

Cloudera ODBC Driver for Impala
Version 2.5.39



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Table of Contents

ABOUT THE CLUDERA ODBC DRIVER FOR IMPALA	5
WINDOWS DRIVER	6
WINDOWS SYSTEM REQUIREMENTS	6
INSTALLING THE DRIVER ON WINDOWS	6
CREATING A DATA SOURCE NAME ON WINDOWS	6
CONFIGURING AUTHENTICATION ON WINDOWS	9
CONFIGURING SSL VERIFICATION ON WINDOWS	13
CONFIGURING ADVANCED OPTIONS ON WINDOWS	14
CONFIGURING SERVER-SIDE PROPERTIES ON WINDOWS	15
CONFIGURING LOGGING OPTIONS ON WINDOWS	16
CONFIGURING KERBEROS AUTHENTICATION FOR WINDOWS	17
VERIFYING THE DRIVER VERSION NUMBER ON WINDOWS	21
MACOS DRIVER	23
MACOS SYSTEM REQUIREMENTS	23
INSTALLING THE DRIVER ON MACOS	23
VERIFYING THE DRIVER VERSION NUMBER ON MACOS	23
LINUX DRIVER	25
LINUX SYSTEM REQUIREMENTS	25
INSTALLING THE DRIVER USING THE RPM FILE	25
INSTALLING THE DRIVER ON DEBIAN	26
VERIFYING THE DRIVER VERSION NUMBER ON LINUX	27
AIX DRIVER	28
AIX SYSTEM REQUIREMENTS	28
INSTALLING THE DRIVER ON AIX	28
VERIFYING THE DRIVER VERSION NUMBER ON AIX	29
CONFIGURING THE ODBC DRIVER MANAGER ON NON-WINDOWS MACHINES	30
SPECIFYING ODBC DRIVER MANAGERS ON NON-WINDOWS MACHINES	30
SPECIFYING THE LOCATIONS OF THE DRIVER CONFIGURATION FILES	30
CONFIGURING ODBC CONNECTIONS	32
CREATING A DATA SOURCE NAME ON A NON-WINDOWS MACHINE	32
CONFIGURING A DSN-LESS CONNECTION ON A NON-WINDOWS MACHINE	34
CONFIGURING AUTHENTICATION ON A NON-WINDOWS MACHINE	36
CONFIGURING SSL VERIFICATION ON A NON-WINDOWS MACHINE	39
CONFIGURING SERVER-SIDE PROPERTIES ON A NON-WINDOWS MACHINE	40
CONFIGURING LOGGING OPTIONS	41

TESTING THE CONNECTION	42
AUTHENTICATION OPTIONS	44
USING A CONNECTION STRING	45
DSN CONNECTION STRING EXAMPLE	45
DSN-LESS CONNECTION STRING EXAMPLES	45
FEATURES	48
DATA TYPES	48
CATALOG AND SCHEMA SUPPORT	49
SQL TRANSLATION	49
SERVER-SIDE PROPERTIES	50
ACTIVE DIRECTORY	50
WRITE-BACK	50
SECURITY AND AUTHENTICATION	50
DRIVER CONFIGURATION OPTIONS	52
CONFIGURATION OPTIONS APPEARING IN THE USER INTERFACE	52
CONFIGURATION OPTIONS HAVING ONLY KEY NAMES	68
ODBC API CONFORMANCE LEVEL	70
CONTACT US	72

About the Cloudera ODBC Driver for Impala

The Cloudera ODBC Driver for Impala is used for direct SQL and Impala SQL access to Apache Hadoop / Impala distributions, enabling Business Intelligence (BI), analytics, and reporting on Hadoop / Impala-based data. The driver efficiently transforms an application's SQL query into the equivalent form in Impala SQL, which is a subset of SQL-92. If an application is Impala-aware, then the driver is configurable to pass the query through to the database for processing. The driver interrogates Impala to obtain schema information to present to a SQL-based application. Queries, including joins, are translated from SQL to Impala SQL. For more information about the differences between Impala SQL and SQL, see "Features" on page 48.

The Cloudera ODBC Driver for Impala complies with the ODBC 3.80 data standard and adds important functionality such as Unicode and 32- and 64-bit support for high-performance computing environments.

ODBC is one of 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. For more information about ODBC, see the *Data Access Standards Glossary*: <http://www.simba.com/resources/data-access-standards-library>. For complete information about the ODBC specification, see the *ODBC API Reference*: [http://msdn.microsoft.com/en-us/library/windows/desktop/ms714562\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/ms714562(v=vs.85).aspx).

The *Installation and Configuration Guide* is suitable for users who are looking to access data residing within Impala from their desktop environment. Application developers might also find the information helpful. Refer to your application for details on connecting via ODBC.

Windows Driver

Windows System Requirements

The Cloudera ODBC Driver for Impala is recommended for Impala versions 1.0.1 through 2.8, and CDH versions 5.0 through 5.10. The driver also supports later minor versions of CDH 5.

Install the driver on client machines where the application is installed. Each machine that you install the driver on must meet the following minimum system requirements:

- Windows Server 2008 or later
- 100 MB of available disk space
- Visual C++ Redistributable for Visual Studio 2013 installed (with the same bitness as the driver that you are installing).
You can download the installation packages at <https://www.microsoft.com/en-ca/download/details.aspx?id=40784>.

To install the driver, you must have Administrator privileges on the machine.

Installing the Driver on Windows

On 64-bit Windows operating systems, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit drivers, and 32-bit applications must use 32-bit drivers. Make sure that you use the version of the driver that matches the bitness of the client application:

- Cloudera Impala 2.5 32-bit.msi for 32-bit applications
- Cloudera Impala 2.5 64-bit.msi for 64-bit applications

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

To install the Cloudera ODBC Driver for Impala on Windows:

1. Depending on the bitness of your client application, double-click to run **Cloudera Impala 2.5 32-bit.msi** or **Cloudera Impala 2.5 64-bit.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 **Change**, 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**.

Creating a Data Source Name on Windows

Typically, after installing the Cloudera ODBC Driver for Impala, you need to create a Data Source Name (DSN).

Alternatively, for information about DSN-less connections, see "Using a Connection String" on page 45.

To create a Data Source Name on Windows:

1. Open the ODBC Administrator:
 - If you are using Windows 7 or earlier, click **Start**  > **All Programs > Cloudera ODBC Driver for Impala 2.5 > ODBC Administrator**.
 - Or, if you are using Windows 8 or later, on the Start screen, type **ODBC administrator**, and then click the **ODBC Administrator** search result.

Note:

Make sure to select the ODBC Data Source Administrator that has the same bitness as the client application that you are using to connect to Impala.

2. In the ODBC Data Source Administrator, click the **Drivers** tab, and then scroll down as needed to confirm that the Cloudera ODBC Driver for Impala appears in the alphabetical list of ODBC drivers that are installed on your system.
3. Choose one:
 - To create a DSN that only the user currently logged into Windows can use, click the **User DSN** tab.
 - Or, to create a DSN that all users who log into Windows can use, click the **System DSN** tab.

Note:

It is recommended that you create a System DSN instead of a User DSN. Some applications load the data using a different user account, and might not be able to detect User DSNs that are created under another user account.

4. Click **Add**.
5. In the Create New Data Source dialog box, select **Cloudera ODBC Driver for Impala** and then click **Finish**. The Cloudera ODBC Driver for Impala DSN Setup dialog box opens.
6. In the **Data Source Name** field, type a name for your DSN.
7. Optionally, in the **Description** field, type relevant details about the DSN.
8. In the **Host** field, type the IP address or host name of the network load balancer (NLB) or one of the Impala nodes if you are deployed without an NLB.
9. In the **Port** field, type the number of the TCP port that the Impala server uses to listen for client connections.

Note:

The default port number used by Impala is 21050.

10. In the **Database** field, type the name of the database schema to use when a schema is not explicitly specified in a query.

Note:

You can still issue queries on other schemas by explicitly specifying the schema in the query. To inspect your databases and determine the appropriate schema to use, type the `show databases` command at the Impala command prompt.

11. In the Authentication area, configure authentication as needed. For more information, see "Configuring Authentication on Windows" on page 9.

Note:

The default configuration of Impala requires the Cloudera ODBC Driver for Impala to be configured to use the No Authentication mechanism.

12. Optionally, if the operations against Impala are to be done on behalf of a user that is different than the authenticated user for the connection, type the name of the user to be delegated in the **Delegation UID** field.
13. To configure client-server verification over SSL, click **SSL Options**. For more information, see "Configuring SSL Verification on Windows" on page 13.
14. To configure advanced driver options, click **Advanced Options**. For more information, see "Configuring Advanced Options on Windows" on page 14.
15. To configure server-side properties, click **Advanced Options** and then click **Server Side Properties**. For more information, see "Configuring Server-Side Properties on Windows" on page 15.
16. To configure logging behavior for the driver, click **Logging Options**. For more information, see "Configuring Logging Options on Windows" on page 16.
17. To test the connection, click **Test**. Review the results as needed, and then click **OK**.

Note:

If the connection fails, then confirm that the settings in the Cloudera ODBC Driver for Impala DSN Setup dialog box are correct. Contact your Impala server administrator as needed.

18. To save your settings and close the Cloudera ODBC Driver for Impala DSN Setup dialog box, click **OK**.
19. To close the ODBC Data Source Administrator, click **OK**.

Configuring Authentication on Windows

You must determine the authentication type your server is using and configure your DSN accordingly. The Impala server supports the following authentication methods:

- "Using No Authentication" on page 9
- "Using Kerberos" on page 9
- "Using Advanced Kerberos" on page 10
- "Using SASL User Name" on page 12
- "Using User Name And Password" on page 12

Note:

In addition to authentication, you can configure the driver to connect over the Secure Sockets Layer (SSL). For more information, see "Configuring SSL Verification on Windows" on page 13.

Using No Authentication

For this authentication mechanism, you do not need to configure any additional settings.

Note:

The default configuration of Impala requires the Cloudera ODBC Driver for Impala to be configured to use the No Authentication mechanism.

To configure a connection without authentication:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, and then click **Configure**.
2. In the **Mechanism** drop-down list, select **No Authentication**.
3. If the Impala server is configured to use SSL, then click **SSL Options** to configure SSL for the connection. For more information, see "Configuring SSL Verification on Windows" on page 13.
4. To save your settings and close the dialog box, click **OK**.

Using Kerberos

If the Use Only SSPI advanced option is disabled, then Kerberos must be installed and configured before you can use this authentication mechanism. For information about configuring Kerberos on your machine, see "Configuring Kerberos Authentication for Windows" on page 17. For information about setting the Use Only SSPI advanced option, see "Configuring Advanced Options on Windows" on page 14.

To configure Kerberos authentication:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, and then click **Configure**.

2. In the **Mechanism** drop-down list, select **Kerberos**.
3. Choose one:
 - To use the default realm defined in your Kerberos setup, leave the **Realm** field empty.
 - Or, if your Kerberos setup does not define a default realm or if the realm of your Impala server host is not the default, then, in the **Realm** field, type the Kerberos realm of the Impala server.
4. In the **Host FQDN** field, type the fully qualified domain name of the Impala server host.

Note:

To use the Impala server host name as the fully qualified domain name for Kerberos authentication, in the **Host FQDN** field, type **_HOST**.

5. To allow the driver to pass your credentials directly to the server for use in authentication, select **Delegate Kerberos Credentials**.
6. In the **Service Name** field, type the service name of the Impala server.
7. If the Impala server is configured to use SSL, then click **SSL Options** to configure SSL for the connection. For more information, see "Configuring SSL Verification on Windows" on page 13.
8. Optionally, in the **Transport Buffer Size** field, type the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

9. To save your settings and close the dialog box, click **OK**.

Using Advanced Kerberos

The Advanced Kerberos authentication mechanism allows concurrent connections within the same process to use different Kerberos user principals.

This authentication mechanism is supported only when the driver is configured to handle Kerberos authentication using MIT Kerberos:

- MIT Kerberos must be installed on your machine.
- The Use Only SSPI option must be disabled. For more information, see "Use Only SSPI" on page 66.

When you use Advanced Kerberos authentication, you do not need to run the `kinit` command to obtain a Kerberos ticket. Instead, you use a JSON file to map your Impala user name to a Kerberos user principal name and a keytab that contains the corresponding keys. The driver obtains Kerberos tickets based on the specified mapping. As a fallback, you can specify a keytab that the driver uses by default if the mapping file is not available or if no matching keytab can be found in the mapping file.

Note:

- For information about the schema of the mapping file and how the driver handles invalid mappings, see "UPN Keytab Mapping File" on page 64.
- For information about how the driver searches for a keytab file if the keytab mapping and default keytab file are invalid, see "Default Keytab File" on page 56.

To configure Advanced Kerberos authentication:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, and then click **Configure**.
2. In the **Mechanism** drop-down list, select **Kerberos**.
3. Choose one:
 - To use the default realm defined in your Kerberos setup, leave the **Realm** field empty.
 - Or, if your Kerberos setup does not define a default realm or if the realm of your Impala server host is not the default, then, in the **Realm** field, type the Kerberos realm of the Impala server.
4. Optionally, if you are using MIT Kerberos and a Kerberos realm is specified in the **Realm** field, then choose one:
 - To have the Kerberos layer canonicalize the server's service principal name, leave the **Canonicalize Principal FQDN** check box selected.
 - Or, to prevent the Kerberos layer from canonicalizing the server's service principal name, clear the **Canonicalize Principal FQDN** check box.
5. In the **Host FQDN** field, type the fully qualified domain name of the Impala server host.

Note:

To use the Impala server host name as the fully qualified domain name for Kerberos authentication, in the **Host FQDN** field, type **_HOST**.

6. In the **Service Name** field, type the service name of the Impala server.
7. Select the **Use Keytab** check box.

Note:

If the check box is not available, make sure that MIT Kerberos is installed on your machine.

8. In the **User Name** field, type an appropriate user name for accessing the Impala server.
9. Click **Keytab Options** and then do the following in the Keytab Options dialog box:
 - a. In the **UPN Keytab Mapping File** field, specify the full path to a JSON file that maps your Impala user name to a Kerberos user principal name and a keytab file.

- b. In the **Default Keytab File** field, specify the full path to a keytab file that the driver can use if the mapping file is not available or if no matching keytab can be found in the mapping file.
 - c. To save your settings and close the dialog box, click **OK**.
10. If the Impala server is configured to use SSL, then click **SSL Options** to configure SSL for the connection. For more information, see "Configuring SSL Verification on Windows" on page 13.
11. Optionally, in the **Transport Buffer Size** field, type the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

12. To save your settings and close the dialog box, click **OK**.

Using SASL User Name

This authentication mechanism requires a user name but not a password. The user name labels the session, facilitating database tracking.

To configure SASL User Name authentication:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, and then click **Configure**.
2. In the **Mechanism** drop-down list, select **SASL User Name**.
3. In the **User Name** field, type an appropriate user name for accessing the Impala server.
4. Optionally, in the **Transport Buffer Size** field, type the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

5. To save your settings and close the dialog box, click **OK**.

Using User Name And Password

This authentication mechanism requires a user name and a password.

Note:

This authentication mechanism should not be used with an Impala configuration that does not have LDAP enabled.

To configure User Name And Password authentication:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, and then click **Configure**.
2. In the **Mechanism** drop-down list, select **User Name And Password**.
3. In the **User Name** field, type an appropriate user name for accessing the Impala server.
4. In the **Password** field, type the password corresponding to the user name you typed above.
5. To save the password, select the **Save Password (Encrypted)** check box.

Important:

The password is obscured, that is, not saved in plain text. However, it is still possible for the encrypted password to be copied and used.

6. If the Impala server is configured to use SSL, then click **SSL Options** to configure SSL for the connection. For more information, see "Configuring SSL Verification on Windows" on page 13.
7. Optionally, in the **Transport Buffer Size** field, type the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

8. Optionally, to use SASL to handle authentication, select the **Use Simple Authentication and Security Layer (SASL)** check box.
9. To save your settings and close the dialog box, click **OK**.

Configuring SSL Verification on Windows

If you are connecting to an Impala server that has Secure Sockets Layer (SSL) enabled, you can configure the driver to connect to an SSL-enabled socket. When using SSL to connect to a server, the driver can be configured to verify the identity of the server.

To configure SSL verification on Windows:

1. To access SSL options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click **Configure**, and then click **SSL Options**.
2. Select the **Enable SSL** check box.
3. To allow self-signed certificates from the server, select the **Allow Self-signed Server Certificate** check box.
4. To allow the common name of a CA-issued SSL certificate to not match the host name of the Impala server, select the **Allow Common Name Host Name Mismatch** check box.

- To specify the CA certificates that you want to use to verify the server, do one of the following:
 - To verify the server using the trusted CA certificates from a specific `.pem` file, specify the full path to the file in the **Trusted Certificates** field and clear the **Use System Trust Store** check box.
 - Or, to use the trusted CA certificates `.pem` file that is installed with the driver, leave the **Trusted Certificates** field empty, and clear the **Use System Trust Store** check box.
 - Or, to use the Windows Trust Store, select the **Use System Trust Store** check box.

Important:

- If you are using the Windows Trust Store, make sure to import the trusted CA certificates into the Trust Store.
- If the trusted CA supports certificate revocation, select the **Check Certificate Revocation** check box.

- To save your settings and close the SSL Options dialog box, click **OK**.

Configuring Advanced Options on Windows

You can configure advanced options to modify the behavior of the driver.

To configure advanced options on Windows:

- To access advanced options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click **Configure**, and then click **Advanced Options**.
- To disable translation from ODBC SQL to Impala SQL, select the **Use Native Query** check box.

Note:

By default, the driver applies transformations to the queries emitted by an application to convert the queries into an equivalent form in Impala SQL. If the application is Impala-aware and already emits Impala SQL, then turning off the translation avoids the additional overhead of query transformation.

- To enable the driver to successfully run queries that contain transaction statements, select the **Enable Simulated Transactions** check box.

Note:

The transaction statements are not executed, because ODBC does not support them. Enabling this option allows the driver to run the query without returning error messages.

- To enable the driver to return `SQL_WVARCHAR` instead of `SQL_VARCHAR` for `STRING` and `VARCHAR` columns, and `SQL_WCHAR` instead of `SQL_CHAR` for `CHAR` columns, select the **Use SQL Unicode Types** check box.

5. To have the driver automatically attempt to reconnect to the server if communications are lost, select **Enable Auto Reconnect**.
6. To have the driver restrict catalog queries to the current schema when no schema is specified, or when the schema is specified with the wildcard character %, select **Restrict Metadata with Current Schema**.
7. To handle Kerberos authentication using the SSPI plugin instead of MIT Kerberos by default, select one or both of the check boxes under the **Use Only SSPI** option:
 - To configure the current DSN to use the SSPI plugin by default, select **Enable For This DSN**.
 - To configure all DSN-less connections to use the SSPI plugin by default, select **Enable For DSN-less Connections**.
 - To configure all connections that use the Cloudera ODBC Driver for Impala to use the SSPI plugin by default, select both check boxes.
8. In the **Rows Fetched Per Block** field, type the number of rows to be fetched per block.
9. In the **Socket Timeout** field, type the number of seconds after which Impala closes the connection with the client application if the connection is idle.

Note:

Setting the Socket Timeout value to 0 disables the timeout feature.

10. In the **String Column Length** field, type the maximum data length for STRING columns.
11. In the **Async Exec Poll Interval (ms)** field, type the time in milliseconds between each poll for the query execution status.
12. To save your settings and close the Advanced Options dialog box, click **OK**.

Configuring Server-Side Properties on Windows

When connecting to a server that is running Impala 2.0 or later, you can use the driver to apply configuration properties to the server.

Important:

This feature is not supported for earlier versions of Impala, where the SET statement can only be executed from within the Impala shell.

To configure server-side properties on Windows:

1. To configure server-side properties, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click **Configure**, then click **Advanced Options**, and then click **Server Side Properties**.
2. To create a server-side property, click **Add**, then type appropriate values in the **Key** and **Value** fields, and then click **OK**. For example, to set the value of the MEM_LIMIT query option to 1 GB, type **MEM_LIMIT** in the **Key** field and then type **1000000000** in the **Value** field.

3. To edit a server-side property, select the property from the list, then click **Edit**, then update the **Key** and **Value** fields as needed, and then click **OK**.
4. To delete a server-side property, select the property from the list, and then click **Remove**. In the confirmation dialog box, click **Yes**.
5. To configure the driver to convert server-side property key names to all lower-case characters, select the **Convert Key Name To Lower Case** check box.
6. To save your settings and close the Server Side Properties dialog box, click **OK**.

Configuring Logging Options on Windows

To help troubleshoot issues, you can enable logging. In addition to functionality provided in the Cloudera ODBC Driver for Impala, the ODBC Data Source Administrator provides tracing functionality.

Important:

Only enable logging or tracing long enough to capture an issue. Logging or tracing decreases performance and can consume a large quantity of disk space.

To enable driver logging on Windows:

1. To access logging options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click **Configure**, and then click **Logging Options**.
2. From the **Log Level** drop-down list, select the logging level corresponding to the amount of information that you want to include in log files:

Logging Level	Description
OFF	Disables all logging.
FATAL	Logs severe error events that lead the driver to abort.
ERROR	Logs error events that might allow the driver to continue running.
WARNING	Logs events that might result in an error if action is not taken.
INFO	Logs general information that describes the progress of the driver.
DEBUG	Logs detailed information that is useful for debugging the driver.
TRACE	Logs all driver activity.

3. In the **Log Path** field, specify the full path to the folder where you want to save log files.
4. If requested by Technical Support, type the name of the component for which to log messages in the **Log Namespace** field. Otherwise, do not type a value in the field.

- In the **Max Number Files** field, type the maximum number of log files to keep.

Note:

After the maximum number of log files is reached, each time an additional file is created, the driver deletes the oldest log file.

- In the **Max File Size** field, type the maximum size of each log file in megabytes (MB).

Note:

After the maximum file size is reached, the driver creates a new file and continues logging.

- Click **OK**.
- Restart your ODBC application to make sure that the new settings take effect.

The Cloudera ODBC Driver for Impala produces a log file named `ImpalaODBC_driver.log` at the location that you specify in the Log Path field.

To disable driver logging on Windows:

- Open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click **Configure**, and then click **Logging Options**.
- From the **Log Level** drop-down list, select **LOG_OFF**.
- Click **OK**.
- Restart your ODBC application to make sure that the new settings take effect.

Configuring Kerberos Authentication for Windows

Active Directory

The Cloudera ODBC Driver for Impala supports Active Directory Kerberos on Windows. There are two prerequisites for using Active Directory Kerberos on Windows:

- MIT Kerberos is not installed on the client Windows machine.
- The MIT Kerberos Hadoop realm has been configured to trust the Active Directory realm, according to Cloudera's documentation, so that users in the Active Directory realm can access services in the MIT Kerberos Hadoop realm.

MIT Kerberos

Downloading and Installing MIT Kerberos for Windows 4.0.1

For information about Kerberos and download links for the installer, see the MIT Kerberos website: <http://web.mit.edu/kerberos/>.

To download and install MIT Kerberos for Windows 4.0.1:

1. Download the appropriate Kerberos installer:
 - For a 64-bit machine, use the following download link from the MIT Kerberos website: <http://web.mit.edu/kerberos/dist/kfw/4.0/kfw-4.0.1-amd64.msi>.
 - For a 32-bit machine, use the following download link from the MIT Kerberos website: <http://web.mit.edu/kerberos/dist/kfw/4.0/kfw-4.0.1-i386.msi>.

Note:

The 64-bit installer includes both 32-bit and 64-bit libraries. The 32-bit installer includes 32-bit libraries only.

2. To run the installer, double-click the `.msi` file that you downloaded above.
3. Follow the instructions in the installer to complete the installation process.
4. When the installation completes, click **Finish**.

Setting Up the Kerberos Configuration File

Settings for Kerberos are specified through a configuration file. You can set up the configuration file as an `.ini` file in the default location, which is the `C:\ProgramData\MIT\Kerberos5` directory, or as a `.conf` file in a custom location.

Normally, the `C:\ProgramData\MIT\Kerberos5` directory is hidden. For information about viewing and using this hidden directory, refer to Microsoft Windows documentation.

Note:

For more information on configuring Kerberos, refer to the MIT Kerberos documentation.

To set up the Kerberos configuration file in the default location:

1. Obtain a `krb5.conf` configuration file. You can obtain this file from your Kerberos administrator, or from the `/etc/krb5.conf` folder on the machine that is hosting the Impala server.
2. Rename the configuration file from `krb5.conf` to `krb5.ini`.
3. Copy the `krb5.ini` file to the `C:\ProgramData\MIT\Kerberos5` directory and overwrite the empty sample file.

To set up the Kerberos configuration file in a custom location:

1. Obtain a `krb5.conf` configuration file. You can obtain this file from your Kerberos administrator, or from the `/etc/krb5.conf` folder on the machine that is hosting the Impala server.
2. Place the `krb5.conf` file in an accessible directory and make note of the full path name.

3. Open the System window:
 - If you are using Windows 7 or earlier, click **Start** , then right-click **Computer**, and then click **Properties**.
 - Or, if you are using Windows 8 or later, right-click **This PC** on the Start screen, and then click **Properties**.
4. Click **Advanced System Settings**.
5. In the System Properties dialog box, click the **Advanced** tab and then click **Environment Variables**.
6. In the Environment Variables dialog box, under the System Variables list, click **New**.
7. In the New System Variable dialog box, in the **Variable Name** field, type **KRB5_CONFIG**.
8. In the **Variable Value** field, type the full path to the `krb5.conf` file.
9. Click **OK** to save the new variable.
10. Make sure that the variable is listed in the System Variables list.
11. Click **OK** to close the Environment Variables dialog box, and then click **OK** to close the System Properties dialog box.

Setting Up the Kerberos Credential Cache File

Kerberos uses a credential cache to store and manage credentials.

To set up the Kerberos credential cache file:

1. Create a directory where you want to save the Kerberos credential cache file. For example, create a directory named `C:\temp`.
2. Open the System window:
 - If you are using Windows 7 or earlier, click **Start** , then right-click **Computer**, and then click **Properties**.
 - Or, if you are using Windows 8 or later, right-click **This PC** on the Start screen, and then click **Properties**.
3. Click **Advanced System Settings**.
4. In the System Properties dialog box, click the **Advanced** tab and then click **Environment Variables**.
5. In the Environment Variables dialog box, under the System Variables list, click **New**.
6. In the New System Variable dialog box, in the **Variable Name** field, type **KRB5CCNAME**.
7. In the **Variable Value** field, type the path to the folder you created above, and then append the file name `krb5cache`. For example, if you created the folder `C:\temp`, then type `C:\temp\krb5cache`.

Note:

`krb5cache` is a file (not a directory) that is managed by the Kerberos software, and it should not be created by the user. If you receive a permission error when you first use Kerberos, make sure that the `krb5cache` file does not already exist as a file or a directory.

8. Click **OK** to save the new variable.
9. Make sure that the variable appears in the System Variables list.
10. Click **OK** to close the Environment Variables dialog box, and then click **OK** to close the System Properties dialog box.
11. To make sure that Kerberos uses the new settings, restart your machine.

Obtaining a Ticket for a Kerberos Principal

A principal refers to a user or service that can authenticate to Kerberos. To authenticate to Kerberos, a principal must obtain a ticket by using a password or a keytab file. You can specify a keytab file to use, or use the default keytab file of your Kerberos configuration.

To obtain a ticket for a Kerberos principal using a password:

1. Open MIT Kerberos Ticket Manager.
2. In MIT Kerberos Ticket Manager, click **Get Ticket**.
3. In the Get Ticket dialog box, type your principal name and password, and then click **OK**.

If the authentication succeeds, then your ticket information appears in MIT Kerberos Ticket Manager.

To obtain a ticket for a Kerberos principal using a keytab file:

1. Open a command prompt:
 - If you are using Windows 7 or earlier, click **Start** , then click **All Programs**, then click **Accessories**, and then click **Command Prompt**.
 - If you are using Windows 8 or later, click the arrow button at the bottom of the Start screen, then find the Windows System program group, and then click **Command Prompt**.
2. In the Command Prompt, type a command using the following syntax:

```
kinit -k -t [KeytabPath] [Principal]
```

[KeytabPath] is the full path to the keytab file. For example:

```
C:\mykeytabs\myUser.keytab.
```

[Principal] is the Kerberos user principal to use for authentication. For example:

```
myUser@EXAMPLE.COM.
```

3. If the cache location KRB5CCNAME is not set or used, then use the `-c` option of the `kinit` command to specify the location of the credential cache. In the command, the `-c` argument must appear last. For example:

```
kinit -k -t C:\mykeytabs\myUser.keytab myUser@EXAMPLE.COM
-c C:\ProgramData\MIT\krbcache
```

Krbcache is the Kerberos cache file, not a directory.

To obtain a ticket for a Kerberos principal using the default keytab file:

Note:

For information about configuring a default keytab file for your Kerberos configuration, refer to the MIT Kerberos documentation.

1. Open a command prompt:
 - If you are using Windows 7 or earlier, click **Start** , then click **All Programs**, then click **Accessories**, and then click **Command Prompt**.
 - If you are using Windows 8 or later, click the arrow button at the bottom of the Start screen, then find the Windows System program group, and then click **Command Prompt**.
2. In the Command Prompt, type a command using the following syntax:

```
kinit -k [principal]
```

[principal] is the Kerberos user principal to use for authentication. For example: MyUser@EXAMPLE.COM.

3. If the cache location KRB5CCNAME is not set or used, then use the `-c` option of the `kinit` command to specify the location of the credential cache. In the command, the `-c` argument must appear last. For example:

```
kinit -k -t C:\mykeytabs\myUser.keytab myUser@EXAMPLE.COM
-c C:\ProgramData\MIT\krbcache
```

Krbcache is the Kerberos cache file, not a directory.

Verifying the Driver Version Number on Windows

If you need to verify the version of the Cloudera ODBC Driver for Impala that is installed on your Windows machine, you can find the version number in the ODBC Data Source Administrator.

To verify the driver version number on Windows:

1. Open the ODBC Administrator:
 - If you are using Windows 7 or earlier, click **Start**  > **All Programs** > **Cloudera ODBC Driver for Impala 2.5** > **ODBC Administrator**.

- Or, if you are using Windows 8 or later, on the Start screen, type **ODBC administrator**, and then click the **ODBC Administrator** search result.

Note:

Make sure to select the ODBC Data Source Administrator that has the same bitness as the client application that you are using to connect to Impala.

2. Click the **Drivers** tab and then find the Cloudera ODBC Driver for Impala in the list of ODBC drivers that are installed on your system. The version number is displayed in the **Version** column.

macOS Driver

macOS System Requirements

The Cloudera ODBC Driver for Impala is recommended for Impala versions 1.0.1 through 2.8, and CDH versions 5.0 through 5.10. The driver also supports later minor versions of CDH 5.

Install the driver on client machines where the application is installed. Each machine that you install the driver on must meet the following minimum system requirements:

- macOS version 10.9, 10.10, or 10.11
- 100 MB of available disk space
- iODBC 3.52.7 or later

Installing the Driver on macOS

The Cloudera ODBC Driver for Impala is available for macOS as a .dmg file named `ClouderaImpalaODBC.dmg`. The driver supports both 32- and 64-bit client applications.

To install the Cloudera ODBC Driver for Impala on macOS:

1. Double-click **ClouderaImpalaODBC.dmg** to mount the disk image.
2. Double-click **ClouderaImpalaODBC.pkg** to run the installer.
3. In the installer, click **Continue**.
4. On the Software License Agreement screen, click **Continue**, and when the prompt appears, click **Agree** if you agree to the terms of the License Agreement.
5. Optionally, to change the installation location, click **Change Install Location**, then select the desired location, and then click **Continue**.

Note:

By default, the driver files are installed in the `/opt/cloudera/impalaodbc` directory.

6. To accept the installation location and begin the installation, click **Install**.
7. When the installation completes, click **Close**.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the driver. For more information, see "Configuring the ODBC Driver Manager on Non-Windows Machines" on page 30.

Verifying the Driver Version Number on macOS

If you need to verify the version of the Cloudera ODBC Driver for Impala that is installed on your macOS machine, you can query the version number through the Terminal.

To verify the driver version number on macOS:

- At the Terminal, run the following command:

```
pkgutil --info cloudera.impalaodbc
```

The command returns information about the Cloudera ODBC Driver for Impala that is installed on your machine, including the version number.

Linux Driver

For most Linux distributions, you can install the driver using the RPM file. If you are installing the driver on a Debian machine, you must use the Debian package.

Linux System Requirements

The Cloudera ODBC Driver for Impala is recommended for Impala versions 1.0.1 through 2.8, and CDH versions 5.0 through 5.10. The driver also supports later minor versions of CDH 5.

Install the driver on client machines where the application is installed. Each machine that you install the driver on must meet the following minimum system requirements:

- One of the following distributions:
 - Red Hat® Enterprise Linux® (RHEL) 6 or 7
 - CentOS 6 or 7
 - SUSE Linux Enterprise Server (SLES) 11 or 12
 - Debian 6 or 7
 - Ubuntu 14.04
- 50 MB of available disk space
- One of the following ODBC driver managers installed:
 - iODBC 3.52.7 or later
 - unixODBC 2.3.0 or later
- All of the following `libsasl` libraries installed:
 - `cyrus-sasl-2.1.22-7` or later
 - `cyrus-sasl-gssapi-2.1.22-7` or later
 - `cyrus-sasl-plain-2.1.22-7` or later

Note:

If the package manager in your Linux distribution cannot resolve the dependencies automatically when installing the driver, then download and manually install the packages.

To install the driver, you must have root access on the machine.

Installing the Driver Using the RPM File

On 64-bit editions of Linux, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit drivers, and 32-bit applications must use 32-bit drivers. Make sure to install and use the version of the driver that matches the bitness of the client application:

- `ClouderaImpalaODBC-32bit-[Version]-[Release].i686.rpm` for the 32-bit driver
- `ClouderaImpalaODBC-[Version]-[Release].x86_64.rpm` for the 64-bit driver

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

The placeholders in the file names are defined as follows:

- `[Version]` is the version number of the driver.
- `[Release]` is the release number for this version of the driver.

To install the Cloudera ODBC Driver for Impala using the RPM File:

1. Log in as the root user, and then navigate to the folder containing the RPM package for the driver.
2. Depending on the Linux distribution that you are using, run one of the following commands from the command line, where `[RPMFileName]` is the file name of the RPM package:

- If you are using Red Hat Enterprise Linux or CentOS, run the following command:

```
yum --nogpgcheck localinstall [RPMFileName]
```

- Or, if you are using SUSE Linux Enterprise Server, run the following command:

```
zypper install [RPMFileName]
```

The Cloudera ODBC Driver for Impala files are installed in the `/opt/cloudera/impalaodbc` directory.

Note:

If the package manager in your Linux distribution cannot resolve the `libsasl` dependencies automatically when installing the driver, then download and manually install the packages.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the driver. For more information, see "Configuring the ODBC Driver Manager on Non-Windows Machines" on page 30.

Installing the Driver on Debian

To install the driver on a Debian machine, use the Debian package instead of the RPM file or tarball package.

On 64-bit editions of Debian, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit drivers, and 32-bit applications must use 32-bit drivers. Make sure that you use the version of the driver that matches the bitness of the client application:

- `ClouderaImpalaODBC-32bit-[Version]-[Release]_i386.deb` for the 32-bit driver
- `ClouderaImpalaODBC-[Version]-[Release]_amd64.deb` for the 64-bit driver

[Version] is the version number of the driver, and *[Release]* is the release number for this version of the driver.

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

To install the Cloudera ODBC Driver for Impala on Debian:

1. Log in as the root user, and then navigate to the folder containing the Debian package for the driver.
2. Double-click **ClouderaImpalaODBC-32bit-Version-Release_i386.deb** or **ClouderaImpalaODBC-Version-Release_amd64.deb**.
3. Follow the instructions in the installer to complete the installation process.

The Cloudera ODBC Driver for Impala files are installed in the `/opt/cloudera/impalaodbc` directory.

Note:

If the package manager in your Ubuntu distribution cannot resolve the `libsasl` 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.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the driver. For more information, see "Configuring the ODBC Driver Manager on Non-Windows Machines" on page 30.

Verifying the Driver Version Number on Linux

If you need to verify the version of the Cloudera ODBC Driver for Impala that is installed on your Linux machine, you can query the version number through the command-line interface if the driver was installed using an RPM file or Debian package.

To verify the driver version number on Linux:

- Depending on your package manager, at the command prompt, run one of the following commands:
 - `yum list | grep ClouderaImpalaODBC`
 - `rpm -qa | grep ClouderaImpalaODBC`
 - `dpkg -l | grep ClouderaImpalaODBC`

The command returns information about the Cloudera ODBC Driver for Impala that is installed on your machine, including the version number.

AIX Driver

AIX System Requirements

The Cloudera ODBC Driver for Impala is recommended for Impala versions 1.0.1 through 2.8, and CDH versions 5.0 through 5.10. The driver also supports later minor versions of CDH 5.

Install the driver on client machines where the application is installed. Each machine that you install the driver on must meet the following minimum system requirements:

- IBM AIX 5.3, 6.1, or 7.1
- 150 MB of available disk space
- One of the following ODBC driver managers installed:
 - iODBC 3.52.7 or later
 - unixODBC 2.3.0 or later

To install the driver, you must have root access on the machine.

Installing the Driver on AIX

On 64-bit editions of AIX, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit drivers, and 32-bit applications must use 32-bit drivers. Make sure that you use the version of the driver that matches the bitness of the client application:

- `ClouderaImpalaODBC-32bit-[Version]-[Release].ppc.rpm` for the 32-bit driver
- `ClouderaImpalaODBC-[Version]-[Release].ppc.rpm` for the 64-bit driver

`[Version]` is the version number of the driver, and `[Release]` is the release number for this version of the driver.

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

To install the Cloudera ODBC Driver for Impala on AIX:

1. Log in as the root user, and then navigate to the folder containing the RPM package for the driver.
2. Run the following command from the command line, where `[RPMFileName]` is the file name of the RPM package:

```
rpm --install [RPMFileName]
```

The Cloudera ODBC Driver for Impala files are installed in the `/opt/cloudera/impalaodbc` directory.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the driver. For more information, see "Configuring the ODBC Driver Manager on Non-Windows Machines" on page 30.

Verifying the Driver Version Number on AIX

If you need to verify the version of the Cloudera ODBC Driver for Impala that is installed on your AIX machine, you can query the version number through the command-line interface.

To verify the driver version number on AIX:

- At the command prompt, run the following command:

```
rpm -qa | grep ClouderaImpalaODBC
```

The command returns information about the Cloudera ODBC Driver for Impala that is installed on your machine, including the version number.

Configuring the ODBC Driver Manager on Non-Windows Machines

To make sure that the ODBC driver manager on your machine is configured to work with the Cloudera ODBC Driver for Impala, do the following:

- Set the library path environment variable to make sure that your machine uses the correct ODBC driver manager. For more information, see "Specifying ODBC Driver Managers on Non-Windows Machines" on page 30.
- If the driver configuration files are not stored in the default locations expected by the ODBC driver manager, then set environment variables to make sure that the driver manager locates and uses those files. For more information, see "Specifying the Locations of the Driver Configuration Files" on page 30.

After configuring the ODBC driver manager, you can configure a connection and access your data store through the driver. For more information, see "Configuring ODBC Connections" on page 32.

Specifying ODBC Driver Managers on Non-Windows Machines

You need to make sure that your machine uses the correct ODBC driver manager to load the driver. To do this, set the library path environment variable.

macOS

If you are using a macOS machine, then set the `DYLD_LIBRARY_PATH` environment variable to include the paths to the ODBC driver manager libraries. For example, if the libraries are installed in `/usr/local/lib`, then run the following command to set `DYLD_LIBRARY_PATH` for the current user session:

```
export DYLD_LIBRARY_PATH=$DYLD_LIBRARY_PATH:/usr/local/lib
```

For information about setting an environment variable permanently, refer to the macOS shell documentation.

Linux or AIX

If you are using a Linux or AIX machine, then set the `LD_LIBRARY_PATH` environment variable to include the paths to the ODBC driver manager libraries. For example, if the libraries are installed in `/usr/local/lib`, then run the following command to set `LD_LIBRARY_PATH` for the current user session:

```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib
```

For information about setting an environment variable permanently, refer to the Linux or AIX shell documentation.

Specifying the Locations of the Driver Configuration Files

By default, ODBC driver managers are configured to use hidden versions of the `odbc.ini` and `odbcinst.ini` configuration files (named `.odbc.ini` and `.odbcinst.ini`) located in the home directory, as well as the `cloudera.impalaodbc.ini` file in the `lib` subfolder of the

driver installation directory. If you store these configuration files elsewhere, then you must set the environment variables described below so that the driver manager can locate the files.

If you are using iODBC, do the following:

- Set ODBCINI to the full path and file name of the `odbc.ini` file.
- Set ODBCINSTINI to the full path and file name of the `odbcinst.ini` file.
- Set CLOUDERAIMPALAODBCINI to the full path and file name of the `cloudera.impalaodbc.ini` file.

If you are using unixODBC, do the following:

- Set ODBCINI to the full path and file name of the `odbc.ini` file.
- Set ODBCYSINI to the full path of the directory that contains the `odbcinst.ini` file.
- Set CLOUDERAIMPALAODBCINI to the full path and file name of the `cloudera.impalaodbc.ini` file.

For example, if your `odbc.ini` and `odbcinst.ini` files are located in `/usr/local/odbc` and your `cloudera.impalaodbc.ini` file is located in `/etc`, then set the environment variables as follows:

For iODBC:

```
export ODBCINI=/usr/local/odbc/odbc.ini
export ODBCINSTINI=/usr/local/odbc/odbcinst.ini
export CLOUDERAIMPALAODBCINI=/etc/cloudera.impalaodbc.ini
```

For unixODBC:

```
export ODBCINI=/usr/local/odbc/odbc.ini
export ODBCYSINI=/usr/local/odbc
export CLOUDERAIMPALAODBCINI=/etc/cloudera.impalaodbc.ini
```

To locate the `cloudera.impalaodbc.ini` file, the driver uses the following search order:

1. If the CLOUDERAIMPALAODBCINI environment variable is defined, then the driver searches for the file specified by the environment variable.
2. The driver searches the directory that contains the driver library files for a file named `cloudera.impalaodbc.ini`.
3. The driver searches the current working directory of the application for a file named `cloudera.impalaodbc.ini`.
4. The driver searches the home directory for a hidden file named `.cloudera.impalaodbc.ini` (prefixed with a period).
5. The driver searches the `/etc` directory for a file named `cloudera.impalaodbc.ini`.

Configuring ODBC Connections

The following sections describe how to configure ODBC connections when using the Cloudera ODBC Driver for Impala on non-Windows platforms:

- "Creating a Data Source Name on a Non-Windows Machine" on page 32
- "Configuring a DSN-less Connection on a Non-Windows Machine" on page 34
- "Configuring Authentication on a Non-Windows Machine" on page 36
- "Configuring SSL Verification on a Non-Windows Machine" on page 39
- "Configuring Server-Side Properties on a Non-Windows Machine" on page 40
- "Configuring Logging Options" on page 41
- "Testing the Connection" on page 42

Creating a Data Source Name on a Non-Windows Machine

When connecting to your data store using a DSN, you only need to configure the `odbc.ini` file. Set the properties in the `odbc.ini` file to create a DSN that specifies the connection information for your data store. For information about configuring a DSN-less connection instead, see "Configuring a DSN-less Connection on a Non-Windows Machine" on page 34.

If your machine is already configured to use an existing `odbc.ini` file, then update that file by adding the settings described below. Otherwise, copy the `odbc.ini` file from the `Setup` subfolder in the driver installation directory to the home directory, and then update the file as described below.

To create a Data Source Name on a non-Windows machine:

1. In a text editor, open the `odbc.ini` configuration file.

Note:

If you are using a hidden copy of the `odbc.ini` file, you can remove the period (.) from the start of the file name to make the file visible while you are editing it.

2. In the `[ODBC Data Sources]` section, add a new entry by typing a name for the DSN, an equal sign (=), and then the name of the driver.

For example, on a macOS machine:

```
[ODBC Data Sources]
Sample DSN=Cloudera ODBC Driver for Impala
```

As another example, for a 32-bit driver on a Linux/AIX/Debian machine:

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

3. Create a section that has the same name as your DSN, and then specify configuration options as key-value pairs in the section:

- a. Set the `Driver` property to the full path of the driver library file that matches the bitness of the application.

For example, on a macOS machine:

```
Driver=/opt/cloudera/impalaodbc/lib/universal/libclouderaimpalaodbc.dylib
```

As another example, for a 32-bit driver on a Linux/AIX/Debian machine:

```
Driver=/opt/cloudera/impalaodbc/lib/32/libclouderaimpalaodbc32.so
```

- b. Set the `Host` property to the IP address or host name of the server.

For example:

```
Host=192.168.222.160
```

- c. Set the `Port` property to the number of the TCP port that the server uses to listen for client connections.

For example:

```
Port=21050
```

- d. If authentication is required to access the server, then specify the authentication mechanism and your credentials. For more information, see "Configuring Authentication on a Non-Windows Machine" on page 36.
- e. If you want to connect to the server through SSL, then enable SSL and specify the certificate information. For more information, see "Configuring SSL Verification on a Non-Windows Machine" on page 39.
- f. If you want to configure server-side properties, then set them as key-value pairs using a special syntax. For more information, see "Configuring Server-Side Properties on a Non-Windows Machine" on page 40.
- g. Optionally, set additional key-value pairs as needed to specify other optional connection settings. For detailed information about all the configuration options supported by the Cloudera ODBC Driver for Impala, see "Driver Configuration Options" on page 52.

4. Save the `odbc.ini` configuration file.

Note:

If you are storing this file in its default location in the home directory, then prefix the file name with a period (`.`) so that the file becomes hidden. If you are storing this file in another location, then save it as a non-hidden file (without the prefix), and make sure that the `ODBCINI` environment variable specifies the location. For more information, see "Specifying the Locations of the Driver Configuration Files" on page 30.

For example, the following is an `odbc.ini` configuration file for macOS containing a DSN that connects to an Impala server that does not require authentication:

```
[ODBC Data Sources]
Sample DSN=Cloudera ODBC Driver for Impala
[Sample DSN]
Driver=/opt/cloudera/impalaodbc/lib/universal/libclouderaimpalaodbc.dylib
Host=192.168.222.160
Port=21050
```

As another example, the following is an `odbc.ini` configuration file for a 32-bit driver on a Linux/AIX/Debian machine, containing a DSN that connects to an Impala server that does not require authentication:

```
[ODBC Data Sources]
Sample DSN=Cloudera ODBC Driver for Impala 32-bit
[Sample DSN]
Driver=/opt/cloudera/impalaodbc/lib/32/libclouderaimpalaodbc32.so
Host=192.168.222.160
Port=21050
```

You can now use the DSN in an application to connect to the data store.

Configuring a DSN-less Connection on a Non-Windows Machine

To connect to your data store through a DSN-less connection, you need to define the driver in the `odbcinst.ini` file and then provide a DSN-less connection string in your application.

If your machine is already configured to use an existing `odbcinst.ini` file, then update that file by adding the settings described below. Otherwise, copy the `odbcinst.ini` file from the `Setup` subfolder in the driver installation directory to the home directory, and then update the file as described below.

To define a driver on a non-Windows machine:

1. In a text editor, open the `odbcinst.ini` configuration file.

Note:

If you are using a hidden copy of the `odbcinst.ini` file, you can remove the period (.) from the start of the file name to make the file visible while you are editing it.

2. In the `[ODBC Drivers]` section, add a new entry by typing a name for the driver, an equal sign (=), and then `Installed`.

For example:

```
[ODBC Drivers]
Cloudera ODBC Driver for Impala=Installed
```

3. Create a section that has the same name as the driver (as specified in the previous step), and then specify the following configuration options as key-value pairs in the section:

- a. Set the `Driver` property to the full path of the driver library file that matches the bitness of the application.

For example, on a macOS machine:

```
Driver=/opt
/cloudera/impalaodbc/lib/universal/libclouderaimpalaodbc.dylib
```

As another example, for a 32-bit driver on a Linux/AIX/Debian machine:

```
Driver=/opt/cloudera/impalaodbc/lib/32/libclouderaimpalaodbc32.so
```

- b. Optionally, set the `Description` property to a description of the driver.

For example:

```
Description=Cloudera ODBC Driver for Impala
```

4. Save the `odbcinst.ini` configuration file.

Note:

If you are storing this file in its default location in the home directory, then prefix the file name with a period (.) so that the file becomes hidden. If you are storing this file in another location, then save it as a non-hidden file (without the prefix), and make sure that the `ODBCINSTINI` or `ODBCSYSINI` environment variable specifies the location. For more information, see "Specifying the Locations of the Driver Configuration Files" on page 30.

For example, the following is an `odbcinst.ini` configuration file for macOS:

```
[ODBC Drivers]
Cloudera ODBC Driver for Impala=Installed
[Cloudera ODBC Driver for Impala]
Description=Cloudera ODBC Driver for Impala
Driver=/opt/cloudera/impalaodbc/lib/universal/libclouderaimpalaodbc.dylib
```

As another example, the following is an `odbcinst.ini` configuration file for both the 32- and 64-bit drivers on Linux/AIX/Debian:

```
[ODBC Drivers]
Cloudera ODBC Driver for Impala 32-bit=Installed
Cloudera ODBC Driver for Impala 64-bit=Installed
[Cloudera ODBC Driver for Impala 32-bit]
Description=Cloudera ODBC Driver for Impala (32-bit)
Driver=/opt/cloudera/impalaodbc/lib/32/libclouderaimpalaodbc32.so
[Cloudera ODBC Driver for Impala 64-bit]
Description=Cloudera ODBC Driver for Impala (64-bit)
```

```
Driver=/opt/cloudera/impalaodbc/lib/64/libclouderaimpalaodbc64.so
```

You can now connect to your data store by providing your application with a connection string where the `Driver` property is set to the driver name specified in the `odbcinst.ini` file, and all the other necessary connection properties are also set. For more information, see "DSN-less Connection String Examples" in "Using a Connection String" on page 45.

For instructions about configuring specific connection features, see the following:

- "Configuring Authentication on a Non-Windows Machine" on page 36
- "Configuring SSL Verification on a Non-Windows Machine" on page 39
- "Configuring Server-Side Properties on a Non-Windows Machine" on page 40

For detailed information about all the connection properties that the driver supports, see "Driver Configuration Options" on page 52.

Configuring Authentication on a Non-Windows Machine

The Impala server supports multiple authentication mechanisms. You must determine the authentication type your server is using and configure your DSN accordingly. The available authentication methods are as follows:

- "Using No Authentication" on page 36
- "Using Kerberos" on page 37
- "Using Advanced Kerberos" on page 37
- "Using SASL User Name" on page 39
- "Using User Name And Password" on page 39

You can set the connection properties for authentication in a connection string or in a DSN (in the `odbc.ini` file). Settings in the connection string take precedence over settings in the DSN.

Note:

In addition to authentication, you can configure the driver to connect over the Secure Sockets Layer (SSL). For more information, see "Configuring SSL Verification on a Non-Windows Machine" on page 39.

Using No Authentication

For this authentication mechanism, you do not need to configure any additional settings.

Note:

The default configuration of Impala requires the Cloudera ODBC Driver for Impala to be configured to use the No Authentication mechanism.

To configure a connection without authentication:

- Set the `AuthMech` connection attribute to 0.

Using Kerberos

Kerberos must be installed and configured before you can use this authentication mechanism. For more information, refer to the MIT Kerberos Documentation: <http://web.mit.edu/kerberos/krb5-latest/doc/>.

To configure Kerberos authentication:

1. Set the `AuthMech` connection attribute to 1.
2. Choose one:
 - To use the default realm defined in your Kerberos setup, do not set the `KrbRealm` attribute.
 - Or, if your Kerberos setup does not define a default realm or if the realm of your Impala server is not the default, then set the appropriate realm using the `KrbRealm` attribute.
3. Set the `KrbFQDN` attribute to the fully qualified domain name of the Impala server host.

Note:

To use the Impala server host name as the fully qualified domain name for Kerberos authentication, set `KrbFQDN` to `_HOST`.

4. Set the `KrbServiceName` attribute to the service name of the Impala server.
5. Optionally, set the `TSaslTransportBufSize` attribute to the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

Using Advanced Kerberos

This authentication mechanism allows concurrent connections within the same process to use different Kerberos user principals.

When you use Advanced Kerberos authentication, you do not need to run the `kinit` command to obtain a Kerberos ticket. Instead, you use a JSON file to map your Impala user name to a Kerberos user principal name and a keytab that contains the corresponding keys. The driver obtains Kerberos tickets based on the specified mapping. As a fallback, you can specify a keytab that the driver uses by default if the mapping file is not available or if no matching keytab can be found in the mapping file.

Note:

- For information about the schema of the mapping file and how the driver handles invalid mappings, see "UPN Keytab Mapping File" on page 64.
- For information about how the driver searches for a keytab file if the keytab mapping and default keytab file are invalid, see "Default Keytab File" on page 56.

To configure Advanced Kerberos authentication:

1. Set the `AuthMech` connection attribute to 1.
2. Choose one:
 - To use the default realm defined in your Kerberos setup, do not set the `KrbRealm` attribute.
 - Or, if your Kerberos setup does not define a default realm or if the realm of your Impala server is not the default, then set the appropriate realm using the `KrbRealm` attribute.
3. Optionally, if you are using MIT Kerberos and a Kerberos realm is specified using the `KrbRealm` connection attribute, then choose one:
 - To have the Kerberos layer canonicalize the server's service principal name, leave the `ServicePrincipalCanonicalization` attribute set to 1.
 - Or, to prevent the Kerberos layer from canonicalizing the server's service principal name, set the `ServicePrincipalCanonicalization` attribute to 0.
4. Set the `KrbFQDN` attribute to the fully qualified domain name of the Impala server host.

Note:

To use the Impala server host name as the fully qualified domain name for Kerberos authentication, set `KrbFQDN` to `_HOST`.

5. Set the `KrbServiceName` attribute to the service name of the Impala server.
6. Set the `UseKeytab` attribute to 1.
7. Set the `UID` attribute to an appropriate user name for accessing the Impala server.
8. Set the `UPNKeytabMappingFile` attribute to the full path to a JSON file that maps your Impala user name to a Kerberos user principal name and a keytab file.
9. Set the `DefaultKeytabFile` attribute to the full path to a keytab file that the driver can use if the mapping file is not available or if no matching keytab can be found in the mapping file.
10. If the Impala server is configured to use SSL, then configure SSL for the connection. For more information, see "Configuring SSL Verification on a Non-Windows Machine" on page 39.
11. Optionally, set the `TSaslTransportBufSize` attribute to the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

Using SASL User Name

This authentication mechanism requires a user name but does not require a password. The user name labels the session, facilitating database tracking.

To configure SASL User Name authentication:

1. Set the `AuthMech` connection attribute to 2.
2. Set the `UID` attribute to an appropriate user name for accessing the Impala server.
3. Optionally, set the `TSaslTransportBufSize` attribute to the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

Using User Name And Password

This authentication mechanism requires a user name and a password.

Note:

This authentication mechanism should not be used with an Impala configuration that does not have LDAP enabled.

To configure User Name And Password authentication:

1. Set the `AuthMech` connection attribute to 3.
2. Set the `UID` attribute to an appropriate user name for accessing the Impala server.
3. Set the `PWD` attribute to the password corresponding to the user name you provided above.
4. Optionally, set the `TSaslTransportBufSize` attribute to the number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

5. Optionally, to use SASL to handle authentication, set the `UseSASL` attribute to 1.

Configuring SSL Verification on a Non-Windows Machine

If you are connecting to an Impala server that has Secure Sockets Layer (SSL) enabled, you can configure the driver to connect to an SSL-enabled socket. When using SSL to connect to a server,

the driver can be configured to verify the identity of the server.

You can set the connection properties described below in a connection string or in a DSN (in the `odbc.ini` file). Settings in the connection string take precedence over settings in the DSN.

To configure SSL verification on a non-Windows machine:

1. To enable SSL connections, set the `SSL` attribute to 1.
2. To allow self-signed certificates from the server, set the `AllowSelfSignedServerCert` attribute to 1.
3. To allow the common name of a CA-issued SSL certificate to not match the host name of the Impala server, set the `CAIssuedCertNamesMismatch` attribute to 1.
4. Choose one:
 - To configure the driver to load SSL certificates from a specific `.pem` file when verifying the server, set the `TrustedCerts` attribute to the full path of the `.pem` file.
 - Or, to use the trusted CA certificates `.pem` file that is installed with the driver, do not specify a value for the `TrustedCerts` attribute.

Configuring Server-Side Properties on a Non-Windows Machine

When connecting to a server that is running Impala 2.0 or later, you can use the driver to apply configuration properties to the Impala server.

You can set the connection properties described below in a connection string or in a DSN (in the `odbc.ini` file). Settings in the connection string take precedence over settings in the DSN.

Important:

This feature is not supported for earlier versions of Impala, where the SET statement can only be executed from within the Impala shell.

To configure server-side properties on a non-Windows machine:

1. To set a server-side property, use the syntax `SSP_[SSPKey]=[SSPValue]`, where `[SSPKey]` is the name of the server-side property and `[SSPValue]` is the value to specify for that property. For example, to set the `MEM_LIMIT` query option to 1 GB and the `REQUEST_POOL` query option to `myPool`, type the following in the `odbc.ini` file:

```
SSP_MEM_LIMIT=1000000000
SSP_REQUEST_POOL=myPool
```

Or, to set those properties in a connection string, type the following:

```
SSP_MEM_LIMIT={1000000000};SSP_REQUEST_POOL={myPool}
```

Note:

When setting a server-side property in a connection string, it is recommended that you enclose the value in braces ({ }) to make sure that special characters can be properly escaped.

- To disable the driver's default behavior of converting server-side property key names to all lower-case characters, set the `LCaseSspKeyName` property to 0.

Configuring Logging Options

To help troubleshoot issues, you can enable logging in the driver.

Important:

Only enable logging long enough to capture an issue. Logging decreases performance and can consume a large quantity of disk space.

Logging is configured through driver-wide settings in the `cloudera.impalaodbc.ini` file, which apply to all connections that use the driver.

To enable logging:

- Open the `cloudera.impalaodbc.ini` configuration file in a text editor.
- To specify the level of information to include in log files, set the `LogLevel` property to one of the following numbers:

LogLevel Value	Description
0	Disables all logging.
1	Logs severe error events that lead the driver to abort.
2	Logs error events that might allow the driver to continue running.
3	Logs events that might result in an error if action is not taken.
4	Logs general information that describes the progress of the driver.
5	Logs detailed information that is useful for debugging the driver.
6	Logs all driver activity.

- Set the `LogPath` key to the full path to the folder where you want to save log files.
- Set the `LogFileCount` key to the maximum number of log files to keep.

Note:

After the maximum number of log files is reached, each time an additional file is created, the driver deletes the oldest log file.

5. Set the `LogFileSize` key to the maximum size of each log file in megabytes (MB).

Note:

After the maximum file size is reached, the driver creates a new file and continues logging.

6. Save the `cloudera.impalaodbc.ini` configuration file.
7. Restart your ODBC application to make sure that the new settings take effect.

The Cloudera ODBC Driver for Impala produces a log file named `ImpalaODBC_driver.log` at the location you specify using the `LogPath` key.

To disable logging:

1. Open the `cloudera.impalaodbc.ini` configuration file in a text editor.
2. Set the `LogLevel` key to 0.
3. Save the `cloudera.impalaodbc.ini` configuration file.
4. Restart your ODBC application to make sure that the new settings take effect.

Testing the Connection

To test the connection, you can use an ODBC-enabled client application. For a basic connection test, you can also use the test utilities that are packaged with your driver manager installation. For example, the iODBC driver manager includes simple utilities called `iodbctest` and `iodbctestw`. Similarly, the unixODBC driver manager includes simple utilities called `isql` and `iusql`.

Using the iODBC Driver Manager

You can use the `iodbctest` and `iodbctestw` utilities to establish a test connection with your driver. Use `iodbctest` to test how your driver works with an ANSI application, or use `iodbctestw` to test how your driver works with a Unicode application.

Note:

There are 32-bit and 64-bit installations of the iODBC driver manager available. If you have only one or the other installed, then the appropriate version of `iodbctest` (or `iodbctestw`) is available. However, if you have both 32- and 64-bit versions installed, then you need to make sure that you are running the version from the correct installation directory.

For more information about using the iODBC driver manager, see <http://www.iodbc.org>.

To test your connection using the iODBC driver manager:

1. Run **iodbctest** or **iodbctestw**.
2. Optionally, if you do not remember the DSN, then type a question mark (?) to see a list of available DSNs.
3. Type the connection string for connecting to your data store, and then press ENTER. For more information, see .

If the connection is successful, then the `SQL>` prompt appears.

Using the unixODBC Driver Manager

You can use the `isql` and `iusql` utilities to establish a test connection with your driver and your DSN. `isql` and `iusql` can only be used to test connections that use a DSN. Use `isql` to test how your driver works with an ANSI application, or use `iusql` to test how your driver works with a Unicode application.

Note:

There are 32-bit and 64-bit installations of the unixODBC driver manager available. If you have only one or the other installed, then the appropriate version of `isql` (or `iusql`) is available. However, if you have both 32- and 64-bit versions installed, then you need to make sure that you are running the version from the correct installation directory.

For more information about using the unixODBC driver manager, see <http://www.unixodbc.org>.

To test your connection using the unixODBC driver manager:

- Run `isql` or `iusql` by using the corresponding syntax:
 - `isql [DataSourceName]`
 - `iusql [DataSourceName]`

`[DataSourceName]` is the DSN that you are using for the connection.

If the connection is successful, then the `SQL>` prompt appears.

Note:

For information about the available options, run `isql` or `iusql` without providing a DSN.

Authentication Options

Impala supports multiple authentication mechanisms. You must determine the authentication type that your server is using. The authentication methods available in the Cloudera ODBC Driver for Impala are as follows:

- No Authentication
- Kerberos
- SASL User Name
- User Name And Password

Note:

- The default configuration of Impala requires the Cloudera ODBC Driver for Impala to be configured to use the No Authentication mechanism.
- In addition to regular Kerberos authentication, the driver also supports an advanced configuration of Kerberos authentication that allows concurrent connections within the same process to use different Kerberos user principals.

In addition to authentication, you can configure the driver to connect over SSL or use SASL to handle authentication.

The Impala server uses SASL (Simple Authentication and Security Layer) to support some of the authentication methods. Kerberos is supported with the SASL GSSAPI mechanism. SASL User Name and User Name And Password (with SASL enabled) are supported with the SASL PLAIN mechanism.

SASL mechanisms	Non-SASL mechanisms
<ul style="list-style-type: none"> • Kerberos • SASL User Name • User Name And Password (with SASL enabled) 	<ul style="list-style-type: none"> • No Authentication • User Name And Password (without SASL enabled)

Note:

Thrift (the layer for handling remote process communication between the Cloudera ODBC Driver for Impala and the Impala server) has a limitation where it cannot detect a mix of non-SASL and SASL mechanisms being used between the driver and the server. If this happens, the driver will appear to hang during connection establishment.

Using a Connection String

For some applications, you might need to use a connection string to connect to your data source. For detailed information about how to use a connection string in an ODBC application, refer to the documentation for the application that you are using.

The connection strings in the following sections are examples showing the minimum set of connection attributes that you must specify to successfully connect to the data source. Depending on the configuration of the data source and the type of connection you are working with, you might need to specify additional connection attributes. For detailed information about all the attributes that you can use in the connection string, see "Driver Configuration Options" on page 52.

DSN Connection String Example

The following is an example of a connection string for a connection that uses a DSN:

```
DSN=[DataSourceName]
```

[DataSourceName] is the DSN that you are using for the connection.

You can set additional configuration options by appending key-value pairs to the connection string. Configuration options that are passed in using a connection string take precedence over configuration options that are set in the DSN.

DSN-less Connection String Examples

Some applications provide support for connecting to a data source using a driver without a DSN. To connect to a data source without using a DSN, use a connection string instead.

The placeholders in the examples are defined as follows, in alphabetical order:

- *[DomainName]* is the fully qualified domain name of the Impala server host.
- *[MappingFile]* is the full path to a JSON file that maps your Impala user name to a Kerberos user principal name and a keytab file.
- *[PortNumber]* is the number of the TCP port that the Impala server uses to listen for client connections.
- *[Realm]* is the Kerberos realm of the Impala server host.
- *[Server]* is the IP address or host name of the Impala server to which you are connecting.
- *[ServiceName]* is the Kerberos service principal name of the Impala server.
- *[YourPassword]* is the password corresponding to your user name.
- *[YourUserName]* is the user name that you use to access the Impala server.

Connecting to an Impala Server Without Authentication

The following is the format of a DSN-less connection string that connects to an Impala server that does not require authentication:

```
Driver=Cloudera ODBC Driver for Impala;Host=[Server];
```

```
Port=[PortNumber];
```

For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;  
Port=21050;
```

If you are connecting to the server through SSL, then set the SSL property to 1. For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;  
Port=21050;SSL=1;
```

Connecting to an Impala Server that Requires Kerberos Authentication

The following is the format of a DSN-less connection string that connects to an Impala server requiring Kerberos authentication:

```
Driver=Cloudera ODBC Driver for Impala;Host=[Server];  
Port=[PortNumber];AuthMech=1;KrbRealm=[Realm];  
KrbFQDN=[DomainName];KrbServiceName=[ServiceName];
```

For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;  
Port=21050;AuthMech=1;KrbRealm=CLOUDERA;  
KrbFQDN=localhost.localdomain;KrbServiceName=impala;
```

If you are connecting to the server through SSL, then set the SSL property to 1. For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;  
Port=21050;AuthMech=1;KrbRealm=CLOUDERA;  
KrbFQDN=localhost.localdomain;KrbServiceName=impala;SSL=1;
```

Connecting to an Impala Server using Advanced Kerberos Authentication

The following is the format of a DSN-less connection string that connects to an Impala server using Advanced Kerberos authentication:

```
Driver=Cloudera ODBC Driver for Impala;Host=[Server];  
Port=[PortNumber];AuthMech=1;KrbRealm=[Realm];  
KrbFQDN=[DomainName];KrbServiceName=[ServiceName];  
UseKeytab=1;UID=[YourUserName];  
UPNKeytabMappingFile=[MappingFile];
```

For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;  
Port=21050;AuthMech=1;KrbRealm=CLOUDERA;  
KrbFQDN=localhost.localdomain;KrbServiceName=impala;  
UseKeytab=1;UID=cloudera;  
UPNKeytabMappingFile=C:\Temp\cloudera.keytab;
```

If you are connecting to the server through SSL, then set the SSL property to 1. For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;
Port=21050;AuthMech=1;KrbRealm=CLOUDERA;
KrbFQDN=localhost.localdomain;KrbServiceName=impala;
UseKeytab=1;UID=cloudera;
UPNKeytabMappingFile=C:\Temp\cloudera.keytab;SSL=1;
```

Connecting to an Impala Server that Requires User Name Authentication

The following is the format of a DSN-less connection string that connects to an Impala server requiring User Name authentication. By default, the driver uses **anonymous** as the user name.

```
Driver=Cloudera ODBC Driver for Impala;Host=[Server];
Port=[PortNumber];AuthMech=2;
```

For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;
Port=21050;AuthMech=2;
```

If you are connecting to the server through SSL, then set the SSL property to 1. For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;
Port=21050;AuthMech=2;SSL=1;
```

Connecting to an Impala Server with LDAP Authentication or other User Name and Password Authentication Enabled

The following is the format of a DSN-less connection string that connects to an Impala server with LDAP authentication, or another form of username/password authentication, enabled:

```
Driver=Cloudera ODBC Driver for Impala;Host=[Server];
Port=[PortNumber];AuthMech=3;UID=[UserName];
PWD=[Password];
```

For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;
Port=21050;AuthMech=3;UID=cloudera;PWD=cloudera;
```

If you are connecting to the LDAP-enabled server through SSL, then set the SSL property to 1. For example:

```
Driver=Cloudera ODBC Driver for Impala;Host=192.168.222.160;
Port=21050;AuthMech=3;UID=cloudera;PWD=cloudera;SSL=1;
```

Features

For more information on the features of the Cloudera ODBC Driver for Impala, see the following:

- "Data Types" on page 48
- "Catalog and Schema Support" on page 49
- "SQL Translation" on page 49
- "Server-Side Properties" on page 50
- "Active Directory" on page 50
- "Write-back" on page 50
- "Security and Authentication" on page 50

Data Types

The Cloudera ODBC Driver for Impala supports many common data formats, converting between Impala data types and SQL data types.

The table below lists the supported data type mappings.

Impala Type	SQL Type
ARRAY	SQL_VARCHAR
BIGINT	SQL_BIGINT
BINARY	SQL_VARBINARY
BOOLEAN	SQL_BOOLEAN
CHAR	SQL_CHAR
<p>Note: Only available in CDH 5.2 or later.</p>	<p>Note: SQL_WCHAR is returned instead if the Use SQL Unicode Types configuration option (the UseUnicodeSqlCharacterTypes key) is enabled.</p>
DATE	SQL_DATE
DECIMAL	SQL_DECIMAL
<p>Note: Only available in CDH 5.2 or later.</p>	

Impala Type	SQL Type
DOUBLE Note: REAL is an alias for DOUBLE.	SQL_DOUBLE
FLOAT	SQL_REAL
INT	SQL_INTEGER
MAP	SQL_VARCHAR
SMALLINT	SQL_SMALLINT
STRUCT	SQL_VARCHAR
TIMESTAMP	SQL_TIMESTAMP
TINYINT	SQL_TINYINT
VARCHAR Note: Only available in CDH 5.2 or later.	SQL_VARCHAR Note: SQL_WVARCHAR is returned instead if the Use SQL Unicode Types configuration option (the UseUnicodeSqlCharacterTypes key) is enabled.

Catalog and Schema Support

The Cloudera ODBC Driver for Impala supports both catalogs and schemas to make it easy for the driver to work with various ODBC applications. Since Impala only organizes tables into schemas/databases, the driver provides a synthetic catalog named IMPALA under which all of the schemas/databases are organized. The driver also maps the ODBC schema to the Impala schema/database.

SQL Translation

The Cloudera ODBC Driver for Impala can parse queries locally before sending them to the Impala server. This feature allows the driver to calculate query metadata without executing the query, support query parameters, and support extra SQL features such as ODBC escape sequences and additional scalar functions that are not available in the Impala-shell tool.

Note:

The driver does not support translation for queries that reference a field contained in a nested column (an ARRAY, MAP, or STRUCT column). To retrieve data from a nested column, make sure that the query is written in valid Impala SQL syntax.

Server-Side Properties

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

For more information about setting server-side properties when using the Windows driver, see "Configuring Server-Side Properties on Windows" on page 15. For information about setting server-side properties when using the driver on a non-Windows platform, see "Configuring Server-Side Properties on a Non-Windows Machine" on page 40.

Active Directory

The Cloudera ODBC Driver for Impala supports Active Directory Kerberos on Windows. There are two prerequisites for using Active Directory Kerberos on Windows:

- MIT Kerberos is not installed on the client Windows machine.
- The MIT Kerberos Hadoop realm has been configured to trust the Active Directory realm, according to Cloudera's documentation, so that users in the Active Directory realm can access services in the MIT Kerberos Hadoop realm.

Write-back

The Cloudera ODBC Driver for Impala supports translation for the following syntax:

- INSERT
- CREATE
- DROP

The driver also supports translation for UPDATE and DELETE syntax, but only when querying Kudu tables while connected to an Impala server that is running Impala 2.7 or later.

If the statement contains non-standard SQL-92 syntax, then the driver is unable to translate the statement to SQL and instead falls back to using Impala SQL.

Security and Authentication

To protect data from unauthorized access, some Impala data stores require connections to be authenticated with user credentials or the SSL protocol. The Cloudera ODBC Driver for Impala provides full support for these authentication protocols.

Note:

In this documentation, "SSL" refers to both TLS (Transport Layer Security) and SSL (Secure Sockets Layer). The driver supports TLS 1.0, 1.1, and 1.2. The SSL version used for the connection is the highest version that is supported by both the driver and the server.

The driver provides mechanisms that enable you to authenticate your connection using the Kerberos protocol, your Impala user name only, or your Impala user name and password. You must use the authentication mechanism that matches the security requirements of the Impala server. For information about determining the appropriate authentication mechanism to use based on the Impala server configuration, see "Authentication Options" on page 44. For detailed driver configuration instructions, see "Configuring Authentication on Windows" on page 9 or "Configuring Authentication on a Non-Windows Machine" on page 36.

Additionally, the driver supports SSL connections with or without one-way authentication. If the server has an SSL-enabled socket, then you can configure the driver to connect to it.

It is recommended that you enable SSL whenever you connect to a server that is configured to support it. SSL encryption protects data and credentials when they are transferred over the network, and provides stronger security than authentication alone. For detailed configuration instructions, see "Configuring SSL Verification on Windows" on page 13 or "Configuring SSL Verification on a Non-Windows Machine" on page 39.

Driver Configuration Options

Driver Configuration Options lists the configuration options available in the Cloudera ODBC Driver for Impala alphabetically by field or button label. Options having only key names, that is, not appearing in the user interface of the driver, are listed alphabetically by key name.

When creating or configuring a connection from a Windows machine, the fields and buttons are available in the following dialog boxes:

- Cloudera ODBC Driver for Impala DSN Setup
- Advanced Options
- Keytab Options
- Server Side Properties
- SSL Options

When using a connection string or configuring a connection from a Linux/macOS/AIX/Debian machine, use the key names provided.

Configuration Options Appearing in the User Interface

The following configuration options are accessible via the Windows user interface for the Cloudera ODBC Driver for Impala, or via the key name when using a connection string or configuring a connection from a Linux/macOS/AIX/Debian machine:

- "Allow Common Name Host Name Mismatch" on page 53
- "Allow Self-Signed Server Certificate" on page 53
- "Async Exec Poll Interval" on page 54
- "Canonicalize Principal FQDN" on page 54
- "Check Certificate Revocation" on page 54
- "Convert Key Name to Lower Case" on page 55
- "Database" on page 55
- "Default Keytab File" on page 56
- "Delegation UID" on page 56
- "Enable Auto Reconnect" on page 56
- "Enable Simulated Transactions" on page 57
- "Enable SSL" on page 57
- "Host" on page 57
- "Password" on page 60
- "Port" on page 60
- "Realm" on page 61
- "Restrict Metadata with Current Schema" on page 61
- "Rows Fetched Per Block" on page 61
- "Save Password (Encrypted)" on page 62
- "Service Name" on page 62
- "Socket Timeout" on page 62
- "String Column Length" on page 62
- "Transport Buffer Size" on page 63
- "Trusted Certificates" on page 63
- "UPN Keytab Mapping File" on page 64
- "Use Keytab" on page 65
- "Use Native Query" on page 65
- "Use Only SSPI" on page 66
- "Use Simple Authentication and

- "Host FQDN" on page 58
- "Log Level" on page 58
- "Log Path" on page 59
- "Mechanism" on page 60
- "Security Layer (SASL)" on page 66
- "Use SQL Unicode Types" on page 67
- "Use System Trust Store" on page 67
- "User Name" on page 67

Allow Common Name Host Name Mismatch

Key Name	Default Value	Required
AllowHostNameCNMismatch	Clear (0)	No

Description

This option specifies whether a CA-issued SSL certificate name must match the host name of the Impala server.

Note:

The key for this option used to be `CAIssuedCertNamesMismatch`, and will still be recognized by the driver under that key. If both keys are defined in the Windows registry or `.ini` file, `AllowHostNameCNMismatch` will take precedence.

- Enabled (1): The driver allows a CA-issued SSL certificate name to not match the host name of the Impala server.
- Disabled (0): The CA-issued SSL certificate name must match the host name of the Impala server.

Note:

This setting is applicable only when SSL is enabled.

Allow Self-Signed Server Certificate

Key Name	Default Value	Required
AllowSelfSignedServerCert	Clear (0)	No

Description

This option specifies whether the driver allows self-signed certificates from the server.

- Enabled (1): The driver authenticates the Impala server even if the server is using a self-signed certificate.
- Disabled (0): The driver does not allow self-signed certificates from the server.

Note:

This setting is applicable only when SSL is enabled.

Async Exec Poll Interval

Key Name	Default Value	Required
AsyncExecPollInterval	10	No

Description

The time in milliseconds between each poll for the query execution status.

"Asynchronous execution" refers to the fact that the RPC call used to execute a query against Impala is asynchronous. It does not mean that ODBC asynchronous operations are supported.

Canonicalize Principal FQDN

Key Name	Default Value	Required
ServicePrincipalCanonicalization	Selected (1)	No

Description

This option specifies whether the Kerberos layer canonicalizes the host FQDN in the server's service principal name.

- Enabled (1): The Kerberos layer canonicalizes the host FQDN in the server's service principal name.
- Disabled (0): The Kerberos layer does not canonicalize the host FQDN in the server's service principal name.

Note:

- This option only affects MIT Kerberos, and is ignored when using Active Directory Kerberos.
- This option can only be disabled if the Kerberos Realm or `KrbRealm` key is specified.

Check Certificate Revocation

Key Name	Default Value	Required
CheckCertRevocation	Clear (0)	No

Description

This option specifies whether the driver checks to see if a certificate has been revoked while retrieving a certificate chain from the Windows Trust Store.

This option is only applicable if you are using a CA certificate from the Windows Trust Store (see "Use System Trust Store" on page 67).

- Enabled (1): The driver checks for certificate revocation while retrieving a certificate chain from the Windows Trust Store.
- Disabled (0): The driver does not check for certificate revocation while retrieving a certificate chain from the Windows Trust Store.

Note:

This option is only available on Windows.

Convert Key Name to Lower Case

Key Name	Default Value	Required
LCaseSspKeyName	Selected (1)	No

Description

This option specifies whether the driver converts server-side property key names to all lower-case characters.

- Enabled (1): The driver converts server-side property key names to all lower-case characters.
- Disabled (0): The driver does not modify the server-side property key names.

Database

Key Name	Default Value	Required
Schema	default	No

Description

The name of the database schema to use when a schema is not explicitly specified in a query. You can still issue queries on other schemas by explicitly specifying the schema in the query.

Note:

To inspect your databases and determine the appropriate schema to use, at the Impala command prompt, type `show databases`.

Default Keytab File

Key Name	Default Value	Required
DefaultKeytabFile	None	No

Description

The full path to the keytab file that the driver uses to obtain the ticket for Kerberos authentication.

Note:

- This option is applicable only when the authentication mechanism is set to Kerberos (AuthMech=1) and the Use Keytab option is enabled (UseKeytab=1).
- If the UPN Keytab Mapping File option (the UPNKeytabMappingFile key) is set to a JSON file with a valid mapping to a keytab, then that keytab takes precedence.

If you do not set this option but the Use Keytab option is enabled (UseKeytab=1), then the MIT Kerberos library will search for a keytab using the following search order:

- The file specified by the KRB5_KTNAME environment variable.
- The default_keytab_name setting in the [libdefaults] section of the Kerberos configuration file (krb5.conf/krb5.ini).
- The default keytab file specified in the MIT Kerberos library. Typically, the default file is C:\Windows\krb5kt for Windows platforms and /etc/krb5.keytab for non-Windows platforms.

Delegation UID

Key Name	Default Value	Required
DelegationUID	None	No

Description

If a value is specified for this setting, the driver delegates all operations against Impala to the specified user, rather than to the authenticated user for the connection.

Enable Auto Reconnect

Key Name	Default Value	Required
AutoReconnect	Selected (1)	Yes

Description

This option specifies whether the driver attempts to automatically reconnect to the server when a communication link error occurs.

- Enabled (1): The driver attempts to reconnect.
- Disabled (0): The driver does not attempt to reconnect.

Enable Simulated Transactions

Key Name	Default Value	Required
EnableSimulatedTransactions	Clear (0)	No

Description

This option specifies whether the driver should simulate transactions, or return an error.

- Enabled (1): The driver simulates transactions, enabling queries that contain transaction statements to be run successfully. The transactions are not executed.
- Disabled (0): The driver returns an error if it attempts to run a query that contains transaction statements.

Note:

ODBC does not support transaction statements, so they cannot be executed.

Enable SSL

Key Name	Default Value	Required
SSL	Clear (0)	No

Description

This option specifies whether the client uses an SSL encrypted connection to communicate with the Impala.

- Enabled (1): The client communicates with the Impala using SSL.
- Disabled (0): SSL is disabled.

SSL is configured independently of authentication. When authentication and SSL are both enabled, the driver performs the specified authentication method over an SSL connection.

Host

Key Name	Default Value	Required
Host	None	Yes

Description

The IP address or host name of the Impala server.

Host FQDN

Key Name	Default Value	Required
KrbFQDN	_HOST	No.

Description

The fully qualified domain name of the Impala host.

When the value of Host FQDN is `_HOST`, the driver uses the Impala server host name as the fully qualified domain name for Kerberos authentication.

Log Level

Key Name	Default Value	Required
LogLevel	OFF (0)	No

Description

Use this property to enable or disable logging in the driver and to specify the amount of detail included in log files.

Important:

- Only enable logging long enough to capture an issue. Logging decreases performance and can consume a large quantity of disk space.
- This option is not supported in connection strings. To configure logging for the Windows driver, you must use the Logging Options dialog box. To configure logging for a non-Windows driver, you must use the `cloudera.impalaodbc.ini` file.

Set the property to one of the following values:

- OFF (0): Disable all logging.
- FATAL (1): Logs severe error events that lead the driver to abort.
- ERROR (2): Logs error events that might allow the driver to continue running.
- WARNING (3): Logs events that might result in an error if action is not taken.
- INFO (4): Logs general information that describes the progress of the driver.
- DEBUG (5): Logs detailed information that is useful for debugging the driver.
- TRACE (6): Logs all driver activity.

When logging is enabled, the driver produces a log file named `ImpalaODBC_driver.log` in the location specified in the Log Path (`LogPath`) property.

Log Path

Key Name	Default Value	Required
<code>LogPath</code>	None	Yes, if logging is enabled.

Description

The full path to the folder where the driver saves log files when logging is enabled.

Important:

This option is not supported in connection strings. To configure logging for the Windows driver, you must use the Logging Options dialog box. To configure logging for a non-Windows driver, you must use the `cloudera.impalaodbc.ini` file.

Max File Size

Key Name	Default Value	Required
<code>LogFileSize</code>	20	No

Description

The maximum size of each log file in megabytes (MB). After the maximum file size is reached, the driver creates a new file and continues logging.

Important:

This option is not supported in connection strings. To configure logging for the Windows driver, you must use the Logging Options dialog box. To configure logging for a non-Windows driver, you must use the `cloudera.impalaodbc.ini` file.

Max Number Files

Key Name	Default Value	Required
<code>LogFileCount</code>	50	No

Description

The maximum number of log files to keep. After the maximum number of log files is reached, each time an additional file is created, the driver deletes the oldest log file.

Important:

This option is not supported in connection strings. To configure logging for the Windows driver, you must use the Logging Options dialog box. To configure logging for a non-Windows driver, you must use the `cloudera.impalaodbc.ini` file.

Mechanism

Key Name	Default Value	Required
AuthMech	No Authentication (0)	No

Description

The authentication mechanism to use.

Select one of the following settings, or set the key to the corresponding number:

- No Authentication (0)
- Kerberos (1)
- SASL User Name (2)
- User Name And Password (3)

Password

Key Name	Default Value	Required
PWD	None	Yes, if the authentication mechanism is User Name And Password (3).

Description

The password corresponding to the user name that you provided in the User Name field (the UID key).

Port

Key Name	Default Value	Required
Port	21050	Yes

Description

The TCP port that the Impala server uses to listen for client connections.

Realm

Key Name	Default Value	Required
KrbRealm	NULL	No

Description

The realm of the Impala host.

If your Kerberos configuration already defines the realm of the Impala host as the default realm, then you do not need to configure this option.

Restrict Metadata with Current Schema

Key Name	Default Value	Required
CurrentSchema RestrictedMetadata	Clear (0)	No

Description

This option specifies whether the driver should restrict catalog function results to tables and views in the current schema if a catalog function call is made without specifying a schema, or if the schema is specified as the wildcard character %.

Note:

Restricting results to the tables and views in the current schema may improve the performance of catalog calls that do not specify a schema.

- Enabled (1): The driver restricts catalog function results to the current schema if a schema is not specified.
- Disabled (0): The driver does not restrict catalog function results to the current schema if a schema is not specified.

Rows Fetched Per Block

Key Name	Default Value	Required
RowsFetchedPerBlock	10000	No

Description

The maximum number of rows that a query returns at a time.

Valid values for this setting include any positive 32-bit integer. However, testing has shown that performance gains are marginal beyond the default value of 10000 rows.

Save Password (Encrypted)

Key Name	Default Value	Required
N/A	Selected	No

Description

This option specifies whether the password is saved in the registry.

- Enabled: The password is saved in the registry.
- Disabled: The password is not saved in the registry.

This option is available only in the Windows driver. It appears in the Cloudera ODBC Driver for Impala DSN Setup dialog box.

Important:

The password is obscured (not saved in plain text). However, it is still possible for the encrypted password to be copied and used.

Service Name

Key Name	Default Value	Required
KrbServiceName	impala	No.

Description

The Kerberos service principal name of the Impala server.

Socket Timeout

Key Name	Default Value	Required
SocketTimeout	0	No

Description

The number of seconds after which Impala closes the connection with the client application if the connection is idle.

When this option is set to 0, the connection does not time out.

String Column Length

Key Name	Default Value	Required
StringColumnLength	32767	No

Description

The maximum number of characters that can be contained in STRING columns.

Transport Buffer Size

Key Name	Default Value	Required
TSaslTransportBufSize	1000	No

Description

The number of bytes to reserve in memory for buffering unencrypted data from the network.

Note:

In most circumstances, the default value of 1000 bytes is optimal.

Trusted Certificates

Key Name	Default Value	Required
TrustedCerts	<p>The <code>cacerts.pem</code> file in the <code>\lib</code> subfolder within the driver's installation directory.</p> <p>The exact file path varies depending on the version of the driver that is installed. For example, the path for the Windows driver is different from the path for the macOS driver.</p>	No

Description

The full path of the `.pem` file containing trusted CA certificates, for verifying the server when using SSL.

If this option is not set, then the driver defaults to using the trusted CA certificates `.pem` file installed by the driver.

Important:

If you are connecting from a Windows machine and the Use System Trust Store option is enabled, then the driver uses the certificates from the Windows system trust store instead of your specified `.pem` file. For more information, see "Use System Trust Store" on page 67.

UPN Keytab Mapping File

Key Name	Default Value	Required
UPNKeytabMappingFile	None	No

Description

The full path to a JSON file that maps your Impala user name to a Kerberos user principal name and a keytab file.

Note:

This option is applicable only when the authentication mechanism is set to Kerberos (AuthMech=1) and the Use Keytab option is enabled (UseKeytab=1).

The mapping in the JSON file must be written using the following schema, where *[UserName]* is the Impala user name, *[KerberosUPN]* is the Kerberos user principal name, and *[KeytabFile]* is the full path to the keytab file:

```
{
  "[UserName]": {
    "principal" : "[KerberosUPN]",
    "keytabfile": "[KeytabFile]"
  },
  ... }
```

For example, the following file maps the Impala user name **cloudera** to the **cloudera@CLLOUDERA** Kerberos user principal name and the **C:\Temp\cloudera.keytab** file:

```
{
  "cloudera": {
    "principal" : "cloudera@CLLOUDERA",
    "keytabfile": "C:\Temp\cloudera.keytab"
  },
  ... }
```

If parts of the mapping are invalid or not defined, then the following occurs:

- If the mapping file fails to specify a Kerberos user principal name, then the driver uses the Impala user name as the Kerberos user principal name.
- If the mapping file fails to specify a keytab file, then the driver uses the keytab file that is specified in the Default Keytab File setting.
- If the entire mapping file is invalid or not defined, then the driver does both of the actions described above.

Use Keytab

Key Name	Default Value	Required
UseKeytab	Clear (0)	No

Description

This option specifies whether the driver obtains the ticket for Kerberos authentication by using a keytab.

- Enabled (1): The driver uses a keytab to obtain a ticket before authenticating the connection using Kerberos.
- Disabled (0): The driver does not attempt to obtain the Kerberos ticket, and assumes that a valid ticket is already available in the credentials cache.

Note:

This option is applicable only when the authentication mechanism is set to Kerberos (AuthMech=1).

If you enable this option but do not set the Default Keytab File option (the `DefaultKeytabFile` key), then the MIT Kerberos library will search for a keytab file using the following search order:

1. The file specified by the `KRB5_KTNAME` environment variable.
2. The `default_keytab_name` setting in the `[libdefaults]` section of the Kerberos configuration file (`krb5.conf/krb5.ini`).
3. The default keytab file specified in the MIT Kerberos library. Typically, the default file is `C:\Windows\krb5kt` for Windows platforms.

Use Native Query

Key Name	Default Value	Required
UseNativeQuery	Clear (0)	No

Description

This option specifies whether the driver uses native queries, or converts them into an equivalent form in .

- Enabled (1): The driver does not transform the queries emitted by an application, and executes queries directly.
- Disabled (0): The driver transforms the queries emitted by an application and converts them into an equivalent form in .

Note:

If the application is Impala-aware and already emits , then enable this option to avoid the extra overhead of query transformation.

Use Only SSPI

Key Name	Default Value	Required
UseOnlySSPI	Clear (0)	No

Description

This option specifies how the driver handles Kerberos authentication: either with the SSPI plugin or with MIT Kerberos.

- **Enable For This DSN (1 in the DSN entry in the registry):** The driver handles Kerberos authentication in the DSN connection by using the SSPI plugin instead of MIT Kerberos by default.
- **Enable For DSN-less Connections (1 in the driver configuration section of the registry):** The driver handles Kerberos authentication in DSN-less connections by using the SSPI plugin instead of MIT Kerberos by default.

If you want all connections that use the Cloudera ODBC Driver for Impala to use the SSPI plugin by default, then enable Use Only SSPI for both DSN and DSN-less connections.

- **Disabled (0):** The driver uses MIT Kerberos to handle Kerberos authentication, and only uses the SSPI plugin if the GSSAPI library is not available.

Important:

This option is available only in the Windows driver.

Use Simple Authentication and Security Layer (SASL)

Key Name	Default Value	Required
UseSASL	0 if using No Authentication. 1 if using User Name And Password or Kerberos or SASL User Name authentication.	No

Description

This option specifies whether the driver uses SASL to handle authentication.

- Enabled (1): The driver uses SASL to handle authentication.
- Disabled (0): The driver does not use SASL.

This option is configurable only when you are using the User Name And Password authentication mechanism. If the driver is configured to use the other authentication mechanisms, then it uses the default setting for the Use Simple Authentication and Security Layer (SASL) option.

Use SQL Unicode Types

Key Name	Default Value	Required
UseSQLUnicodeTypes	Clear (0)	No

Description

This option specifies the SQL types to be returned for string data types.

- Enabled (1): The driver returns SQL_WVARCHAR for STRING and VARCHAR columns, and returns SQL_WCHAR for CHAR columns.
- Disabled (0): The driver returns SQL_VARCHAR for STRING and VARCHAR columns, and returns SQL_CHAR for CHAR columns.

Use System Trust Store

Key Name	Default Value	Required
UseSystemTrustStore	Clear (0)	No

Description

This option specifies whether to use a CA certificate from the system trust store, or from a specified PEM file.

- Enabled (1): The driver verifies the connection using a certificate in the system trust store.
- Disabled (0): The driver verifies the connection using a specified PEM file.

Note:

This option is only available on Windows.

User Name

Key Name	Default Value	Required
UID	For User Name (2) authentication only, the default value is <code>anonymous</code>	Yes, if the authentication mechanism is User Name And Password (3). No, if the authentication

Key Name	Default Value	Required
		mechanism is SASL User Name (2).

Description

The user name that you use to access the Impala server.

Configuration Options Having Only Key Names

The following configuration options do not appear in the Windows user interface for the Cloudera ODBC Driver for Impala. They are accessible only when you use a connection string or configure a connection from a Linux/macOS/AIX/Debian machine:

- "DelegationUIDCase" on page 68
- "Driver" on page 68
- "SSP_" on page 69

DelegationUIDCase

Key Name	Default Value	Required
DelegationUIDCase	Unchanged	No

Description

This option specifies whether the driver changes the Delegation UID (or `DelegationUID`) value to all upper-case or all lower-case. The following values are supported:

- `Upper`: Change the delegated user name to all upper-case.
- `Lower`: Change the delegated user name to all lower-case.
- `Unchanged`: Do not modify the delegated user name.

For more information about delegating a user name, see "Delegation UID" on page 56.

Driver

Key Name	Default Value	Required
Driver	Cloudera ODBC Driver for Impala when installed on Windows, or the absolute path of the driver shared object file when installed on a non-Windows machine.	Yes

Description

On Windows, the name of the installed driver(Cloudera ODBC Driver for Impala).

On other platforms, the name of the installed driver as specified in `odbcinst.ini`, or the absolute path of the driver shared object file.

SSP_

Key Name	Default Value	Required
SSP_	None	No

Description

Set a server-side property by using the following syntax, where `[SSPKey]` is the name of the server-side property and `[SSPValue]` is the value for that property:

```
SSP_[SSPKey]=[SSPValue]
```

For example:

```
SSP_MEM_LIMIT=1000000000
SSP_REQUEST_POOL=myPool
```

Or, to set those properties in a connection string, type the following:

```
SSP_MEM_LIMIT={1000000000};SSP_REQUEST_POOL={myPool}
```

After the driver applies the server-side property, the `SSP_` prefix is removed from the DSN entry, leaving an entry of `[SSPKey]=[SSPValue]`.

Important:

This property is supported only for connections to Impala 2.0 or later. In earlier versions of Impala, the SET statement can only be executed from within the Impala shell.

Note:

- The `SSP_` prefix must be upper case.
- When setting a server-side property in a connection string, it is recommended that you enclose the value in braces (`{ }`) to make sure that special characters can be properly escaped.

ODBC API Conformance Level

The following table lists the ODBC interfaces that the Cloudera ODBC Driver for Impala implements and the ODBC compliance level of each interface.

ODBC compliance levels are Core, Level 1, and Level 2. These compliance levels are defined in the ODBC Specification published with the Interface SDK from Microsoft.

Interfaces include both the Unicode and non-Unicode versions. For more information, see "Unicode Function Arguments" in the *ODBC Programmer's Reference*:

<http://msdn.microsoft.com/en-us/library/ms716246%28VS.85%29.aspx>.

Conformance Level	INTERFACES		Conformance Level	INTERFACES
Core	SQLAllocHandle		Core	SQLGetStmtAttr
Core	SQLBindCol		Core	SQLGetTypeInfo
Core	SQLBindParameter		Core	SQLNativeSql
Core	SQLCancel		Core	SQLNumParams
Core	SQLCloseCursor		Core	SQLNumResultCols
Core	SQLColAttribute		Core	SQLParamData
Core	SQLColumns		Core	SQLPrepare
Core	SQLConnect		Core	SQLPutData
Core	SQLCopyDesc		Core	SQLRowCount
Core	SQLDescribeCol		Core	SQLSetConnectAttr
Core	SQLDisconnect		Core	SQLSetCursorName
Core	SQLDriverconnect		Core	SQLSetDescField
Core	SQLEndTran		Core	SQLSetDescRec
Core	SQLExecDirect		Core	SQLSetEnvAttr
Core	SQLExecute		Core	SQLSetStmtAttr
Core	SQLFetch		Core	SQLSpecialColumns
Core	SQLFetchScroll		Core	SQLStatistics

Conformance Level	INTERFACES		Conformance Level	INTERFACES
Core	SQLFreeHandle		Core	SQLTables
Core	SQLFreeStmt		Core	SQLBrowseConnect
Core	SQLGetConnectAttr		Core	SQLPrimaryKeys
Core	SQLGetCursorName		Core	SQLGetInfo
Core	SQLGetData		Level 1	SQLProcedureColumns
Core	SQLGetDescField		Level 1	SQLProcedures
Core	SQLGetDescRec		Level 2	SQLColumnPrivileges
Core	SQLGetDiagField		Level 2	SQLDescribeParam
Core	SQLGetDiagRec		Level 2	SQLForeignKeys
Core	SQLGetEnvAttr		Level 2	SQLTablePrivileges
Core	SQLGetFunctions			

Contact Us

If you are having difficulties using the driver, our [Community Forum](#) may have your solution. In addition to providing user to user support, our forums are a great place to share your questions, comments, and feature requests with us.

If you are a Subscription customer you may also use the [Cloudera Support Portal](#) to search the Knowledge Base or file a Case.

Important:

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