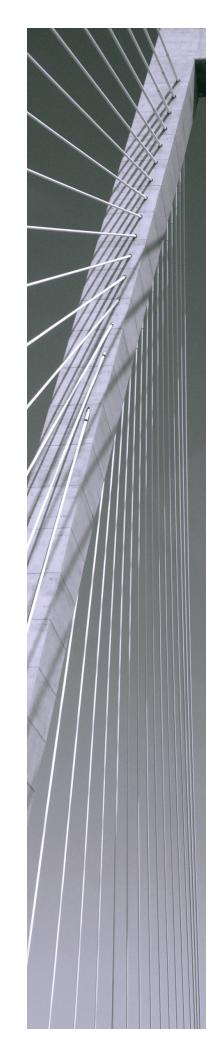


# Simba Cassandra ODBC Driver with SQL Connector

### Installation and Configuration Guide

Simba Technologies Inc.

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### **About This Guide**

### **Purpose**

The Simba Cassandra ODBC Driver with SQL Connector Installation and Configuration Guide explains how to install and configure the Simba Cassandra ODBC Driver with SQL Connector. The guide also provides details related to features of the driver.

### **Audience**

The guide is intended for end users of the Simba Cassandra ODBC Driver, as well as administrators and developers integrating the driver.

### **Knowledge Prerequisites**

To use the Simba Cassandra ODBC Driver, the following knowledge is helpful:

- Familiarity with the platform on which you are using the Simba Cassandra ODBC Driver
- Ability to use the data source to which the Simba Cassandra ODBC Driver is connecting
- An understanding of the role of ODBC technologies and driver managers in connecting to a data source
- Experience creating and configuring ODBC connections
- Exposure to SQL

### **Document Conventions**

Italics are used when referring to book and document titles.

**Bold** is used in procedures for graphical user interface elements that a user clicks and text that a user types.

Monospace font indicates commands, source code, or contents of text files.



A text box with a pencil icon indicates a short note appended to a paragraph.

### ! Important:

A text box with an exclamation mark indicates an important comment related to the preceding paragraph.

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### About the Simba Cassandra ODBC Driver

The Simba Cassandra ODBC Driver enables Business Intelligence (BI), analytics, and reporting on data that is stored in Apache Cassandra databases. The driver complies with the ODBC 3.80 data standard and adds important functionality such as Unicode, as well as 32- and 64-bit support for high-performance computing environments on all platforms.

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.

The Simba Cassandra ODBC Driver is available for Microsoft® Windows®, Linux, and Mac OS X platforms.

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



For basic configuration instructions that allow you to quickly set up the Windows driver so that you can evaluate and use it, see the *Simba ODBC Drivers Quick Start Guide for Windows*. The Quick Start Guide also explains how to use the driver in various applications.

### Windows Driver

### Windows System Requirements

The Simba Cassandra ODBC Driver supports Apache Cassandra versions 2.0.0 through 3.x.

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 operating systems:
  - Windows Vista, 7, 8, or 10
  - Windows Server 2008 or later
- 150 MB of available disk space

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:

- Simba Cassandra 2.4 32-bit.msi for 32-bit applications
- Simba Cassandra 2.4 64-bit.msi for 64-bit applications

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

#### To install the Simba Cassandra ODBC Driver:

- Depending on the bitness of your client application, double-click to run Simba Cassandra 2.4 32-bit.msi or Simba Cassandra 2.4 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**.
- Click Install.
- 6. When the installation completes, click **Finish**.

7. If you received a license file via email, then copy the license file into the \lib subfolder in the installation folder you selected above.



#### Note:

To avoid security issues, you might need to save the license file on your local machine prior to copying the file into the \lib subfolder.

### Creating a Data Source Name

Typically, after installing the Simba Cassandra ODBC Driver, you need to create a Data Source Name (DSN).

Alternatively, for information about DSN-less connections, see Using a Connection String on page 34.

#### To create a Data Source Name:

- Open the ODBC Administrator:
  - If you are using Windows 7 or earlier, click the Start button , then click All Programs, then click the Simba Cassandra ODBC Driver 2.4 program group corresponding to the bitness of the client application accessing data in Cassandra, and then click **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 corresponding to the bitness of the client application accessing data in Cassandra.
- 2. In the ODBC Data Source Administrator, click the **Drivers** tab, and then scroll down as needed to confirm that the Simba Cassandra ODBC Driver 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, such as Sisense, 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 **Simba Cassandra ODBC Driver** and then click **Finish**. The Simba Cassandra ODBC Driver 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. Choose one:
  - In the Host field, type the name or IP address of the host where your Cassandra instance is running.
  - Or, in the Host field, type a comma-separated list of host names or IP addresses of Cassandra servers to which the driver connects.



The driver attempts to connect to all the servers concurrently, and then keep the first connection that is successfully established. The driver does not maintain a connection with any of the other servers in the list.

9. In the **Port** field, type the number of the TCP port that the server uses to listen for client connections.

#### Note:

The default port used by Cassandra is 9042.

- If user login is required to access the Cassandra instance, then, in the Mechanism list, select User Name and Password and type your credentials in the User Name and Password fields.
- 11. In the **Default Keyspace** field, type the name of the Cassandra keyspace to use by default.
- 12. To configure advanced driver options, click **Advanced Options**. For more information, see Configuring Advanced Options on page 12.
- 13. To configure logging behavior for the driver, click **Logging Options**. For more information, see Configuring Logging Options on page 15.
- 14. To test the connection, click **Test**. Review the results as needed, and then click **OK**.



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

15. To save your settings and close the Simba Cassandra ODBC Driver DSN Setup dialog box, click **OK**.

16. To close the ODBC Data Source Administrator, click **OK**.

### **Configuring Advanced Options**

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

#### To configure advanced options:

- 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.
- 2. In the **Query Mode** list, select an option to specify how the driver executes queries:
  - To execute all queries in SQL, select SQL.
  - To execute all queries in CQL, select CQL.
  - To execute queries in SQL by default and then execute failed queries in CQL, select SQL with CQL fallback.
- 3. In the **Tunable Consistency** list, select an option to specify a Cassandra replica or the number of Cassandra replicas that must process a query in order for the query to be considered successful. For detailed information about each option, see the topic *Configuring data consistency* in the Apache Cassandra 2.0 documentation:
  - http://www.datastax.com/documentation/cassandra/2.0/cassandra/dml/dml\_config\_consistency\_c.html.
- 4. In the **Load Balancing Policy** list, select the load balancing policy to use:
  - To cycle through all nodes in the cluster on a per-query basis, select Round Robin.
  - To first try all nodes in a primary "local" data center before trying any nodes from other data centers, select **DC Aware**.
- 5. In the **Binary Column Length** field, type the default column length to report for BLOB columns.
- 6. In the **String Column Length** field, type the default column length to report for ASCII, TEXT, and VARCHAR columns.
- 7. In the **Virtual Table Name Separator** field, type a separator for naming a virtual table built from a collection.



For more information about virtual tables, see Virtual Tables on page 38.

8. To use a Blacklist or Whitelist when connecting to hosts in the Cassandra cluster, enter the host IP addresses in the **Blacklist hosts** or **Whitelist hosts** field.

- Each IP addresses should be entered in quotation marks, separated by a comma. For example: "1.2.3.4", "5.6.7.8".
- 9. To use a Blacklist or Whitelist of datacenter hosts, enter the host names or addresses in the **Blacklist datacenter hosts** or **Whitelist dataceter hosts** field.
  - Each name or addresses should be entered in quotation marks, separated by a comma. For example: "datacenter1", "datacenter2".
- 10. To use a token-aware policy to improve load balancing and latency, select the **Enable Token Aware** check box.
- 11. To use a latency-awareness algorithm to distribute more of the workload onto faster machines, select the **Enable Latency Aware** check box.
- 12. Select how the driver handles null value INSERT statements:
  - To configure the driver to insert all NULL values as specified in INSERT statements, select the Enable null values insertion check box.
  - To configure the driver to ignore NULL values inserted into a column that contains only NULL values, clear the Enable null values insertion check box.



For more information about this option, see Enable Null Value Insert on page 45.

- 13. Select how the driver handles capitalization in schema, table, and column names:
  - To differentiate between capital and lower-case letters in schema, table, and column names, select the **Enable Case Sensitive** check box.
  - To ignore the capitalization of schema, table, and column names, clear the **Enable Case Sensitive** check box.



For more information about case sensitivity in Cassandra, see Enable Case Sensitive on page 44.

- 14. To map text and varchar data types in Cassandra to use SQL\_WVARCHAR, select the **Use SQL\_WVARCHAR** for string data type check box.
- 15. Select how the driver handles large result sets:
  - To configure the driver to split large result sets into pages, select the Enable paging check box and then type the maximum number of rows to display on each page in the Rows per page field.
  - To configure the driver to fetch all results into memory regardless of the result set size, clear the **Enable paging** check box.

#### ! Important:

Disabling paging and then fetching a large result set can cause issues such as out of memory errors and database timeouts.

- 16. To configure client-server verification over SSL, use the options in the SSL area. For more information, see Configuring SSL Verification on page 14.
- 17. To save your settings and close the Advanced Options dialog box, click **OK**.
- 18. To close the Simba Cassandra ODBC Driver DSN Setup dialog box, click **OK**.

### Configuring SSL Verification

If you are connecting to a Cassandra server that has Secure Sockets Layer (SSL) enabled, then you can configure the driver to connect to an SSL-enabled socket. When connecting to a server over SSL, the driver supports identity verification between the client and the server.

### Configuring an SSL Connection without Identity Verification

You can configure a connection that uses SSL but does not verify the identity of the client or the server.

#### To configure an SSL connection without verification:

- To access the SSL options for a DSN, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click Configure, and then click Advanced Options.
- 2. In the SSL area, select **One-way Server Verification** or **Two-way Server and Client Verification**.
- 3. Clear the **Enable Server Hostname Verification** check box.
- 4. To save your settings and close the dialog box, click **OK**.

### Configuring One-way SSL Verification

You can configure one-way SSL verification so that the client verifies the identity of the Cassandra server.

#### To configure one-way SSL verification:

- To access the SSL options for a DSN, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click Configure, and then click Advanced Options.
- 2. In the SSL area, select **One-way Server Verification**.
- 3. Ensure that the **Enable Server Hostname Verification** check box is selected.

- 4. In the **Trusted CA Certificates** field, specify the full path of the PEM file containing the certificate for verifying the server.
- 5. To save your settings and close the dialog box, click **OK**.

### Configuring Two-way SSL Verification

You can configure two-way SSL verification so that the client and the Cassandra server verify each other.

#### To configure two-way SSL verification:

- To access the SSL options for a DSN, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click Configure, and then click Advanced Options.
- 2. In the SSL area, select **Two-way Server and Client Verification**.
- 3. Ensure that the **Enable Server Hostname Verification** check box is selected.
- 4. In the **Trusted CA Certificates** field, specify the full path of the PEM file containing the certificate for verifying the server.
- 5. In the **Client-side Certificate** field, specify the full path of the PEM file containing the certificate for verifying the client.
- 6. In the **Client-side Private Key** field, specify the full path of the file containing the private key used to verify the client.
- 7. If the private key file is protected with a password, type the password in the **Key File Password** field. To save the password in the DSN, select the **Remember Password** check box.

### ! Important:

Passwords are saved in plain text in the DSN; they are not encrypted or censored.

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

### **Configuring Logging Options**

To help troubleshoot issues, you can enable logging. In addition to functionality provided in the Simba Cassandra ODBC Driver, 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.

The driver allows you to set the amount of detail included in log files. The following table lists the logging levels provided by the Simba Cassandra ODBC Driver, in order from least verbose to most verbose.

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	BUG Logs detailed information that is useful for debugging the driver.	
TRACE	Logs all driver activity.	

#### To enable driver logging:

- 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 desired level of information to include in log files.
- 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.
- 5. Click OK.
- 6. Restart your ODBC application to make sure that the new settings take effect.

The Simba Cassandra ODBC Driver produces a log file named Simba Cassandra ODBC Driver driver.log at the location that you specify in the Log Path field.

#### To disable driver logging:

- 1. 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 **LOG\_OFF**.
- 3. Click OK.

#### To start tracing using the ODBC Data Source Administrator:

- 1. In the ODBC Data Source Administrator, click the **Tracing** tab.
- 2. In the **Log File Path** area, click **Browse**. In the Select ODBC Log File dialog box, browse to the location where you want to save the log file, then type a descriptive file name in the **File Name** field, and then click **Save**.
- 3. On the Tracing tab, click Start Tracing Now.

#### To stop ODBC Data Source Administrator tracing:

On the Tracing tab in the ODBC Data Source Administrator, click Stop Tracing Now.

For more information about tracing using the ODBC Data Source Administrator, see "How to Generate an ODBC Trace with ODBC Data Source Administrator" on the Microsoft Support website: http://support.microsoft.com/kb/274551.

### Verifying the Version Number

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

#### To verify the version number:

- Open the ODBC Administrator:
  - If you are using Windows 7 or earlier, click Start , then click All Programs, then click the Simba Cassandra Driver 2.4 program group corresponding to the bitness of the client application accessing data in Cassandra, and then click 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 corresponding to the bitness of the client application accessing data in Cassandra.
- Click the **Drivers** tab and then find the Simba Cassandra ODBC Driver in the list of ODBC drivers that are installed on your system. The version number is displayed in the **Version** column.

### Linux Driver

### **Linux System Requirements**

The Simba Cassandra ODBC Driver supports Apache Cassandra versions 2.0.0 through 2.2.5.

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) 5, 6, or 7
  - CentOS 5, 6, or 7
  - SUSE Linux Enterprise Server (SLES) 11 or 12
  - Debian 7 or 8
  - Ubuntu 12.04, 14.04, or 16.04
- 50 MB of available disk space
- One of the following ODBC driver managers installed:
  - ∘ iODBC 3.52.7 or later
  - unixODBC 2.2.12 or later

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

### Installing the Driver Using the RPM

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 that you use the version of the driver that matches the bitness of the client application:

- simbacassandra-[Version]-[Release].i686.rpm for the 32-bit driver
- simbacassandra-[Version]-[Release].x86\_64.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.

The Simba Cassandra ODBC Driver files are installed in the following directories:

- /opt/simba/cassandra contains the release notes and the Simba Cassandra ODBC Driver with SQL Connector Installation and Configuration Guide.
- /opt/simba/cassandra/ErrorMessages contains error message files required by the driver.
- /opt/simba/cassandra/Setup contains sample configuration files named odbc.ini and odbcinst.ini.
- /opt/simba/cassandra/lib/32 contains the 32-bit shared libraries and the simba.cassandraodbc.ini configuration file.
- /opt/simba/cassandra/lib/64 contains the 64-bit shared libraries and the simba.cassandraodbc.ini configuration file.

#### To install the Simba Cassandra ODBC Driver:

- 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]
```

3. If you received a license file via email, then copy the license file into the /opt/simba/cassandra/lib/32 or /opt/simba/cassandra/lib/64 folder, depending on the version of the driver that you installed.



To avoid security issues, you might need to save the license file on your local machine prior to copying the file into the folder.

### Installing the Driver Using the Tarball Package

The Simba Cassandra ODBC Driver is available as a tarball package containing the following:

- /opt/simba/cassandra contains the release notes and the Simba Cassandra ODBC Driver with SQL Connector Installation and Configuration Guide.
- /opt/simba/cassandra/ErrorMessages contains error message files required by the driver.
- /opt/simba/cassandra/Setup contains sample configuration files named odbc.ini and odbcinst.ini.
- /opt/simba/cassandra/lib/32 contains the 32-bit shared libraries and the simba.cassandraodbc.ini configuration file.
- /opt/simba/cassandra/lib/64 contains the 64-bit shared libraries and the simba.cassandraodbc.ini configuration 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 that you use the version of the driver that matches the bitness of the client application. You can install both versions of the driver on the same machine.

#### To install the Simba Cassandra ODBC Driver:

- 1. Log in as the root user, and then navigate to the folder containing the tarball package.
- 2. Run the tar command to extract the package and install the driver.

#### For example:

```
tar -zxvf [TarballName]
```

[TarballName] is the name of the tarball package containing the driver.

3. If you received a license file via email, then copy the license file into the opt/simba/cassandra/lib/32 or opt/simba/cassandra/lib/64 folder, depending on the version of the driver that you installed.



#### Note:

To avoid security issues, you might need to save the license file on your local machine prior to copying the file into the folder.

### Setting the LD\_LIBRARY\_PATH Environment Variable

The LD\_LIBRARY\_PATH environment variable must include the paths to the installed ODBC driver manager libraries.

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

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

For information about how to set environment variables permanently, refer to your Linux shell documentation.

For information about creating ODBC connections using the Simba Cassandra ODBC Driver, see Configuring ODBC Connections for Non-Windows Platforms on page 24.

### Verifying the Version Number

If you need to verify the version of the Simba Cassandra ODBC Driver 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.

#### To verify the version number:

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

The command returns information about the Simba Cassandra ODBC Driver that is installed on your machine, including the version number.

### Mac OS X Driver

### Mac OS X System Requirements

The Simba Cassandra ODBC Driver supports Apache Cassandra versions 2.0.0 through 2.2.5.

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:

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

### Installing the Driver on Mac OS X

The Simba Cassandra ODBC Driver supports both 32- and 64-bit client applications.

The driver files are installed in the following directories:

- /Library/simba/cassandra contains release notes and the Simba Cassandra ODBC Driver with SQL Connector Installation and Configuration Guide.
- /Library/simba/cassandra/ErrorMessages contains error message files required by the driver.
- /Library/simba/cassandra/Setup contains sample configuration files named odbc.ini and odbcinst.ini.
- /Library/simba/cassandra/lib contains the driver binaries and the simba.cassandraodbc.ini configuration file.

#### To install the Simba Cassandra ODBC Driver:

- Double-click Simba Cassandra 2.4.dmg to mount the disk image.
- 2. Double-click **Simba Cassandra 2.4.pkg** to run the installer.
- 3. In the installer, click **Continue**.
- 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**.
- 6. To accept the installation location and begin the installation, click **Install**.
- 7. When the installation completes, click **Close**.

8. If you received a license file via email, then copy the license file into the /Library/simba/cassandra/lib folder.



To avoid security issues, you might need to save the license file on your local machine prior to copying the file into the folder.

# Setting the DYLD\_LIBRARY\_PATH Environment Variable

The DYLD\_LIBRARY\_PATH environment variable must include the paths to the installed ODBC driver manager libraries.

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

```
export DYLD LIBRARY PATH=$DYLD LIBRARY PATH:/usr/local/lib
```

For information about how to set environment variables permanently, refer to your Mac OS X shell documentation.

For information about creating ODBC connections using the Simba Cassandra ODBC Driver, see Configuring ODBC Connections for Non-Windows Platforms on page 24.

### Verifying the Version Number

If you need to verify the version of the Simba Cassandra ODBC Driver that is installed on your Mac OS X machine, you can query the version number through the Terminal.

#### To verify the version number:

At the Terminal, run the following command:

```
pkgutil --info com.simba.cassandraodbc
```

The command returns information about the Simba Cassandra ODBC Driver that is installed on your machine, including the version number.

## Configuring ODBC Connections for Non-Windows Platforms

The following sections describe how to configure ODBC connections when using the Simba Cassandra ODBC Driver with non-Windows platforms:

- Configuration Files on page 24
- Sample Configuration Files on page 25
- Configuring the Environment on page 25
- Defining DSNs in odbc.ini on page 26
- Specifying ODBC Drivers in odbcinst.ini on page 27
- Configuring Driver Settings in simba.cassandraodbc.ini on page 28
- Configuring SSL Verification on page 29
- Configuring Logging Options on page 30
- Testing the Connection on page 32

### **Configuration Files**

ODBC driver managers use configuration files to define and configure ODBC data sources and drivers. By default, the following configuration files are used:

- .odbc.ini is used to define ODBC data sources, and it is required for DSNs.
- .odbcinst.ini is used to define ODBC drivers, and it is optional.

These files are located in the user's home directory.

Also, by default the Simba Cassandra ODBC Driver is configured using the simba.cassandraodbc.ini file, which is required. This file is located in one of the following directories depending on the version of the driver that you are using:

- /opt/simba/cassandra/lib/32 for the 32-bit driver on Linux.
- /opt/simba/cassandra/lib/64 for the 64-bit driver on Linux.
- /Library/simba/cassandra/lib for the driver on Mac OS X.

For information about the configuration options available for controlling the behavior of DSNs that are using the Simba Cassandra ODBC Driver, see <u>Driver Configuration</u> Options on page 42.

### Sample Configuration Files

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

odbc.iniodbcinst.ini

These sample configuration files provide preset values for settings related to the Simba Cassandra ODBC Driver.

The names of the sample configuration files do not begin with a period (.) so that they appear in directory listings by default. A file name beginning with a period (.) is hidden. For odbc.ini and odbcinst.ini, if the default location is used, then the file names must begin with a period (.).

If the configuration files do not exist in the home directory, then you can copy the sample configuration files to the home directory, and then rename the files. If the configuration files already exist in the home directory, then use the sample configuration files as a guide to modify the existing configuration files.

### Configuring the Environment

Optionally, you can use three environment variables, ODBCINI, ODBCSYSINI, and SIMBACASSANDRAODBCINI, to specify different locations for the odbc.ini, odbcinst.ini, and simba.cassandraodbc.ini configuration files by doing the following:

- Set ODBCINI to point to your odbc.ini file.
- Set ODBCSYSINI to point to the directory containing the odbcinst.ini file.
- Set SIMBACASSANDRAODBCINI to point to your simba.cassandraodbc.ini file.

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

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

The following search order is used to locate the simba.cassandraodbc.ini file:

1. If the SIMBACASSANDRAODBCINI environment variable is defined, then the driver searches for the file specified by the environment variable.

#### Note:

SIMBACASSANDRAODBCINI must specify the full path, including the file name.

- 2. The directory containing the driver's binary is searched for a file named simba.cassandraodbc.ini (not beginning with a period).
- 3. The current working directory of the application is searched for a file named simba.cassandraodbc.ini (not beginning with a period).
- 4. The directory ~/, that is, \$HOME, is searched for a hidden file named simba.cassandraodbc.ini (beginning with a period).
- 5. The directory /etc is searched for a file named simba.cassandraodbc.ini (not beginning with a period).

### Defining DSNs in odbc.ini

ODBC Data Source Names (DSNs) are defined in the odbc.ini configuration file. This file is divided into several sections:

- [ODBC] is optional. This section is used to control global ODBC configuration, such as ODBC tracing.
- [ODBC Data Sources] is required. This section lists the DSNs and associates them with a driver. The driver can be specified by the name given in odbcinst.ini or by the path to the driver shared object file.
- A section having the same name as the data source specified in the [ODBC Data Sources] section is required to configure the data source.

The following is an example of an odbc.ini configuration file for Linux:

```
[ODBC Data Sources]
Sample DSN=Simba Cassandra ODBC Driver 32-bit
[Sample DSN]
Driver=/opt/simba/cassandra/lib/32/libcassandraodbc_sb32.so
HOST=[server1], [server2], [server3]
PORT=9042
DefaultKeyspace=[MyKeyspace]
```

[server1], [server2], and [server3] are the host names or IP addresses of the Cassandra servers to which the driver connects. [MyKeyspace] is the Cassandra keyspace to use.

The following is an example of an odbc.ini configuration file for Mac OS X:

```
[ODBC Data Sources]
Sample DSN=Simba Cassandra ODBC Driver
[Sample DSN]
Driver=/Library/simba/cassandra/lib/libcassandraodbc_
sbu.dylib
HOST=[server1], [server2], [server3]
PORT=9042
DefaultKeyspace=[MyKeyspace]
```

[server1], [server2], and [server3] are the host names or IP addresses of the Cassandra servers to which the driver connects. [MyKeyspace] is the Cassandra keyspace to use.

#### To create a Data Source Name:

- 1. In a text editor, open the odbc.ini configuration file.
- 2. In the [ODBC Data Sources] section, add a new entry by typing the Data Source Name (DSN), then an equal sign (=), and then the driver name as specified in odbcinst.ini.
- 3. Add a new section to the file, with a section name that matches the DSN you specified above, and then add configuration options to the section. Specify the configuration options as key-value pairs.
- 4. Save the odbc.ini configuration file.

For information about the configuration options available for controlling the behavior of DSNs that are using the Simba Cassandra ODBC Driver, see <u>Driver Configuration</u>
Options on page 42.

### Specifying ODBC Drivers in odbcinst.ini

ODBC drivers are defined in the odbcinst.ini configuration file. This configuration file is optional because drivers can be specified directly in the odbc.ini configuration file, as described in Defining DSNs in odbc.ini on page 26.

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

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

The following is an example of an odbcinst.ini configuration file for Linux:

```
[ODBC Drivers]
Simba Cassandra ODBC Driver 32-bit=Installed
Simba Cassandra ODBC Driver 64-bit=Installed
```

```
[Simba Cassandra ODBC Driver 32-bit]
Description=Simba Cassandra ODBC Driver (32-bit)
Driver=/opt/simba/cassandra/lib/32/libcassandraodbc sb32.so
[Simba Cassandra ODBC Driver 64-bit]
Description=Simba Cassandra ODBC Driver (64-bit)
Driver=/opt/simba/cassandra/lib/64/libcassandraodbc sb64.so
```

The following is an example of an odbcinst.ini configuration file for Mac OS X:

```
[ODBC Drivers]
Simba Cassandra ODBC Driver=Installed
[Simba Cassandra ODBC Driver]
Description=Simba Cassandra ODBC Driver
Driver=/Library/simba/cassandra/lib/libcassandraodbc
sbu.dylib
```

#### To define a driver:

- 1. In a text editor, open the odbcinst.ini configuration file.
- 2. In the [ODBC Drivers] section, add a new entry by typing the driver name and then typing = Installed.



#### Note:

Give the driver a symbolic name that you want to use to refer to the driver in connection strings or DSNs.

- 3. Add a new section to the file with a name that matches the driver name you typed above, and then add configuration options to the section based on the sample odbcinst.ini file provided in the Setup directory. Specify the configuration options as key-value pairs.
- 4. Save the odbcinst.ini configuration file.

### Configuring Driver Settings in simba.cassandraodbc.ini

The simba.cassandraodbc.ini file contains configuration settings for the Simba Cassandra ODBC Driver. Settings that you define in this file apply to all connections that use the driver.

You do not need to modify the settings in the simba.cassandraodbc.ini file to use the driver and connect to your data source.

However, to help troubleshoot issues, you can configure the simba.cassandraodbc.ini file to enable logging in the driver. For information about configuring logging, see Configuring Logging Options on page 30.

### Configuring SSL Verification

You can configure verification between the client and the Cassandra server over SSL by defining the SSLMode connection attribute in a connection string or in a DSN (in the odbc.ini file). Depending on the type of SSL verification that you use, there may be additional connection attributes that you must define. For more information about the attributes involved in configuring SSL verification, see Driver Configuration Options on page 42.

### Configuring a Connection without SSL

You can configure a connection that does not use SSL.

#### To configure a connection without SSL:

Set the SSLMode connection attribute to 0.

### Configuring One-way SSL Verification

You can enable the client to verify the Cassandra server.

#### To configure one-way SSL verification:

- 1. Set the SSLMode connection attribute to 1.
- 2. Set the UseSslIdentityCheck connection attribute to 1.
- 3. Set the SSLTrustedCertsPath connection attribute to the full path of the .pem file containing the certificate for verifying the server.

### Configuring Two-way SSL Verification

You can enable the client and the Cassandra server to verify each other.

### To configure two-way SSL verification:

- 1. Set the SSLMode connection attribute to 2.
- 2. Set the UseSslIdentityCheck connection attribute to 1.
- 3. Set the SSLTrustedCertsPath connection attribute to the full path of the .pem file containing the certificate for verifying the server.
- 4. Set the SSLUserCertsPath connection attribute to the full path of the .pem file containing the certificate for verifying the client.

- 5. Set the SSLUserKeyPath connection attribute to the full path of the file containing the private key used to verify the client.
- 6. If the private key file is protected with a password, set the SSLUserKeyPWD connection attribute to specify the password.

#### ! Important:

Passwords are saved in plain text in the DSN; they are not encrypted or censored.

### Configuring an SSL Connection that does not Verify Certificates

You can configure a connection that uses SSL but does not verify the client or the server.

#### To configure an SSL connection without verification:

- 1. Set the SSLMode connection attribute to 1 or 2.
- 2. Set the UseSslIdentityCheck connection attribute 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.

Use the LogLevel key to set the amount of detail included in log files. The following table lists the logging levels provided by the Simba Cassandra ODBC Driver, in order from least verbose to most verbose.

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.

LogLevel Value	Description
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.

#### To enable logging:

- 1. Open the simba.cassandraodbc.ini configuration file in a text editor.
- 2. Set the LogLevel key to the desired level of information to include in log files. For example:

LogLevel=2

3. Set the LogPath key to the full path to the folder where you want to save log files. For example:

LogPath=/localhome/employee/Documents

4. Set the LogFileCount key to 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.

5. Set the LogFileSize key to 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.

- 6. Save the simba.cassandraodbc.ini configuration file.
- 7. Restart your ODBC application to make sure that the new settings take effect.

The Simba Cassandra ODBC Driver produces a log file named SimbaCassandra ODBC Driver\_driver.log at the location you specify using the LogPath key.

#### To disable logging:

- 1. Open the simba.cassandraodbc.ini configuration file in a text editor.
- 2. Set the LogLevel key to 0.
- 3. Save the simba.cassandraodbc.ini configuration file.

### **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 isgl and iusgl.

### 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.



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 <a href="http://www.iodbc.org">http://www.iodbc.org</a>.

#### To test your connection using the iODBC driver manager:

- 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 an ODBC connection string using the following format, specifying additional connection attributes as needed:

```
DSN=[DataSourceName]; [Key]=[Value]
```

[DataSourceName] is the DSN that you are using for the connection. [Key] is any connection attribute that is not already specified as a configuration key in the DSN, and [Value] is the value for the attribute. Add key-value pairs to the connection string as needed, separating each pair with a semicolon (;).

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.



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 <a href="http://www.unixodbc.org">http://www.unixodbc.org</a>.

#### 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.



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

### 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 <u>Driver Configuration Options</u> on page 42.

### **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:

- [PortNumber] is the number of the TCP port that the Cassandra server uses to listen for client connections.
- [Server] is the IP address or host name of the Cassandra server to which you are connecting. You can specify a comma-separated list of servers.
- [YourPassword] is the password corresponding to your user name.
- [YourUserName] is the user name that you use to access the Cassandra server.

### Connecting to a Cassandra Server Without Authentication

The following is the format of a DSN-less connection string for a Cassandra server that does not require authentication:

```
Driver=Simba Cassandra ODBC Driver; Host=[Server];
Port=[PortNumber];
```

#### For example:

```
Driver=Simba Cassandra ODBC Driver; Host=192.168.222.160;
Port=9042;
```

### Connecting to a Cassandra Server Requiring Authentication

The following is the format of a DSN-less connection string for a Cassandra server that requires authentication:

```
Driver=Simba Cassandra ODBC Driver; Host=[Server];
Port=[PortNumber]; AuthMech=1; UID=[YourUserName];
PWD=[YourPassword];
```

#### For example:

```
Driver=Simba Cassandra ODBC Driver; Host=192.168.222.160;
Port=9042; AuthMech=1; UID=simba; PWD=simba;
```

#### **Features**

For more information on the features of the Simba Cassandra ODBC Driver, see the following:

- SQL Connector on page 36
- Data Types on page 36
- Virtual Tables on page 38
- Write-Back on page 40
- Query Modes on page 41
- Authentication on page 41
- Catalog and Schema Support on page 41

### **SQL** Connector

The SQL Connector feature of the driver allows applications to execute standard SQL queries against Cassandra. It converts SQL-92 queries to CQL operations and processes the results. When the driver is configured to work in SQL with CQL Fallback mode, it uses the SQL Connector to handle SQL queries by loading and processing the data in memory. This feature enables the driver to support SQL operations that cannot be executed natively through CQL queries, such as column filtering and table joins.

### **Data Types**

The Simba Cassandra ODBC Driver can convert between Cassandra data types and SQL data types.

The table below lists the supported ODBC 3.x data type mappings. A few data types are mapped to a different type when using ODBC 2.x. Those data type mappings are listed in the next table.

To support complex data types such as sets, lists, and maps, the driver renormalizes the data into virtual tables. For more information, see Virtual Tables on page 38.

Cassandra Type	SQL Type
ASCII	SQL_VARCHAR
BIGINT	SQL_INT

Cassandra Type	SQL Type
BLOB	SQL_LONGVARBINARY
BOOLEAN	SQL_BIT
COUNTER	SQL_BIGINT
DATE	SQL_DATE (2.x) and SQL_TYPE_DATE (3.x)
DECIMAL	SQL_DECIMAL
DOUBLE	SQL_DOUBLE
FLOAT	SQL_REAL
INET	SQL_VARCHAR
INT	SQL_INTEGER
SMALLINT	SQL_SMALLINT
TEXT	SQL_WVARCHAR
TIME	SQL_TIME (2.x) or SQL_TYPE_TIME (3.x)
TIMESTAMP See the note below.	SQL_TYPE_TIMESTAMP
TIMEUUID	GUID
TINYINT	SQL_TINYINT
UUID	GUID
VARCHAR	SQL_VARCHAR
VARINT	SQL_NUMERIC

#### */* 1

#### Note:

Cassandra internally represents a Timestamp value as a 64-bit signed integer value representing the number of milliseconds since epoch January 1 1970 at 00:00:00 GMT. The range of Timestamp values supported by the Simba Cassandra ODBC Driver is from "1601-01-01 00:00:00.000" to "9999-12-31 23:59:59.999".

Cassandra Type	SQL Type
TIMESTAMP See the note above.	SQL_TIMESTAMP
TIMEUUID	SQL_VARCHAR
UUID	SQL_VARCHAR

## **Virtual Tables**

One advantage of the Apache Cassandra design is the ability to store data that is denormalized into fewer tables. By taking advantage of nested data structures such as sets, lists, and maps, transactions can be simplified. However, the ODBC interface does not natively support accessing this type of data. By renormalizing the data contained within collections (sets, lists, and maps) into virtual tables, the Simba Cassandra ODBC Driver allows users to directly interact with the data but leave the storage of the data in its denormalized form in Cassandra.

If a table contains any collection columns, when the table is queried for the first time, the driver creates the following virtual tables:

- A "base" table, which contains the same data as the real table except for the collection columns.
- A virtual table for each collection column, which expands the nested data.

Virtual tables refer to the data in the real table, enabling the driver to access the denormalized data. By querying the virtual tables, you can access the contents of Cassandra collections via ODBC. When you write or modify data in a virtual table, the data in the real table in the Cassandra database is updated.

The base table and virtual tables appear as additional tables in the list of tables that exist in the database. The base table uses the same name as the real table that it represents. The virtual tables that represent collections are named using the name of the real table, a separator ( vt by default), and the name of the column.

For example, consider the table below. ExampleTable is a Cassandra database table that contains an integer primary key column named pk\_int, a list column, a map column, and a set column (named StringSet).

pk_int	List	Мар	StringSet
1	["1", "2" , "3"]	{ "S1" : "a", "S2" : "b" }	{ "A", "B", "C" }
3	["100", "101", "102", "105"]	{ "S1" : "t" }	{ "A", "E" }

The driver would generate multiple virtual tables to represent this single table. The first virtual table is the base table, shown below.

pk_int		
1		
3		

The base table contains the same data as the original database table except for the collections, which are omitted from this table and expanded in other virtual tables.

The following tables show the virtual tables that renormalize the data from the List, Map, and StringSet columns.

pk_int	List#index	List#value
1	0	1
1	1	2
1	2	3
3	0	100
3	1	101
3	2	102
3	3	105

pk_int	Map#key	Map#value
1	S1	Α
1	S2	b
3	S1	t

pk_int	StringSet#value
1	A
1	В
1	С
3	A
3	E

The foreign key columns in the virtual tables reference the primary key columns in the real table, and indicate which real table row the virtual table row corresponds to. The columns with names that end with #index or #key indicate the position of the data within the original list or map. The columns with names that end with #value contain the expanded data from the collection.

The data in the virtual tables can be selected, inserted, and updated as if they were normal tables, and the driver will handle the storage details within Cassandra. You can also explicitly append data to the end of a list by inserting a row of data with the index column set to -1.

For example, to append 106 to the List column in ExampleTable, where pk\_int = 3, use the following query:

```
INSERT INTO "ExampleTable_vt_List" (pk_int, "List#index",
"List#value") VALUES (3, -1, '106')
```

### Write-Back

The Simba Cassandra ODBC Driver supports Data Manipulation Languages (DML) statements such as INSERT, UPDATE, and DELETE.

Because Cassandra supports the UPSERT operation instead of INSERT and UPDATE, when you execute an INSERT or UPDATE statement using the Simba Cassandra ODBC Driver, the resulting behavior is an UPSERT operation. When you use the driver to write data to a Cassandra database, the INSERT and UPDATE operations both set the column value regardless of whether the data already exists.

You can use the TRUNCATE TABLE statement to delete rows from non-virtual tables. However, to delete rows from virtual tables, you must use the DELETE FROM statement instead.

## **Query Modes**

The Simba Cassandra ODBC Driver can be configured to process queries as SQL statements or as CQL statements.

The default query mode used by the driver is SQL with CQL Fallback. In this query mode, the driver treats all incoming queries as SQL. If an error occurs while handling the query as SQL, then the driver will pass the original query to Cassandra to execute as CQL. However, because Cassandra is not aware of virtual tables, incoming queries that reference virtual tables will fail when they are passed through to the server to be executed as CQL.

Alternatively, you can configure the driver to work in SQL mode or CQL mode. When working in SQL mode, the driver treats all incoming queries as SQL, so any queries that are not written in standard SQL-92 syntax will fail. When working in CQL mode, the driver treats all incoming queries as CQL, so any queries written in a non-CQL syntax will fail.

### **Authentication**

The Cassandra service supports authentication through user login. Configure authentication for your connection by enabling the authentication mechanism and then specifying a user name and password in the DSN or in the connection string.

# Catalog and Schema Support

The Simba Cassandra ODBC Driver supports both catalogs and schemas to make it easy for the driver to work with various ODBC applications. Since Cassandra only organizes column families into keyspaces, the driver provides a synthetic catalog named CASSANDRA under which all of the keyspaces are organized. The driver also maps the ODBC schema to the Cassandra keyspace.

## **Driver Configuration Options**

Driver Configuration Options lists the configuration options available in the Simba Cassandra ODBC Driver alphabetically by field or button label.

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

- Simba Cassandra ODBC Driver DSN Setup
- Advanced Options

When using a connection string or configuring a connection from a Linux or Mac OS X machine, use the key names provided.

The following configuration options are available:

- Binary Column Length on page 43
- Client-side Certificate on page 44
- Client-side Private Key on page 44
- Default Keyspace on page 44
- Enable Case Sensitive on page 44
- Enable Latency Aware on page 45
- Enable Null Value Insert on page 45
- Enable Paging on page 46
- Enable Token Aware on page 47
- Enable Server Hostname Verification on page 47
- Host on page 47
- Key File Password on page 48
- Load Balancing Policy on page 48
- Log Level on page 48

- Log Path on page 49
- Mechanism on page 50
- Password on page 50
- Port on page 50
- Query Mode on page 51
- Rows Per Page on page 51
- SSL on page 51
- String Column Length on page 52
- Trusted CA Certificates on page 52
- Tunable Consistency on page 53
- Use SQL\_WVARCHAR For String Data Types on page 53
- User Name on page 54
- Virtual Table Name Separator on page 54

## Binary Column Length

Key Name	Default Value	Required
BinaryColumnLength	4000	No

## Description

The default column length to report for BLOB columns.

## **Blacklist Hosts**

Key Name	Default Value	Required
BlacklistFilteringHosts	None	No

### **Description**

The IP addresses of data store hosts in the Cassandra cluster you do not wish to connect to. Each IP addresses should be entered in quotation marks, separated by a comma.

For example: "1.2.3.4", "5.6.7.8".

## **Blacklist Data Center Hosts**

Key Name	Default Value	Required
BlacklistDatacenterFilteringHosts	None	No

## **Description**

The address or name of data center hosts in the Cassandra cluster you do not wish to connect to. Each name or addresses should be entered in quotation marks, separated by a comma.

For example: "datacenter1", "datacenter2".

## Client-side Certificate

Key Name	Default Value	Required
SSLUserCertsPath	None	Yes, if two-way SSL verification is enabled.

## Description

The full path to the .pem file containing the certificate for verifying the client.

## Client-side Private Key

Key Name	Default Value	Required
SSLUserKeyPath	None	Yes, if two-way SSL verification is enabled.

## **Description**

The full path to the file containing the private key used to verify the client.

# Default Keyspace

Key Name	Default Value	Required
DefaultKeyspace	None	No

## **Description**

The default keyspace (schema) to connect to in Cassandra.

## **Enable Case Sensitive**

Key Name	Default Value	Required
EnableCaseSensitive	Selected (1)	No

This option specifies whether the driver differentiates between capital and lower-case letters in schema, table, and column names.

- Enabled (1): The driver differentiates between capital and lower-case letters in schema, table, and column names. It is recommended that you enclose the names of all schemas, tables, and columns in double quotation marks (") if this option is enabled.
- Disabled (10): The driver ignores the capitalization of schema, table, and column names.

#### ! Important:

- If the naming conventions for your Cassandra server are case-sensitive, you must leave this option enabled.
- If you are using the driver in a BI tool such as Tableau or Lumira, it is recommended that you leave this option enabled.
- If this option is disabled, then queries that use case-sensitive schema, table, and column names are not supported.

## **Enable Latency Aware**

Key Name	Default Value	Required
EnableLatencyAware	Clear (0)	No

## **Description**

This option specifies whether the driver uses a latency-awareness algorithm to distribute the load away from slower-performing nodes.

- Enabled (1): The driver uses the latency-awareness algorithm.
- Disabled (0): The driver does use the latency-awareness algorithm.

## **Enable Null Value Insert**

Key Name	Default Value	Required
EnableNullInsert	Clear (0)	No

This option specifies how the driver inserts NULL values.

- Enabled (1): The driver inserts all NULL values as specified in INSERT statements.
- Disabled (0): If an INSERT statement only specifies NULL values for a column or does not specify any values for a column, then the driver omits that column when executing the INSERT statement.

Consider the following before modifying this property:

- It is recommended that you leave the property disabled so that the driver does not insert NULL values into empty cells and create tombstones, which may decrease server performance and cause errors to occur. However, this setting may decrease driver performance when executing INSERT statements that affect a large number of rows.
- It is recommended that you enable this property by setting it to 1 only when executing INSERT statements that do not contain unnecessary NULL values, because inserting NULL values into empty columns creates tombstones.

For more information about tombstones, see "About deletes" in the Apache Cassandra 2.0 documentation: http://docs.datastax.com/en/cassandra/2.0/cassandra/dml/dml\_about\_deletes\_c.html.

## **Enable Paging**

Key Name	Default Value	Required
EnablePaging	Selected (1)	No

## Description

This option specifies whether to split large result sets into pages.

- Enabled (1): The driver splits large result sets into pages.
- Disabled (0): The driver fetches all results into memory regardless of the result set size.

See also the driver configuration option Rows Per Page on page 51.

## **Enable Server Hostname Verification**

Key Name	Default Value	Required
UseSslIdentityCheck	Selected (1)	No

### **Description**

This option specifies whether the driver requires the host name of the server to match the host name in the SSL certificate.

- Enabled (1): During SSL verification the driver requires the host name of the server to match the host name in the certificate.
- Disabled (0): During SSL verification the driver allows the host name of the server to not match the host name in the certificate.

### **Enable Token Aware**

Key Name	Default Value	Required
EnableTokenAware	Selected (1)	No

## Description

This option specifies whether to use a token-aware policy to improve load balancing and latency.

- Enabled (1): The driver uses the token-aware policy.
- Disabled (1): The token-aware policy is not used.

### Host

Key Name	Default Value	Required
Host	None	Yes

## **Description**

The IP address or host name of the Cassandra server.

You can specify a comma-separated list of IP addresses or host names. The driver will attempt to connect to all the servers concurrently, and then keep the first connection that is successfully established. The driver does not maintain a connection with any of the other servers in the list.

## Key File Password

Key Name	Default Value	Required
SSLUserKeyPWD	None	No

### **Description**

The password for the private key file that is specified in the Client-side Private Key field or the SSLUserKeyPath key.

For more information, see Client-side Private Key on page 44.

# **Load Balancing Policy**

Key Name	Default Value	Required
COLoadBalancingPolicy	DC Aware (0)	No

## **Description**

This option specifies the load balancing policy to be used.

- Round Robin (1): The driver uses the Round Robin policy to cycle through all nodes in the cluster on a per-query basis.
- DC Aware (0): The driver uses the DC Aware policy. For each query, all nodes in a primary "local" data center are tried first, before any nodes from other data centers.

## Log Level

Key Name	Default Value	Required
LogLevel	OFF (0)	No

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 simba.cassandraodbc.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 Simba Cassandra ODBC Driver\_driver.log in the location specified in the Log Path (LogPath) property.

## Log Path

Key Name	Default Value	Required
LogPath	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

simba.cassandraodbc.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)
- User Name And Password (1)

### **Password**

Key Name	Default Value	Required
PWD	None	Yes, if the authentication mechanism is User Name And Password (1).

## **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	9042	

The number of the TCP port that the Cassandra server uses to listen for client connections.

## **Query Mode**

Key Name	Default Value	Required
QueryMode	SQL with CQL Fallback (2)	No

### **Description**

This option specifies the query mode to use when sending queries to Cassandra.

- SQL (0):The driver uses SQL\_QUERY\_MODE and executes all queries in SQL.
- CQL (1): The driver uses CQL QUERY MODE and executes all queries in CQL.
- SQL with CQL Fallback (2): The driver uses SQL\_WITH\_CQL\_FALLBACK\_QUERY\_MODE and executes all queries in SQL by default. If a query fails, then the driver executes the query in CQL.

## Rows Per Page

Key Name	Default Value	Required
RowsPerPage	10000	No

### **Description**

When the Enable Paging option is enabled, use this option to specify the maximum number of rows to display on each page.

See also the driver configuration option Enable Paging on page 46.

## SSL

Key Name	Default Value	Required
SSLMode	No SSL (0)	No

This option specifies how the driver uses SSL to connect to the Cassandra server.

- No SSL (0): The driver does not use SSL.
- One-way Server Verification (1): If the Enable Server Hostname Verification
  option is enabled, the client verifies the Cassandra server using SSL. Otherwise,
  the driver connects to the Cassandra server using SSL but the client and the
  server do not verify each other.
- Two-way Server and Client Verification (2): If the Enable Server Hostname Verification option is enabled, the client and the Cassandra server verify each other using SSL. Otherwise, the driver connects to the Cassandra server using SSL but the client and the server do not verify each other.

For more information, see Enable Server Hostname Verification on page 47.

# String Column Length

Key Name	Default Value	Required
StringColumnLength	4000	No

### **Description**

The default column length to report for ASCII, TEXT, and VARCHAR columns.

## **Trusted CA Certificates**

Key Name	Default Value	Required
SSLTrustedCertsPath	The path to the cacerts.pem file in the \lib folder in the driver's installation directory.  The exact file path varies depending on the version of the driver that is installed.	Yes, if SSL verification is enabled.

The full path to the .pem file containing the certificate for verifying the server.

## **Tunable Consistency**

Key Name	Default Value	Required
TunableConsistency	ONE (1)	No

## **Description**

The specific Cassandra replica or the number of Cassandra replicas that must process a query in order for the query to be considered successful.

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

- ANY (0)
- ONE (1)
- TWO (2)
- THREE (3)
- QUORUM (4)
- ALL (5)
- LOCAL\_QUORUM (6)
- EACH QUORUM (7)
- LOCAL\_ONE (10)

These settings correspond to the consistency levels available in Cassandra. For detailed information about each consistency level, see *Configuring data consistency* in the Apache Cassandra 2.0 documentation:

http://www.datastax.com/documentation/cassandra/2.0/cassandra/dml/dml\_config\_consistency\_c.html.

## Use SQL\_WVARCHAR For String Data Types

Key Name	Default Value	Required
UseSqlWVarchar	Clear (0)	No

This option specifies how text and varchar types are mapped to SQL.

- Enabled (1): The Cassandra text and varchar types are mapped to SQL\_ WVARCHAR.
- Disabled (0): The Cassandra text and varchar types are mapped to SQL\_ VARCHAR.

## **User Name**

Key Name	Default Value	Required
UID	None	Yes, if the authentication mechanism is User Name And Password (1).

## **Description**

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

# Virtual Table Name Separator

Key Name	Default Value	Required
VTTableNameSeparator	_vt_	No

### **Description**

The separator for naming a virtual table built from a collection.

The name of a virtual table consists of the name of the original table, then the separator, and then the name of the collection.

#### For example:

OriginalTable\_vt\_CollectionName

## Whitelist Hosts

Key Name	Default Value	Required
WhitelistFilteringHosts	None	No

## **Description**

The IP addresses of data store hosts in the Cassandra cluster you wish to connect to. Each IP addresses should be entered in quotation marks, separated by a comma.

For example: "1.2.3.4", "5.6.7.8".

## White List Data Center Hosts

Key Name	Default Value	Required
WhitelistDatacenterFilteringHosts	None	No

## **Description**

The addresses or names of the datacenter hosts in the Cassandra cluster you wish to connect to. Each name or addresses should be entered in quotation marks, separated by a comma.

For example: "datacenter1", "datacenter2".

## Contact Us

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

Technical Support is available Monday to Friday from 8 a.m. to 6 p.m. Pacific Time.

#### Note:

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

You can contact Technical Support via:

Email: support@simba.comWeb site: www.simba.com

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