



JDBC



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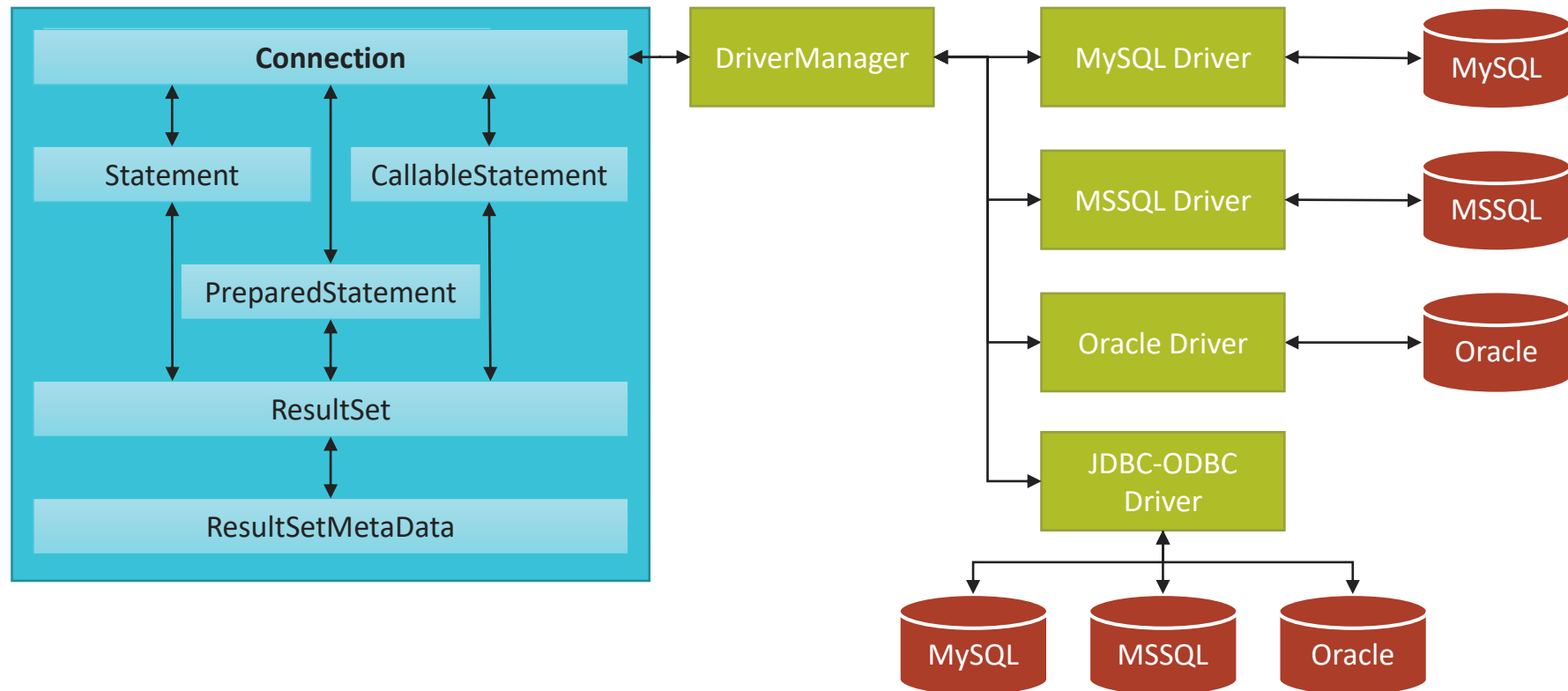
JDBC

Database connection technologies

- Native SQL connectivity (надається виробником);
- ODBC (Open Database Connectivity),
DAO (Data Access Objects) та RDO (Remote Data Objects);
- OLE-DB (Object Linking and Embedding for Database);
- ADO.NET (ActiveX Data Objects)
- JDBC (Java Database Connectivity)

ODBC	DAO	OLE DB	ADO	RDO	JDBC	ADO.net
1992	1992	1995	1996	1996	1997	2002

JDBC



General schema

- Open connection
- Get Statement object
- Execute query
- Get a Result Set
- Process Result Set
- Close connection

Connection parameters

- Oracle
 - Driver class: `oracle.jdbc.OracleDriver`
 - URL: `jdbc:oracle:thin:@localhost:sample`
 - Username: `user`
 - Password: `123`
- MySQL
 - Driver class : `com.mysql.jdbc.Driver`, `com.mysql.cj.jdbc.Driver`
 - URL: `jdbc:mysql://localhost/sample`
 - Username: `root`
 - Password: `123`

Getting connection

- DriverManager
 - Since JDBC 1.0
 - Indicate URL
 - Class loads drivers from CLASSPATH
- DataSource
 - Since JDBC 2.0
 - Preferable way, because DS implementation can be changed without changing application code.

Getting connection

- `javax.sql.ConnectionPoolDataSource`
 - Supports caching and reuse of physical connections
 - Allows to increase the performance and scalability of the application
- `javax.sql.XADataSource`
 - Since JDBC 2.0
 - Provider of connections that can be used in distributed transactions

DriverManager

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DriverManager

```
Class.forName("com.mysql.cj.jdbc.Driver");
```

```
String URL = "jdbc:mysql://localhost:3306/shop"  
            + "?sslMode=DISABLED&serverTimezone=UTC&user=root&password=root";
```

```
con = DriverManager.getConnection(URL);
```

Connection URL

jdbc:mysql://<localhost>:3306/<database>

↑
Driver

↑
Domain or IP

↑
Port

↑
DB name

?sslMode=DISABLED&serverTimezone=UTC&user=<uname>&password=<upass>

↑
Additional properties

↑
User
name

↑
User
password

Statement

- Allows to execute query
 - Statement
 - PreparedStatement
 - CallableStatement

ResultSet

- Encapsulates result of the query
 - Cursor
 - `ResultSet#next()`
 - Getting data
 - `ResultSet#getString(int/String)`
 - `ResultSet#getLong(int/String)`
 - ...

SQLException

- Exception handling example

SQL types <=> Java types

SQL type	Java type	SQL type	Java type
BIT	java.lang.Boolean	DATE	java.sql.Date
BIT	byte[]	DATETIME, TIMESTAMP	java.sql.Timestamp
SMALLINT, MEDIUMINT	java.lang.Integer	TIME	java.sql.Time
INTEGER [UNSIGNED]	java.lang.Integer, if UNSIGNED java.lang.Long	BINARY	byte[]
BIGINT [UNSIGNED]	java.lang.Long, if UNSIGNED java.math.BigInteger	TINYBLOB	byte[]
FLOAT	java.lang.Float	VARCHAR	java.lang.String
DOUBLE	java.lang.Double	BLOB	byte[]
DECIMAL	java.math.BigDecimal	VARCHAR	java.lang.String

Transactions

- Methods on Connection class
 - `setAutoCommit(boolean)`
 - `commit()`
 - `rollback()`
 - `setTransactionIsolation(int)`
- Levels
 - `TRANSACTION_READ_UNCOMMITTED`
 - `TRANSACTION_READ_COMMITTED`
 - `TRANSACTION_READ_REPEATABLE_READ`
 - `TRANSACTION_READ_SERIALIZABLE`

DAO

<https://www.oracle.com/java/technologies/dataaccessobject.html>