Installation and Configuration Guide

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About This Guide

Purpose
The *Magnitude Simba Neo4j Data Connector for Business Intelligence Tools Installation and Configuration Guide* explains how to install and configure the Magnitude Simba Neo4j Data Connector for Business Intelligence Tools. The guide also provides details related to features of the connector.

Audience
The guide is intended for end users of the Simba Neo4j BI Connector, as well as administrators and developers integrating the connector.

Knowledge Prerequisites
To use the Simba Neo4j BI Connector, the following knowledge is helpful:

- Familiarity with the platform on which you are using the Simba Neo4j BI Connector
- Ability to use the data source to which the Simba Neo4j BI Connector 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.

ℹ️ Note:
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 Neo4j BI Connector

The Simba Neo4j BI Connector enables Business Intelligence (BI), analytics, and reporting on data. The connector 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 connector, which connects an application to the database. For more information about ODBC, see Data Access Standards on the Simba Technologies website: https://www.simba.com/resources/data-access-standards-glossary. For complete information about the ODBC specification, see the ODBC API Reference from the Microsoft documentation: https://docs.microsoft.com/en-us/sql/odbc/reference/syntax/odbc-api-reference.

The Installation and Configuration Guide is suitable for users who are looking to access Neo4j data from their desktop environment. Application developers might also find the information helpful. Refer to your application for details on connecting via ODBC.
Windows Connector

Windows System Requirements

The Simba Neo4j BI Connector supports Neo4j server version 4.x and Neo4j Aura. In addition, the Neo4j APOC library must be installed on the server machine.

The required APOC version depends on the Neo4j version that you are connecting to:

- Neo4j server version 4.x requires the matching APOC version or later (minimum version 4.0.0.4).

We recommend that you make sure APOC procedures are made accessible by adding or appending `apoc.*` to the list of comma separated procedures provided through `dbms.security.procedures.unrestricted` in the Neo4j server configuration file.

For example:

```
 dbms.security.procedures.unrestricted=algo.*,apoc.*
```

Install the connector on client machines where the application is installed. Before installing the connector, make sure that you have the following:

- Administrator rights on your machine.
- A machine that meets the following system requirements:
  - One of the following operating systems:
    - Windows 10 or 8.1
    - Windows Server 2019, 2016, or 2012
    - 100 MB of available disk space

Before the connector can be used, the Visual C++ Redistributable for Visual Studio 2015 with the same bitness as the connector must also be installed. If you obtained the connector from the Simba website, then your installation of the connector automatically includes this dependency. Otherwise, you must install the redistributable manually. You can download the installation packages for the redistributable at https://www.microsoft.com/en-ca/download/details.aspx?id=48145.

Installing the Connector on Windows

If you did not obtain this connector from the Simba website, you might need to follow a different installation procedure. For more information, see the Simba OEM ODBC Connectors Installation Guide.
On 64-bit Windows operating systems, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit connectors, and 32-bit applications must use 32-bit connectors. Make sure that you use a connector whose bitness matches the bitness of the client application:

- Simba Neo4j 1.0 32-bit.msi for 32-bit applications
- Simba Neo4j 1.0 64-bit.msi for 64-bit applications

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

**To install the Simba Neo4j BI Connector on Windows:**

1. Depending on the bitness of your client application, double-click to run Simba Neo4j 1.0 32-bit.msi or Simba Neo4j 1.0 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.
7. If you received a license file through email, then copy the license file into the \lib subfolder of the installation folder you selected above. You must have Administrator privileges when changing the contents of this folder.

**Creating a Data Source Name on Windows**

Typically, after installing the Simba Neo4j BI Connector, you need to create a Data Source Name (DSN).

Alternatively, for information about DSN-less connections, see Using a Connection String on page 35.

**To create a Data Source Name on Windows:**

1. From the Start menu, go to ODBC Data Sources.

**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 Neo4j.
2. In the ODBC Data Source Administrator, click the **Drivers** tab, and then scroll down as needed to confirm that the appears in the alphabetical list of ODBC connectors 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 and then click **Finish**. The DSN Setup dialog box opens.

6. In the **Data Source Name** field, type a name for your DSN.

8. Configure the data source name by specifying values for the properties.

9. To configure the sampling process for the connector, click **Advanced Options**. For more information, see Configuring Additional Options on Windows on page 11.

10. To configure logging behavior for the connector, click **Logging Options**. For more information, see Configuring Logging Options on Windows on page 12.

11. 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 Simba Neo4j ODBC Driver DSN Setup dialog box are correct. Contact your Neo4j server administrator as needed.

12. To save your settings and close the Simba Neo4j ODBC Driver DSN Setup dialog box, click **OK**.

13. To close the ODBC Data Source Administrator, click **OK**.
Configuring Authentication on Windows

Some Neo4j databases are configured to require authentication for access. To connect to a Neo4j server, you must configure the Simba Neo4j BI Connector to use the authentication mechanism that matches the access requirements of the server and provides the necessary credentials.

Basic authentication

By default, the Simba Neo4j BI Connector requires a user name and password when connecting to a Neo4j data store. You can also configure the connector to connect to the data store without requiring authentication.

To configure basic authentication on Windows:

1. To access authentication options, open the ODBC Data Source Administrator where you created the DSN, select the DSN, and then click Configure.
2. In the Method drop-down list, select Basic.
3. In the User field, type your Neo4j user name.
4. In the Password field, type the password associated with your Neo4j user name.
5. To encrypt your credentials, click the Options... dialog and choose one of the following:
   - If the credentials are used only by the current Windows user, select Current User Only.
   - Or, if the credentials are used by all users on the current Windows machine, select All Users Of This Machine.

   ! Note:
   
   The credentials in the DSN are always encrypted.

6. To save your settings and close the DSN Setup dialog box, click OK.

Configuring Additional Options on Windows

You can configure the sampling process used to create the node and relationship tables for the connector.

To configure additional options on Windows:

1. 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 Additional Options.
2. To configure a table name for a node with multiple labels, under **Labels**:
   a. In the **Separator** field, type a separator that is going between labels.
   b. In the **Sample Size** field, type the interval at which the connector samples nodes when scanning through the data store.
3. To configure a table name for a relationship type, under **Relationship Nodes**:
   a. In the **Separator** field, type a separator that is going between labels and relationship types.
   b. In the **Sample Size** field, type maximum number of relations that the connector samples for a given relationship type.
4. In the **IncludeLabels** field, type a comma-separated list of node labels to include during the metadata retrieval of nodes or relationships.
5. In the **IncludeRels** field, type a comma-separated list of relationship types to include during the metadata retrieval of nodes or relationships.
6. In the **ExcludeLabels** field, type a comma-separated list of node labels to exclude during the metadata retrieval of nodes or relationships.
7. In the **ExcludeRels** field, type a comma-separated list of relationship types to exclude during the metadata retrieval of nodes or relationships.
8. To save your settings and close the Additional Configuration dialog box, click **OK**.
9. To save your settings and close the Simba Neo4j ODBC Driver DSN Setup dialog box, click **OK**.

### Configuring Logging Options on Windows

To help troubleshoot issues, you can enable logging. In addition to functionality provided in the Simba Neo4j BI Connector, 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.

### Configuring Connector-wide Logging Options

The settings for logging apply to every connection that uses the Simba Neo4j BI Connector, so make sure to disable the feature after you are done using it. To configure logging for the current connection, see Configuring Logging for the Current Connection on page 14.
To enable connector-wide 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:

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

3. In the Log Path field, specify the full path to the folder where you want to save log files.
4. 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 connector deletes the oldest log file.

5. 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 connector creates a new file and continues logging.

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

The Simba Neo4j BI Connector produces the following log files at the location you specify in the Log Path field:

- A simbaneo4jodbcdriver.log file that logs connector activity that is not specific to a connection.
- A simbaneo4jodbcdriver_connection_[Number].log file for each connection made to the database, where [Number] is a number that identifies each log file. This file logs connector activity that is specific to the connection.

To disable connector logging on Windows:
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.
4. Restart your ODBC application to make sure that the new settings take effect.

Configuring Logging for the Current Connection

You can configure logging for the current connection by setting the logging configuration properties in the DSN or in a connection string. For information about the logging configuration properties, see Configuring Logging Options on Windows on page 12. Settings in the connection string take precedence over settings in the DSN, and settings in the DSN take precedence over connector-wide settings.

Note:
If the LogLevel configuration property is passed in via the connection string or DSN, the rest of the logging configurations are read from the connection string or DSN and not from the existing connector-wide logging configuration.

To configure logging properties in the DSN, you must modify the Windows registry. For information about the Windows registry, see the Microsoft Windows documentation.
Important:

Editing the Windows Registry incorrectly can potentially cause serious, system-wide problems that may require re-installing Windows to correct.

To add logging configurations to a DSN on Windows:

1. On the Start screen, type regedit, and then click the regedit search result.
2. Navigate to the appropriate registry key for the bitness of your connector and your machine:
   - 32-bit System DSNs: HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\ODBC\ODBC.INI\[DSN Name]
   - 64-bit System DSNs: HKEY_LOCAL_MACHINE\SOFTWARE\ODBC\ODBC.INI\[DSN Name]
   - 32-bit and 64-bit User DSNs: HKEY_CURRENT_USER\SOFTWARE\ODBC\ODBC.INI\[DSN Name]
3. For each configuration option that you want to configure for the current connection, create a value by doing the following:
   a. If the key name value does not already exist, create it. Right-click the [DSN Name] and then select New > String Value, type the key name of the configuration option, and then press Enter.
   b. Right-click the key name and then click Modify.
   c. In the Edit String dialog box, in the Value Data field, type the value for the configuration option.
4. Close the Registry Editor.
5. Restart your ODBC application to make sure that the new settings take effect.

Configuring SSL Connections on Windows

If you are connecting to a Neo4j server that has Secure Sockets Layer (SSL) enabled, then you can configure the connector to connect to an SSL-enabled socket and encrypt the connection. When connecting to a server over SSL, the connector uses one-way authentication to verify the identity of the server.
In this documentation, "SSL" indicates both TLS (Transport Layer Security) and SSL (Secure Sockets Layer). The connector supports industry-standard versions of TLS/SSL.

Configuring an SSL Connection without Identity Verification

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

To configure an SSL connection without verification on Windows:

1. To access the SSL options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click Configure.
2. Select the Use SSL check box.
3. Select the Allow Self-Signed Certificates check box.
4. To save your settings and close the Simba Neo4j ODBC Driver DSN Setup dialog box, click OK.

Configuring One-way SSL Identity Verification

You can configure one-way verification so that the client verifies the identity of the Neo4j server.

To configure one-way SSL identity verification on Windows:

1. To access the SSL options, open the ODBC Data Source Administrator where you created the DSN, then select the DSN, then click Configure, and then select the SSL tab.
2. Select the Use SSL check box.
3. In the PEM Certificate File field, specify the full path of the PEM file containing the certificate for verifying the server.
4. To save your settings and close the Simba Neo4j ODBC Driver DSN Setup dialog box, click OK.

Exporting a Data Source Name on Windows

After you configure a DSN, you can export it to be used on other machines. When you export a DSN, all of its configuration settings are saved in a .sdc file. You can then distribute the .sdc file to other users so that they can import your DSN configuration and use it on their machines.
To export a Data Source Name on Windows:

1. Open the ODBC Data Source Administrator where you created the DSN, select the DSN, click Configure, and then click Logging Options.
2. Click Export Configuration, specify a name and location for the exported DSN, and then click Save.

Your DSN is saved as a .sdc file in the location that you specified.

Importing a Data Source Name on Windows

You can import a DSN configuration from a .sdc file and then use those settings to connect to your data source.

To import a Data Source Name on Windows:

1. Open the ODBC Data Source Administrator where you created the DSN, select the DSN, click Configure, and then click Logging Options.
2. Click Import Configuration, browse to select the .sdc file that you want to import the DSN configuration from, and then click Open.
3. Click OK to close the Logging Options dialog box.

The Simba Neo4j BI Connector DSN Setup dialog box loads the configuration settings from the selected .sdc file. You can now save this DSN and use it to connect to your data source.

Verifying the Connector Version Number on Windows

If you need to verify the version of the Simba Neo4j BI Connector that is installed on your Windows machine, you can find the version number in the ODBC Data Source Administrator.

To verify the connector version number on Windows:

1. From the Start menu, go to ODBC Data Sources.

   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 Neo4j.

2. Click the Drivers tab and then find the Simba Neo4j BI Connector in the list of ODBC connectors that are installed on your system. The version number is displayed in the Version column.
macOS Connector

macOS System Requirements

The Simba Neo4j BI Connector supports Neo4j server version 4.x and Neo4j Aura. In addition, the Neo4j APOC library must be installed on the server machine.

The required APOC version depends on the Neo4j version that you are connecting to:

- Neo4j server version 4.x requires the matching APOC version or later (minimum version 4.0.0.4).

We recommend that you make sure APOC procedures are made accessible by adding or appending `apoc.*` to the list of comma separated procedures provided through `dbms.security.procedures.unrestricted` in the Neo4j server configuration file.

For example:

```
dbms.security.procedures.unrestricted=algo.*,apoc.*
```

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

- One of the following macOS versions:
  - macOS 10.14
  - macOS 10.15
  - macOS 11
- 150MB of available disk space
- One of the following ODBC driver managers installed:
  - iODBC 3.52.9 or later
  - unixODBC 2.2.14 or later

Installing the Connector on macOS

If you did not obtain this connector from the Simba website, you might need to follow a different installation procedure. For more information, see the Simba OEM ODBC Connectors Installation Guide.

The Simba Neo4j BI Connector is available for macOS as a .dmg file named Simba Neo4j 1.0.dmg. The connector supports both 32- and 64-bit client applications.
To install the Simba Neo4j BI Connector on macOS:

1. Double-click **Simba Neo4j 1.0.dmg** to mount the disk image.
2. Double-click **Simba Neo4j 1.0.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 connector files are installed in the `/Library/simba/neo4j` directory.

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 through email, then copy the license file into the `/lib` subfolder in the connector installation directory. You must have root privileges when changing the contents of this folder.

   For example, if you installed the connector to the default location, you would copy the license file into the `/Library/simba/neo4j/lib` folder.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the connector. For more information, see Configuring the ODBC Driver Manager on Non-Windows Machines on page 22.

**Verifying the Connector Version Number on macOS**

If you need to verify the version of the Simba Neo4j BI Connector that is installed on your macOS machine, you can query the version number through the Terminal.

**To verify the connector version number on macOS:**

- At the Terminal, run the following command:

  ```
  pkgutil --info simba.neo4jodbc
  ```

The command returns information about the Simba Neo4j BI Connector that is installed on your machine, including the version number.
Linux Connector

Linux System Requirements

The Simba Neo4j BI Connector supports Neo4j server version 4.x and Neo4j Aura. In addition, the Neo4j APOC library must be installed on the server machine.

The required APOC version depends on the Neo4j version that you are connecting to:

- Neo4j server version 4.x requires the matching APOC version or later (minimum version 4.0.0.4).

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

- One of the following distributions:
  - Red Hat® Enterprise Linux® (RHEL) 7 or 8
  - CentOS 7 or 8
  - SUSE Linux Enterprise Server (SLES) 12 or 15
  - Ubuntu 18.04 or 20.04
- One of the following ODBC driver managers installed:
  - iODBC 3.52.9 or later
  - unixODBC 2.2.14 or later

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

Installing the Connector Using the Tarball Package

If you did not obtain this connector from the Simba website, you might need to follow a different installation procedure. For more information, see the Simba OEM ODBC Connectors Installation Guide.

The Simba Neo4j BI Connector is available as a tarball package named SimbaNeo4jODBC-[Version].[Release]-Linux.tar.gz, where [Version] is the version number of the connector and [Release] is the release number for this version of the connector. The package contains both the 32-bit and 64-bit versions of the connector.

On 64-bit editions of Linux, you can execute both 32- and 64-bit applications. However, 64-bit applications must use 64-bit connectors, and 32-bit applications must use 32-bit connectors. Make sure that you use a connector whose bitness matches the
bittness of the client application. You can install both versions of the connector on the same machine.

**To install the connector using the tarball package:**

1. Log in as the root user, and then navigate to the folder containing the tarball package.
2. Run the following command to extract the package and install the connector:

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

   Where `[TarballName]` is the name of the tarball package containing the connector.

   The Simba Neo4j BI Connector files are installed in the `/opt/simba/neo4j` directory.

3. If you received a license file through email, then copy the license file into the `opt/simba/neo4j/lib/32` or `opt/simba/neo4j/lib/64` folder, depending on the version of the connector that you installed.

Next, configure the environment variables on your machine to make sure that the ODBC driver manager can work with the connector. For more information, see Configuring the ODBC Driver Manager on Non-Windows Machines on page 22.

**Verifying the Connector Version Number on Linux**

If you need to verify the version of the Simba Neo4j BI Connector that is installed on your Linux machine, you can search the connector’s binary file for version number information.

**To verify the driver version number on Linux using the binary file:**

1. Navigate to the `/lib` subfolder in your connector installation directory. By default, the path to this directory is: `/opt/simba/neo4j/lib`.
2. Open the driver’s `.so` binary file in a text editor, and search for the text `$driver_version_sb$`. The connector’s version number is listed after this text.
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 Simba Neo4j BI Connector, 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 22.
- If the connector 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.

After configuring the ODBC driver manager, you can configure a connection and access your data store through the connector.

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 connector. To do this, set the library path environment variable.

macOS

If you are using a macOS machine, then set theDYLD_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

If you are using a Linux machine, then set theLD_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 shell documentation.
Specifying the Locations of the Connector 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 simba.neo4jodbc.ini file in the lib subfolder of the connector 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 SIMBANE04JODBCINI to the full path and file name of the simba.neo4jodbc.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 ODBCSYSINI to the full path of the directory that contains the odbcinst.ini file.
- Set SIMBANE04JODBCINI to the full path and file name of the simba.neo4jodbc.ini file.

For example, if your odbc.ini and odbcinst.ini files are located in /usr/local/odbc and your simba.neo4jodbc.ini file is located in /etc, then set the environment variables as follows:

For iODBC:

```bash
export ODBCINI=/usr/local/odbc/odbc.ini
export ODBCINSTINI=/usr/local/odbc/odbcinst.ini
export SIMBANE04JODBCINI=/etc/simba.neo4jodbc.ini
```

For unixODBC:

```bash
export ODBCINI=/usr/local/odbc/odbc.ini
export ODBCSYSINI=/usr/local/odbc
export SIMBANE04JODBCINI=/etc/simba.neo4jodbc.ini
```
To locate the `simba.neo4jodbc.ini` file, the connector uses the following search order:

1. If the SIMBANE04JODBCINI environment variable is defined, then the
   connector searches for the file specified by the environment variable.
2. The connector searches the directory that contains the connector library files for
   a file named `simba.neo4jodbc.ini`.
3. The connector searches the current working directory of the application for a file
   named `simba.neo4jodbc.ini`.
4. The connector searches the home directory for a hidden file named
   `.simba.neo4jodbc.ini` (prefixed with a period).
5. The connector searches the `/etc` directory for a file named
   `simba.neo4jodbc.ini`. 
Configuring ODBC Connections on a Non-Windows Machine

The following sections describe how to configure ODBC connections when using the Simba Neo4j BI Connector on non-Windows platforms:

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 27.

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=Simba Neo4j BI Connector
   ```

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

   ```
   [ODBC Data Sources]
   Sample DSN=Simba Neo4j BI Connector 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=/Library/simba/neo4j/lib/libneo4jodbc_sbu.dylib
   ```

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

   ```
   Driver=/opt/simba/neo4j/lib/32/libneo4jodbc_sb32.so
   ```

b. Set the **Host** property to the IP address or host name of the server, and then set the **Port** property to the number of the TCP port that the server uses to listen for client connections.

   For example:

   ```
   Host=192.168.222.160
   Port=31010
   ```

c. 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 Simba Neo4j BI Connector, see **Connector Configuration Properties** on page 45.

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 29.

e. Optionally, 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 32.

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 Connector Configuration Files** on page 23.
For example, the following is an odbc.ini configuration file for macOS containing a DSN that connects to Neo4j without authentication:

```
[ODBC Data Sources]
Sample DSN=Simba Neo4j BI Connector
[Sample DSN]
Driver=/Library/simba/neo4j/lib/libneo4jodbc_sbu.dylib
Host=192.168.222.160
Port=31010
```

As another example, the following is an odbc.ini configuration file for a 32-bit driver on a Linux machine, containing a DSN that connects to Neo4j without authentication:

```
[ODBC Data Sources]
Sample DSN=Simba Neo4j BI Connector 32-bit
[Sample DSN]
Driver=/opt/simba/neo4j/lib/32/libneo4jodbc_sb32.so
Host=192.168.222.160
Port=31010
```

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 connector 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 connector installation directory to the home directory, and then update the file as described below.

**To define a connector 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 connector, an equal sign (=), and then Installed. For example:

   [ODBC Drivers]
   Simba Neo4j BI Connector=Installed

3. Create a section that has the same name as the connector (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 connector library file that matches the bitness of the application.
      For example, on a macOS machine:

      Driver=/Library/simba/neo4j/lib/libneo4jodbc_sbu.dylib

      As another example, for a 32-bit connector on a Linux machine:

      Driver=/opt/simba/neo4j/lib/32/libneo4jodbc_sb32.so

   b. Optionally, set the Description property to a description of the connector.
      For example:

      Description=Simba Neo4j BI Connector

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 Connector Configuration Files on page 23.

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

   [ODBC Drivers]
   Simba Neo4j BI Connector=Installed
As another example, the following is an odbcinst.ini configuration file for both the 32- and 64-bit connectors on Linux:

```
[ODBC Drivers]
Simba Neo4j BI Connector 32-bit=Installed
Simba Neo4j BI Connector 64-bit=Installed
[ 32-bit]
Description=Simba Neo4j BI Connector (32-bit)
Driver=/opt/simba/neo4j/lib/32/libneo4jodbc_sb32.so
[Simba Neo4j BI Connector 64-bit]
Description=Simba Neo4j BI Connector (64-bit)
Driver=/opt/simba/neo4j/lib/64/libneo4jodbc_sb64.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 connector 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 35.

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

- [Configuring Authentication on a Non-Windows Machine](#) on page 29
- [Configuring SSL Verification on a Non-Windows Machine](#) on page 32

For detailed information about all the connection properties that the connector supports, see [Connector Configuration Properties](#) on page 45.

### Configuring Authentication on a Non-Windows Machine

Some Neo4j databases require authentication. You can configure the Simba Neo4j BI Connector to provide your credentials and authenticate the connection to the database using Basic Authentication.

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.

#### Basic authentication

By default, the Simba Neo4j BI Connector requires a user name and password when connecting to a Neo4j data store. You can also configure the connector to connect to
the data store without requiring authentication.

**To configure Basic authentication:**

1. Set the **Auth_Type** property to **Basic**.
2. Set the **UID** property to an appropriate user name for accessing the Neo4j database.
3. Set the **PWD** property to the password corresponding to the user name you typed above.

**Configuring Logging Options on a Non-Windows Machine**

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

⚠️ **Important:**

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

You can set the connection properties described below in a connection string, in a DSN (in the `odbc.ini` file), or as a connector-wide setting (in the `simba.neo4jodbc.ini` file). Settings in the connection string take precedence over settings in the DSN, and settings in the DSN take precedence over connector-wide settings.

**To enable logging on a non-Windows machine:**

1. Open the `simba.neo4jodbc.ini` configuration file in a text editor.
2. To specify the level of information to include in log files, set the **LogLevel** property to one of the following numbers:

<table>
<thead>
<tr>
<th>LogLevel Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Disables all logging.</td>
</tr>
<tr>
<td>1</td>
<td>Logs severe error events that lead the connector to abort.</td>
</tr>
<tr>
<td>2</td>
<td>Logs error events that might allow the connector to continue running.</td>
</tr>
<tr>
<td>LogLevel Value</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>3</td>
<td>Logs events that might result in an error if action is not taken.</td>
</tr>
<tr>
<td>4</td>
<td>Logs general information that describes the progress of the connector.</td>
</tr>
<tr>
<td>5</td>
<td>Logs detailed information that is useful for debugging the connector.</td>
</tr>
<tr>
<td>6</td>
<td>Logs all connector activity.</td>
</tr>
</tbody>
</table>

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

4. 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 connector deletes the oldest log file.

5. Set the LogFileSize key to the maximum size of each log file in bytes.

**Note:**

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

6. Save the simba.neo4jodbc.ini configuration file.

7. Restart your ODBC application to make sure that the new settings take effect.

The Simba Neo4j BI Connector produces the following log files at the location you specify using the LogPath key:

- A simbaneo4jodbcdriver.log file that logs connector activity that is not specific to a connection.
- A simbaneo4jodbcdriver_connection_[Number].log file for each connection made to the database, where [Number] is a number that identifies each log file. This file logs connector activity that is specific to the connection.
To disable logging on a non-Windows machine:

1. Set the LogLevel key to 0.
2. Save the simba.neo4jodbc.ini configuration file.
3. Restart your ODBC application to make sure that the new settings take effect.

Configuring SSL Verification on a Non-Windows Machine

If you are connecting to a Neo4j server that has Secure Sockets Layer (SSL) enabled, then you can configure the connector to connect to an SSL-enabled socket. When connecting to a server over SSL, the connector uses one-way authentication to verify the identity of the server.

Note:

In this documentation, "SSL" indicates both TLS (Transport Layer Security) and SSL (Secure Sockets Layer). The connector supports industry-standard versions of TLS/SSL.

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.

Configuring an SSL Connection without Identity Verification

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

To configure an SSL Connection without Identity Verification on a non-Windows machine:

1. Set the SSL property to 1.
2. Set the AllowSelfSignedServerCert property to 1.

Configuring One-way SSL Identity Verification

You can configure one-way verification so that the client verifies the identity of the Neo4j server.

To configure one-way SSL verification on a non-Windows machine:

1. Set the SSL property to 1.
2. Set the TrustedCerts property to the full path of the .pem file containing the certificate for verifying the server.
Testing the Connection on a Non-Windows Machine

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 connector. Use iodbctest to test how your connector works with an ANSI application, or use iodbctestw to test how your connector 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 connector and your DSN. isql and iusql can only be used to test connections that use a DSN. Use isql to test how your connector works with an ANSI application, or use iusql to test how your connector 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.
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 Connector Configuration Properties on page 45.

⚠️ Important:
When connecting to the data store using a DSN-less connection string, the connector does not encrypt your credentials.

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:

- `DatabaseName` is the name of the database service.
- `PortNumber` is the number of the port that the Neo4j server uses to listen for client connections.
- `Server` is the IP address or host name of the Neo4j server to which you are connecting.
• \[YourPassword\] is the password corresponding to your user name.
• \[YourUserName\] is the user name that you use to access the Neo4j server.

**Connecting to a Standard Neo4j Server Without Authentication**

The following is the format of a DSN-less connection string for a standard connection to a Neo4j server that does not require authentication:

```sql
Driver=Simba Neo4j ODBC Driver;Host=[Server];Port=[PortNumber];Database=[DatabaseName];Auth_Type=None
```

For example:

```sql
Driver=Simba Neo4j ODBC Driver;Host=192.168.222.160;Port=31010;Database=neo4j;Auth_Type=None
```

**Connecting to a Standard Neo4j Server that requires Basic Authentication**

The following is the format of a DSN-less connection string for a standard connection to a Neo4j server that requires Basic authentication:

```sql
Driver=Simba Neo4j ODBC Driver;Port=[PortNumber];Database=[DatabaseName];Auth_Type=Basic;UID=[YourUserName];PWD=[YourPassword]
```

For example:

```sql
Driver=Simba Neo4j ODBC Driver;Host=192.168.222.160;Port=31010;Database=neo4j;Auth_Type=Basic;UID=simba;PWD=simba;
```
Features

For more information on the features of the Simba Neo4j BI Connector, see the following:

- Security and Authentication on page 37
- SQL Connector on page 37
- Catalog and Schema Support on page 38
- Schema Definition on page 38
- Nodes and Relationships on page 40
- Aggregate Function Passdown on page 41
- Filter Passdown on page 42
- Data Types on page 43

Security and Authentication

Note:

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

To protect data from unauthorized access, some Neo4j data stores require connections to be authenticated with user credentials. For information about configuring the connector to authenticate your connections, see Configuring Authentication on Windows on page 11 or Configuring Authentication on a Non-Windows Machine on page 29. For information about configuring authentication on your Neo4j server, see the Neo4j documentation.

Additionally, the connector supports one-way SSL encryption. SSL encryption protects data and credentials when they are transferred over the network, and provides stronger security than authentication alone. For information about configuring SSL connections, see Configuring SSL Connections on Windows on page 15 or Configuring SSL Verification on a Non-Windows Machine on page 32.

SQL Connector

The SQL Connector feature of the connector allows applications to use normal SQL queries against Neo4j, translating standard SQL-92 queries into equivalent Neo4j API
calls. This translation allows standard queries that BI tools execute to run against your Neo4j instance.

**Catalog and Schema Support**

The Simba Neo4j BI Connector supports both catalogs and schemas to make it easy for the connector to work with various ODBC applications.

Databases are mapped to catalogs. Depending on the version of Neo4j Server, the connector supports the following databases:

- For Neo4j Server 4.x, you can specify which database to connect to. If you do not specify a database, the connector connects to the default database that is specified by the server.

The connector supports two schemas:

- Node: a schema containing all the nodes in the graph that the connector connects to.
- Relationship: a schema containing all the relationships in the graph that the connector connects to.

For information about how the connector maps node and relationship data to a standard relational table format, see [Nodes and Relationships](#) on page 40.

**Schema Definition**

When the connector connects to a Neo4j database, it generates a temporary schema definition. This definition is based on the metadata retrieved through the following APOC procedures:

- `apoc.meta.nodeTypeProperties()`: the API call is used to obtain metadata for nodes with labels.
- `apoc.meta.relTypeProperties()`: the API call is used to obtain metadata for relationship types.

The input parameters for these API calls and their mapping to the connector's connection string properties are as defined in the table below:

<table>
<thead>
<tr>
<th>Input Parameter</th>
<th>Configuration Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>includeLabels</td>
<td>IncludeLabels</td>
</tr>
<tr>
<td>includeRels</td>
<td>IncludeRels</td>
</tr>
</tbody>
</table>
Input Parameter | Configuration Option
---|---
excludeLabels | ExcludeLabels
excludeRels | ExcludeRels
sample | LabelsSampleSize
maxRels | RelsSampleSize

Temporary schema definitions generated by the connector do not persist after the connection is closed. Also, the connector might generate different schema definitions during subsequent connections to the same database.

**Note:**

Make sure to configure the connector to sample all the necessary data. Nodes and relationship types that are not sampled by the APOC procedures are not included in the temporary schema definition, and therefore are not available in ODBC applications.

**Mapping Retrieved Metadata**

Neo4j is a graph database and therefore does not contain data in the traditional, relational form. Since traditional ODBC toolsets might not support such datasets, the Simba Neo4j BI Connector generates a schema definition that maps the Neo4j data to a ODBC-compatible format.

When the Simba Neo4j BI Connector generates a schema definition, it performs the following tasks:

1. Retrieves metadata from Simba Neo4j BI Connector through the above-mentioned APOC procedure calls and generates tables for node labels and relationship types based on the retrieved metadata. For more information, see Nodes and Relationships on page 40.
2. Assigns a Neo4j data type to each column.
3. Maps each Neo4j data type to the SQL data type that is best able to represent the greatest number of values.

During this schema generation process, the connector defines data types for each column, but does not change the data types of the individual node or relationship properties in the database. As a result, columns might contain mixed data types.
During read operations, values are converted to match the SQL data type of the column so that the connector can work with all the data in the column consistently.

**Nodes and Relationships**

The Simba Neo4j BI Connector creates tables to allow Neo4j nodes and relationships to be queried through SQL.

**Nodes**

The connector creates one table for each distinct combination of node labels.

For example, if the data store contains the following nodes:

- Node1, with the label [Alphabet]
- Node2, with the label [Google]
- Node3, with the labels [Alphabet, Google]

Then the connector creates the following tables:

- Alphabet: a table containing information for nodes that only have the label name "Alphabet".
- Alphabet__Google: a table containing information for nodes that only have the label names [Alphabet, Google] or [Google, Alphabet].
- Google: a table containing information for nodes that only have the label name "Google".

**Note:**

- The connector only creates tables for nodes that have labels.
- The default separator between the node label names is two underscores (__). To use a different separator, set the `LabelSeparator` configuration property. For more information, see `LabelSeparator` on page 48.

Each node table contains a virtual column named _NodeId_ that contains the ID for the representative node.

**Relationships**

The connector creates one table for each distinct combination of source label, relationship type, and target label.

For example, if the data store contains a relationship between the source labels Google and Alphabet, the relationship type Companies, and the target label Search, the connector creates the table Google__Alphabet_COMPANIES__Search.
Note:

- The default separator between the node label names is two underscores (___). To use a different separator, set the `LabelSeparator` configuration property.
- The default separator between node label names and relationship names is an underscore (_). To use a different separator, set the `RelNodeSeparator` configuration property.

For more information, see `LabelSeparator` on page 48 or `RelNodeSeparator` on page 51.

Each relationship table contains the following virtual columns:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>SourceId</em></td>
<td>The ID for the source node being connected.</td>
</tr>
<tr>
<td><em>TargetId</em></td>
<td>The ID for the target node being connected.</td>
</tr>
</tbody>
</table>

**Aggregate Function Passdown**

The Simba Neo4j BI Connector can pass certain queries down to the Neo4j server for execution. This improves the performance of the connector. Queries that are not passed down are executed by the connector.

**Important:**

The connector handles `SUM(NULL)` differently from the Neo4j server.

- The connector returns NULL for `SUM(NULL)`
- The Neo4j server returns 0 for `SUM(NULL)`

This might result in a discrepancy between queries that are passed down and queries that are resolved by the connector.

The connector supports a limited aggregate function passdown for simple queries. It enforces the following limitations:

- The supported expressions for the argument of an aggregate function are column references and literals.
The only supported expressions in the GROUP BY clause are column references.

- Aggregate functions must have 0 or 1 arguments.
- Aggregate functions are only supported in one level of any nested queries.

For example, the following queries can be passed down to the server:

- `SELECT C1, C2, AVG(C3) + SUM(C4) FROM T1 GROUP BY C1, C2`
- `SELECT C1, SUM(1.1) FROM T1 GROUP BY C1`
- `SELECT SUM(C1) FROM T1`
- `SELECT SUM(1.1) FROM T1 GROUP BY C1`

The following queries are not supported for aggregate function passdown:

- `SELECT C1, SUM(C2 + C3) FROM T1 GROUP BY C1`
- `SELECT C1 + 1.0, SUM(C2) FROM T1 GROUP BY C1 + 1.0`
- `SELECT COUNT(*) FROM (SELECT C1, COUNT(*) AS test FROM T1 GROUP BY C1) Ta GROUP BY test`

⚠️ **Important:**

Aggregate values calculated by the server can be different than values calculated by the connector.

For example, the SQL query `SELECT AVG(COL1) FROM t1, with COL1 containing the following values: 0.0, null, -0.0001, 4.9999, 99999.9999, 1.0, 1.0, 2.0, 3.0, 4.0, 5.0.

If the connector passes down the aggregation operation performed on COL1 to the Neo4j server, the aggregation result is determined to be 10002.09996999997. However, if the connector resolves the query and does not pass down the aggregation operation, the aggregation result is determined to be 10002.09997.

**Filter Passdown**

The Simba Neo4j BI Connector can pass down filters to the Neo4j server for execution. This improves the performance of the connector. Queries that are not passed down are executed by the connector.

The filter pass down supports conditions that operate on single columns.

For example, the following queries can be passed down to the server:
- SELECT * FROM table WHERE col1 = 'value'
- SELECT * FROM table WHERE col1 > 200 AND col2 LIKE '%sale%
- SELECT * FROM table WHERE col1 <> 'value' OR col2 IS NULL

The following queries are not supported for filter passdown:

- SELECT * FROM table WHERE col1 + col2 < 200
- SELECT * FROM table WHERE col1 = CONCAT('this', ' value')

**Important:**

When comparing strings with different lengths, the connector handles the "=" condition on strings differently from the Neo4j server. The connector pads the value with whitespaces, while the Neo4j server does not.

For example, when resolving "col1=col2", if the value of col1 is 'ValueTest ' and col2 is 'ValueTest', the connector reports a match, but the Neo4j server does not.

**Data Types**

The Simba Neo4j BI Connector supports many common data formats, converting between Neo4j data types and SQL data types.

The table below lists the supported data type mappings.

**Note:**

Any Neo4j data types that do not have a specific SQL mapping are mapped to SQLVARCHAR.

<table>
<thead>
<tr>
<th>Neo4j Type</th>
<th>SQL Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boolean</td>
<td>SQL_BIT</td>
</tr>
<tr>
<td>ByteArray</td>
<td>SQL_LONGVARBINARY</td>
</tr>
<tr>
<td>Date</td>
<td>SQL_DATE</td>
</tr>
<tr>
<td>DateTime</td>
<td>SQL_TIMESTAMP</td>
</tr>
<tr>
<td>Neo4j Type</td>
<td>SQL Type</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Duration</td>
<td>SQL_VARCHAR</td>
</tr>
<tr>
<td>Float</td>
<td>SQL_DOUBLE</td>
</tr>
<tr>
<td>Integer</td>
<td>SQL_BIGINT</td>
</tr>
<tr>
<td>LocalDateTime</td>
<td>SQL_TIMESTAMP</td>
</tr>
<tr>
<td>LocalTime</td>
<td>SQL_TIME</td>
</tr>
<tr>
<td>Point</td>
<td>SQL_VARCHAR</td>
</tr>
<tr>
<td>String</td>
<td>SQL_VARCHAR</td>
</tr>
<tr>
<td>Time</td>
<td>SQL_TIME</td>
</tr>
</tbody>
</table>
Connector Configuration Properties

Connector Configuration Options lists the configuration options available in the Simba Neo4j BI Connector alphabetically by field or button label. Options having only key names, that is, not appearing in the user interface of the connector, are listed alphabetically by key name.

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

- Logging Options

When using a connection string, use the key names provided below.

Configuration Options Appearing in the User Interface

The following configuration options are accessible via the Windows user interface for the Simba Neo4j BI Connector, or via the key name when using a connection string or configuring a connection from a Linux or macOS computer:

- Allow Self-Signed Server Certificate on page 46
- Auth_Type on page 46
- Database on page 46
- ExcludeLabels on page 47
- ExcludeRels on page 47
- Host on page 47
- IncludeLabels on page 48
- IncludeRels on page 48
- LabelSeparator on page 48
- LabelsSampleSize on page 49
- Log Level on page 49
- Log Path on page 50
- Max File Size on page 50
- Max Number Files on page 50
- Password on page 51
- PEM Key File on page 51
- Port on page 51
- RelNodeSeparator on page 51
- RelsSampleSize on page 52
- Enable SSL on page 52
- User on page 52
### Allow Self-Signed Server Certificate

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AllowSelfSignedServerCert</td>
<td>Clear (0)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

This option specifies whether the connector allows a connection to a Neo4j server that uses a self-signed certificate.

- **Enabled (1):** The connector authenticates the Neo4j server even if the server is using a self-signed certificate.
- **Disabled (0):** The connector does not allow self-signed certificates from the server.

**Note:**

This setting is applicable only when SSL is enabled.

### Auth_Type

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auth_Type</td>
<td>Basic</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

This option specifies the authentication method to use.

By default, the connection is authenticated by using basic authentication. To disable authentication, set this property to `None`.

### Database

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>Retrieved from server.</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

The name of the Neo4j database that you want to access.
### ExcludeLabels

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExcludeLabels</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

A comma-separated list of node labels to exclude during the metadata retrieval of nodes or relationships. Each item in the list must be surrounded by single quotation marks (').

For example:

```excludeLabels='Person','Friend'```

### ExcludeRels

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExcludeRels</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

A comma-separated list of relationship types to exclude during the metadata retrieval of nodes or relationships. Each item in the list must be surrounded by single quotation marks (').

For example:

```excludeRels='HAS','INCLUDES'```

### Host

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host</td>
<td>None</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Description**

The IP address or host name of the Neo4j server.
### IncludeLabels

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>IncludeLabels</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

A comma-separated list of node labels to include during the metadata retrieval of nodes or relationships. Each item in the list must be surrounded by single quotation marks (').

For example:

```
IncludeLabels='Person','Friend'
```

### IncludeRels

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>IncludeRels</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

A comma-separated list of relationship types to include during the metadata retrieval of nodes or relationships. Each item in the list must be surrounded by single quotation marks (').

For example:

```
IncludeRels='HAS','INCLUDES'
```

### LabelSeparator

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LabelSeparator</td>
<td>Two underscores (___)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

The separator between labels that the connector uses when creating a table name for a node with multiple labels.
**LabelsSampleSize**

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LabelSampleSize</td>
<td>1000</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

The interval at which the connector samples nodes when scanning through the data store. For example, if you set this property to 2000, then the connector samples one node for every 2000 nodes in the data store.

**Log Level**

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogLevel</td>
<td>OFF (0)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

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

Set the property to one of the following values:

- **OFF (0)**: Disable all logging.
- **FATAL (1)**: Logs severe error events that lead the connector to abort.
- **ERROR (2)**: Logs error events that might allow the connector 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 connector.
- **DEBUG (5)**: Logs detailed information that is useful for debugging the connector.
- **TRACE (6)**: Logs all connector activity.
- A simbaneo4jodbcdriver.log file that logs connector activity that is not specific to a connection.
- A simbaneo4jodbcdriver_connection_[Number].log file for each connection made to the database, where [Number] is a number that identifies each log file. This file logs connector activity that is specific to the connection.
## Log Path

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogPath</td>
<td>None</td>
<td>Yes, if logging is enabled.</td>
</tr>
</tbody>
</table>

**Description**
The full path to the folder where the connector saves log files when logging is enabled.

## Max File Size

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogFileSize</td>
<td>20971520</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**
The maximum size of each log file in bytes. After the maximum file size is reached, the connector creates a new file and continues logging.

If this property is set using the Windows UI, the entered value is converted from megabytes (MB) to bytes before being set.

## Max Number Files

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogFileCount</td>
<td>50</td>
<td>No</td>
</tr>
</tbody>
</table>

**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 connector deletes the oldest log file.
Password

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWD</td>
<td>None</td>
<td>Yes, unless Auth_Type is set to None.</td>
</tr>
</tbody>
</table>

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

PEM Key File

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>TrustedCerts</td>
<td>None</td>
<td>No</td>
</tr>
</tbody>
</table>

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

Port

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>7687</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Description
The number of the TCP port that the Neo4j server uses to listen for client connections.

RelNodeSeparator

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>RelNodeSeparator</td>
<td>Underscore (_)</td>
<td>No</td>
</tr>
</tbody>
</table>

Description
The separator between labels and relationship types that the connector uses when creating a table name for a relationship type.
RelsSampleSize

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>RelsSampleSize</td>
<td>100</td>
<td>No</td>
</tr>
</tbody>
</table>

Description

The maximum number of relations that the connector samples for a given relationship type.

Enable SSL

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSL</td>
<td>Clear (0)</td>
<td>No</td>
</tr>
</tbody>
</table>

Description

This option specifies whether the client uses an SSL encrypted connection to communicate with the Neo4j server.

- Enabled (1): The client communicates with the Neo4j server using SSL.
- Disabled (0): SSL is disabled.

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

User

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>UID</td>
<td>None</td>
<td>Yes, unless Auth_Type is set to None.</td>
</tr>
</tbody>
</table>

Description

The user name that you use to access the Neo4j server.

Configuration Options Having Only Key Names

The following configuration options do not appear in the Windows user interface for the Simba Neo4j BI Connector. They are accessible only when you use a connection
string or configure a connection on macOS or Linux.

- **Driver** on page 53
- **StrictlyUseBoltScheme** on page 53

### Driver

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Simba Neo4j ODBC Driver when installed on Windows, or the absolute path of the connector shared object file when installed on a non-Windows machine.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Description**

On Windows, the name of the installed connector (**Simba Neo4j ODBC Driver;**).

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

### StrictlyUseBoltScheme

<table>
<thead>
<tr>
<th>Key Name</th>
<th>Default Value</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>StrictlyUseBoltScheme</td>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>

**Description**

This property specifies whether the connector uses the bolt:// scheme for connection.

- **1**: The connector only attempts to connect using the bolt:// scheme.
- **0**: The connector attempts to connect using the neo4j://scheme. If the connection fails, the connector then attempts to connect using the bolt:// scheme.

We recommend that you use the bolt:// scheme to connect to a standalone endpoint and the neo4j:// scheme to connect to a clustered endpoint.
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