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Teradata JDBC Driver for Presto Installation and Configuration Guide

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About This Guide

Purpose

The *Teradata JDBC Driver for Presto Installation and Configuration Guide* explains how to install and configure the Teradata 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 Teradata Presto JDBC Driver.

Knowledge Prerequisites

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

- Familiarity with the platform on which you are using the Teradata Presto JDBC Driver
- Ability to use the data store to which the Teradata 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:

This text box indicates a short note appended to a paragraph.

Important:

This text box indicates an important comment related to the preceding paragraph.

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About the Teradata 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: <http://teradata.github.io/presto/docs/current/>.

About the Driver

The Teradata 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 Teradata Presto JDBC Driver leverages INFORMATION_SCHEMA to expose Presto's metadata to BI tools as needed.

The Teradata 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 Teradata 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.

Teradata Presto JDBC Driver Files

The Teradata 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 Teradata Presto JDBC Driver

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

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

- The class path (see [Setting the Class Path](#) on page 10)
- 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 12)

Setting the Class Path

To use the Teradata Presto JDBC Driver, you must set the class path to include the JAR file from the ZIP archive containing the driver.

The class path 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 Teradata 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.teradata.presto.jdbc4.Driver`
- `com.teradata.presto.jdbc4.DataSource`

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

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

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

- `com.teradata.presto.jdbc42.Driver`
- `com.teradata.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.teradata.presto.jdbc4.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 Teradata 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 21.

The example file paths use primarily Windows examples in which backslashes are prefaced with the appropriate Java escape character, for example: `c:\\temp`. Mac and Linux 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 "teradata", you would use the following connection URL:

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

Important:

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

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 Teradata 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
```

Note:

If Kerberos is enabled, SSL is automatically enabled.

For more information about connection URL syntax, see [Building the Connection URL](#) on page 12.

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.

Set the `LogLevel` key in your connection URL to enable logging and specify the amount of detail included in log files. The following table lists the logging levels provided by the Teradata 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 Teradata 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 Teradata Presto JDBC Driver:

- [Catalog and Schema Support](#) on page 17
- [Supported Connectors](#) on page 17
- [Parameters](#) on page 17
- [Data Types](#) on page 17

Catalog and Schema Support

The Teradata 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 Teradata Presto JDBC Driver fully supports parameterized queries.

Supported Connectors

The Teradata Presto JDBC Driver supports the following connectors:

- MySQL
- PostgreSQL
- Hive

Data Types

The Teradata 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 <div style="border: 1px solid black; background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Note: Deprecated in Presto 0.152t and later.</p> </div>	REAL
INTEGER	INTEGER
INTERVAL DAY TO SECOND	VARCHAR
INTERVAL YEAR TO MONTH	VARCHAR
JSON	VARCHAR
MAP	VARCHAR
REAL <div style="border: 1px solid black; background-color: #f0f0f0; padding: 5px; margin-top: 5px;"> <p>Note: Only supported in Presto 0.152t and later.</p> </div>	REAL
ROW	VARCHAR
SMALLINT	SMALLINT

SQL Type	Java Type
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\"}\".

Driver Configuration Options

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

You can set configuration properties using the connection URL. For more information, see [Building the Connection URL](#) on page 12.

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 26).

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 28.

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
0.152	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	No

Description

The full path and file name of the Java TrustStore containing the SSL certificates to use during authentication.

See also the property [SSLTrustStorePwd](#) on page 27.

SSLTrustStorePwd

Default Value	Data Type	Required
None	String	Yes, if using a TrustStore.

Description

The password for accessing the Java TrustStore that you specified using the property [SSLTrustStorePath](#) on page 27.

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 22).

This option specifies whether the driver uses Kerberos authentication.

Note:

If Kerberos is enabled, SSL is enabled automatically.

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