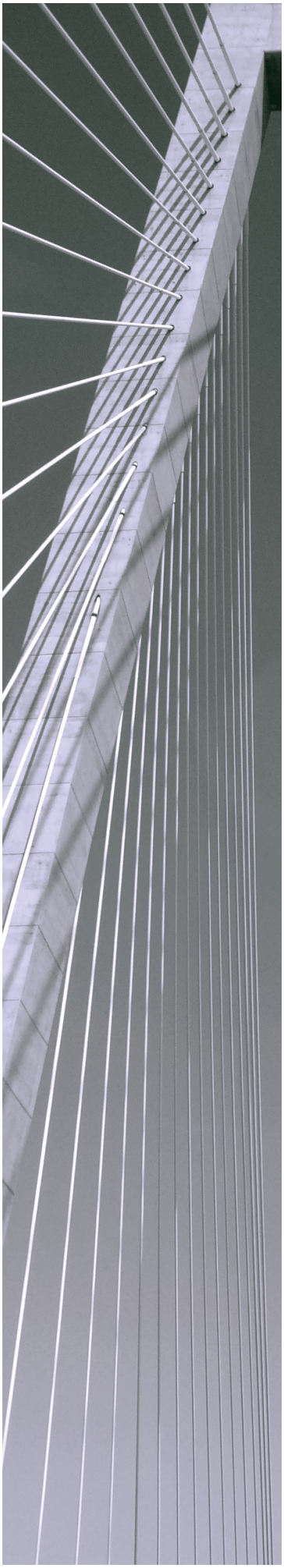

Simba Presto JDBC Driver with SQL Connector

Installation and Configuration Guide

Simba Technologies Inc.

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About This Guide

Purpose

The *Simba Presto JDBC Driver with SQL Connector Installation and Configuration Guide* explains how to install and configure the Simba Presto JDBC Driver with SQL Connector on all supported platforms. The guide also provides details related to features of the driver.

Audience

The guide is intended for end users of the Simba Presto JDBC Driver.

Knowledge Prerequisites

To use the Simba Presto JDBC Driver, the following knowledge is helpful:

- Familiarity with the platform on which you are using the Simba Presto JDBC Driver
- Ability to use the data store to which the Simba Presto JDBC Driver is connecting
- An understanding of the role of JDBC technologies in connecting to a data store
- Experience creating and configuring JDBC 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.

> **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 Presto JDBC Driver

About Presto

Presto is a low latency distributed query engine capable of querying large datasets from multiple data sources using SQL.

The data sources that Presto supports include MySQL and PostgreSQL. Presto also integrates with the Hive metastore seamlessly to complement existing Hive environments with low latency queries. Presto can query self-describing data as well as complex or multi-structured data that is commonly seen in big data systems.

Note:

For information about connecting Presto to data sources, see the Presto documentation: https://prestodb.io/docs/current/.

About the Driver

The Simba Presto JDBC Driver lets organizations connect their BI tools to Presto. Presto provides an ANSI SQL query layer and also exposes the metadata information through an ANSI SQL standard metadata database called INFORMATION_SCHEMA. The Simba Presto JDBC Driver leverages INFORMATION_SCHEMA to expose Presto's metadata to BI tools as needed.

The Simba Presto JDBC Driver complies with the JDBC 4.0, 4.1, and 4.2 data standards. JDBC 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 JDBC driver, which connects an application to the database. For more information about JDBC, see the *Data Access Standards Glossary*: http://www.simba.com/resources/data-access-standards-glossary/.

This guide is suitable for users who want to access data residing within Presto from their desktop environment. Application developers might also find the information helpful. Refer to your application for details on connecting via JDBC.

System Requirements

Each machine where you use the Simba Presto JDBC Driver must have Java Runtime Environment (JRE) installed. The version of JRE that must be installed depends on the version of the JDBC API you are using with the driver. The following table lists the required version of JRE for each version of the JDBC API.

JDBC API Version	JRE Version
4.0	6.0 or later
4.1	7.0 or later
4.2	8.0 or later

The driver supports open-source Presto Server versions 0.160 and earlier, and Teradata Presto Server versions 0.157-t and earlier.

Simba Presto JDBC Driver Files

The Simba Presto JDBC Driver is delivered in the ZIP archive `PrestoJDBC_[Version].zip`, where *[Version]* is the version number of the driver.

This archive contains the fat JARs for all of the JDBC API versions that are supported by the driver: JDBC 4.0, 4.1, and 4.2. Each JAR contains all of the required third-party dependencies for the driver.

Installing and Using the Simba Presto JDBC Driver

To install the Simba Presto JDBC Driver on your machine, extract the appropriate JAR file from the ZIP archive to the directory of your choice.

! Important:

If you received a license file through email, then you must copy the file into the same directory as the fat JAR file before you can use the Simba Presto JDBC Driver.

To access a Presto data store using the Simba Presto JDBC Driver, you need to configure the following:

- The list of driver library files (see Referencing the JDBC Driver Libraries on page 9)
- The Driver or DataSource class (see Registering the Driver Class on page 10)
- The connection URL for the driver (see Building the Connection URL on page 11)

Referencing the JDBC Driver Libraries

Before you use the Simba Presto JDBC Driver, the JDBC application or Java code that you are using to connect to the data store must be able to access the driver JAR file. In the application or code, specify the appropriate fat JAR file for the JDBC version that you are using.

Using the Driver in a JDBC Application

Most JDBC applications provide a set of configuration options for adding a list of driver library files. Use the provided options to include the appropriate fat JAR file from the ZIP archive as part of the driver configuration in the application. For more information, see the documentation for your JDBC application.

Using the Driver in Java Code

You must include all the driver library files in the class path. This is the path that the Java Runtime Environment searches for classes and other resource files. For more information, see "Setting the Class Path" in the Java SE Documentation:

- For Windows: http://docs.oracle.com/javase/7/docs/technotes/tools/windows/classpath.html

- For Linux and Solaris: http://docs.oracle.com/javase/7/docs/technotes/tools/solaris/classpath.html

Registering the Driver Class

Before connecting to the data store, you must register the appropriate class for your application.

The following is a list of the classes used to connect the Simba Presto JDBC Driver to Presto data stores. The `Driver` classes extend `java.sql.Driver`, and the `DataSource` classes extend `javax.sql.DataSource` and `javax.sql.ConnectionPoolDataSource`.

To support JDBC 4.0, classes with the following fully-qualified class names (FQCNs) are available:

- `com.simba.presto.jdbc4.Driver`
- `com.simba.presto.jdbc4.DataSource`

To support JDBC 4.1, classes with the following FQCNs are available:

- `com.simba.presto.jdbc41.Driver`
- `com.simba.presto.jdbc41.DataSource`

To support JDBC 4.2, classes with the following FQCNs are available:

- `com.simba.presto.jdbc42.Driver`
- `com.simba.presto.jdbc42.DataSource`

The following sample code shows how to use the `DriverManager` to establish a connection for JDBC 4:

Note:

In these examples, the line `Class.forName(DRIVER_CLASS);` is only required for JDBC 4.0.

```
private static Connection connectViaDM() throws Exception
{
   Connection connection = null;
   Class.forName(DRIVER_CLASS);
   connection = DriverManager.getConnection(CONNECTION_URL);
   return connection;
}
```

The following sample code shows how to use the `DataSource` class to establish a connection:

```
private static Connection connectViaDS() throws Exception
{
   Connection connection = null;
   Class.forName(DRIVER_CLASS);
   DataSource ds = new com.simba.presto.jdbc41.DataSource();
   ds.setURL(CONNECTION_URL);
   connection = ds.getConnection();
   return connection;
}
```

Building the Connection URL

Use the connection URL to supply connection information to the data store that you are accessing. The following is the format of the connection URL for the Simba Presto JDBC Driver, where *[Host]* is the DNS or IP address of the server and *[Port]* is the number of the TCP port to connect to:

```
jdbc:presto://[Host]:[Port];
```

You can specify additional settings such as any of the connection properties supported by the driver. For a list of configuration options, see Driver Configuration Options on page 23.

The example file paths use primarily Windows examples in which backslashes are prefaced with the appropriate Java escape character, for example: `c:\\temp`. Linux and macOS users should replace these with Unix-style paths, for example: `/tmp`.

The following is the format of a connection URL that specifies some optional settings:

```
jdbc:presto://[Host]:[Port];[Property1]=[Value];
```

For example, to connect to a Presto server using the user name "simba", you would use the following connection URL:

```
jdbc:presto://192.168.203.141:8080;User=simba;
```

! Important:

- Properties are case-sensitive.
- Do not duplicate properties in the connection URL.

Configuring Authentication

Some Presto data stores require authentication. You can configure the Simba Presto JDBC Driver to provide your credentials and authenticate the connection to the database using one of the following methods:

- Using Kerberos Authentication on page 13
- Using LDAP Authentication on page 14

Note:

If Kerberos or LDAP authentication is enabled, then SSL is automatically enabled.

Using Kerberos Authentication

You can configure the driver to use the Kerberos protocol to authenticate the connection. Kerberos is provided as part of the Java Runtime Environment (JRE).

Before you can use Kerberos authentication with the Simba Presto JDBC Driver, you must do the following:

1. On your Presto server, in the `/etc/presto/config.properties` file, set the following properties:

```
http.server.authentication.krb5.service-name=HTTP

http.server.authentication.krb5.keytab=HTTP.keytab
```

2. On your client machine, in the `java.policy` file for your Java environment, include the following line:

```
permission java.util.PropertyPermission
"javax.security.auth.useSubjectCredsOnly", "write";
```

3. On your client machine, in your Java environment, install the appropriate Java Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files.

When you use Kerberos authentication, the driver loads the credentials from the Kerberos credential cache.

- On Windows, if the Windows machine has been joined to the appropriate Active Directory domain and the domain user has been granted access to the Presto service, then when you log in to the Windows machine it automatically caches your Kerberos credentials.

- Otherwise, a Kerberos ticket must be generated before you run the driver. To generate a Kerberos ticket, run the `kinit` Kerberos command with the appropriate principal.

To configure Kerberos authentication:

1. Run the `kinit` command using the following syntax, where *`[Keytab]`* is the Kerberos credential and *`[Principal]`* is the Kerberos user principal to use for authentication:

   ```
   kinit -kt [Keytab][Principal]
   ```

2. Connect to the Presto server using a connection URL written in the following format:

   ```
   jdbc:presto://[Host]:[Port];AuthenticationType=Kerberos
   Authentication;SSLTrustStorePath=
   [TrustStoreFilePath];SSLTrustStorePwd=
   [TrustStorePassword]
   ```

   The variables are defined as follows:

   - *[Host]* is the DNS or IP address of the server.
   - *[Port]* is the number of the TCP port to connect to.
   - *[TrustStoreFilePath]* is the full path and file name of the Java TrustStore containing the SSL certificates to use during authentication.
   - *[TrustStorePassword]* is the password for accessing the defined Java Truststore.

   For example:

   ```
   jdbc:presto://presto-demo-
   cdh:7778;AuthenticationType=Kerberos Authentication;
   SSLTrustStorePath=C:\\Program Files\\Java\\jre1.8.0_
   92\\lib\\security\\cacerts;SSLTrustStorePwd=changeit
   ```

For more information about connection URL syntax, see Building the Connection URL on page 11.

Using LDAP Authentication

You can configure the driver to use the LDAP protocol to authenticate the connection.

You provide the configuration information to the driver in the connection URL. For more information about the syntax of the connection URL, see Building the Connection URL on page 11.

To configure LDAP authentication:

1. Set the `AuthenticationType` property to `LDAP Authentication`.
2. Set the `UID` property to an appropriate user name for accessing the Presto server.
3. Set the `PWD` property to the password corresponding to the user name you provided.

For example:

```
jdbc:presto://presto-demo-cdh:7778;AuthenticationType=LDAP
Authentication;UID=simba;PWD=simba123
```

Configuring SSL Connections

Note:

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

If you are connecting to a Presto server that has SSL enabled, you can configure the driver to connect to an SSL-enabled socket. When connecting to a server over SSL, the driver uses one-way authentication to verify the identity of the server. Before configuring SSL in the driver, make sure that you have a TrustStore containing a signed, trusted SSL certificate for verifying the identity of the server.

You provide the configuration information to the driver in the connection URL. For more information about the syntax of the connection URL, see Building the Connection URL on page 11.

Note:

If Kerberos or LDAP authentication is enabled, then SSL is automatically enabled. Make sure to configure the driver to use an appropriate TrustStore.

To configure an SSL connection:

1. Set the `SSL` property to `1`.
2. Set the `SSLTrustStorePath` property to the full path of the TrustStore that you want to use.
3. Set the `SSLTrustStorePwd` property to your password for accessing the TrustStore.

For example:

```
jdbc:presto://192.168.203.141:8080;SSL=1;SSLTrustStorePath=C
:\\Documents\\Presto_
TrustCerts.jks;SSLTrustStorePwd=simba123
```

Configuring Logging

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.

In the connection URL, set the `LogLevel` key to enable logging at the desired level of detail. The following table lists the logging levels provided by the Simba Presto JDBC Driver, in order from least verbose to most verbose.

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

To enable logging:

1. Set the `LogLevel` property to the desired level of information to include in log files.
2. Set the `LogPath` property to the full path to the folder where you want to save log files. To make sure that the connection URL is compatible with all JDBC applications, escape the backslashes (`\`) in your file paths by typing another backslash.

For example, the following connection URL enables logging level 3 and saves the log files in the `C:\temp` folder:

```
jdbc:presto://localhost;LogLevel=3;LogPath=C:\\temp
```

3. To make sure that the new settings take effect, restart your JDBC application and reconnect to the server.

   The Simba Presto JDBC Driver produces a log file named `presto.log` in the location specified in the `LogPath` property.

If the `LogPath` value is invalid, then the driver sends the logged information to the standard output stream (`System.out`).

To disable logging:

1. Remove the `LogLevel` and `LogPath` properties from the connection URL.
2. To make sure that the new settings take effect, restart your JDBC application and reconnect to the server.

Features

More information is provided on the following features of the Simba Presto JDBC Driver:

- Catalog and Schema Support on page 19
- Supported Connectors on page 19
- Parameters on page 19
- Data Types on page 19
- Security and Authentication on page 22

Catalog and Schema Support

The Simba Presto JDBC Driver supports both catalogs and schemas to make it easy for the driver to work with various JDBC applications.

Parameters

A parameterized query contains placeholders that are used for parameters. The values of those parameters are supplied at execution time.

The Simba Presto JDBC Driver fully supports parameterized queries.

Supported Connectors

The Simba Presto JDBC Driver supports the following connectors:

- MySQL
- PostgreSQL
- Hive
- Cassandra

Data Types

The Simba Presto JDBC Driver supports many common SQL and Java data types, and converts between them.

The following table lists the supported data type mappings.

SQL Type	Java Type
ARRAY	VARCHAR
BIGINT	BIGINT
BOOLEAN	BOOLEAN
CHAR	CHAR
DATE	DATE
DECIMAL	DECIMAL
DOUBLE	DOUBLE
FLOAT **Note:** Deprecated in Presto 0.152-t and later.	REAL
INTEGER	INTEGER
INTERVAL DAY TO SECOND	VARCHAR
INTERVAL YEAR TO MONTH	VARCHAR
JSON	VARCHAR
MAP	VARCHAR
REAL **Note:** Only supported in Presto 0.152-t and later.	REAL
ROW	VARCHAR

SQL Type	Java Type
SMALLINT	SMALLINT
TIME	TIME
TIME WITH TIME ZONE	VARCHAR
TIMESTAMP	TIMESTAMP
TIMESTAMP WITH TIME ZONE	VARCHAR
TINYINT	TINYINT
VARBINARY	VARBINARY
VARCHAR	VARCHAR

Complex SQL data types that are mapped to the Java SQL type VARCHAR are returned as a STRING representation of the returned value.

For example:

ARRAY
Query: select ARRAY[1,2,3].
Driver Result: A STRING with the value [1,2,3].

MAP
Query: select MAP(ARRAY[1,2], ARRAY['hello','world']).
Driver Result: A STRING with the value {"1":"hello","2":"world"}

ROW
Query: select ROW(1,2).
Driver Result: A STRING with the value [1,2].

INTERVAL DAY TO SECOND
Query: select INTERVAL '2' DAY.
Driver Result: A STRING with the value 2 00:00:00.000.

INTERVAL YEAR TO MONTH
Query: select INTERVAL '3' MONTH.
Driver Result: A STRING with the value 0-3.

TIMESTAMP WITH TIMEZONE
Query: select TIMESTAMP '2001-08-22 03:04:05.321 America/Los_Angeles'.

Driver Result: A STRING with the value 2001-08-22 03:04:05.321 America/Los_Angeles.

TIME WITH TIMEZONE
Query: select TIME '01:02:03.456 America/Los_Angeles'.
Driver Result: A STRING with the value 01:02:03.456 America/Los_Angeles.

JSON
Query: select cast('{\"id\": 1, \"name\": \"test\"}' as json).
Driver Result: A STRING with the value "{\"id\": 1, \"name\": \"test\"}".

Security and Authentication

To protect data from unauthorized access, some Presto data stores require connections to be authenticated with user credentials and the SSL protocol. The Simba Presto JDBC Driver provides full support for these authentication protocols.

Note:

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

The driver provides a mechanism that enables you to authenticate your connection using the Kerberos protocol or the LDAP protocol. For detailed configuration instructions, see Configuring Authentication on page 13.

Additionally, the driver supports SSL connections with one-way authentication. If the server has an SSL-enabled socket, then you can configure the driver to connect to it.

It is recommended that you enable SSL whenever you connect to a server that is configured to support it. SSL encryption protects data and credentials when they are transferred over the network, and provides stronger security than authentication alone. For detailed configuration instructions, see Configuring SSL Connections on page 16.

The SSL version that the driver supports depends on the JVM version that you are using. For information about the SSL versions that are supported by each version of Java, see "Diagnosing TLS, SSL, and HTTPS" on the Java Platform Group Product Management Blog: https://blogs.oracle.com/java-platform-group/entry/diagnosing_tls_ssl_and_https.

Note:

The SSL version used for the connection is the highest version that is supported by both the driver and the server, which is determined at connection time.

Driver Configuration Options

Driver Configuration Options lists and describes the properties that you can use to configure the behavior of the Simba Presto JDBC Driver.

You can set configuration properties using the connection URL. For more information, see Building the Connection URL on page 11.

Note:

Property names and values are case-sensitive.

AllowSelfSignedServerCert

Default Value	Data Type	Required
0	Integer	No

Description

This property specifies whether the driver allows the server to use self-signed SSL certificates.

- 1: The driver allows self-signed certificates.
- 0: The driver does not allow self-signed certificates.

Note:

This property is applicable only when SSL connections are enabled.

AuthenticationType

Default Value	Data Type	Required
No Authentication	String	No

Description

This option specifies the authentication mechanism to use, if any:

- `No Authentication`: The server does not use any authentication.
- `Kerberos Authentication`: The server uses Kerberos authentication.
- `LDAP Authentication`: The server uses LDAP authentication.

Note:

- If either Kerberos Authentication or LDAP Authentication are specified, SSL is automatically enabled.
- This option replaces and supersedes the deprecated `enableKerberos` option.

AllowHostNameCNMismatch

Default Value	Data Type	Required
`0`	Integer	No

Description

This property specifies whether the driver requires the name of the CA-issued SSL certificate to match the host name of the Presto server.

- `0`: The driver requires the names to match.
- `1`: The driver allows the names to mismatch.

Note:

This property is applicable only when SSL connections are enabled.

Catalog

Default Value	Data Type	Required
None	String	No

Description

The current catalog context for all requests against the server.

ConnectionTest

Default Value	Data Type	Required
1	Integer	No

Description

This option specifies whether the driver should automatically attempt to test the connection by contacting the server while establishing the connection.

- `1`: The driver automatically tests the connection while establishing the connection.
- `0`: The driver does not automatically test the connection.

Note:

- Disabling this option may improve driver performance.
- If this option is disabled, you should specify the version of the Presto server in the `ServerVersion` configuration option (see ServerVersion on page 27).

LogLevel

Default Value	Data Type	Required
0	Integer	No

Description

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

Important:

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

Set the property to one of the following numbers:

- `0`: Disable all logging.
- `1`: Enable logging on the FATAL level, which logs very severe error events that will lead the driver to abort.
- `2`: Enable logging on the ERROR level, which logs error events that might still allow the driver to continue running.
- `3`: Enable logging on the WARNING level, which logs events that might result in an error if action is not taken.
- `4`: Enable logging on the INFO level, which logs general information that describes the progress of the driver.
- `5`: Enable logging on the DEBUG level, which logs detailed information that is useful for debugging the driver.
- `6`: Enable logging on the TRACE level, which logs all driver activity.

When logging is enabled, the driver produces a log file named `presto.log` in the location specified in the `LogPath` property.

If the `LogPath` value is invalid, then the driver sends the logged information to the standard output stream (`System.out`).

LogPath

Default Value	Data Type	Required
The current working directory	String	No

Description

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

PWD or Password

Default Value	Data Type	Required
None	String	No

Description

The password corresponding to the user name that you provided using the property UID or User on page 29.

The password for LDAP authentication.

Schema

Default Value	Data Type	Required
None	String	No

Description

The current schema context for all requests against the server.

ServerVersion

Default Value	Data Type	Required
`0.155`	String	No

Description

This option specifies the version of the Presto server that the driver connects to, in the event that the driver cannot automatically detect the server version.

Note:

If `ConnectionTest` is set to `0`, this option should be set to the version of the Presto server that is being used.

SSL

Default Value	Data Type	Required
`0`	Integer	No

Description

This property specifies whether the driver communicates with the Presto server through an SSL-enabled socket.

- `1`: The driver connects to SSL-enabled sockets.
- `0`: The driver does not connect to SSL-enabled sockets.

Note:

- SSL is configured independently of authentication. When authentication and SSL are both enabled, the driver performs the specified authentication method over an SSL connection.
- If `AuthType` is set to either `Kerberos Authentication` or `LDAP Authentication`, SSL is automatically enabled.

SSLTrustStorePath

Default Value	Data Type	Required
None	String	Yes, if `SSL=1`.

Description

The full path of the Java TrustStore containing the server certificate for one-way SSL authentication.

See also the property SSLTrustStorePwd on page 28.

SSLTrustStorePwd

Default Value	Data Type	Required
None	String	Yes, if `SSL=1`.

Description

The password for accessing the Java TrustStore that you specified using the property SSLTrustStorePath on page 28.

TimeZoneID

Default Value	Data Type	Required
None	String	No

Description

This option specifies the local time zone that the driver uses. If this value is not specified, the driver uses the system's current time zone ID.

Valid values for this option are specified in the IANA Time Zone Database. For a complete list of time zones, see https://en.wikipedia.org/wiki/List_of_tz_database_time_zones.

UID or User

Default Value	Data Type	Required
`PrestoJDBC_Driver`	String	No

Description

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

enableKerberos (deprecated)

Default Value	Data Type	Required
False	Boolean	No

Description

This option is deprecated. Use `AuthenticationType` instead (see AuthenticationType on page 23).

This option specifies whether the driver uses Kerberos authentication.

Note:

If Kerberos is enabled, SSL is enabled automatically.

Contact Us

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

> **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 the Magnitude Support Community at http://magnitudesoftware.com/online-support/.

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