

UNIT V

JDBC – Introduction

What is JDBC?

JDBC stands for **Java Database Connectivity**, which is a standard Java API for database-independent connectivity between the Java programming language and a wide range of databases.

The JDBC library includes APIs for each of the tasks mentioned below that are commonly associated with database usage.

- Making a connection to a database.
- Creating SQL or MySQL statements.
- Executing SQL or MySQL queries in the database.
- Viewing & Modifying the resulting records.

Fundamentally, JDBC is a specification that provides a complete set of interfaces that allows for portable access to an underlying database. Java can be used to write different types of executables, such as –

- Java Applications
- Java Applets
- Java Servlets
- Java ServerPages (JSPs)
- Enterprise JavaBeans (EJBs).

All of these different executables are able to use a JDBC driver to access a database, and take advantage of the stored data.

JDBC provides the same capabilities as ODBC, allowing Java programs to contain database-independent code.

What is JDBC Driver?

JDBC drivers implement the defined interfaces in the JDBC API, for interacting with your database server.

For example, using JDBC drivers enable you to open database connections and to interact with it by sending SQL or database commands then receiving results with Java.

The *Java.sql* package that ships with JDK, contains various classes with their behaviours defined and their actual implementations are done in third-party drivers. Third party vendors implements the *java.sql.Driver* interface in their database driver.

JDBC Drivers Types

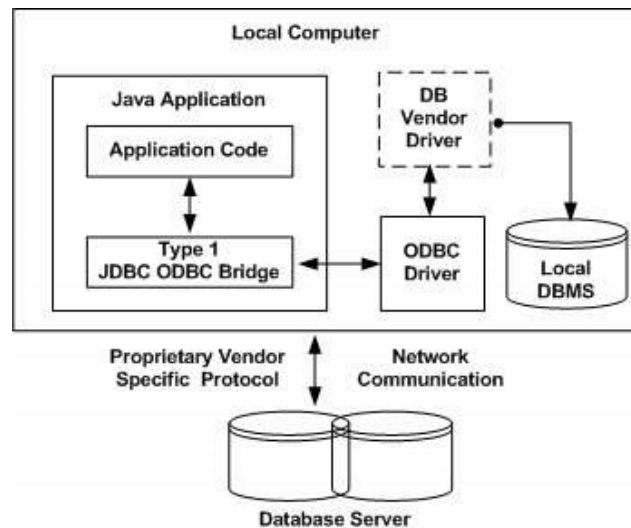
JDBC driver implementations vary because of the wide variety of operating systems and hardware platforms in which Java operates. Sun has divided the implementation types into four categories, Types 1, 2, 3, and 4, which is explained below –

Type 1: JDBC-ODBC Bridge Driver

In a Type 1 driver, a JDBC bridge is used to access ODBC drivers installed on each client

machine. Using ODBC, requires configuring on your system a Data Source Name (DSN) that represents the target database.

When Java first came out, this was a useful driver because most databases only supported ODBC access but now this type of driver is recommended only for experimental use or when no other alternative is available.



JDBC Architecture

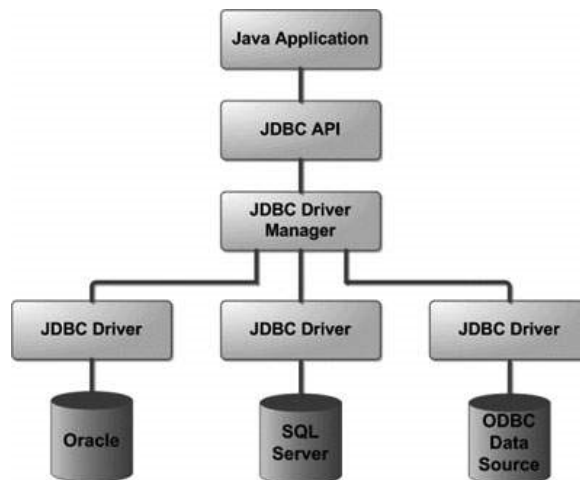
The JDBC API supports both two-tier and three-tier processing models for database access but in general, JDBC Architecture consists of two layers –

- **JDBC API:** This provides the application-to-JDBC Manager connection.
- **JDBC Driver API:** This supports the JDBC Manager-to-Driver Connection.

The JDBC API uses a driver manager and database-specific drivers to provide transparent connectivity to heterogeneous databases.

The JDBC driver manager ensures that the correct driver is used to access each data source. The driver manager is capable of supporting multiple concurrent drivers connected to multiple heterogeneous databases.

Following is the architectural diagram, which shows the location of the driver manager with respect to the JDBC drivers and the Java application –



Interface in Java

An **interface in Java** is a blueprint of a class. It has static constants and abstract methods. The interface in Java is *a mechanism to achieve [abstraction](#)*. There can be only abstract methods in the Java interface, not method body. It is used to achieve abstraction and multiple [inheritance in Java](#).

In other words, you can say that interfaces can have abstract methods and variables. It cannot have a method body.



Developing JDBC Applications

This chapter provides information about developing JDBC applications for Sequel link environments including:

- ["JDBC 3.0 Support"](#)
- ["SQL Support"](#)
- ["Data Types and Isolation Levels"](#)
- ["Threading"](#)
- ["Using Scrollable Cursors"](#)
- ["Specifying Application IDs"](#)
- ["Error Handling"](#)

["Fine-Tuning JDBC Application Performance](#)

JDBC - Create Tables Example

This chapter provides an example on how to create a table using JDBC application. Before executing the following example, make sure you have the following in place –

- To execute the following example you can replace the *username* and *password* with your actual user name and password.
- Your MySQL or whatever database you are using is up and running.

Required Steps

The following steps are required to create a new Database using JDBC application –

- **Import the packages:** Requires that you include the packages containing the JDBC classes needed for database programming. Most often, using *import java.sql.** will suffice.
- **Register the JDBC driver:** Requires that you initialize a driver so you can open a communications channel with the database.
- **Open a connection:** Requires using the *DriverManager.getConnection()* method to create a Connection object, which represents a physical connection with a database server.
- **Execute a query:** Requires using an object of type Statement for building and submitting an SQL statement to create a table in a selected database.
- **Clean up the environment:** Requires explicitly closing all database resources versus relying on the JVM's garbage collection.

Java DatabaseMetaData interface

DatabaseMetaData interface provides methods to get meta data of a database such as database product name, database product version, driver name, name of total number of tables, name of total number of views etc.

Commonly used methods of DatabaseMetaData interface

- **public String getDriverName()throws SQLException:** it returns the name of the JDBC driver.
- **public String getDriverVersion()throws SQLException:** it returns the version number of the JDBC driver.
- **public String getUsername()throws SQLException:** it returns the username of the database.
- **public String getDatabaseProductName()throws SQLException:** it returns the product name of the database.
- **public String getDatabaseProductVersion()throws SQLException:** it returns the product version of the database.
- **public ResultSet getTables(String catalog, String schemaPattern, String**

tableNamePattern, String[] types) throws SQLException: it returns the description of the tables of the specified catalog. The table type can be TABLE, VIEW, ALIAS, SYSTEM TABLE, SYNONYM etc.

How to get the object of DatabaseMetaData:

The `getMetaData()` method of `Connection` interface returns the object of `DatabaseMetaData`. Syntax:

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