

# Cloudera JDBC Driver for Impala Version 2.5.30



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## Introduction

The Cloudera JDBC Driver for Impala is used for direct SQL and Impala SQL access to Apache Hadoop / Impala distributions, enabling Business Intelligence (BI), analytics, and reporting on Hadoop / Impala-based data. The driver efficiently transforms an application's SQL query into the equivalent form in Impala SQL, which is a subset of SQL-92. If an application is Impala-aware, then the driver is configurable to pass the query through to the database for processing. The driver interrogates Impala to obtain schema information to present to a SQL-based application. Queries, including joins, are translated from SQL to Impala SQL. For more information about the differences between Impala SQL and SQL, see "Features" on page 24.

The Cloudera JDBC Driver for Impala complies with the JDBC 3.0, 4.0 and 4.1 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 <http://www.simba.com/resources/data-access-standards-library>.

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

## System Requirements

Each computer where you use the Cloudera JDBC Driver for Impala 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. Table 1 lists the required version of JRE for each version of the JDBC API.

**Table 1. Driver System Requirements**

| JDBC API Version | JRE Version  |
|------------------|--------------|
| 3.0              | 4.0 or 5.0   |
| 4.0              | 6.0 or later |
| 4.1              | 7.0 or later |

The driver supports Cloudera Impala versions 1.0.1 through 2.3.

## Cloudera JDBC Driver for Impala Files

The Cloudera JDBC Driver for Impala is delivered in the following ZIP archives, where *version* is the version number of the driver:

- Cloudera\_ImpalaJDBC3\_*version*.zip
- Cloudera\_ImpalaJDBC4\_*version*.zip
- Cloudera\_ImpalaJDBC41\_*version*.zip

Each archive contains the driver supporting the JDBC API version indicated in the archive name.

The archives contain the following file and folder structure, where *LibVersion* is the version number of the library and *APIVersion* is the JDBC API version that the driver supports:

- ImpalaJDBC*APIVersion*
  - hive\_metastore.jar
  - hive\_service.jar
  - ImpalaJDBC*APIVersion*.jar
  - libfb303-*LibVersion*.jar
  - libthrift-*LibVersion*.jar
  - log4j-*LibVersion*.jar
  - ql.jar
  - slf4j-api-*LibVersion*.jar
  - slf4j-log4j12-*LibVersion*.jar
  - TCLIServiceClient.jar

## Using the Cloudera JDBC Driver for Impala

To access an Impala data warehouse using the Cloudera JDBC Driver for Impala, you need to configure the following:

- Class path
- Driver or DataSource class
- Connection URL

For sample code that demonstrates how to use the driver, see "Java Sample Code" on page 11.

### Important:

The Cloudera JDBC Driver for Impala is a forward-only, read-only driver with no transaction support. Because the driver does not support transactions, auto-commit is always set to **true**

## Setting the Class Path

To use the Cloudera JDBC Driver for Impala, you must set the class path to include all the JAR files from the ZIP archive containing the driver that you are using.

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: <http://docs.oracle.com/javase/7/docs/technotes/tools/windows/classpath.html>.

## Initializing the Driver Class

Before connecting to the data store, you must initialize the appropriate class for the Impala server and your application.

The following is a list of the classes used to connect the Cloudera JDBC Driver for Impala to Impala. The Driver classes extend `java.sql.Driver`, and the DataSource classes extend `javax.sql.DataSource` and `javax.sql.ConnectionPoolDataSource`.

To support JDBC 3.0, classes with the following fully-qualified class names (FQCNs) are available:

- `com.cloudera.impala.jdbc3.Driver`
- `com.cloudera.impala.jdbc3.DataSource`

To support JDBC 4.0, classes with the following FQCNs are available:

- `com.cloudera.impala.jdbc4.Driver`
- `com.cloudera.impala.jdbc4.DataSource`

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

- `com.cloudera.impala.jdbc41.Driver`
- `com.cloudera.impala.jdbc41.DataSource`

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



```
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.cloudera.impala.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 source that you are accessing. The following is the format of the connection URL for the Cloudera JDBC Driver for Impala, where *Host* is the DNS or IP address of the Impala server:

```
jdbc:impala://Host
```

By default, the driver connects to port 21050 and uses the schema named **default**.

You can specify optional settings such as the number of the TCP port to connect to, the schema to use, or any of the connection properties supported by the driver. For a list of the properties available in the driver, see "Driver Configuration Options" on page 83.

### Note:

If you specify a property that is not supported by the driver, then the driver attempts to apply the property as a Impala server-side property for the client session. For more information, see "Configuring Server-Side Properties" on page 23.

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

```
jdbc:impala://Host:Port[/Schema];Property1=Value;
Property2=Value;...
```

For example, to connect to port 18000 on an Impala server installed on the local machine, use a schema named **default2**, and authenticate the connection using a user name and password, you would use the following connection URL:

```
jdbc:impala://localhost:18000[/default2];AuthMech=3;  
UID=cloudera;PWD=cloudera
```

**Important:**

Be aware of the following:

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

## Java Sample Code

The following Java code provides an example demonstrating how to use the JDBC API to do the following:

- Register the Cloudera JDBC Driver for Impala
- Establish a connection to an Impala database
- Query the database
- Parse a result set
- Handle exceptions
- Clean up to avoid memory leakage

**Important:**

To use the Cloudera JDBC Driver for Impala in an application, you must include all the JAR files from the ZIP archive in the class path for your Java project.

```
// java.sql packages are required
import java.sql.*;
// java.math packages are required
import java.math.*;
class ClouderaJDBCImpalaExample {

    // Define a string as the fully qualified class name
    // (FQCN) of the desired JDBC driver
    static String JDBCdriver = "com.cloudera.impala.jdbc3.Driver";
    // Define a string as the connection URL
    private static final String CONNECTION_URL =
        "jdbc:impala://192.168.1.1:21050";

    public static void main(String[] args) {

        Connection con = null;
        Statement stmt = null;
        ResultSet rs = null;

        // Define a plain query
        String query = "SELECT store_sales, store_cost FROM
            default.test LIMIT 20";
        // Define a parameterized query
```

```
String prepQuery = "SELECT first_name, last_name, emp_id
FROM default.emp where store_id = ?";

try {

    // Register the driver using the class name
    Class.forName(JDBC_DRIVER);

    // Establish a connection using the connection
    // URL
    con = DriverManager.getConnection(CONNECTION_URL);

    // Create a Statement object for sending SQL
    // statements to the database
    stmt = con.createStatement();

    // Execute the SQL statement
    rs = stmt.executeQuery(query);

    // Display a header line for output appearing in
    // the Console View
    System.out.printf("%20s%20s\r\n", "STORE SALES",
"STORE COST");

    // Step through each row in the result set
    // returned from the database
    while(rs.next()) {
        // Retrieve values from the row where the
        // cursor is currently positioned using
        // column names
        BigDecimal StoreSales = rs.getBigDecimal ("store_
sales");
        BigDecimal StoreCost = rs.getBigDecimal ("store_
cost");

        // Display values in columns 20 characters
        // wide in the Console View using the
        // Formatter
    }
}
```

```

        System.out.printf("%20s%20s\r\n",
            StoreSales.toString(), StoreCost.toString());
    }
    // Create a prepared statement
    PreparedStatement prep = con.prepareStatement
        (prepQuery);

    // Bind the query parameter with a value
    prep.setInt(1, 204);
    // Execute the query
    prep.execute();
    rs = prep.getResultSet();
    // Step through each row in the result set
    // returned from the database
    while(rs.next()) {
        // Retrieve values from the row where the
        // cursor is currently positioned using
        // column names
        String FirstName = rs.getString("first_name");
        String LastName = rs.getString("last_name");
        String EmployeeID = rs.getString("emp_id");

        // Display values in columns 20 characters
        // wide in the Console View using the
        // Formatter
        System.out.printf("%20s%20s%20s\r\n", FirstName,
            LastName, EmployeeID);
    }

} catch (SQLException se) {
    // Handle errors encountered during interaction
    // with the data source
} catch (Exception e) {
    // Handle other errors
} finally {
    // Perform clean up
    try {
        if (rs != null) {

```

```
        rs.close();
    }
} catch (SQLException se1) {
    // Log this
}

try {
    if (stmt != null) {
        stmt.close();
    }
} catch (SQLException se2) {
    // Log this
}

try {
    if (prep != null) {
        prep.close();
    }
} catch (SQLException se3) {
    // Log this
}

try {
    if (con != null) {
        con.close();
    }
} catch (SQLException se4) {
    // Log this
} // End try
} // End try
} // End main
} // End ClouderaJDBCImpalaExample
```

## Configuring Authentication

The Cloudera JDBC Driver for Impala supports the following authentication mechanisms:

- No Authentication
- Kerberos
- User Name
- User Name and Password

You configure the authentication mechanism that the driver uses to connect to Impala by specifying the relevant properties in the connection URL.

For information about configuring the authentication mechanism that Impala uses, refer to the Cloudera Impala documentation available at <http://www.cloudera.com/content/cloudera/en/documentation.html>.

For information about the properties you can use in the connection URL, see "Driver Configuration Options" on page 83.

**Note:**

In addition to authentication, you can configure the driver to connect over SSL. For more information, see "Configuring SSL" on page 22.

### Using No Authentication

**To configure a connection without authentication:**

- Set the AuthMech property to 0.

For example:

```
jdbc:impala://localhost:21050;AuthMech=0
```

### Using Kerberos

Kerberos must be installed and configured before you can use this authentication mechanism. For information about configuring and operating Kerberos on Windows, see "Configuring Kerberos Authentication for Windows" on page 16. For other operating systems, refer to the MIT Kerberos documentation.

**To configure Kerberos authentication:**

1. Set the AuthMech property to 1.
2. To use the default realm defined in your Kerberos setup, do not set the KrbRealm property.

If your Kerberos setup does not define a default realm or if the realm of your Impala server is not the default, then set the KrbRealm property to the realm of the Impala server.

3. Set the KrbHostFQDN property to the fully qualified domain name of the Impala server

host.

4. Set the `KrbServiceName` property to the service name of the Impala server.

For example:

```
jdbc:impala://localhost:21050;AuthMech=1;KrbRealm=EXAMPLE.COM;  
KrbHostFQDN=impala.example.com;KrbServiceName=impala
```

### Using User Name

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

**To configure User Name authentication:**

1. Set the `AuthMech` property to 2.
2. Set the `UID` property to an appropriate user name for accessing the Impala server.

For example:

```
jdbc:impala://localhost:21050;AuthMech=2;UID=impala
```

### Using User Name and Password

This authentication mechanism requires a user name and a password.

**To configure User Name and Password authentication:**

1. Set the `AuthMech` property to 3.
2. Set the `UID` property to an appropriate user name for accessing the Impala server.
3. Set the `PWD` property to the password corresponding to the user name you provided.

For example:

```
jdbc:impala://localhost:21050;AuthMech=3;UID=impala;PWD=*****
```

## Configuring Kerberos Authentication for Windows

You can configure your Kerberos setup so that you use the MIT Kerberos Ticket Manager to get the Ticket Granting Ticket (TGT), or configure the setup so that you can use the driver to get the ticket directly from the Key Distribution Center (KDC). Also, if a client application obtains a Subject with a TGT, it is possible to use that Subject to authenticate the connection.

### Downloading and Installing MIT Kerberos for Windows

**To download and install MIT Kerberos for Windows 4.0.1:**

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



- For a 32-bit computer, use the following download link from the MIT Kerberos website: <http://web.mit.edu/kerberos/dist/kfw/4.0/kfw-4.0.1-i386.msi>.

**Note:**

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


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

## Using the MIT Kerberos Ticket Manager to Get Tickets

### Setting the KRB5CCNAME Environment Variable


You must set the KRB5CCNAME environment variable to your credential cache file.

#### To set the KRB5CCNAME environment variable:

1. Click the **Start** button , then right-click **Computer**, and then click **Properties**.
2. Click **Advanced System Settings**.
3. In the System Properties dialog box, on the **Advanced** tab, click **Environment Variables**.
4. In the Environment Variables dialog box, under the System variables list, click **New**.
5. In the **New System Variable** dialog box, in the Variable name field, type **KRB5CCNAME**.
6. In the **Variable Value** field, type the path for your credential cache file. For example, type `C:\KerberosTickets.txt`.
7. Click **OK** to save the new variable.
8. Make sure that the variable appears in the System Variables list.
9. Click **OK** to close the Environment Variables dialog box, and then click **OK** to close the System Properties dialog box.
10. Restart your computer.

### Getting a Kerberos Ticket

#### To get a Kerberos ticket:

1. Click the **Start** button , then click **All Programs**, and then click the **Kerberos for Windows (64-bit)** or **Kerberos for Windows (32-bit)** program group.
2. Click **MIT Kerberos Ticket Manager**.
3. In the MIT Kerberos Ticket Manager, click **Get Ticket**.
4. In the Get Ticket dialog box, type your principal name and password, and then click **OK**.

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

## Authenticating to the Impala Server

### To authenticate to the Impala server:

- Use a connection string that has the following properties defined:
  - AuthMech
  - KrbHostFQDN
  - KrbRealm
  - KrbServiceName


For detailed information about these properties, see "Driver Configuration Options" on page 83.

## Using the Driver to Get Tickets

### Deleting the KRB5CCNAME Environment Variable

To enable the driver to get Ticket Granting Tickets (TGTs) directly, you must ensure that the KRB5CCNAME environment variable has not been set.

### To delete the KRB5CCNAME environment variable:

1. Click the **Start** button , then right-click **Computer**, and then click **Properties**.
2. Click **Advanced System Settings**.
3. In the System Properties dialog box, click the **Advanced** tab and then click **Environment Variables**.
4. In the Environment Variables dialog box, check if the KRB5CCNAME variable appears in the System variables list. If the variable appears in the list, then select the variable and click **Delete**.
5. Click **OK** to close the Environment Variables dialog box, and then click **OK** to close the System Properties dialog box.

## Setting Up the Kerberos Configuration File

### To set up the Kerberos configuration file:

1. Create a standard `krb5.ini` file and place it in the `C:\Windows` directory.
2. Ensure that the KDC and Admin server specified in the `krb5.ini` file can be resolved from your terminal. If necessary, modify `C:\Windows\System32\drivers\etc\hosts`.

## Setting Up the JAAS Login Configuration File

### To set up the JAAS login configuration file:

1. Create a JAAS login configuration file that specifies a keytab file and "doNotPrompt=true"

For example:

```
Client {  
    com.sun.security.auth.module.Krb5LoginModule required
```

```

useKeyTab=true
keyTab="PathToTheKeyTab"
principal="cloudera@CLLOUDERA"
doNotPrompt=true;
};

```

2. Set the `java.security.auth.login.config` environment variable to the location of the JAAS file.

For example: `C:\KerberosLoginConfig.ini`.

### Authenticating to the Impala Server

#### To authenticate to the Impala server:

- Use a connection string that has the following properties defined:
  - AuthMech
  - KrbHostFQDN
  - KrbRealm
  - KrbServiceName

For detailed information about these properties, see "Driver Configuration Options" on page 83.

### Using an Existing Subject to Authenticate the Connection

If the client application obtains a Subject with a TGT, then that Subject can be used to authenticate the connection to the server.

#### To use an existing Subject to authenticate the connection:

1. Create a `PrivilegedAction` for establishing the connection to the database.

For example:

```

// Contains logic to be executed as a privileged action
public class AuthenticateDriverAction
implements PrivilegedAction<Void>
{
// The connection, which is established as a
// PrivilegedAction
Connection con;

// Define a string as the connection URL
static String ConnectionURL =
"jdbc:impala://192.168.1.1:21050";

```

## Configuring Authentication

```
/**
 * Logic executed in this method will have access to the
 * Subject that is used to "doAs". The driver will get
 * the Subject and use it for establishing a connection
 * with the server.
 */
@Override
public Void run()
{
    try
    {
        // Establish a connection using the connection URL
        con = DriverManager.getConnection(ConnectionURL);
    }
    catch (SQLException e)
    {
        // Handle errors that are encountered during
        // interaction with the data source
        e.printStackTrace();
    }
    catch (Exception e)
    {
        // Handle other errors
        e.printStackTrace();
    }
    return null;
}
}
```

2. Run the PrivilegedAction using the existing Subject, and then use the connection.

For example:

```
// Create the action
AuthenticateDriverAction authenticateAction = new
AuthenticateDriverAction();
// Establish the connection using the Subject for
// authentication.
Subject.doAs(loginConfig.getSubject(), authenticateAction);
```

```
// Use the established connection.  
authenticateAction.con;
```

## Configuring SSL

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

SSL connections require a KeyStore and a TrustStore. You can create a TrustStore and configure the driver to use it, or allow the driver to use one of the default TrustStores. If you do not configure the driver to use a specific TrustStore, then the driver uses the Java TrustStore `jssecacerts`. If `jssecacerts` is not available, then the driver uses `cacerts` instead.

### To configure SSL:

1. Create a KeyStore and configure the driver to use it:
  - a. Create a KeyStore containing your signed, trusted SSL certificate.
  - b. Set the `SSLKeyStore` property to the full path of the KeyStore, including the file name.
  - c. Set the `SSLKeyStorePwd` property to the password for the KeyStore.
2. Optionally, create a TrustStore and configure the driver to use it:
  - a. Create a TrustStore containing your signed, trusted SSL certificate.
  - b. Set the `SSLTrustStore` property to the full path of the TrustStore, including the file name.
  - c. Set the `SSLTrustStorePwd` property to the password for the TrustStore.
3. Set the `SSL` property to 1.
4. Optionally, to allow the SSL certificate used by the server to be self-signed, set the `AllowSelfSignedCerts` property to 1
5. Optionally, to allow the common name of a CA-issued certificate to not match the host name of the Impala server, set the `CAIssuedCertNamesMismatch` property to 1

#### Note:

For self-signed certificates, the driver always allows the common name of the certificate to not match the host name.

For example:

```
jdbc:impala://localhost:21050;AuthMech=3;SSL=1;  
SSLKeyStore=C:\\Users\\bsmith\\Desktop\\keystore.jks;  
SSLKeyStorePwd=*****;UID=impala;PWD=*****
```

#### Note:

For more information about the connection properties used in SSL connections, see "Driver Configuration Options" on page 83

## Configuring Server-Side Properties

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

**Important:**

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

For example, to set the MEM\_LIMIT query option to 1 GB and the REQUEST\_POOL query option to myPool, you would use a connection URL such as the following:

```
jdbc:impala://localhost:18000[/default2];AuthMech=3;  
UID=cloudera;PWD=cloudera;MEM_LIMIT=1000000000;REQUEST_POOL=myPool
```

## Features

More information is provided on the following features of the Cloudera JDBC Driver for Impala:

- "SQL Translation" on page 24
- "Data Types" on page 24
- "Catalog and Schema Support" on page 25

## SQL Translation

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

**Note:**

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

## Data Types

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

Table 2 lists the supported data type mappings.

**Table 2. Supported Data Types**

| Impala Type                                  | SQL Type  | Java Type            |
|--|-----------|----------------------|
| ARRAY  | VARCHAR   | String               |
| BIGINT                                       | BIGINT    | java.math.BigInteger |
| BINARY                                       | VARBINARY | byte[]               |
| BOOLEAN                                      | BOOLEAN   | Boolean              |
| CHAR<br>(Available only in CDH 5.2 or later) | CHAR      | String               |
| DATE   | DATE      | java.sql.Date        |
| DECIMAL                                      | DECIMAL   | java.math.BigDecimal |



| Impala Type                                     | SQL Type  | Java Type          |
|---|-----------|--------------------|
| (Available only in CDH 5.1 or later)            |           |                    |
| DOUBLE<br>(REAL is an alias for DOUBLE)         | DOUBLE    | Double             |
| FLOAT   | REAL      | Float              |
| INT   | INTEGER   | Long               |
| MAP   | VARCHAR   | String             |
| SMALLINT  | SMALLINT  | Integer            |
| STRUCT  | VARCHAR   | String             |
| TIMESTAMP                                       | TIMESTAMP | java.sql.Timestamp |
| TINYINT   | TINYINT   | Short              |
| VARCHAR<br>(Available only in CDH 5.2 or later) | VARCHAR   | String             |

## Catalog and Schema Support

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

**Note:**

Setting the CatalogSchemaSwitch connection property to 1 will cause Impala catalogs to be treated as schemas in the driver as a restriction for filtering.

## Interfaces and Supported Methods

The Cloudera JDBC Driver for Impala implements the following JDBC interfaces:

- "CallableStatement" on page 26
- "Connection" on page 36
- "PooledConnection" on page 55
- "PreparedStatement" on page 56

## Features

- "DatabaseMetaData" on page 40
- "DataSource" on page 53
- "Driver" on page 53
- "ParameterMetaData" on page 54
- "ResultSet" on page 61
- "ResultSetMetaData" on page 76
- "Statement" on page 78

However, the driver does not support every method from these interfaces. For information about whether a specific method is supported by the driver and which version of the JDBC API is the earliest version that supports the method, refer to the following sections.

The driver does **not** support the following JDBC features:

- Array
- Blob
- Clob
- Ref
- Savepoint
- SQLData
- SQLInput
- SQLOutput
- Struct

## CallableStatement

The CallableStatement interface extends the PreparedStatement interface.

Table 3 lists the methods that belong to the CallableStatement interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the CallableStatement interface, see the Java API documentation available at

<http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/CallableStatement.html>.

**Table 3. Methods in the CallableStatement Class Interface**

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| Array <code>getArray(int i)</code>                        | 3.0                          | No                      |       |
| Array <code>getArray(String parameterName)</code>         | 3.0                          | No                      |       |
| BigDecimal <code>getBigDecimal(int parameterIndex)</code> | 3.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes      |
|---|------------------------------|-------------------------|------------|
| BigDecimal getBigDecimal(int parameterIndex, int scale) | 3.0                          | Yes                     | Deprecated |
| BigDecimal getBigDecimal(String parameterName)          | 3.0                          | Yes                     |            |
| Blob getBlob(int i)                                     | 3.0                          | No                      |            |
| Blob getBlob(String parameterName)                      | 3.0                          | No                      |            |
| boolean getBoolean(int parameterIndex)                  | 3.0                          | Yes                     |            |
| boolean getBoolean(String parameterName)                | 3.0                          | Yes                     |            |
| byte getByte(int parameterIndex)                        | 3.0                          | Yes                     |            |
| byte getByte(String parameterName)                      | 3.0                          | Yes                     |            |
| byte[] getBytes(int parameterIndex)                     | 3.0                          | Yes                     |            |
| byte[] getBytes(String parameterName)                   | 3.0                          | Yes                     |            |
| Clob getClob(int i)                                     | 3.0                          | No                      |            |
| Clob getClob(String parameterName)                      | 3.0                          | No                      |            |
| Date getDate(int parameterIndex)                        | 3.0                          | Yes                     |            |
| Date getDate(int parameterIndex, Calendar cal)          | 3.0                          | Yes                     |            |
| Date getDate(String parameterName)                      | 3.0                          | Yes                     |            |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| parameterName)                                    |                              |                         |       |
| Date getDate(String parameterName, Calendar cal)  | 3.0                          | Yes                     |       |
| double getDouble(int parameterIndex)              | 3.0                          | Yes                     |       |
| double getDouble(String parameterName)            | 3.0                          | Yes                     |       |
| float getFloat(int parameterIndex)                | 3.0                          | Yes                     |       |
| float getFloat(String parameterName)              | 3.0                          | Yes                     |       |
| int getInt(int parameterIndex)                    | 3.0                          | Yes                     |       |
| int getInt(String parameterName)                  | 3.0                          | Yes                     |       |
| long getLong(int parameterIndex)                  | 3.0                          | Yes                     |       |
| long getLong(String parameterName)                | 3.0                          | Yes                     |       |
| Reader getNCharacterStream(int parameterIndex)    | 4.0                          | No                      |       |
| Reader getNCharacterStream (String parameterName) | 4.0                          | No                      |       |
| NClob getNClob(int parameterIndex)                | 4.0                          | No                      |       |
| NClob getNClob(String parameterName)              | 4.0                          | No                      |       |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| String getNString(int parameterIndex)                            | 4.0                          | No                      |       |
| String getNString(String parameterName)                          | 4.0                          | No                      |       |
| Object getObject(int parameterIndex)                             | 3.0                          | Yes                     |       |
| <T> T getObject(int parameterIndex, Class<T> type)               | 4.1                          | No                      |       |
| Object getObject(int i, Map<String,Class<?>> map)                | 3.0                          | No                      |       |
| Object getObject(String parameterName)                           | 3.0                          | Yes                     |       |
| <T> T getObject(String parameterName, Class<T> type)             | 4.1                          | No                      |       |
| Object getObject(String parameterName, Map<String,Class<?>> map) | 3.0                          | Yes                     |       |
| Ref getRef(int i)  | 3.0                          | No                      |       |
| Ref getRef(String parameterName)                                 | 3.0                          | No                      |       |
| RowId getRowId(int parameterIndex)                               | 4.0                          | No                      |       |
| RowId getRowId(String parameterName)                             | 4.0                          | No                      |       |
| short getShort(int parameterIndex)                               | 3.0                          | Yes                     |       |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| short getShort(String parameterName)                       | 3.0                          | Yes                     |       |
| SQLXML getSQLXML(int parameterIndex)                       | 4.0                          | No                      |       |
| SQLXML getSQLXML(String parameterName)                     | 4.0                          | No                      |       |
| String getString(int parameterIndex)                       | 3.0                          | Yes                     |       |
| String getString(String parameterName)                     | 3.0                          | Yes                     |       |
| Time getTime(int parameterIndex)                           | 3.0                          | Yes                     |       |
| Time getTime(int parameterIndex, Calendar cal)             | 3.0                          | Yes                     |       |
| Time getTime(String parameterName)                         | 3.0                          | Yes                     |       |
| Time getTime(String parameterName, Calendar cal)           | 3.0                          | Yes                     |       |
| Timestamp getTimestamp(int parameterIndex)                 | 3.0                          | Yes                     |       |
| Timestamp getTimestamp(int parameterIndex, Calendar cal)   | 3.0                          | Yes                     |       |
| Timestamp getTimestamp(String parameterName)               | 3.0                          | Yes                     |       |
| Timestamp getTimestamp(String parameterName, Calendar cal) | 3.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| URL getUrl(int parameterIndex)  | 3.0                          | No                      |       |
| URL getUrl(String parameterName)  | 3.0                          | No                      |       |
| void registerOutParameter(int parameterIndex, int sqlType)                    | 3.0                          | Yes                     |       |
| void registerOutParameter(int parameterIndex, int sqlType, int scale)         | 3.0                          | Yes                     |       |
| void registerOutParameter(int paramIndex, int sqlType, String typeName)       | 3.0                          | Yes                     |       |
| void registerOutParameter(String parameterName, int sqlType)                  | 3.0                          | Yes                     |       |
| void registerOutParameter(String parameterName, int sqlType, int scale)       | 3.0                          | Yes                     |       |
| void registerOutParameter(String parameterName, int sqlType, String typeName) | 3.0                          | Yes                     |       |
| void setAsciiStream(String parameterName, InputStream x)                      | 4.0                          | Yes                     |       |
| void setAsciiStream(String parameterName, InputStream x, int                  | 3.0                          | Yes                     |       |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| length)  |                              |                         |       |
| void setAsciiStream (String parameterName, InputStream x, long length)   | 4.0                          | Yes                     |       |
| void setBigDecimal (String parameterName, BigDecimal x)                  | 3.0                          | Yes                     |       |
| void setBinaryStream (String parameterName, InputStream x)               | 4.0                          | Yes                     |       |
| setBinaryStream(String parameterName, InputStream x, int length)         | 3.0                          | Yes                     |       |
| void setBinaryStream (String parameterName, InputStream x, long length)  | 4.0                          | Yes                     |       |
| void setBlob(String parameterName, Blob x)                               | 4.0                          | Yes                     |       |
| void setBlob(String parameterName, InputStream inputStream)              | 4.0                          | Yes                     |       |
| void setBlob(String parameterName, InputStream inputStream, long length) | 4.0                          | Yes                     |       |
| void setBoolean(String parameterName, boolean x)                         | 3.0                          | Yes                     |       |
| void setByte(String parameterName, byte x)                               | 3.0                          | Yes                     |       |



| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| <code>void setBytes(String parameterName, byte[] x)</code>                             | 3.0                          | Yes                     |       |
| <code>void setCharacterStream(String parameterName, Reader reader)</code>              | 4.0                          | Yes                     |       |
| <code>void setCharacterStream(String parameterName, Reader reader, int length)</code>  | 3.0                          | Yes                     |       |
| <code>void setCharacterStream(String parameterName, Reader reader, long length)</code> | 4.0                          | Yes                     |       |
| <code>void setClob(String parameterName, Clob x)</code>                                | 4.0                          | Yes                     |       |
| <code>void setClob(String parameterName, Reader reader)</code>                         | 4.0                          | Yes                     |       |
| <code>void setClob(String parameterName, Reader reader, long length)</code>            | 4.0                          | Yes                     |       |
| <code>void setDate(String parameterName, Date x)</code>                                | 3.0                          | Yes                     |       |
| <code>void setDate(String parameterName, Date x, Calendar cal)</code>                  | 3.0                          | Yes                     |       |
| <code>void setDouble(String parameterName, double x)</code>                            | 3.0                          | Yes                     |       |
| <code>void setFloat(String parameterName, float x)</code>                              | 3.0                          | Yes                     |       |
| <code>void setInt(String parameterName, int x)</code>                                  | 3.0                          | Yes                     |       |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| <code>void setLong(String parameterName, long x)</code>                                | 3.0                          | Yes                     |       |
| <code>void setNCharacterStream(String parameterName, Reader value)</code>              | 4.0                          | Yes                     |       |
| <code>void setNCharacterStream(String parameterName, Reader value, long length)</code> | 4.0                          | Yes                     |       |
| <code>void setNClob(String parameterName, NClob value)</code>                          | 4.0                          | Yes                     |       |
| <code>void setNClob(String parameterName, Reader reader)</code>                        | 4.0                          | Yes                     |       |
| <code>void setNClob(String parameterName, Reader reader, long length)</code>           | 4.0                          | Yes                     |       |
| <code>void setNString(String parameterName, String value)</code>                       | 4.0                          | Yes                     |       |
| <code>void setNull(String parameterName, int sqlType)</code>                           | 3.0                          | Yes                     |       |
| <code>void setNull(String parameterName, int sqlType, String typeName)</code>          | 3.0                          | Yes                     |       |
| <code>void setObject(String parameterName, Object x)</code>                            | 3.0                          | Yes                     |       |
| <code>void setObject(String parameterName, Object x, int targetSqlType)</code>         | 3.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>void setObject(String parameterName, Object x, int targetSqlType, int scale)</code> | 3.0                          | Yes                     |       |
| <code>void setRowId(String parameterName, RowId x)</code>                                 | 4.0                          | Yes                     |       |
| <code>void setShort(String parameterName, short x)</code>                                 | 3.0                          | Yes                     |       |
| <code>void setSQLXML(String parameterName, SQLXML xmlObject)</code>                       | 4.0                          | Yes                     |       |
| <code>void setString(String parameterName, String x)</code>                               | 3.0                          | Yes                     |       |
| <code>void setTime(String parameterName, Time x)</code>                                   | 3.0                          | Yes                     |       |
| <code>void setTime(String parameterName, Time x, Calendar cal)</code>                     | 3.0                          | Yes                     |       |
| <code>void setTimestamp(String parameterName, Timestamp x)</code>                         | 3.0                          | Yes                     |       |
| <code>void setTimestamp(String parameterName, Timestamp x, Calendar cal)</code>           | 3.0                          | Yes                     |       |
| <code>void setURL(String parameterName, URL val)</code>                                   | 3.0                          | Yes                     |       |
| <code>boolean wasNull()</code>  | 3.0                          | Yes                     |       |
| <code>boolean isWrapperFor(Class&lt;?&gt; iface)</code>                                   | 4.0                          | Yes                     |       |
| <code>&lt;T&gt; T unwrap(Class&lt;T&gt; iface)</code>                                     | 4.0                          | Yes                     |       |

## Connection

Table 4 lists the methods that belong to the Connection interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the Connection interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/Connection.html>.

**Table 4. Methods in the Connection Interface**

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes   |
|--|------------------------------|-------------------------|---|
| <code>void clearWarnings()</code>  | 3.0                          | Yes                     |   |
| <code>void close()</code>  | 3.0                          | Yes                     |   |
| <code>void commit()</code>   | 3.0                          | Yes                     | Auto-commit cannot be set to false because it is hard-coded as true |
| <code>Array createArrayOf (String typeName, Object [] elements)</code>   | 4.0                          | No                      |   |
| <code>Blob createBlob()</code>   | 4.0                          | No                      |   |
| <code>Clob createClob()</code>   | 4.0                          | No                      |   |
| <code>NClob createNClob()</code>   | 4.0                          | No                      |   |
| <code>SQLXML createSQLXML()</code>   | 4.0                          | No                      |   |
| <code>Statement createStatement ()</code>  | 3.0                          | Yes                     |   |
| <code>Statement createStatement (int resultSetType, int resultSetConcurrency)</code>                           | 3.0                          | No                      |   |
| <code>Statement createStatement (int resultSetType, int resultSetConcurrency, int resultSetHoldability)</code> | 3.0                          | No                      |   |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes  |
|---|------------------------------|-------------------------|--|
| Struct createStruct (String typeName, Object [] attributes) | 4.0                          | No                      |  |
| boolean getAutoCommit()                                     | 3.0                          | Yes                     | Hard-coded to true   |
| String getCatalog()   | 3.0                          | Yes                     |  |
| Properties getClientInfo ()                                 | 4.0                          | Yes                     |  |
| String getClientInfo (String name)                          | 4.0                          | Yes                     |  |
| int getHoldability()  | 3.0                          | Yes                     | Hard-coded to CLOSE_CURSORS_AT_COMMIT  |
| DatabaseMetaData getMetaData ()                             | 3.0                          | Yes                     |  |
| int getNetworkTimeout()                                     | 4.1                          | No                      |  |
| String getSchema ()   | 4.1                          | Yes                     | The returned schema name does not always match the one used by statements. Statements use the schema name defined in the connection URL. |
| int getTransactionIsolation ()                              | 3.0                          | Yes                     | Hard-coded to TRANSACTION_READ_UNCOMMITTED   |
| Map<String,Class<?>> getTypeMap ()                          | 3.0                          | No                      |  |
| SQLWarning getWarnings ()                                   | 3.0                          | Yes                     |  |
| boolean isClosed ()   | 3.0                          | Yes                     |  |
| boolean isReadOnly ()                                       | 3.0                          | Yes                     | Returns true   |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| <code>boolean isValid(int timeout)</code>  | 4.0                          | Yes                     |       |
| <code>String nativeSQL(String sql)</code>  | 3.0                          | Yes                     |       |
| <code>CallableStatement prepareCall(String sql)</code>   | 3.0                          | No                      |       |
| <code>CallableStatement prepareCall(String sql, int resultSetType, int resultSetConcurrency)</code>                                | 3.0                          | No                      |       |
| <code>CallableStatement prepareCall(String sql, int resultSetType, int resultSetConcurrency, int resultSetHoldability)</code>      | 3.0                          | No                      |       |
| <code>PreparedStatement prepareStatement(String sql)</code>  | 3.0                          | Yes                     |       |
| <code>PreparedStatement prepareStatement(String sql, int autoGeneratedKeys)</code>   | 3.0                          | No                      |       |
| <code>PreparedStatement prepareStatement(String sql, int[] columnIndexes)</code>   | 3.0                          | No                      |       |
| <code>PreparedStatement prepareStatement(String sql, int resultSetType, int resultSetConcurrency)</code>                           | 3.0                          | No                      |       |
| <code>PreparedStatement prepareStatement(String sql, int resultSetType, int resultSetConcurrency, int resultSetHoldability)</code> | 3.0                          | No                      |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes  |
|---|------------------------------|-------------------------|--|
| <code>PreparedStatement<br/>prepareStatement(String<br/>sql, String[]<br/>columnNames)</code> | 3.0                          | No                      |  |
| <code>void releaseSavepoint<br/>(Savepoint savepoint)</code>                                  | 3.0                          | No                      | Savepoints are not available because transactions are not supported. |
| <code>void rollback()</code>  | 3.0                          | No                      | Savepoints are not available because transactions are not supported. |
| <code>void rollback(Savepoint<br/>savepoint)</code>   | 3.0                          | No                      | Savepoints are not available because transactions are not supported. |
| <code>void setAutoCommit<br/>(boolean autoCommit)</code>                                      | 3.0                          | Yes                     | Ignored because auto-commit is hard-coded to true                    |
| <code>void setCatalog(String<br/>catalog)</code>  | 3.0                          | Yes                     |  |
| <code>void setClientInfo<br/>(Properties properties)</code>                                   | 4.0                          | Yes                     |  |
| <code>void setClientInfo(String<br/>name, String value)</code>                                | 4.0                          | Yes                     |  |
| <code>void setHoldability(int<br/>holdability)</code>   | 3.0                          | Yes                     |  |
| <code>void setNetworkTimeout<br/>(Executor executor, int<br/>milliseconds)</code>             | 4.1                          | No                      |  |
| <code>void setReadOnly(boolean<br/>readOnly)</code>   | 3.0                          | Yes                     |  |
| <code>Savepoint setSavepoint()</code>   | 3.0                          | No                      | Savepoints are not available because transactions are not supported. |

| Method                                      | Supported Since JDBC Version | Supported by the Driver | Notes   |
|---|------------------------------|-------------------------|---|
| Savepoint setSavepoint (String name)        | 3.0                          | No                      | Savepoints are not available because transactions are not supported.  |
| void setSchema (String schema)              | 4.1                          | Yes                     | Does not actually change the schema name used by newly created statements; only changes the value returned by getSchema() |
| void setTransactionIsolation (int level)    | 3.0                          | Yes                     |   |
| void setTypeMap (Map<String, Class<?>> map) | 3.0                          | No                      |   |
| boolean isWrapperFor (Class<?> iface)       | 4.0                          | Yes                     |   |
| <T> T unwrap (Class<T> iface)               | 4.0                          | Yes                     |   |

### DatabaseMetaData

Table 5 lists the methods that belong to the DatabaseMetaData interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the DatabaseMetaData interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/DatabaseMetaData.html>.



Table 5. Methods in the DatabaseMetaData Interface

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| <code>boolean allProceduresAreCallable()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean allTablesAreSelectable()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean autoCommitFailureClosesAllResultSets()</code>   | 4.0                          | Yes                     | Returns true  |
| <code>boolean dataDefinitionCausesTransactionCommit()</code>  | 3.0                          | Yes                     | Returns false |
| <code>boolean dataDefinitionIgnoredInTransactions()</code>  | 3.0                          | Yes                     | Returns false |
| <code>boolean deletesAreDetected(int type)</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean doesMaxRowSizeIncludeBlobs()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean generatedKeyAlwaysReturned()</code>   | 4.1                          | Yes                     |               |
| <code>ResultSet getAttributes(String catalog, String schemaPattern, String typeNamePattern, String attributeNamePattern)</code> | 3.0                          | Yes                     |               |
| <code>ResultSet getBestRowIdentifier(String catalog, String schema, String table, int scope, boolean nullable)</code>           | 3.0                          | Yes                     |               |
| <code>ResultSet getCatalogs()</code>  | 3.0                          | Yes                     |               |
| <code>String getCatalogSeparator()</code>   | 3.0                          | Yes                     |               |
| <code>String getCatalogTerm()</code>  | 3.0                          | Yes                     |               |
| <code>ResultSet getClientInfoProperties()</code>  | 4.0                          | Yes                     |               |
| <code>ResultSet getColumnPrivileges(String</code>   | 3.0                          | Yes                     |               |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|--|------------------------------|-------------------------|--|
| <code>catalog, String schema, String table, String columnNamePattern)</code>   |                              |                         |  |
| <code>ResultSet getColumns(String catalog, String schemaPattern, String tableNamePattern, String columnNamePattern)</code>   | 3.0                          | Yes                     |  |
| <code>Connection getConnection()</code>  | 3.0                          | Yes                     |  |
| <code>ResultSet getCrossReference(String primaryCatalog, String primarySchema, String primaryTable, String foreignCatalog, String foreignSchema, String foreignTable)</code> | 3.0                          | Yes                     |  |
| <code>int getDatabaseMajorVersion()</code>   | 3.0                          | Yes                     |  |
| <code>int getDatabaseMinorVersion()</code>   | 3.0                          | Yes                     |  |
| <code>String getDatabaseProductName()</code>   | 3.0                          | Yes                     | Hard-coded to Cloudera Impala              |
| <code>String getDatabaseProductVersion()</code>  | 3.0                          | Yes                     |  |
| <code>int getDefaultTransactionIsolation()</code>  | 3.0                          | Yes                     | Hard-coded to TRANSACTION_READ_UNCOMMITTED |
| <code>int getDriverMajorVersion()</code>   | 3.0                          | Yes                     |  |
| <code>int getDriverMinorVersion()</code>   | 3.0                          | Yes                     |  |
| <code>String getDriverName()</code>  | 3.0                          | Yes                     | Hard-coded to ImpalaJDBC                   |
| <code>String getDriverVersion()</code>   | 3.0                          | Yes                     |  |
| <code>ResultSet getExportedKeys(String</code>  | 3.0                          | Yes                     |  |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                    |
|---|------------------------------|-------------------------|--------------------------|
| <code>catalog, String schema, String table)</code>  |                              |                         |                          |
| <code>String getExtraNameCharacters()</code>  | 3.0                          | Yes                     | Returns an empty String. |
| <code>ResultSet getFunctionColumns(String catalog, String schemaPattern, String functionNamePattern, String columnNamePattern)</code> | 4.0                          | Yes                     |                          |
| <code>ResultSet getFunctions(String catalog, String schemaPattern, String functionNamePattern)</code>                                 | 4.0                          | Yes                     |                          |
| <code>String getIdentifierQuoteString()</code>  | 3.0                          | Yes                     | Returns a backquote (`)  |
| <code>ResultSet getImportedKeys(String catalog, String schema, String table)</code>   | 3.0                          | Yes                     |                          |
| <code>ResultSet getIndexInfo(String catalog, String schema, String table, boolean unique, boolean approximate)</code>                 | 3.0                          | Yes                     |                          |
| <code>int getJDBCMajorVersion()</code>  | 3.0                          | Yes                     |                          |
| <code>int getJDBCMinorVersion()</code>  | 3.0                          | Yes                     |                          |
| <code>int getMaxBinaryLiteralLength()</code>  | 3.0                          | Yes                     | Returns 0                |
| <code>int getMaxCatalogNameLength()</code>  | 3.0                          | Yes                     | Returns 128              |
| <code>int getMaxCharLiteralLength()</code>  | 3.0                          | Yes                     | Returns 0                |
| <code>int getMaxColumnNameLength()</code>   | 3.0                          | Yes                     | Returns 128              |
| <code>int getMaxColumnsInGroupBy()</code>   | 3.0                          | Yes                     | Returns 0                |
| <code>int getMaxColumnsInIndex()</code>   | 3.0                          | Yes                     | Returns 0                |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes  |
|--|------------------------------|-------------------------|--|
| <code>int getMaxColumnsInOrderBy()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxColumnsInSelect()</code>   | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxColumnsInTable()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxConnections()</code>   | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxCursorNameLength()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxIndexLength()</code>   | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxProcedureNameLength()</code>                                       | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxRowSize()</code>   | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxSchemaNameLength()</code>  | 3.0                          | Yes                     | Returns 128  |
| <code>int getMaxStatementLength()</code>   | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxStatements()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxTableNameLength()</code>   | 3.0                          | Yes                     | Returns 128  |
| <code>int getMaxTablesInSelect()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>int getMaxUserNameLength()</code>  | 3.0                          | Yes                     | Returns 0  |
| <code>String getNumericFunctions()</code>  | 3.0                          | Yes                     | Returns the Numeric Functions list from the specification related to the JDBC version of the driver. |
| <code>ResultSet getPrimaryKeys(String catalog, String schema, String table)</code> | 3.0                          | Yes                     |  |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                           |
|---|------------------------------|-------------------------|---------------------------------|
| <code>ResultSet getProcedureColumns(String catalog, String schemaPattern, String procedureNamePattern, String columnNamePattern)</code> | 3.0                          | Yes                     |                                 |
| <code>ResultSet getProcedures(String catalog, String schemaPattern, String procedureNamePattern)</code>                                 | 3.0                          | Yes                     |                                 |
| <code>String getProcedureTerm()</code>  | 3.0                          | Yes                     | Returns procedure               |
| <code>ResultSet getPseudoColumns(String catalog, String schemaPattern, String tableNamePattern, String columnNamePattern)</code>        | 4.1                          | Yes                     |                                 |
| <code>int getResultSetHoldability()</code>  | 3.0                          | Yes                     | Returns CLOSE_CURSORS_AT_COMMIT |
| <code>RowIdLifetime getRowIdLifetime()</code>   | 4.0                          | Yes                     | Returns ROWID_UNSUPPORTED       |
| <code>ResultSet getSchemas()</code>   | 3.0                          | Yes                     |                                 |
| <code>ResultSet getSchemas(String catalog, String schemaPattern)</code>   | 4.0                          | Yes                     |                                 |
| <code>String getSchemaTerm()</code>   | 3.0                          | Yes                     | Returns schema                  |
| <code>String getSearchStringEscape()</code>   | 3.0                          | Yes                     | Returns a backslash (\)         |
| <code>String getSQLKeywords()</code>  | 3.0                          | Yes                     | Returns an empty String.        |
| <code>int getSQLStateType()</code>  | 3.0                          | Yes                     | Returns sqlStateSQL99           |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes  |
|---|------------------------------|-------------------------|--|
| <code>String getStringFunctions()</code>  | 3.0                          | Yes                     | Returns the String Functions list from the specification related to the JDBC version of the driver.        |
| <code>ResultSet getSuperTables(String catalog, String schemaPattern, String tableNamePattern)</code>            | 3.0                          | Yes                     |  |
| <code>ResultSet getSuperTypes(String catalog, String schemaPattern, String typeNamePattern)</code>              | 3.0                          | Yes                     |  |
| <code>String getSystemFunctions()</code>  | 3.0                          | Yes                     | Returns DATABASE,IFNULL,USER   |
| <code>ResultSet getTablePrivileges(String catalog, String schemaPattern, String tableNamePattern)</code>        | 3.0                          | Yes                     |  |
| <code>ResultSet getTables(String catalog, String schemaPattern, String tableNamePattern, String[] types)</code> | 3.0                          | Yes                     |  |
| <code>ResultSet getTableTypes()</code>  | 3.0                          | Yes                     |  |
| <code>String getTimeDateFunctions()</code>  | 3.0                          | Yes                     | Returns the Time and Date Functions list from the specification related to the JDBC version of the driver. |
| <code>ResultSet getTypeInfo()</code>  | 3.0                          | Yes                     |  |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| <code>ResultSet getUDTs(String catalog, String schemaPattern, String typeNamePattern, int[] types)</code> | 3.0                          | Yes                     |               |
| <code>String getURL()</code>  | 3.0                          | Yes                     |               |
| <code>String getUsername()</code>   | 3.0                          | Yes                     |               |
| <code>ResultSet getVersionColumns(String catalog, String schema, String table)</code>                     | 3.0                          | Yes                     |               |
| <code>boolean insertsAreDetected(int type)</code>   | 3.0                          | Yes                     |               |
| <code>boolean isCatalogAtStart()</code>   | 3.0                          | Yes                     |               |
| <code>boolean isReadOnly()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean locatorsUpdateCopy()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean nullPlusNonNullIsNull()</code>  | 3.0                          | Yes                     | Returns true  |
| <code>boolean nullsAreSortedAtEnd()</code>  | 3.0                          | Yes                     | Returns false |
| <code>boolean nullsAreSortedAtStart()</code>  | 3.0                          | Yes                     | Returns false |
| <code>boolean nullsAreSortedHigh()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean nullsAreSortedLow()</code>  | 3.0                          | Yes                     | Returns true  |
| <code>boolean othersDeletesAreVisible(int type)</code>  | 3.0                          | Yes                     |               |
| <code>boolean othersInsertsAreVisible(int type)</code>  | 3.0                          | Yes                     |               |
| <code>boolean othersUpdatesAreVisible(int type)</code>  | 3.0                          | Yes                     |               |
| <code>boolean ownDeletesAreVisible(int type)</code>   | 3.0                          | Yes                     |               |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| <code>boolean ownInsertsAreVisible(int type)</code>       | 3.0                          | Yes                     |               |
| <code>boolean ownUpdatesAreVisible(int type)</code>       | 3.0                          | Yes                     |               |
| <code>boolean storesLowerCaseIdentifiers()</code>         | 3.0                          | Yes                     | Returns false |
| <code>boolean storesLowerCaseQuotedIdentifiers()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean storesMixedCaseIdentifiers()</code>         | 3.0                          | Yes                     | Returns true  |
| <code>boolean storesMixedCaseQuotedIdentifiers()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean storesUpperCaseIdentifiers()</code>         | 3.0                          | Yes                     | Returns false |
| <code>boolean storesUpperCaseQuotedIdentifiers()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsAlterTableWithAddColumn()</code>    | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsAlterTableWithDropColumn()</code>   | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsANSI92EntryLevelSQL()</code>        | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsANSI92FullSQL()</code>              | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsANSI92IntermediateSQL()</code>      | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsBatchUpdates()</code>               | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsCatalogsInDataManipulation()</code> | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsCatalogsInIndexDefinitions()</code> | 3.0                          | Yes                     | Returns true  |



| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| boolean supportsCatalogsInPrivilegeDefinitions()                | 3.0                          | Yes                     | Returns true  |
| boolean supportsCatalogsInProcedureCalls()                      | 3.0                          | Yes                     | Returns true  |
| boolean supportsCatalogsInTableDefinitions()                    | 3.0                          | Yes                     | Returns true  |
| boolean supportsColumnAliasing()                                | 3.0                          | Yes                     | Returns true  |
| boolean supportsConvert()                                       | 3.0                          | Yes                     | Returns true  |
| boolean supportsConvert(int fromType, int toType)               | 3.0                          | Yes                     |               |
| boolean supportsCoreSQLGrammar()                                | 3.0                          | Yes                     | Returns true  |
| boolean supportsCorrelatedSubqueries()                          | 3.0                          | Yes                     | Returns true  |
| boolean supportsDataDefinitionAndDataManipulationTransactions() | 3.0                          | Yes                     | Returns false |
| boolean supportsDataManipulationTransactionsOnly()              | 3.0                          | Yes                     | Returns false |
| boolean supportsDifferentTableCorrelationNames()                | 3.0                          | Yes                     | Returns false |
| boolean supportsExpressionsInOrderBy()                          | 3.0                          | Yes                     | Returns true  |
| boolean supportsExtendedSQLGrammar()                            | 3.0                          | Yes                     | Returns false |
| boolean supportsFullOuterJoins()                                | 3.0                          | Yes                     | Returns true  |
| boolean supportsGetGeneratedKeys()                              | 3.0                          | Yes                     | Returns false |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| <code>boolean supportsGroupBy()</code>                      | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsGroupByBeyondSelect()</code>          | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsGroupByUnrelated()</code>             | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsIntegrityEnhancementFacility()</code> | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsLikeEscapeClause()</code>             | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsLimitedOuterJoins()</code>            | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsMinimumSQLGrammar()</code>            | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsMixedCaseIdentifiers()</code>         | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsMixedCaseQuotedIdentifiers()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsMultipleOpenResults()</code>          | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsMultipleResultSets()</code>           | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsMultipleTransactions()</code>         | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsNamedParameters()</code>              | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsNonNullableColumns()</code>           | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsOpenCursorsAcrossCommit()</code>      | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsOpenCursorsAcrossRollback()</code>    | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsOpenStatementsAcrossCommit()</code>   | 3.0                          | Yes                     | Returns true  |
| <code>boolean</code>  | 3.0                          | Yes                     | Returns true  |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes         |
|--|------------------------------|-------------------------|---------------|
| <code>supportsOpenStatementsAcrossRollback()</code>                          |                              |                         |               |
| <code>boolean supportsOrderByUnrelated()</code>                              | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsOuterJoins()</code>                                    | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsPositionedDelete()</code>                              | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsPositionedUpdate()</code>                              | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsResultSetConcurrency(int type, int concurrency)</code> | 3.0                          | Yes                     |               |
| <code>boolean supportsResultSetHoldability(int holdability)</code>           | 3.0                          | Yes                     |               |
| <code>boolean supportsResultSetType(int type)</code>                         | 3.0                          | Yes                     |               |
| <code>boolean supportsSavepoints()</code>                                    | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsSchemasInDataManipulation()</code>                     | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSchemasInIndexDefinitions()</code>                     | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSchemasInPrivilegeDefinitions()</code>                 | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSchemasInProcedureCalls()</code>                       | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsSchemasInTableDefinitions()</code>                     | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSelectForUpdate()</code>                               | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsStatementPooling()</code>                              | 3.0                          | Yes                     | Returns false |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes         |
|---|------------------------------|-------------------------|---------------|
| <code>boolean supportsStoredFunctionsUsingCallSyntax()</code>     | 4.0                          | Yes                     | Returns false |
| <code>boolean supportsStoredProcedures()</code>                   | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSubqueriesInComparisons()</code>            | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSubqueriesInExists()</code>                 | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSubqueriesInIns()</code>                    | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsSubqueriesInQuantifieds()</code>            | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsTableCorrelationNames()</code>              | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsTransactionIsolationLevel(int level)</code> | 3.0                          | Yes                     |               |
| <code>boolean supportsTransactions()</code>                       | 3.0                          | Yes                     | Returns false |
| <code>boolean supportsUnion()</code>                              | 3.0                          | Yes                     | Returns true  |
| <code>boolean supportsUnionAll()</code>                           | 3.0                          | Yes                     | Returns true  |
| <code>boolean updatesAreDetected(int type)</code>                 | 3.0                          | Yes                     | Returns true  |
| <code>boolean usesLocalFilePerTable()</code>                      | 3.0                          | Yes                     | Returns false |
| <code>boolean usesLocalFiles()</code>                             | 3.0                          | Yes                     | Returns false |
| <code>boolean isWrapperFor(Class&lt;?&gt; iface)</code>           | 4.0                          | Yes                     |               |
| <code>&lt;T&gt; T unwrap(Class&lt;T&gt; iface)</code>             | 4.0                          | Yes                     |               |

## DataSource

Table 6 lists the methods that belong to the DataSource interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the DataSource interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/javax/sql/DataSource.html>.

**Table 6. Methods in the DataSource Interface**

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                                     |
|---|------------------------------|-------------------------|---|
| Connection getConnection ()                                 | 3.0                          | Yes                     |   |
| Connection getConnection (String username, String password) | 3.0                          | Yes                     |   |
| int getLoginTimeout ()                                      | 3.0                          | Yes                     |   |
| PrintWriter getLogWriter ()                                 | 3.0                          | Yes                     |   |
| Logger getParentLogger ()                                   | 4.1                          | No                      | The driver does not use java.util.logging |
| void setLoginTimeout (int seconds)                          | 3.0                          | Yes                     |   |
| void setLogWriter (PrintWriter out)                         | 3.0                          | Yes                     |   |
| boolean isWrapperFor (Class<?> iface)                       | 4.0                          | Yes                     |   |
| <T> T unwrap (Class<T> iface)                               | 4.0                          | Yes                     |   |

## Driver

Table 7 lists the methods that belong to the Driver interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the Driver interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/Driver.html>.

**Table 7. Methods in the Driver Interface**

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>boolean acceptsURL (String url)</code>                                    | 3.0                          | Yes                     |       |
| <code>Connection connect (String url, Properties info)</code>                   | 3.0                          | Yes                     |       |
| <code>int getMajorVersion()</code>  | 3.0                          | Yes                     |       |
| <code>int getMinorVersion()</code>  | 3.0                          | Yes                     |       |
| <code>Logger getParentLogger()</code>   | 4.1                          | No                      |       |
| <code>DriverPropertyInfo[] getPropertyInfo (String url, Properties info)</code> | 3.0                          | Yes                     |       |
| <code>boolean jdbcCompliant()</code>  | 3.0                          | Yes                     |       |

### ParameterMetaData

Table 8 lists the methods that belong to the ParameterMetaData interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the ParameterMetaData interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/ParameterMetaData.html>.

**Table 8. Methods in the ParameterMetaData Interface**

| Method                                    | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>String getParameterClassName</code> | 3.0                          | Yes                     |       |

| Method                                 | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| (int param)                            |                              |                         |       |
| int getParameterCount()                | 3.0                          | Yes                     |       |
| int getParameterMode(int param)        | 3.0                          | Yes                     |       |
| int getParameterType(int param)        | 3.0                          | Yes                     |       |
| String getParameterTypeName(int param) | 3.0                          | Yes                     |       |
| int getPrecision(int param)            | 3.0                          | Yes                     |       |
| int getScale(int param)                | 3.0                          | Yes                     |       |
| int isNullable(int param)              | 3.0                          | Yes                     |       |
| boolean isSigned(int param)            | 3.0                          | Yes                     |       |
| boolean isWrapperFor(Class<?> iface)   | 4.0                          | Yes                     |       |
| <T> T unwrap(Class<T> iface)           | 4.0                          | Yes                     |       |

## PooledConnection

Table 9 lists the methods that belong to the PooledConnection interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the PooledConnection interface, see the Java API documentation available at

<http://docs.oracle.com/javase/1.5.0/docs/api/javax/sql/PooledConnection.html>.

Table 9. Methods in the PooledConnection Interface

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes  |
|--|------------------------------|-------------------------|--|
| <code>void<br/>addConnectionEventListener<br/>(ConnectionEventListener<br/>listener)</code>    | 3.0                          | Yes                     |  |
| <code>void<br/>addStatementEventListener<br/>(StatementEventListener<br/>listener)</code>      | 4.0                          | Yes                     |  |
| <code>void close()</code>  | 3.0                          | Yes                     |  |
| <code>Connection getConnection()</code>  | 3.0                          | Yes                     |  |
| <code>void<br/>removeConnectionEventListene<br/>r(ConnectionEventListener<br/>listener)</code> | 3.0                          | Yes                     |  |
| <code>void<br/>removeStatementEventListener<br/>(StatementEventListener<br/>listener)</code>   | 4.0                          | Yes                     | Removes the specified <code>StatementEventListener</code> from the list of components that will be notified when the driver detects that a <code>PreparedStatement</code> has been closed or is invalid. |

## PreparedStatement

The `PreparedStatement` interface extends the `Statement` interface.

Table 10 lists the methods that belong to the `PreparedStatement` interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the `PooledConnection` interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/PreparedStatement.html>.



Table 10. Methods in the PreparedStatement Interface

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| <code>void addBatch()</code>   | 3.0                          | Yes                     |       |
| <code>void clearParameters()</code>  | 3.0                          | Yes                     |       |
| <code>boolean execute()</code>   | 3.0                          | Yes                     |       |
| <code>ResultSet executeQuery()</code>  | 3.0                          | Yes                     |       |
| <code>int executeUpdate()</code>   | 3.0                          | Yes                     |       |
| <code>ResultSetMetaData<br/>getMetaData()</code>   | 3.0                          | Yes                     |       |
| <code>ParameterMetaData<br/>getParameterMetaData()</code>                                    | 3.0                          | Yes                     |       |
| <code>void setArray(int<br/>parameterIndex, Array x)</code>                                  | 3.0                          | No                      |       |
| <code>void setAsciiStream(int<br/>parameterIndex,<br/>InputStream x)</code>                  | 4.0                          | Yes                     |       |
| <code>void setAsciiStream(int<br/>parameterIndex,<br/>InputStream x, int<br/>length)</code>  | 3.0                          | Yes                     |       |
| <code>void setAsciiStream(int<br/>parameterIndex,<br/>InputStream x, long<br/>length)</code> | 4.0                          | Yes                     |       |
| <code>void setBigDecimal(int<br/>parameterIndex,<br/>BigDecimal x)</code>                    | 3.0                          | Yes                     |       |
| <code>void setBinaryStream(int<br/>parameterIndex,<br/>InputStream x)</code>                 | 4.0                          | Yes                     |       |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>void setBinaryStream(int parameterIndex, InputStream x, int length)</code>    | 3.0                          | Yes                     |       |
| <code>void setBinaryStream(int parameterIndex, InputStream x, long length)</code>   | 4.0                          | Yes                     |       |
| <code>void setBlob(int parameterIndex, Blob x)</code>                               | 3.0                          | No                      |       |
| <code>void setBlob(int parameterIndex, InputStream inputStream)</code>              | 4.0                          | No                      |       |
| <code>void setBlob(int parameterIndex, InputStream inputStream, long length)</code> | 4.0                          | No                      |       |
| <code>void setBoolean(int parameterIndex, boolean x)</code>                         | 3.0                          | Yes                     |       |
| <code>void setByte(int parameterIndex, byte x)</code>                               | 3.0                          | Yes                     |       |
| <code>void setBytes(int parameterIndex, byte[] x)</code>                            | 3.0                          | Yes                     |       |
| <code>void setCharacterStream(int parameterIndex, Reader reader)</code>             | 4.0                          | Yes                     |       |
| <code>void setCharacterStream(int parameterIndex, Reader reader, int length)</code> | 3.0                          | Yes                     |       |
| <code>void setCharacterStream(int parameterIndex,</code>                            | 4.0                          | Yes                     |       |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| Reader reader, long length)  |                              |                         |       |
| void setClob(int parameterIndex, Clob x)                                 | 3.0                          | No                      |       |
| void setClob(int parameterIndex, Reader reader)                          | 4.0                          | No                      |       |
| void setClob(int parameterIndex, Reader reader, long length)             | 4.0                          | No                      |       |
| void setDate(int parameterIndex, Date x)                                 | 3.0                          | Yes                     |       |
| void setDate(int parameterIndex, Date x, Calendar cal)                   | 3.0                          | Yes                     |       |
| void setDouble(int parameterIndex, double x)                             | 3.0                          | Yes                     |       |
| void setFloat(int parameterIndex, float x)                               | 3.0                          | Yes                     |       |
| void setInt(int parameterIndex, int x)                                   | 3.0                          | Yes                     |       |
| void setLong(int parameterIndex, long x)                                 | 3.0                          | Yes                     |       |
| void setNCharacterStream (int parameterIndex, Reader value)              | 4.0                          | No                      |       |
| void setNCharacterStream (int parameterIndex, Reader value, long length) | 4.0                          | No                      |       |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>void setNClob(int parameterIndex, NClob value)</code>                             | 4.0                          | No                      |       |
| <code>void setNClob(int parameterIndex, Reader reader)</code>                           | 4.0                          | No                      |       |
| <code>void setNClob(int parameterIndex, Reader reader, long length)</code>              | 4.0                          | No                      |       |
| <code>void setNString(int parameterIndex, String value)</code>                          | 4.0                          | No                      |       |
| <code>void setNull(int paramIndex, int sqlType, String typeName)</code>                 | 3.0                          | Yes                     |       |
| <code>void setObject(int parameterIndex, Object x)</code>                               | 3.0                          | Yes                     |       |
| <code>void setObject(int parameterIndex, Object x, int targetSqlType)</code>            | 3.0                          | Yes                     |       |
| <code>void setObject(int parameterIndex, Object x, int targetSqlType, int scale)</code> | 3.0                          | Yes                     |       |
| <code>void setRef(int parameterIndex, Ref x)</code>                                     | 3.0                          | No                      |       |
| <code>void setRowId(int parameterIndex, RowId x)</code>                                 | 4.0                          | No                      |       |
| <code>void setShort(int parameterIndex, short x)</code>                                 | 3.0                          | No                      |       |
| <code>void setSQLXML(int</code>   | 4.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes      |
|---|------------------------------|-------------------------|------------|
| <code>parameterIndex, SQLXML xmlObject)</code>                                    |                              |                         |            |
| <code>void setString(int parameterIndex, String x)</code>                         | 3.0                          | Yes                     |            |
| <code>void setTime(int parameterIndex, Time x)</code>                             | 3.0                          | Yes                     |            |
| <code>void setTime(int parameterIndex, Time x, Calendar cal)</code>               | 3.0                          | Yes                     |            |
| <code>void setTimestamp(int parameterIndex, Timestamp x)</code>                   | 3.0                          | Yes                     |            |
| <code>void setTimestamp(int parameterIndex, Timestamp x, Calendar cal)</code>     | 3.0                          | Yes                     |            |
| <code>void setUnicodeStream(int parameterIndex, InputStream x, int length)</code> | 3.0                          | Yes                     | Deprecated |
| <code>void setURL(int parameterIndex, URL x)</code>                               | 3.0                          | No                      |            |
| <code>boolean isWrapperFor(Class&lt;?&gt; iface)</code>                           | 4.0                          | Yes                     |            |
| <code>&lt;T&gt; T unwrap(Class&lt;T&gt; iface)</code>                             | 4.0                          | Yes                     |            |

## ResultSet

Table 11 lists the methods that belong to the ResultSet interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the `ResultSet` interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/ResultSet.html>.

**Table 11. Methods in the `ResultSet` Interface**

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|--|------------------------------|-------------------------|--|
| <code>boolean absolute(int row)</code>                     | 3.0                          | No                      |  |
| <code>void afterLast()</code>                              | 3.0                          | No                      |  |
| <code>void beforeFirst()</code>                            | 3.0                          | No                      |  |
| <code>void cancelRowUpdates()</code>                       | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void clearWarnings()</code>                          | 3.0                          | Yes                     |  |
| <code>void close()</code>                                  | 3.0                          | Yes                     |  |
| <code>void deleteRow()</code>                              | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>int findColumn(String columnName)</code>             | 3.0                          | Yes                     |  |
| <code>boolean first()</code>                               | 3.0                          | No                      |  |
| <code>Array getArray(int i)</code>                         | 3.0                          | No                      |  |
| <code>Array getArray(String colName)</code>                | 3.0                          | No                      |  |
| <code>InputStream getAsciiStream(int columnIndex)</code>   | 3.0                          | Yes                     |  |
| <code>InputStream getAsciiStream(String columnName)</code> | 3.0                          | Yes                     |  |
| <code>BigDecimal getBigDecimal(int columnIndex)</code>     | 3.0                          | Yes                     |  |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes      |
|--|------------------------------|-------------------------|------------|
| BigDecimal getBigDecimal(int columnIndex, int scale)   | 3.0                          | Yes                     | Deprecated |
| BigDecimal getBigDecimal(String columnName)            | 3.0                          | Yes                     |            |
| BigDecimal getBigDecimal(String columnName, int scale) | 3.0                          | Yes                     | Deprecated |
| InputStream getBinaryStream(int columnIndex)           | 3.0                          | Yes                     |            |
| InputStream getBinaryStream(String columnName)         | 3.0                          | Yes                     |            |
| Blob getBlob(int i)                                    | 3.0                          | No                      |            |
| Blob getBlob(String colName)                           | 3.0                          | No                      |            |
| boolean getBoolean(int columnIndex)                    | 3.0                          | Yes                     |            |
| boolean getBoolean(String columnName)                  | 3.0                          | Yes                     |            |
| getBytes(int columnIndex)                              | 3.0                          | Yes                     |            |
| byte getByte(String columnName)                        | 3.0                          | Yes                     |            |
| byte[] getBytes(int columnIndex)                       | 3.0                          | Yes                     |            |
| byte[] getBytes(String columnName)                     | 3.0                          | Yes                     |            |
| Reader getCharacterStream(int columnIndex)             | 3.0                          | Yes                     |            |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| Reader getCharacterStream (String columnName) | 3.0                          | Yes                     |       |
| Clob getClob(int i)                           | 3.0                          | No                      |       |
| Clob getClob(String colName)                  | 3.0                          | No                      |       |
| int getConcurrency()                          | 3.0                          | Yes                     |       |
| String getCursorName()                        | 3.0                          | Yes                     |       |
| Date getDate(int columnIndex)                 | 3.0                          | Yes                     |       |
| Date getDate(int columnIndex, Calendar cal)   | 3.0                          | Yes                     |       |
| Date getDate(String columnName)               | 3.0                          | Yes                     |       |
| Date getDate(String columnName, Calendar cal) | 3.0                          | Yes                     |       |
| double getDouble(int columnIndex)             | 3.0                          | Yes                     |       |
| double getDouble(String columnName)           | 3.0                          | Yes                     |       |
| int getFetchDirection()                       | 3.0                          | Yes                     |       |
| int getFetchSize()                            | 3.0                          | Yes                     |       |
| float getFloat(int columnIndex)               | 3.0                          | Yes                     |       |
| float getFloat(String columnName)             | 3.0                          | Yes                     |       |
| int getHoldability()                          | 4.0                          | Yes                     |       |



| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| <code>int getInt(int columnIndex)</code>                                 | 3.0                          | Yes                     |       |
| <code>int getInt(String columnName)</code>                               | 3.0                          | Yes                     |       |
| <code>long getLong(int columnIndex)</code>                               | 3.0                          | Yes                     |       |
| <code>long getLong(String columnName)</code>                             | 3.0                          | Yes                     |       |
| <code>ResultSetMetaData getMetaData()</code>                             | 3.0                          | Yes                     |       |
| <code>Reader getNCharacterStream(int columnIndex)</code>                 | 4.0                          | No                      |       |
| <code>Reader getNCharacterStream(String columnName)</code>               | 4.0                          | No                      |       |
| <code>NClob getNClob(int columnIndex)</code>                             | 4.0                          | No                      |       |
| <code>NClob getNClob(String columnName)</code>                           | 4.0                          | No                      |       |
| <code>String getNString(int columnIndex)</code>                          | 4.0                          | No                      |       |
| <code>String getNString(String columnName)</code>                        | 4.0                          | No                      |       |
| <code>Object getObject(int columnIndex)</code>                           | 3.0                          | Yes                     |       |
| <code>&lt;T&gt; T getObject(int columnIndex, Class&lt;T&gt; type)</code> | 4.1                          | No                      |       |
| <code>Object getObject(int i,</code>                                     | 3.0                          | No                      |       |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| Map<String,Class<?>> map)                                  |                              |                         |       |
| Object getObject(String columnName)                        | 3.0                          | No                      |       |
| <T> T getObject(String columnName, Class<T> type)          | 4.1                          | No                      |       |
| Object getObject(String colName, Map<String,Class<?>> map) | 3.0                          | Yes                     |       |
| Ref getRef(int i)  | 3.0                          | No                      |       |
| Ref getRef(String colName)                                 | 3.0                          | No                      |       |
| int getRow()   | 3.0                          | Yes                     |       |
| RowId getRowId(int columnIndex)                            | 4.0                          | No                      |       |
| RowId getRowId(String columnLabel)                         | 4.0                          | No                      |       |
| short getShort(int columnIndex)                            | 3.0                          | Yes                     |       |
| short getShort(String columnName)                          | 3.0                          | Yes                     |       |
| SQLXML getSQLXML(int columnIndex)                          | 4.0                          | No                      |       |
| SQLXML getSQLXML(String columnLabel)                       | 4.0                          | No                      |       |
| Statement getStatement()                                   | 3.0                          | Yes                     |       |
| String getString(int columnIndex)                          | 3.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes      |
|---|------------------------------|-------------------------|------------|
| String getString(String columnName)                     | 3.0                          | Yes                     |            |
| Time getTime(int columnIndex)                           | 3.0                          | Yes                     |            |
| Time getTime(int columnIndex, Calendar cal)             | 3.0                          | Yes                     |            |
| Time getTime(String columnName)                         | 3.0                          | Yes                     |            |
| Time getTime(String columnName, Calendar cal)           | 3.0                          | Yes                     |            |
| Timestamp getTimestamp(int columnIndex)                 | 3.0                          | Yes                     |            |
| Timestamp getTimestamp(int columnIndex, Calendar cal)   | 3.0                          | Yes                     |            |
| Timestamp getTimestamp(String columnName)               | 3.0                          | Yes                     |            |
| Timestamp getTimestamp(String columnName, Calendar cal) | 3.0                          | Yes                     |            |
| int getType()   | 3.0                          | Yes                     |            |
| InputStream getUnicodeStream(int columnIndex)           | 3.0                          | Yes                     | Deprecated |
| InputStream getUnicodeStream(String columnName)         | 3.0                          | Yes                     | Deprecated |
| URL getURL(int columnIndex)                             | 3.0                          | No                      |            |

## Features

| Method                        | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|-------------------------------|------------------------------|-------------------------|--|
| URL getUrl(String columnName) | 3.0                          | No                      |  |
| SQLWarning getWarnings()      | 3.0                          | Yes                     |  |
| void insertRow()              | 3.0                          | No                      | Not valid because the driver is read-only. |
| boolean isAfterLast()         | 3.0                          | Yes                     |  |
| boolean isBeforeFirst()       | 3.0                          | Yes                     |  |
| boolean isClosed()            | 4.0                          | Yes                     |  |
| boolean isFirst()             | 3.0                          | Yes                     |  |
| boolean isLast()              | 3.0                          | No                      |  |
| boolean last()                | 3.0                          | No                      |  |
| void moveToCurrentRow()       | 3.0                          | No                      | Not valid because the driver is read-only. |
| void moveToInsertRow()        | 3.0                          | No                      | Not valid because the driver is read-only. |
| boolean next()                | 3.0                          | Yes                     |  |
| boolean previous()            | 3.0                          | No                      |  |
| void refreshRow()             | 3.0                          | No                      |  |
| boolean relative(int rows)    | 3.0                          | No                      |  |
| boolean rowDeleted()          | 3.0                          | Yes                     | Hard-coded to false                        |
| boolean rowInserted()         | 3.0                          | Yes                     | Hard-coded to false                        |
| boolean rowUpdated()          | 3.0                          | Yes                     | Hard-coded to false                        |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes   |
|--|------------------------------|-------------------------|---|
| <code>void setFetchDirection(int direction)</code>                                 | 3.0                          | No                      | Not valid because the driver is forward-only. |
| <code>void setFetchSize(int rows)</code>   | 3.0                          | Yes                     |   |
| <code>void updateArray(int columnIndex, Array x)</code>                            | 3.0                          | No                      |   |
| <code>void updateArray(String columnName, Array x)</code>                          | 3.0                          | No                      |   |
| <code>void updateAsciiStream(int columnIndex, InputStream x)</code>                | 4.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateAsciiStream(int columnIndex, InputStream x, int length)</code>    | 3.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateAsciiStream(int columnIndex, InputStream x, long length)</code>   | 4.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateAsciiStream(String columnName, InputStream x)</code>              | 4.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateAsciiStream(String columnName, InputStream x, int length)</code>  | 3.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateAsciiStream(String columnName, InputStream x, long length)</code> | 4.0                          | No                      | Not valid because the driver is read-only.    |
| <code>void updateBigDecimal(int columnIndex, BigDecimal x)</code>                  | 3.0                          | No                      | Not valid because the driver is read-only.    |

## Features

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|--|------------------------------|-------------------------|--|
| <code>void updateBigDecimal (String columnName, BigDecimal x)</code>                 | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (int columnIndex, InputStream x)</code>                | 4.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (int columnIndex, InputStream x, int length)</code>    | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (int columnIndex, InputStream x, long length)</code>   | 4.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (String columnName, InputStream x)</code>              | 4.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (String columnName, InputStream x, int length)</code>  | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBinaryStream (String columnName, InputStream x, long length)</code> | 4.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBlob (int columnIndex, InputStream inputStream)</code>              | 4.0                          | No                      |  |
| <code>void updateBlob (int columnIndex, Blob x)</code>                               | 3.0                          | No                      |  |
| <code>void updateBlob (int columnIndex, InputStream inputStream, long length)</code> | 4.0                          | No                      |  |
| <code>void updateBlob (String</code>   | 4.0                          | No                      |  |

| Method   | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|--|------------------------------|-------------------------|--|
| <code>columnName, InputStream inputStream)</code>                                      |                              |                         |  |
| <code>void updateBlob(String columnName, Blob x)</code>                                | 3.0                          | No                      |  |
| <code>void updateBlob(String columnLabel, InputStream inputStream, long length)</code> | 4.0                          | No                      |  |
| <code>void updateBoolean(int columnIndex, boolean x)</code>                            | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBoolean(String columnName, boolean x)</code>                          | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateByte(int columnIndex, byte x)</code>                                  | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateByte(String columnName, byte x)</code>                                | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBytes(int columnIndex, byte[] x)</code>                               | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBytes(String columnName, byte[] x)</code>                             | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateCharacterStream(int columnIndex, Reader x, int length)</code>         | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateCharacterStream(String columnName, Reader reader, int length)</code>  | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateBlob(int columnIndex, InputStream inputStream)</code>                 | 4.0                          | No                      |  |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|---|------------------------------|-------------------------|--|
| <code>void updateClob(int columnIndex, Clob x)</code>                                 | 3.0                          | No                      |  |
| <code>void updateBlob(int columnIndex, InputStream inputStream, long length)</code>   | 4.0                          | No                      |  |
| <code>void updateBlob(String columnName, InputStream inputStream)</code>              | 4.0                          | No                      |  |
| <code>void updateClob(String columnName, Clob x)</code>                               | 3.0                          | No                      |  |
| <code>void updateBlob(String columnName, InputStream inputStream, long length)</code> | 4.0                          | No                      |  |
| <code>void updateDate(int columnIndex, Date x)</code>                                 | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateDate(String columnName, Date x)</code>                               | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateDouble(int columnIndex, double x)</code>                             | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateDouble(String columnName, double x)</code>                           | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateFloat(int columnIndex, float x)</code>                               | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateFloat(String columnName, float x)</code>                             | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateInt(int columnIndex, int x)</code>                                   | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateInt(String columnName, int x)</code>                                 | 3.0                          | No                      | Not valid because the driver is read-only. |



| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|---|------------------------------|-------------------------|--|
| <code>void updateLong(int columnIndex, long x)</code>                                   | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateLong(String columnName, long x)</code>                                 | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateNCharacterStream(int columnIndex, Reader x)</code>                     | 4.0                          | No                      |  |
| <code>void updateNCharacterStream(int columnIndex, Reader x, long length)</code>        | 4.0                          | No                      |  |
| <code>void updateNCharacterStream(String columnName, Reader reader)</code>              | 4.0                          | No                      |  |
| <code>void updateNCharacterStream(String columnName, Reader reader, long length)</code> | 4.0                          | No                      |  |
| <code>void updateNClob(int columnIndex, NClob nClob)</code>                             | 4.0                          | No                      |  |
| <code>void updateNClob(int columnIndex, Reader reader)</code>                           | 4.0                          | No                      |  |
| <code>void updateNClob(int columnIndex, Reader reader, long length)</code>              | 4.0                          | No                      |  |
| <code>void updateNClob(String columnName, NClob nClob)</code>                           | 4.0                          | No                      |  |
| <code>void updateNClob(String columnName, Reader reader)</code>                         | 4.0                          | No                      |  |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|---|------------------------------|-------------------------|--|
| reader)   |                              |                         |  |
| void updateNClob(String columnName, Reader reader, long length) | 4.0                          | No                      |  |
| void updateNString(int columnIndex, String nString)             | 4.0                          | No                      |  |
| void updateNString(String columnName, String nString)           | 4.0                          | No                      |  |
| void updateNull(int columnIndex)                                | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateNull(String columnName)                              | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateObject(int columnIndex, Object x)                    | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateObject(int columnIndex, Object x, int scale)         | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateObject(String columnName, Object x)                  | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateObject(String columnName, Object x, int scale)       | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateRef(int columnIndex, Ref x)                          | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateRef(String columnName, Ref x)                        | 3.0                          | No                      | Not valid because the driver is read-only. |
| void updateRow()  | 3.0                          | No                      | Not valid because the driver is read-only. |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes                                      |
|---|------------------------------|-------------------------|--|
| <code>void updateRowId(int columnIndex, RowId x)</code>             | 4.0                          | No                      |  |
| <code>void updateRowId(String columnName, RowId x)</code>           | 4.0                          | No                      |  |
| <code>void updateShort(int columnIndex, short x)</code>             | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateShort(String columnName, short x)</code>           | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateSQLXML(int columnIndex, SQLXML xmlObject)</code>   | 4.0                          | No                      |  |
| <code>void updateSQLXML(String columnName, SQLXML xmlObject)</code> | 4.0                          | No                      |  |
| <code>void updateString(int columnIndex, String x)</code>           | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateString(String columnName, String x)</code>         | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateTime(int columnIndex, Time x)</code>               | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateTime(String columnName, Time x)</code>             | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateTimeStamp(int columnIndex, Timestamp x)</code>     | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>void updateTimeStamp (String columnName, Timestamp x)</code>  | 3.0                          | No                      | Not valid because the driver is read-only. |
| <code>boolean wasNull()</code>                                      | 3.0                          | Yes                     |  |
| <code>boolean isWrapperFor</code>                                   | 4.0                          | Yes                     |  |

| Method                       | Supported Since JDBC Version | Supported by the Driver | Notes |
|------------------------------|------------------------------|-------------------------|-------|
| (Class<?> iface)             |                              |                         |       |
| <T> T unwrap(Class<T> iface) | 4.0                          | Yes                     |       |

## ResultSetMetaData

Table 12 lists the methods that belong to the ResultSetMetaData interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the ResultSetMetaData interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/ResultSetMetaData.html>.

**Table 12. Methods in the ResultSetMetaData Interface**

| Method                                | Supported Since JDBC Version | Supported by the Driver | Notes |
|---------------------------------------|------------------------------|-------------------------|-------|
| String getCatalogName(int column)     | 3.0                          | Yes                     |       |
| String getColumnClassName(int column) | 3.0                          | Yes                     |       |
| int getColumnCount()                  | 3.0                          | Yes                     |       |
| int getColumnDisplaySize(int column)  | 3.0                          | Yes                     |       |
| String getColumnLabel(int column)     | 3.0                          | Yes                     |       |
| String getColumnName(int column)      | 3.0                          | Yes                     |       |
| int getColumnType(int column)         | 3.0                          | Yes                     |       |

| Method                                   | Supported Since JDBC Version | Supported by the Driver | Notes |
|--|------------------------------|-------------------------|-------|
| String getColumnTypeName(int column)     | 3.0                          | Yes                     |       |
| int getPrecision(int column)             | 3.0                          | Yes                     |       |
| int getScale(int column)                 | 3.0                          | Yes                     |       |
| String getSchemaName(int column)         | 3.0                          | Yes                     |       |
| String getTableName(int column)          | 3.0                          | Yes                     |       |
| boolean isAutoIncrement(int column)      | 3.0                          | Yes                     |       |
| boolean isCaseSensitive(int column)      | 3.0                          | Yes                     |       |
| boolean isCurrency(int column)           | 3.0                          | Yes                     |       |
| boolean isDefinitelyWritable(int column) | 3.0                          | Yes                     |       |
| int isNullable(int column)               | 3.0                          | Yes                     |       |
| boolean isReadOnly(int column)           | 3.0                          | Yes                     |       |
| boolean isSearchable(int column)         | 3.0                          | Yes                     |       |
| boolean isSigned(int column)             | 3.0                          | Yes                     |       |
| boolean isWritable(int column)           | 3.0                          | Yes                     |       |
| boolean isWrapperFor                     | 4.0                          | Yes                     |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>(Class&lt;?&gt; iface)</code>                   |                              |                         |       |
| <code>&lt;T&gt; T unwrap(Class&lt;T&gt; iface)</code> | 4.0                          | Yes                     |       |

## Statement

Table 13 lists the methods that belong to the Statement interface, and describes whether each method is supported by the Cloudera JDBC Driver for Impala and which version of the JDBC API is the earliest version that supports the method.

For detailed information about each method in the Statement interface, see the Java API documentation available at <http://docs.oracle.com/javase/1.5.0/docs/api/java/sql/Statement.html>.

**Table 13. Methods in the Statement Interface**

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>void addBatch(String sql)</code>                          | 3.0                          | Yes                     |       |
| <code>void cancel()</code>                                      | 3.0                          | Yes                     |       |
| <code>void clearBatch()</code>                                  | 3.0                          | Yes                     |       |
| <code>void clearWarnings()</code>                               | 3.0                          | Yes                     |       |
| <code>void close()</code>                                       | 3.0                          | Yes                     |       |
| <code>void closeOnCompletion()</code>                           | 4.1                          | Yes                     |       |
| <code>boolean execute(String sql)</code>                        | 3.0                          | Yes                     |       |
| <code>boolean execute(String sql, int autoGeneratedKeys)</code> | 3.0                          | No                      |       |
| <code>boolean execute(String</code>                             | 3.0                          | No                      |       |

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes |
|---|------------------------------|-------------------------|-------|
| <code>sql, int[] columnIndexes)</code>                            |                              |                         |       |
| <code>boolean execute(String sql, String[] columnNames)</code>    | 3.0                          | No                      |       |
| <code>int[]executeBatch()</code>                                  | 3.0                          | No                      |       |
| <code>ResultSet executeQuery (String sql)</code>                  | 3.0                          | Yes                     |       |
| <code>int executeUpdate(String sql)</code>                        | 3.0                          | Yes                     |       |
| <code>int executeUpdate(String sql, int autoGeneratedKeys)</code> | 3.0                          | No                      |       |
| <code>int executeUpdate(String sql, int[] columnIndexes)</code>   | 3.0                          | No                      |       |
| <code>int executeUpdate(String sql, String[] columnNames)</code>  | 3.0                          | No                      |       |
| <code>Connection getConnection ()</code>                          | 3.0                          | Yes                     |       |
| <code>int getFetchDirection()</code>                              | 3.0                          | Yes                     |       |
| <code>int getFetchSize()</code>                                   | 3.0                          | Yes                     |       |
| <code>ResultSet getGeneratedKeys ()</code>                        | 3.0                          | Yes                     |       |
| <code>int getMaxFieldSize()</code>                                | 3.0                          | Yes                     |       |
| <code>int getMaxRows()</code>                                     | 3.0                          | Yes                     |       |
| <code>boolean getMoreResults()</code>                             | 3.0                          | Yes                     |       |
| <code>boolean getMoreResults (int current)</code>                 | 3.0                          | No                      |       |

## Features

| Method  | Supported Since JDBC Version | Supported by the Driver | Notes  |
|---|------------------------------|-------------------------|--|
| <code>int getQueryTimeout()</code>                    | 3.0                          | Yes                     |  |
| <code>ResultSet getResultSet()</code>                 | 3.0                          | Yes                     |  |
| <code>int getResultSetConcurrency()</code>            | 3.0                          | Yes                     | Hard-coded to <code>CONCUR_READ_ONLY</code>        |
| <code>int getResultSetHoldability()</code>            | 3.0                          | Yes                     | Hard-coded to <code>CLOSE_CURSORS_AT_COMMIT</code> |
| <code>int getResultSetType()</code>                   | 3.0                          | Yes                     | Hard-coded to <code>TYPE_FORWARD_ONLY</code>       |
| <code>int getUpdateCount()</code>                     | 3.0                          | Yes                     |  |
| <code>SQLWarning getWarnings()</code>                 | 3.0                          | Yes                     |  |
| <code>boolean isClosed()</code>                       | 4.0                          | Yes                     |  |
| <code>boolean isCloseOnCompletion()</code>            | 4.1                          | Yes                     |  |
| <code>boolean isPoolable()</code>                     | 4.0                          | Yes                     |  |
| <code>void setCursorName(String name)</code>          | 3.0                          | No                      |  |
| <code>void setEscapeProcessing(boolean enable)</code> | 3.0                          | Yes                     |  |
| <code>void setFetchDirection(int direction)</code>    | 3.0                          | No                      |  |
| <code>void setFetchSize(int rows)</code>              | 3.0                          | Yes                     |  |
| <code>void setMaxFieldSize(int max)</code>            | 3.0                          | Yes                     |  |
| <code>void setMaxRows(int max)</code>                 | 3.0                          | Yes                     |  |
| <code>void setPoolable(boolean)</code>                | 4.0                          | Yes                     |  |



| Method                               | Supported Since JDBC Version | Supported by the Driver | Notes |
|--------------------------------------|------------------------------|-------------------------|-------|
| poolable)                            |                              |                         |       |
| void setQueryTimeout(int seconds)    | 3.0                          | Yes                     |       |
| boolean isWrapperFor(Class<?> iface) | 4.0                          | Yes                     |       |
| <T> T unwrap(Class<T> iface)         | 4.0                          | Yes                     |       |

## Contact Us

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

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

**Important:**

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

## Appendix A Driver Configuration Options

Appendix A lists and describes the properties that you can use to configure the behavior of the Cloudera JDBC Driver for Impala.

You can set configuration properties using the connection URL. For more information, see "Building the Connection URL" on page 9.

### AllowSelfSignedCerts

| Default Value | Required |
|---------------|----------|
| 0             | No       |

#### Description

When this property is set to 0, the SSL certificate used by the server cannot be self-signed.

When this property is set to 1, the SSL certificate used by the server can be self-signed.

**Note:**

This property is applicable only when SSL connections are enabled.

### AuthMech

| Default Value | Required |
|---------------|----------|
| 0             | No       |

#### Description

The authentication mechanism to use. Set the value to one of the following numbers:

- **0** for No Authentication
- **1** for Kerberos
- **2** for User Name
- **3** for User Name and Password

### CAIssuedCertNamesMismatch

| Default Value | Required |
|---------------|----------|
| 0             | No       |

## Description

When this property is set to 0, the name of the CA-issued SSL certificate must match the host name of the Impala server.

When this property is set to 1, the names of the certificate and the host name of the server are allowed to mismatch.

**Note:**

This property is applicable only when SSL connections are enabled.

## CatalogSchemaSwitch

| Default Value | Required |
|---------------|----------|
| 0             | No       |

## Description

When this property is set to 1, the driver treats Impala catalogs as schemas as a restriction for filtering.

When this property is set to 0, Impala catalogs are treated as catalogs, and Impala schemas are treated as schemas.

## DefaultStringLength

| Default Value | Required |
|---------------|----------|
| 255           | No       |

## Description

The maximum number of characters that can be contained in STRING columns. The range of DefaultStringLength is 0 to 32,767.

By default, the columns metadata for Impala does not specify a maximum data length for STRING columns.

## DelegationUID

| Default Value | Required |
|---------------|----------|
| None          | No       |

**Description**

Use this option to delegate all operations against Impala to a user that is different than the authenticated user for the connection.

**KrbHostFQDN**

| Default Value | Required                      |
|---------------|-------------------------------|
| None          | Yes, if AuthMech=1 (Kerberos) |

**Description**

The fully qualified domain name of the Impala host.

**KrbRealm**

| Default Value                      | Required |
|------------------------------------|----------|
| Depends on Kerberos configuration. | No       |

**Description**

The realm of the Impala host.

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

**KrbServiceName**

| Default Value | Required                      |
|---------------|-------------------------------|
| None          | Yes, if AuthMech=1 (Kerberos) |

**Description**

The Kerberos service principal name of the Impala server.

**LowerCaseResultSetColumnName**

| Default Value | Required |
|---------------|----------|
| 1             | No       |

**Description**

When this property is set to 1, the column name aliases in the resultSet metadata are returned in lower-case characters, matching the server-side behavior.

When this property is set to 0, the column name aliases are returned in the same letter case as specified in the query.

**PreparedMetaLimitZero**

| Default Value | Required |
|---------------|----------|
| 1             | No       |

**Description**

When this property is set to 1, the PreparedStatement.getMetadata() call will request metadata from the server with "LIMIT 0", increasing performance.

**PWD**

| Default Value | Required                                    |
|---------------|---|
| None          | Yes, if AuthMech=3 (User Name and Password) |

**Description**

The password corresponding to the user name that you provided using the property "UID" on page 89.

**RowsFetchedPerBlock**

| Default Value | Required |
|---------------|----------|
| 10000         | No       |

**Description**

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

Any positive 32-bit integer is a valid value, but testing has shown that performance gains are marginal beyond the default value of 10000 rows.

## SocketTimeout

| Default Value | Required |
|---------------|----------|
| 30            | No       |

### Description

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

When this property is set to 0, idle connections are not closed.

## SSL

| Default Value | Required |
|---------------|----------|
| 0             | No       |

### Description

When this property is set to 1, the driver communicates with the Impala server through an SSL-enabled socket.

When this property is set to 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.

## SSLKeyStore

| Default Value | Required      |
|---------------|---------------|
| None          | Yes, if SSL=1 |

### Description

The full path and file name of the Java KeyStore containing an SSL certificate to use during authentication.

See also the property "SSLKeyStorePwd" on page 88.

## SSLKeyStorePwd

| Default Value | Required      |
|---------------|---------------|
| None          | Yes, if SSL=1 |

### Description

The password for accessing the Java KeyStore that you specified using the property "SSLKeyStore" on page 87.

## SSLTrustStore

| Default Value   | Required |
|---|----------|
| jssecacerts, if it exists.<br><br>If jssecacerts does not exist, then cacerts is used. The default location of cacerts is jre\lib\security\ | No       |

### Description

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

See also the property "SSLTrustStorePwd" on page 88.

## SSLTrustStorePwd

| Default Value | Required                    |
|---------------|-----------------------------|
| None          | Yes, if using a TrustStore. |

### Description

The password for accessing the Java TrustStore that you specified using the property "SSLTrustStore" on page 88.



## UID

| Default Value | Required   |
|---------------|--|
| anonymous     | Yes, if AuthMech=3 (User Name and Password)<br>No, if AuthMech=2 (User Name) |

### Description

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

## UseNativeQuery

| Default Value | Required |
|---------------|----------|
| 0             | No       |

### Description

When this option is enabled (1), the driver does not transform the queries emitted by an application, so the native query is used.

When this option is disabled (0), the driver transforms the queries emitted by an application and converts them into an equivalent form in Impala SQL.

**Note:**

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