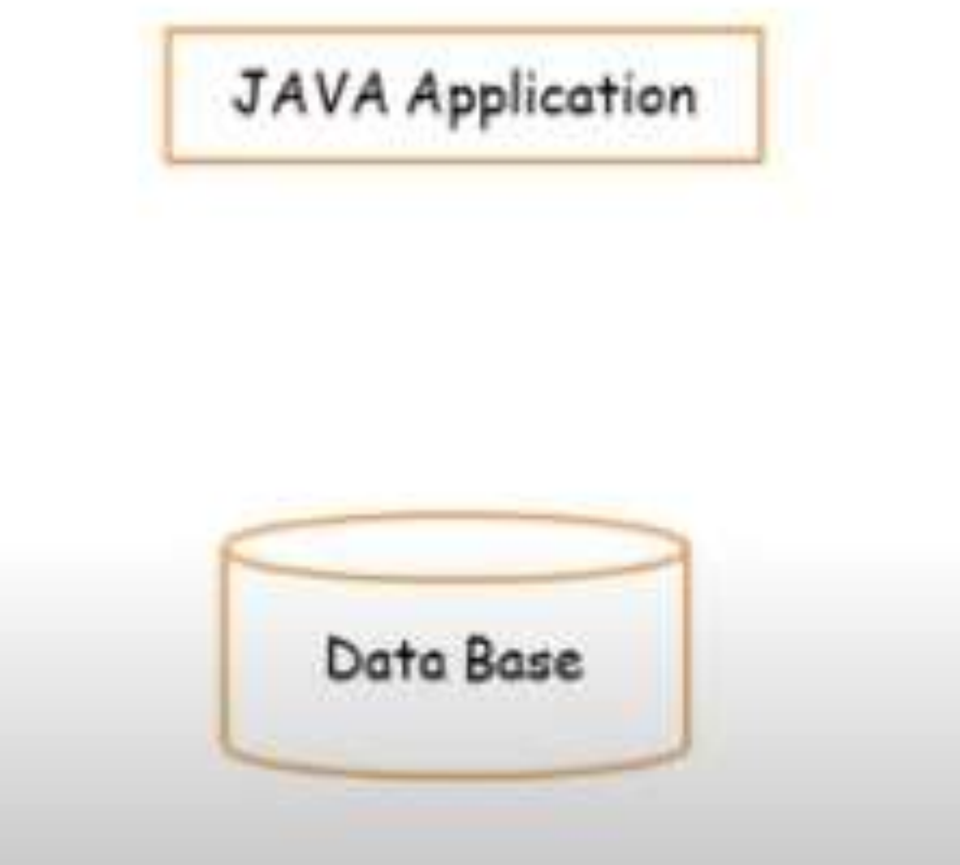
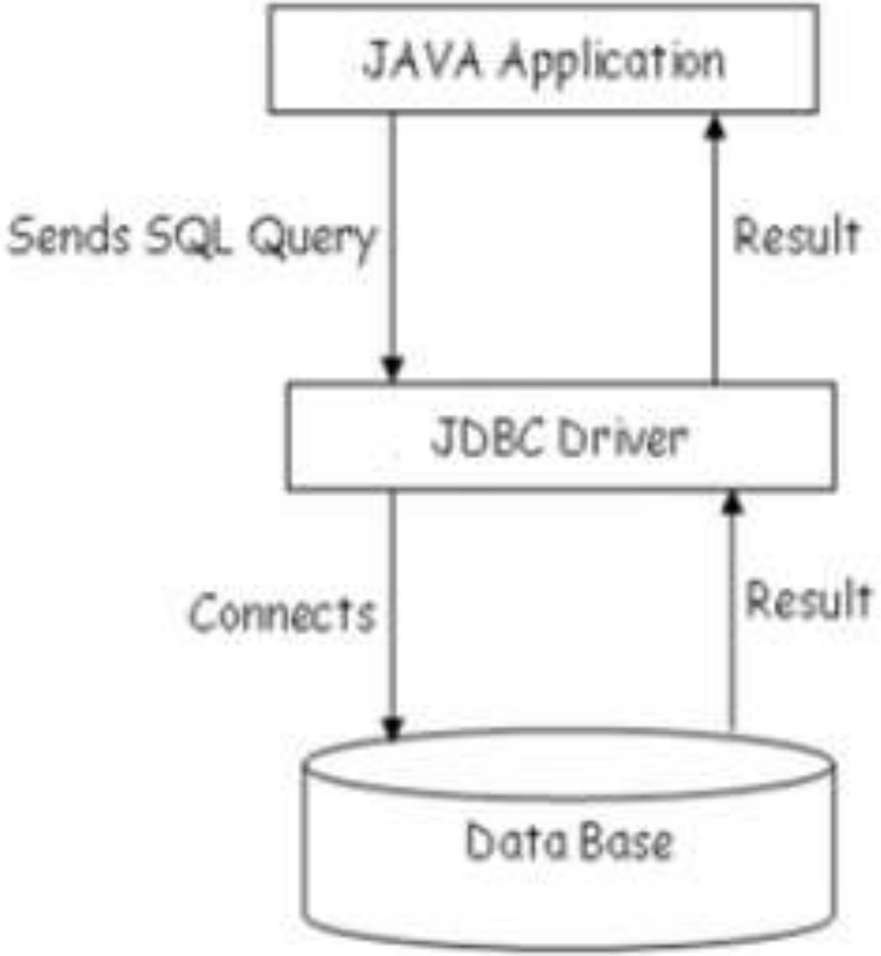
JDBC Drivers

Need of JDBC



Working of JDBC



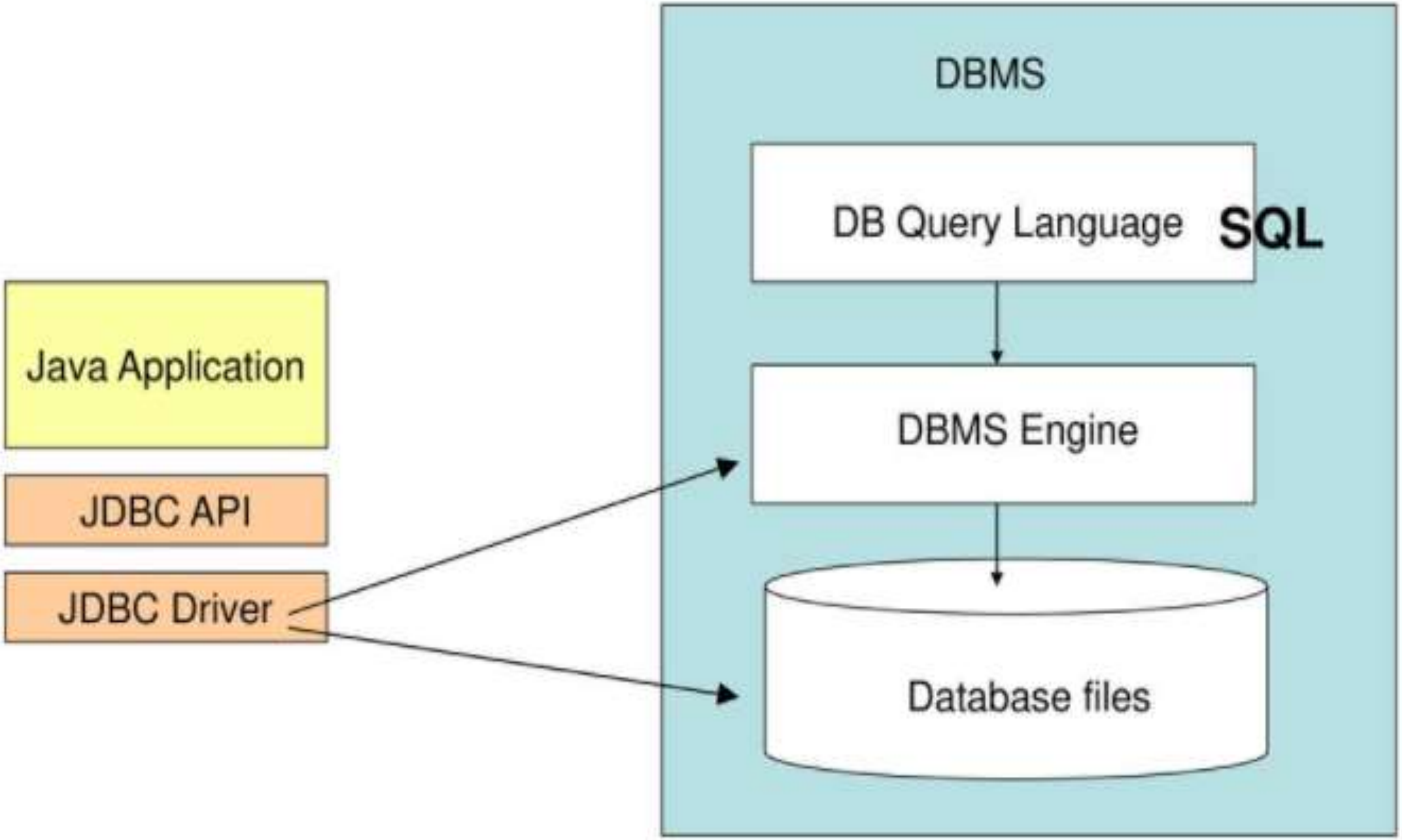
JDBC Driver

- JDBC Driver is a software component that enables java application to interact with the database.
- A JDBC driver uses the JDBC (Java Database Connectivity) API developed by Sun Microsystems.
- Using JDBC, an application can access a variety of databases and run on any platform with a Java Virtual Machine.

Features of JDBC

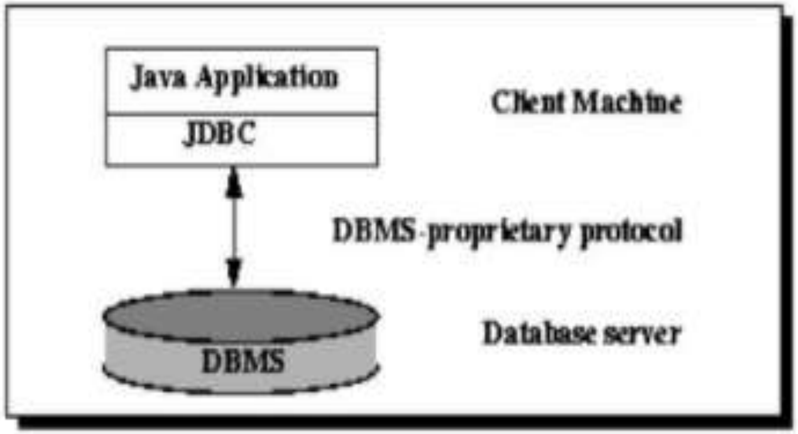
- JDBC is an API, using which we can communicate with any data base without rewriting our Java Application
- Most of the JDBC drivers are implemented in java. Hence JDBC is known as platform independent technology.
- Using JDBC API, We can able to perform all basic data base operations easily.

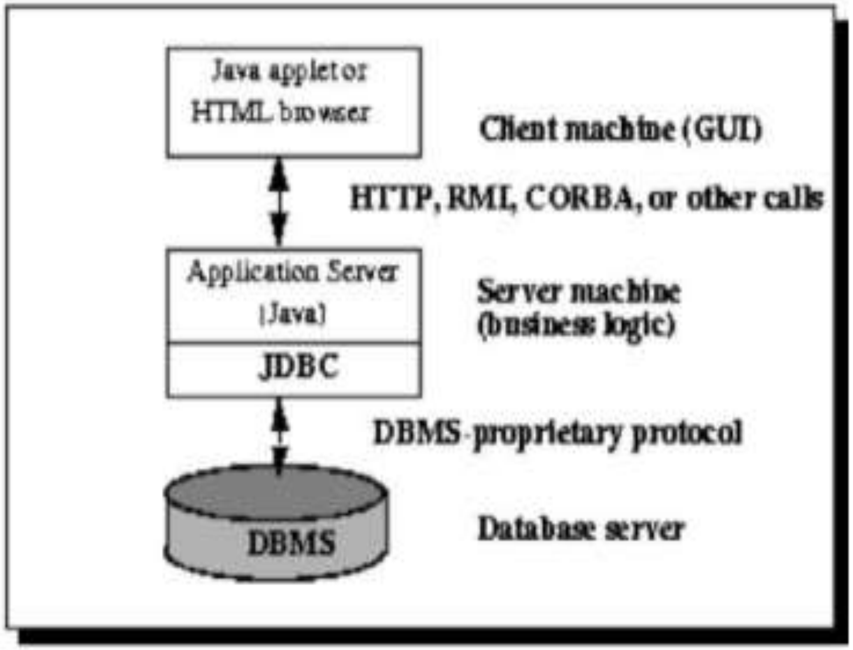
JDBC:
Java <-> Relational Databases



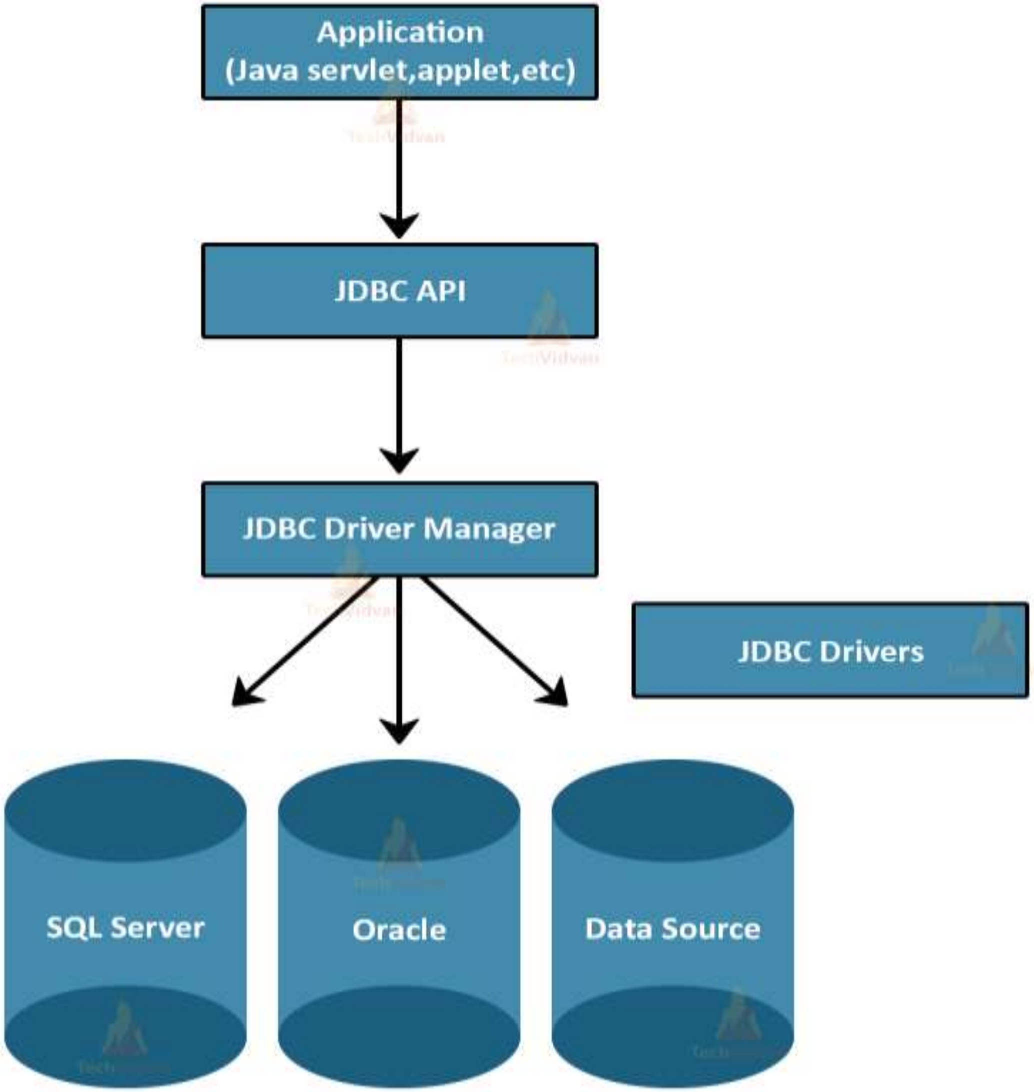
JDBC Architecture

- The JDBC API supports both two-tier and three-tier processing models for database access.





Architecture of JDBC



Application
(Java servlet,applet,etc)

JDBC API

JDBC Driver Manager

JDBC Drivers

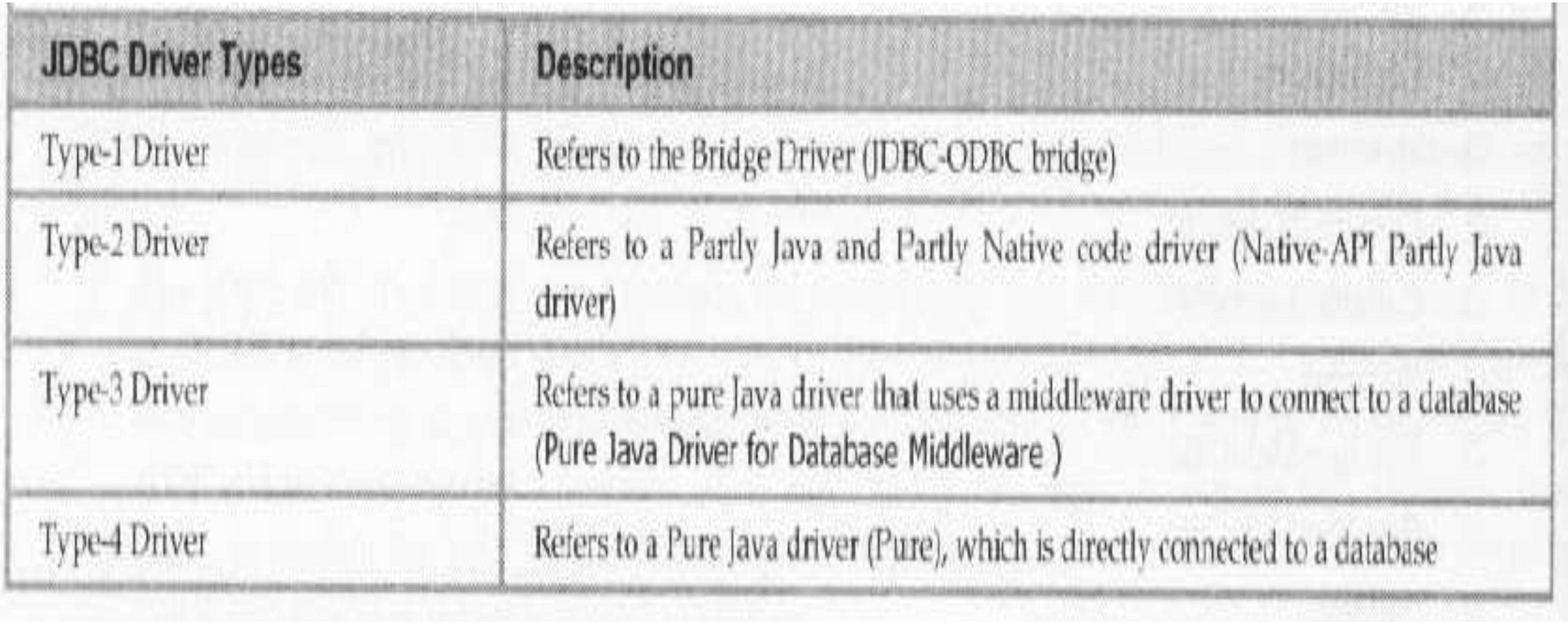
SQL Server

Oracle

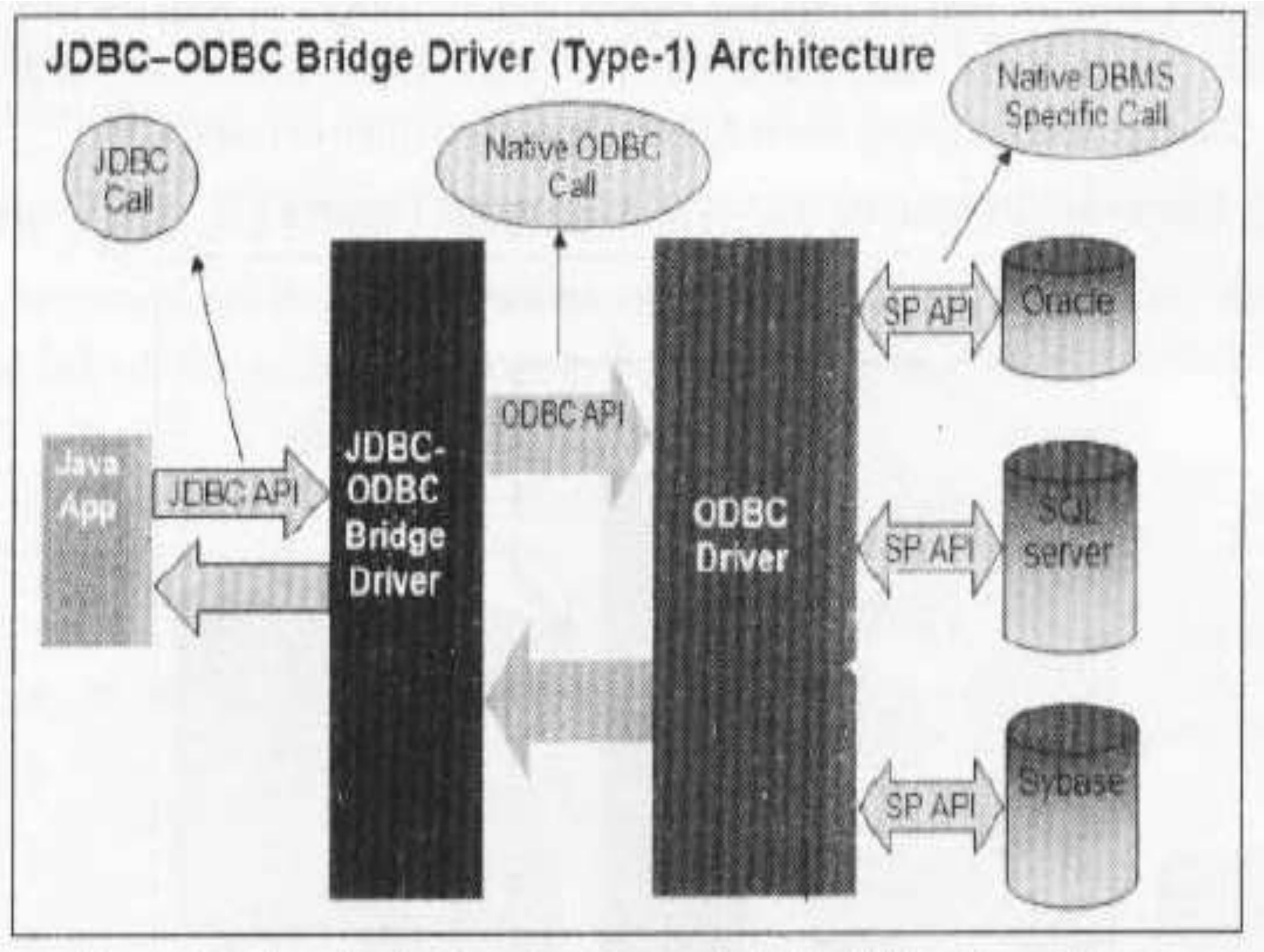
Data Source

- **Application:** Application in JDBC is a Java applet or a Servlet that communicates with a data source.
- **JDBC API:** JDBC API provides classes, methods, and interfaces that allow Java programs to execute SQL statements and retrieve results from the database. Some important classes and interfaces defined in JDBC API are as follows:
  - DriverManager
  - Driver
  - Connection
  - Statement
  - PreparedStatement
  - CallableStatement
  - ResultSet
  - SQL data
- **Driver Manager:** The Driver Manager plays an important role in the JDBC architecture. The Driver manager uses some database-specific drivers that effectively connect enterprise applications to databases.
- **JDBC drivers:** JDBC drivers help us to communicate with a data source through JDBC. We need a JDBC driver that can intelligently interact with the respective data source.

Types of Drivers

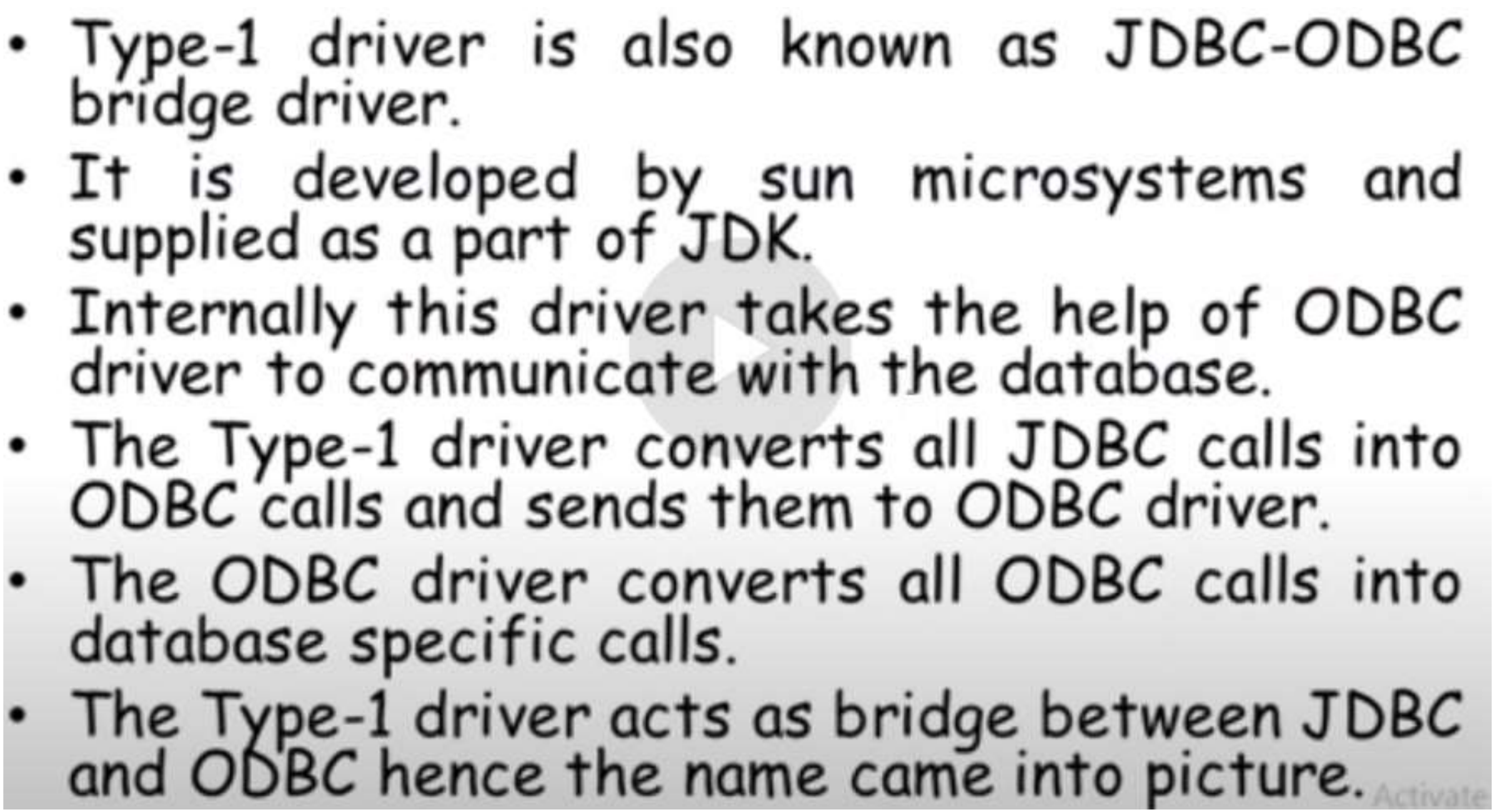


JDBC Driver Types	Description
Type-1 Driver	Refers to the Bridge Driver (JDBC-ODBC bridge)
Type-2 Driver	Refers to a Partly Java and Partly Native code driver (Native-API Partly Java driver)
Type-3 Driver	Refers to a pure Java driver that uses a middleware driver to connect to a database (Pure Java Driver for Database Middleware)
Type-4 Driver	Refers to a Pure Java driver (Pure), which is directly connected to a database

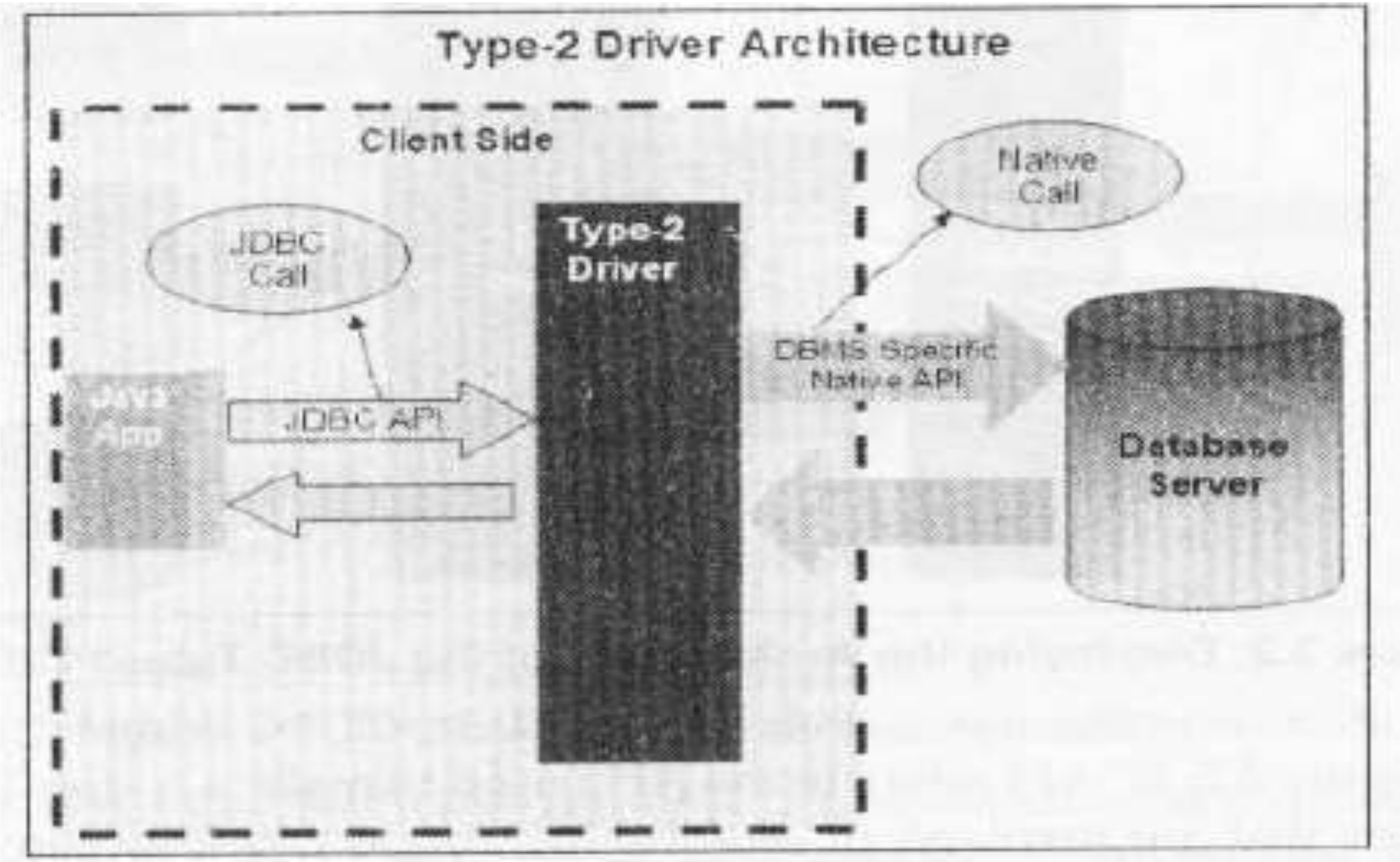


JDBC-ODBC Bridge Driver

Type 1 Driver

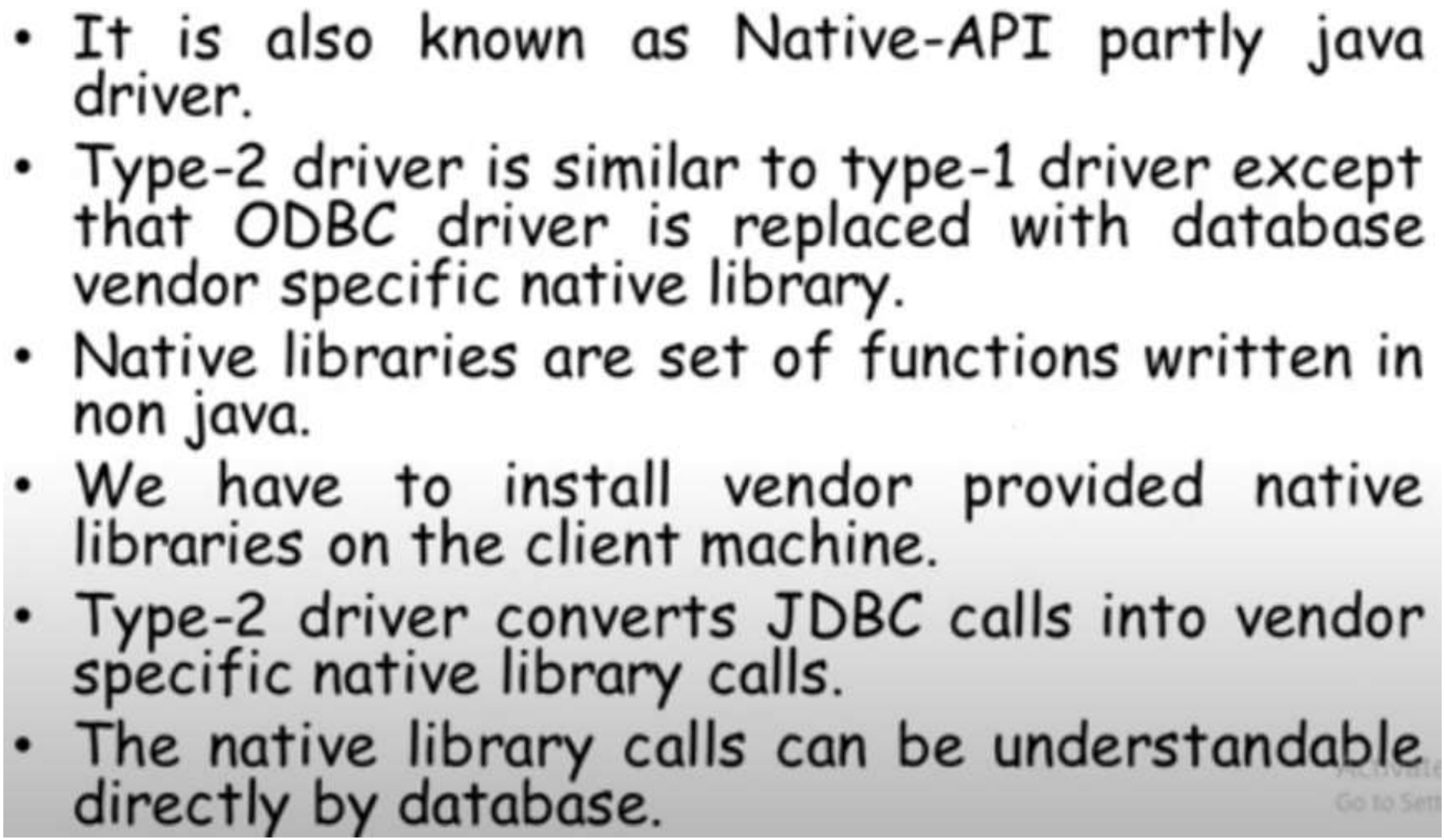


- Type-1 driver is also known as JDBC-ODBC bridge driver.
- It is developed by sun microsystems and supplied as a part of JDK.
- Internally this driver takes the help of ODBC driver to communicate with the database.
- The Type-1 driver converts all JDBC calls into ODBC calls and sends them to ODBC driver.
- The ODBC driver converts all ODBC calls into database specific calls.
- The Type-1 driver acts as bridge between JDBC and ODBC hence the name came into picture.

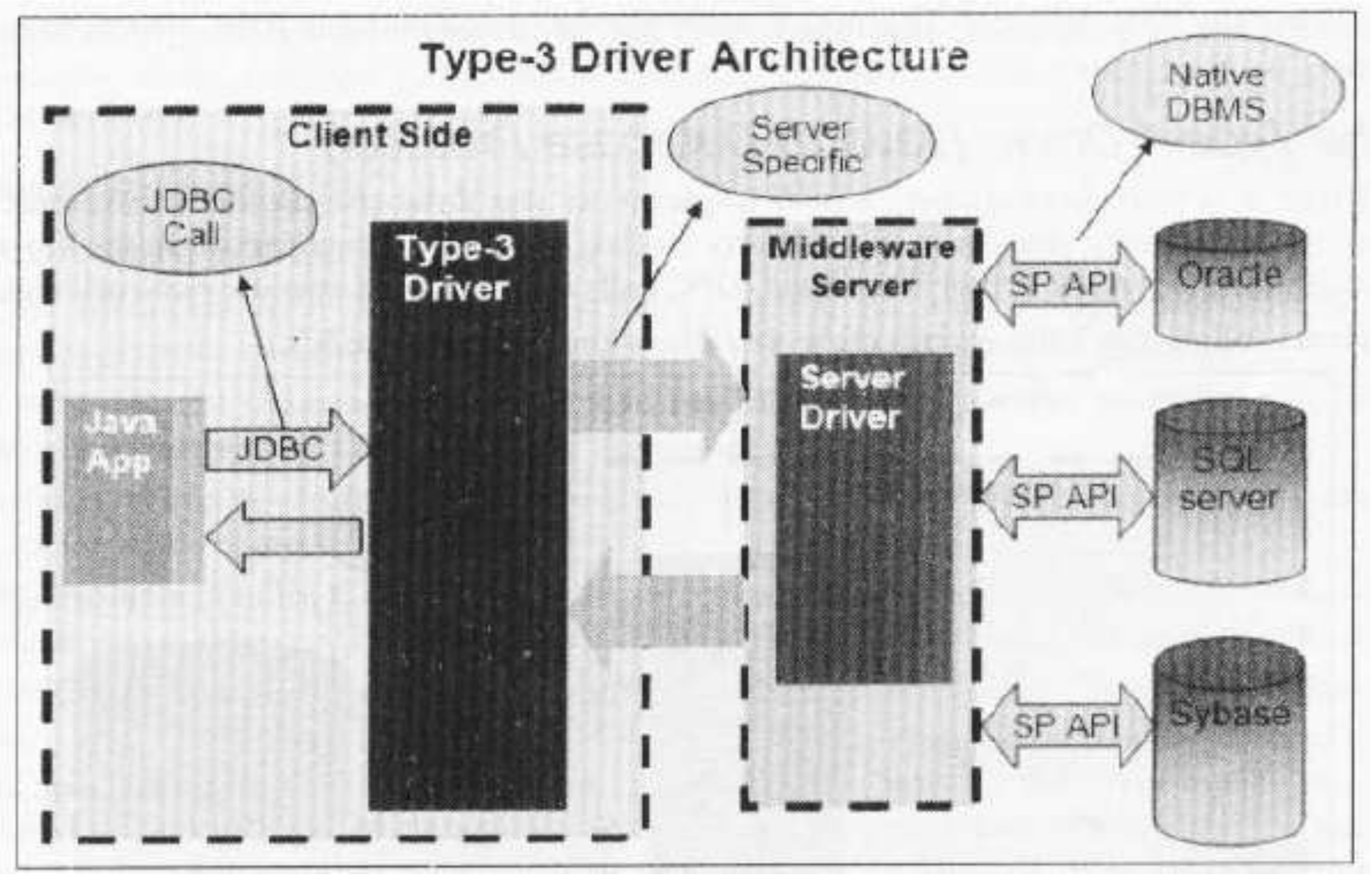


Java to Native API

Type 2 Driver

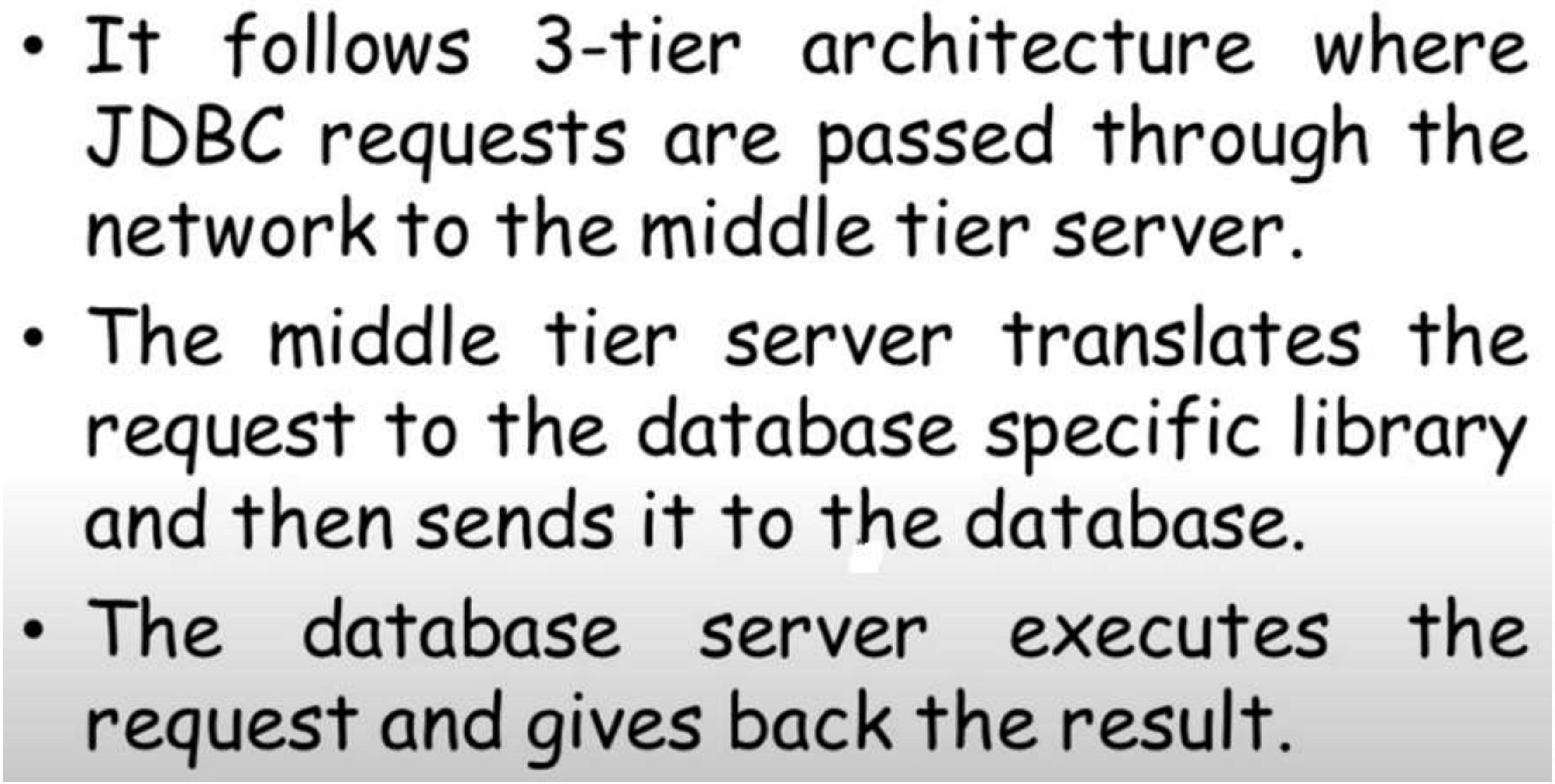


- It is also known as Native-API partly java driver.
- Type-2 driver is similar to type-1 driver except that ODBC driver is replaced with database vendor specific native library.
- Native libraries are set of functions written in non java.
- We have to install vendor provided native libraries on the client machine.
- Type-2 driver converts JDBC calls into vendor specific native library calls.
- The native library calls can be understandable directly by database.

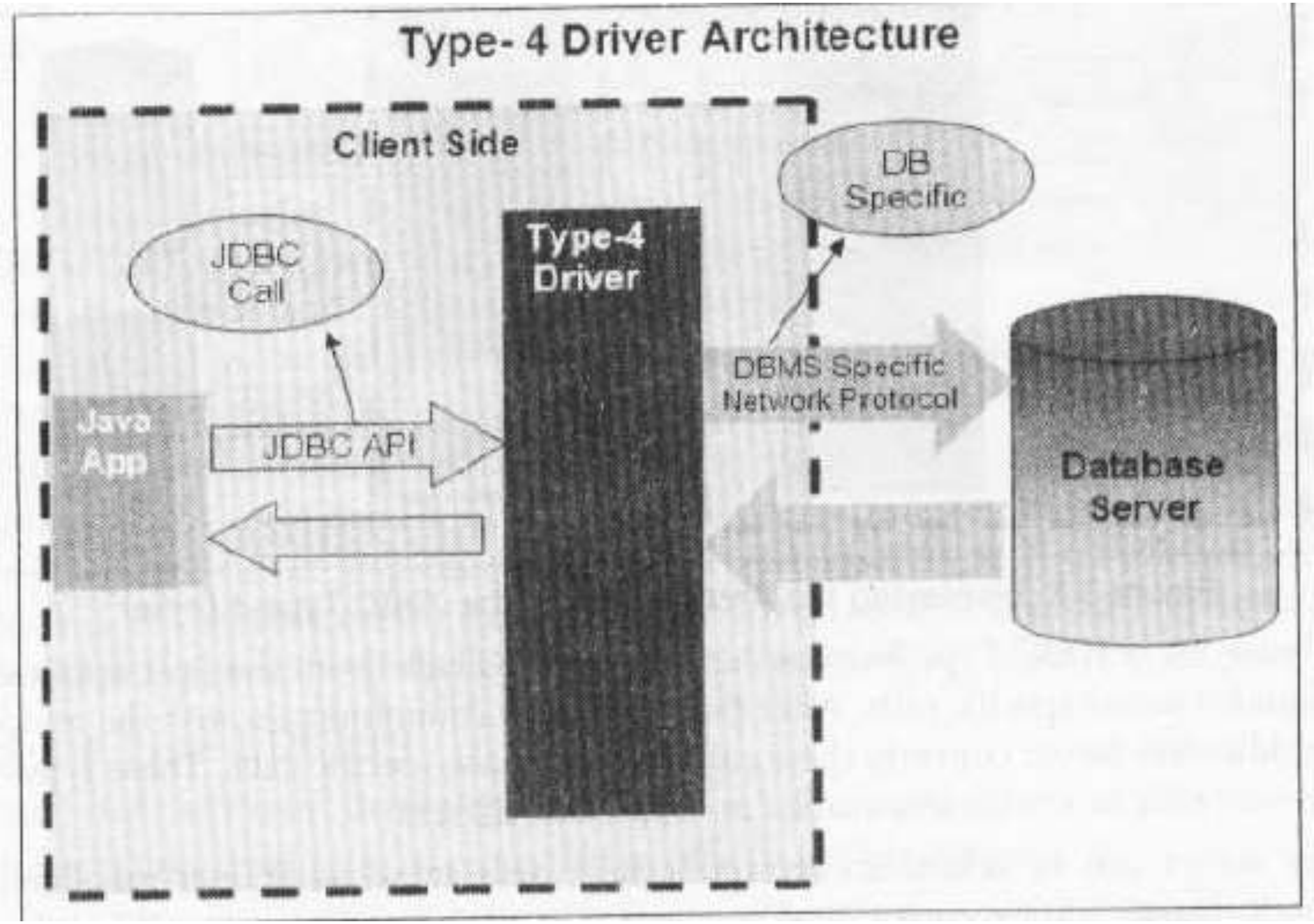


Java to Network Protocol All Drivers

Type 3 Driver

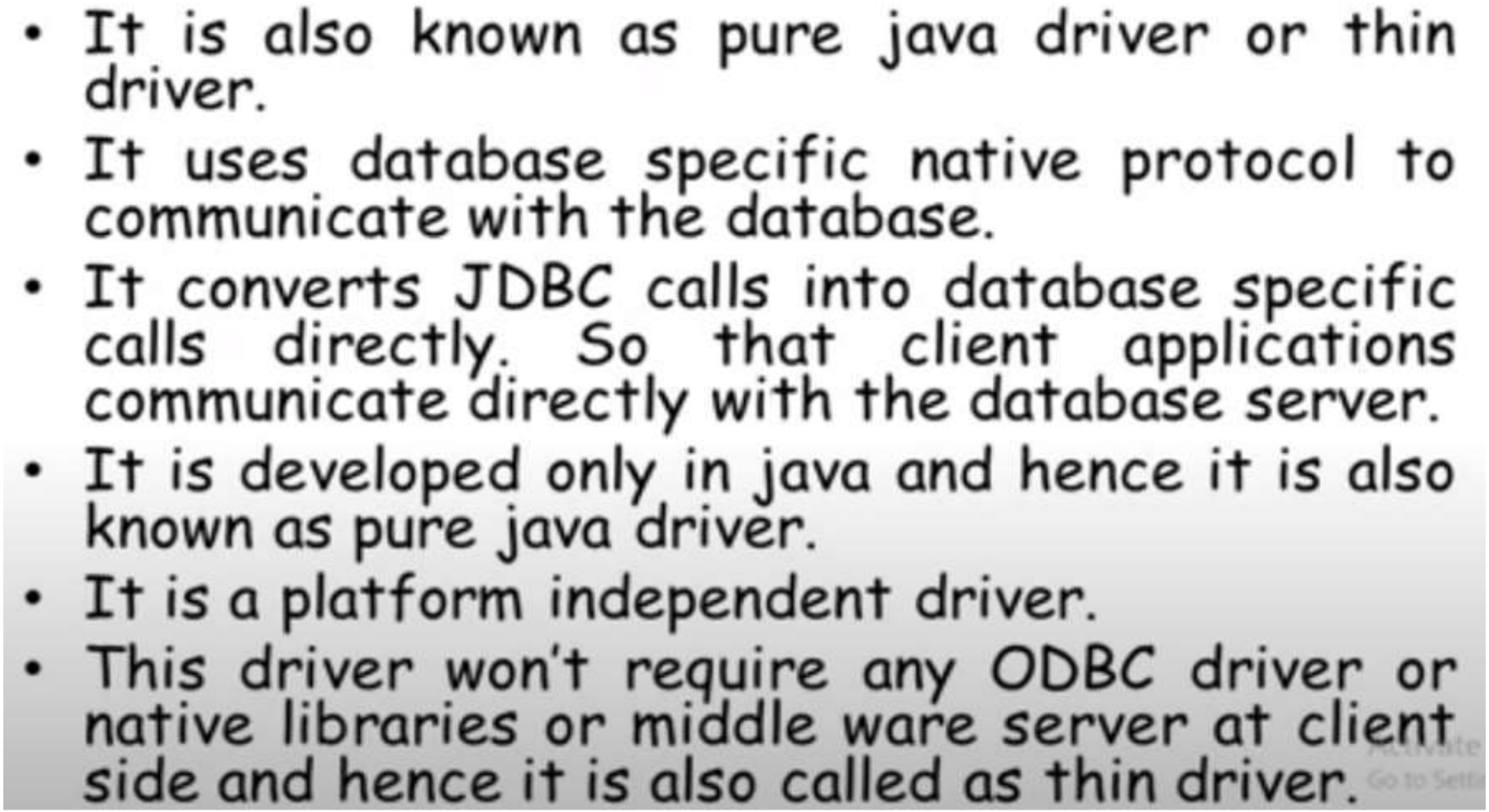


- It follows 3-tier architecture where JDBC requests are passed through the network to the middle tier server.
- The middle tier server translates the request to the database specific library and then sends it to the database.
- The database server executes the request and gives back the result.



Java to Database Protocol

Type 4 Driver



- It is also known as pure java driver or thin driver.
- It uses database specific native protocol to communicate with the database.
- It converts JDBC calls into database specific calls directly. So that client applications communicate directly with the database server.
- It is developed only in java and hence it is also known as pure java driver.
- It is a platform independent driver.
- This driver won't require any ODBC driver or native libraries or middle ware server at client side and hence it is also called as thin driver.

Which Driver should be Used?

- If you are accessing one type of database, such as Oracle, Sybase, or IBM, the preferred driver type is 4.
- If your Java application is accessing multiple types of databases at the same time, type 3 is the preferred driver.
- Type 2 drivers are useful in situations, where a type 3 or type 4 driver is not available yet for our database.
- The type 1 driver is not considered a deployment-level driver, and is typically used for development and testing purposes only.