Learning Goals

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This session will help you to understand about,

- What is JDBC?
- How do you connect java applications to database?
- Types of JDBC Drivers.
- Learn about JDBC APIs.

JDBC Analogy

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John a software developers is transferred to a location in North India. John wants to settle down fast by renting a home first. But he does not have any clue on which location he needs to search based on his requirement.

What should he do to find a suitable place?

John will reach a agent to search for an house.

Similarly for java application to connect to any database we use **JDBC**.
JDBC is an **agent** which will help java applications to connect to any DB.

JDBC Introduction

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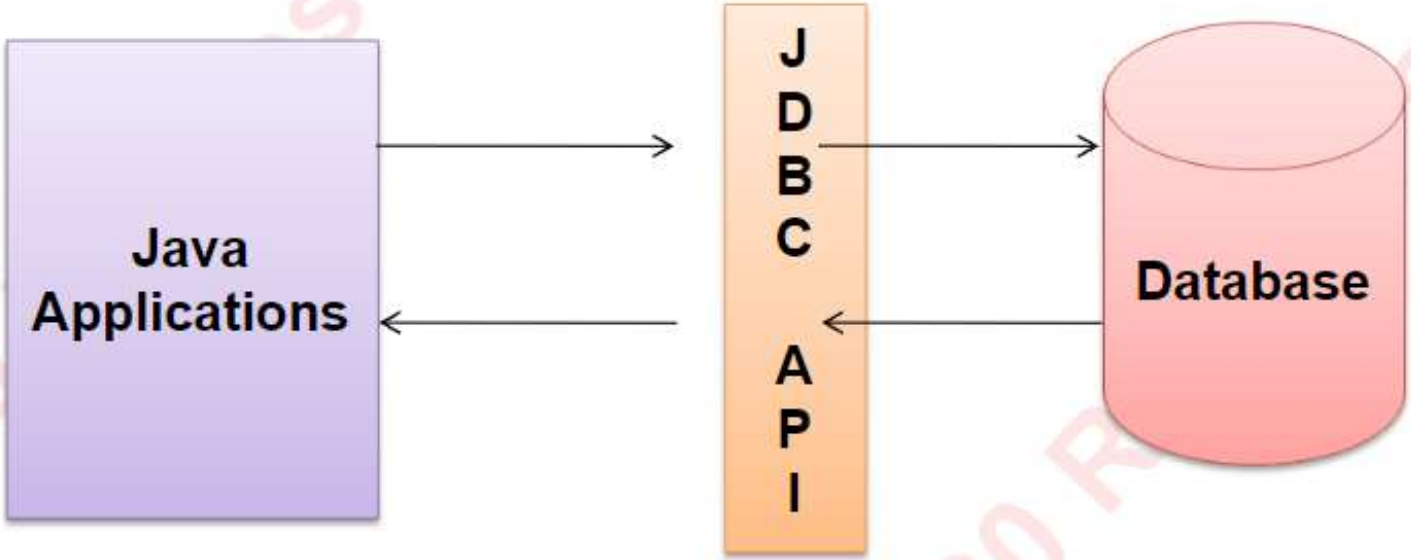
JDBC stands for **J**ava **D**ata**B**ase **C**onnectivity a collection of Java API's that allows programmers to access database from java application.

The JDBC API are used to connect to databases and execute queries.

All these API's are available under **java.sql** package.



JDBC driver

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A **JDBC driver** is a component used by JDBC API to connect with database.

- ✓ Different databases have different JDBC drivers **Example:** Oracle, MYSQL have their own drivers.
- ✓ These drivers are nothing but Java classes bundled in jar file and provided by the appropriate database vendors like Oracle, MySQL.
- ✓ This is a Java class that implements the JDBC's **java.sql.Driver** interface.

Usage of JDBC Drivers:

- ❑ This establishes the connection with the database.
- ❑ Responsible for executing the query in database and transfering the result to the java program.

How it works?

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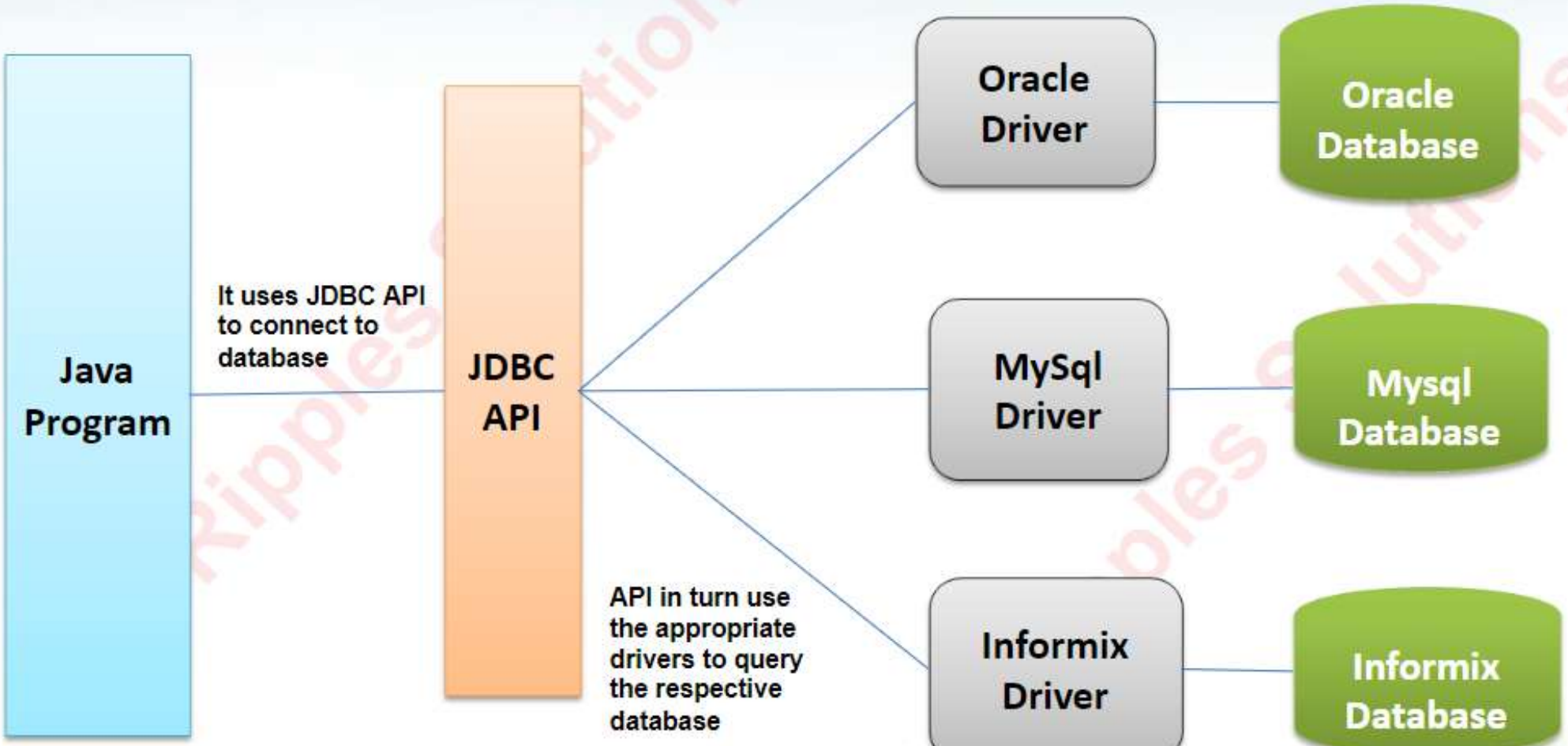

How JDBC connects to DB?

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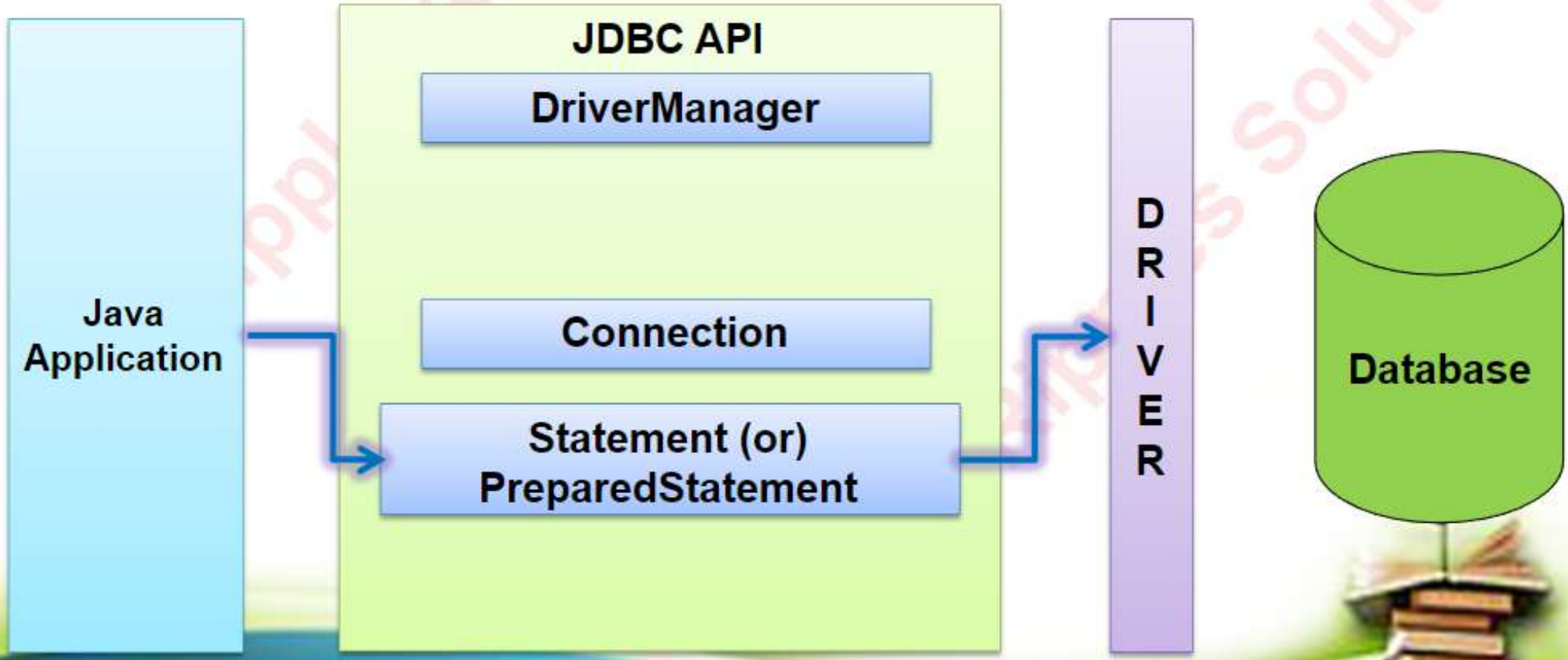
Driver manager API will be used to load the appropriate drivers.

Connection API is used to establish connection with the database.

The Statement/Prepared statement is used to execute the queries.

All these API's are present in java.sql package.



JDBC Drivers Types

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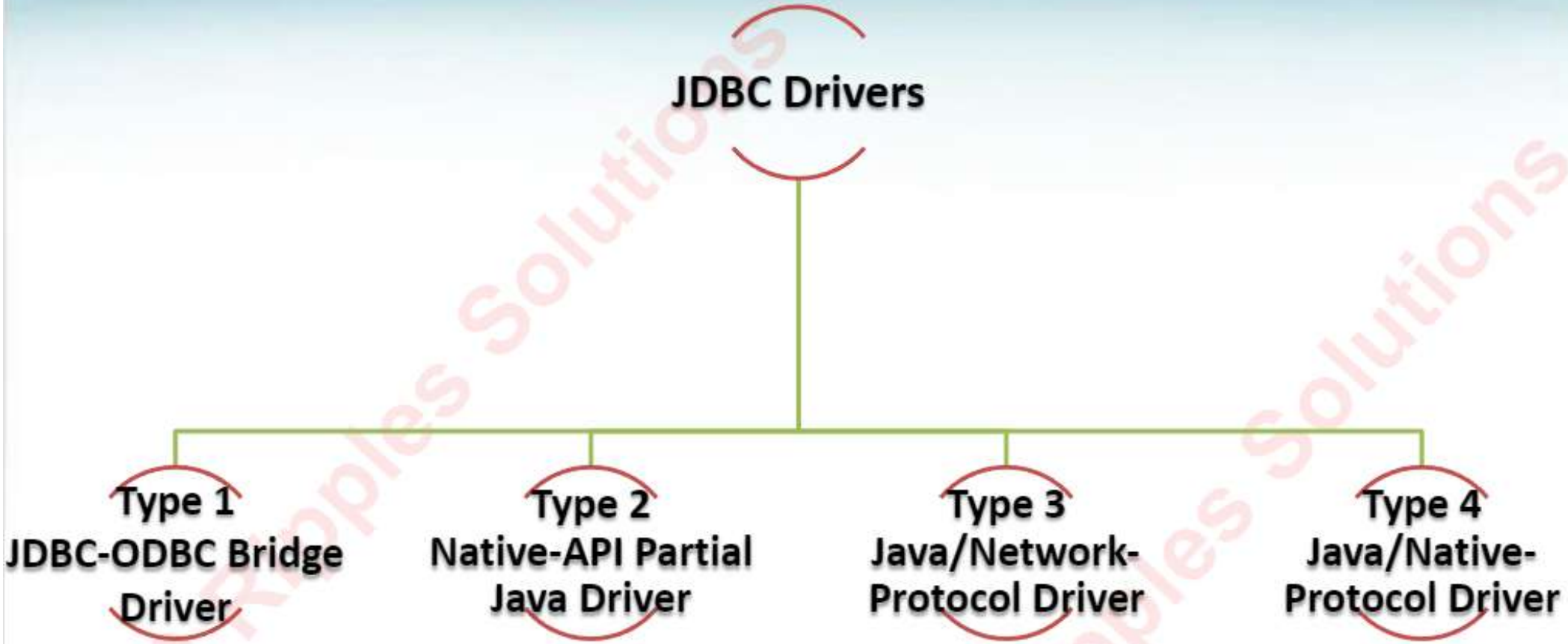

Type 4 Drivers are the **most commonly used in application development.**

Type 1 Driver - JDBC-ODBC Bridge

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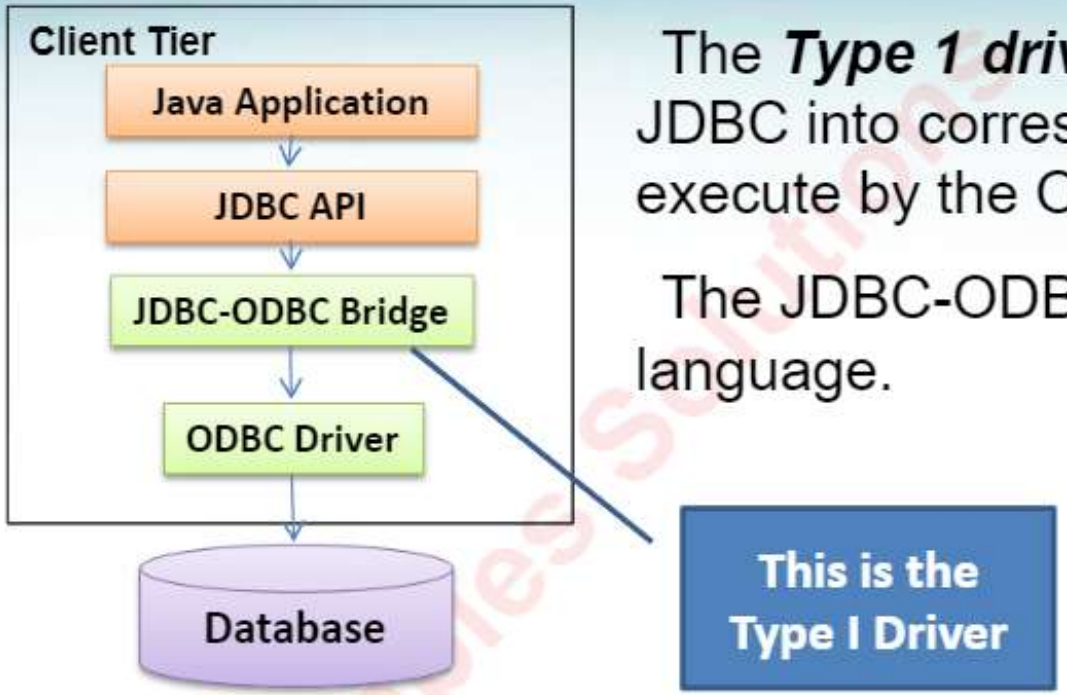

The ***Type 1 driver*** translates query obtained by JDBC into corresponding ODBC query, which is then execute by the ODBC driver.

The JDBC-ODBC Bridge driver is written in native language.

Disadvantage: The client machine should have the ODBC configured and the JDBC/ODBC driver installed for the java application to work.

Type 2 Driver - Native-API Driver

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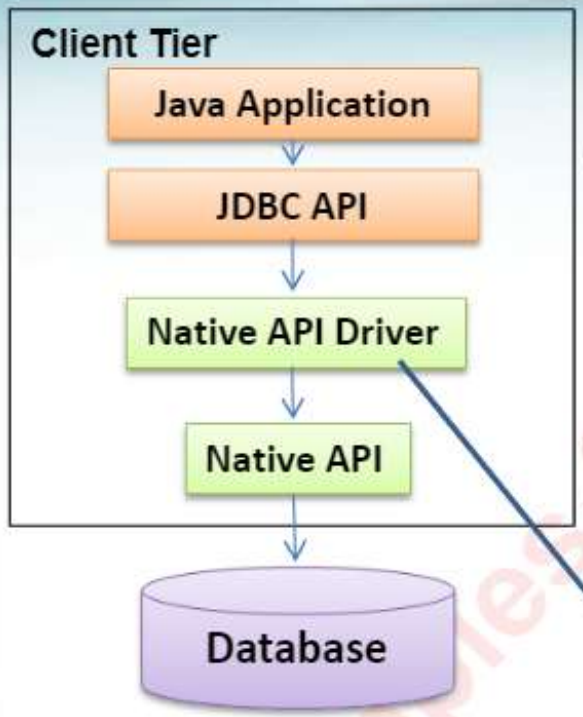

The ***JDBC type 2*** driver, also known as the native-API driver, is a implementation of each database.

It converts JDBC calls into database specific calls.

For example Oracle will have its own implementation and this will convert the queries with respect to Oracle specifications.

Disadvantage : The client machine should have the native driver installed or the java application to work, they are operating system dependent.

Type 3 Driver

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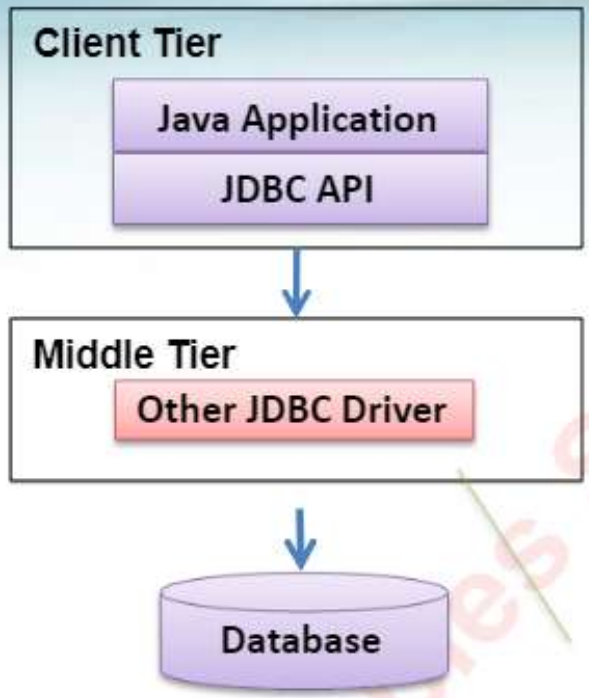

Java/Network-Protocol Driver makes a JDBC call to a middle tier server which translates the request to a database specific requests. This happens back and forth.

The middle tier can have Type 1/2 (or) 4 driver to do the database translation.

Middle Tier is the same or another machine will have either Type I (or) II (or) IV.

The Client machine should have the Type 3 driver

Disadvantage: Performance is slow as it involves multiple layers of processing before the JDBC calls are converted to database specific calls.

Type 4 Driver – Java Drivers

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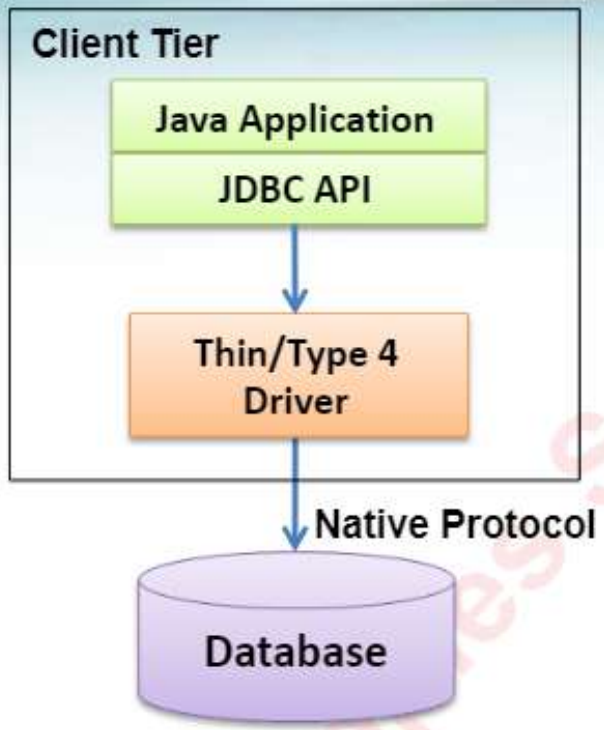

These are also called as **Thin** driver and are very specific to each database engine. This driver is developed using java.

Converts JDBC calls directly into a vendor-specific database protocol. These are distributed by the specific database vendors.

For every database we have Type 4 driver. So if we need to connect to MySQL we need to download MySQL type 4 driver.

Type 4 Drivers are the **most commonly used in application development.**

JDBC Driver 4 API

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- Java.sql.Driver

The **Driver** interface contains methods that every database vendor must implement. Example Oracle,MySQL

- java.sql.DriverManager

The **DriverManager** class loads the appropriate database specific driver in the java program.

- java.sql.Connection

The **connection API** is used to establish connection with the database server.

- java.sql.Statement

The **Statement API** is used to fire the SQL queries in the database server.

- java.sql.PreparedStatement

The **PreparedStatement API** is also used to fire the SQL queries in the database server.

java.sql.Statement

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This API is used to prepare the DML/DDL SQL query object and fire it in the database engine.

There are three types of statements,