of String columns.</td>
</tr>
<tr>
<td>UseNativeQuery</td>
<td>0</td>
<td>Enabling the UseNativeQuery option using a value of 1 disables the SQL Connector feature. The SQL Connector feature has been added to the driver to apply transformations to the queries emitted by an application to convert them into an equivalent form in HiveQL. If the application is Hive aware and already emits HiveQL, then turning off the SQL Connector feature avoids the extra overhead of query transformation.</td>
</tr>
<tr>
<td>FastSQLPrepare</td>
<td>0</td>
<td>To enable the FastSQLPrepare option, use a value of 1.</td>
</tr>
<tr>
<td>Key</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Enabling FastSQLPrepare</td>
<td></td>
<td>Defers query execution to SQLExecute. When using Native Query mode, the driver will execute the HiveQL query to retrieve the result set metadata for SQLPrepare. As a result, SQLPrepare might be slow. If the result set metadata is not required after calling SQLPrepare, then enable FastSQLPrepare.</td>
</tr>
<tr>
<td>RowsFetchedPerBlock</td>
<td>10000</td>
<td>The maximum number of rows that a query returns at a time. Any positive 32-bit integer is a valid value but testing has shown that performance gains are marginal beyond the default value of 10000 rows.</td>
</tr>
<tr>
<td>DecimalColumnScale</td>
<td>10</td>
<td>The maximum number of digits to the right of the decimal point for numeric data types</td>
</tr>
<tr>
<td>SSP_</td>
<td></td>
<td>To set a server-side property, use the following syntax where SSPKey is the name of the server-side property to set and SSPValue is the value to assign to the server-side property: SSP_SSPKey=SSPValue For example: SSP_mapred.queue.names=myQueue After the driver applies the server-side property, the SSP_ prefix is removed from the DSN entry leaving an entry of SSPKey=SSPValue</td>
</tr>
</tbody>
</table>

**Important:**

The SSP_ prefix is case sensitive.
### Key Options

<table>
<thead>
<tr>
<th>Key</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ApplySSPWithQueries</strong></td>
<td>1</td>
<td>When set to the default value of 1—enabled—each server side property you set is applied by executing a <code>set SSPKey=SSPValue</code> query when opening a session to the Hive server. Applying server-side properties using queries involves an additional network round trip per server side property when establishing a session to the Hive server. Some HiveServer2 builds are not compatible with the more efficient method for setting server-side properties that the driver uses when <code>ApplySSPWithQueries</code> is disabled by setting the key value to 0.</td>
</tr>
<tr>
<td><strong>HiveServerType</strong></td>
<td>1</td>
<td>The Hive Server Type. Set it to 1 for Hive Server and 2 for HiveServer2.</td>
</tr>
<tr>
<td><strong>HS2AuthMech</strong></td>
<td>0</td>
<td>The authentication mechanism to use. Set the value to 0 for no authentication, 1 for Kerberos or 2 for User Name.</td>
</tr>
<tr>
<td><strong>HS2HostFQDN</strong></td>
<td></td>
<td>The fully qualified domain name of the HiveServer2 host used.</td>
</tr>
<tr>
<td><strong>HS2KrbServiceName</strong></td>
<td></td>
<td>The Kerberos service principal name of the HiveServer2. By convention the service name is <code>hive</code>, but the name may be different in your server environment.</td>
</tr>
<tr>
<td><strong>HS2KrbRealm</strong></td>
<td></td>
<td>If there is no default realm configured or the realm of the HiveServer2 host is different from the default realm for your Kerberos setup, then define the realm of the HiveServer2 host using this option.</td>
</tr>
<tr>
<td><strong>UserName</strong></td>
<td></td>
<td>The user name of an existing user on the host running HiveServer2. The option is used when using User Name authentication.</td>
</tr>
</tbody>
</table>

**Note:**
When connecting to a HiveServer1, `ApplySSPWithQueries` is always enabled.