



MySQL RDBMS

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Agenda / Syllabus

- ✓ DBMS vs RDBMS
- ✓ MySQL: Introduction, Installation, ...
- ✓ SQL
 - ✓ CREATE TABLE, MySQL data types
 - ✓ SELECT with LIMIT, ORDER, WHERE, GROUP BY, HAVING
 - ✓ INSERT, UPDATE, DELETE
 - ✓ Joins, Sub-queries
 - ✓ Transaction & Locking
 - ✓ GRANT & REVOKE
- ✓ MySQL programming (PSM) / PL:SQL
 - ✓ Stored procedure
 - ✓ Cursors
 - ✓ Functions
 - ✓ Triggers

Syllabus : ① RDBMS : MySQL
✓ ② NoSQL : Mongo

Evaluation = 100 marks
Theory = 40 → CCEE (course end) mca
Lab = 40 → proctored lab exam Lab assignments
Internals = 20 → mca **module end**

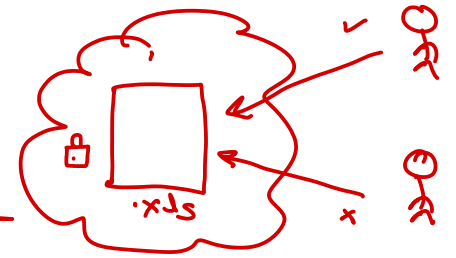
Interview Preparations

Interview Questions
✓ Rapid Fire
✓ Hot Seat



DBMS Database Management System.

- Any enterprise application need to manage data.
- In early days of software development, programmers store data into files and does operation on it. However data is highly application specific.
- Even today many software manage their data in custom formats e.g. Tally, Address book, etc.
- As data management became more common, DBMS systems were developed to handle the data. This enabled developers to focus on the business logic e.g. FoxPro, DBase, Excel, etc.
- At least CRUD (Create, Retrieve, Upsert and Delete) operations are supported by all databases.
- Traditional databases are file based, less secure, single-user, non-distributed, manage less amount of data (MB), complicated relation management, file-locking and need number of lines of code to use in applications.



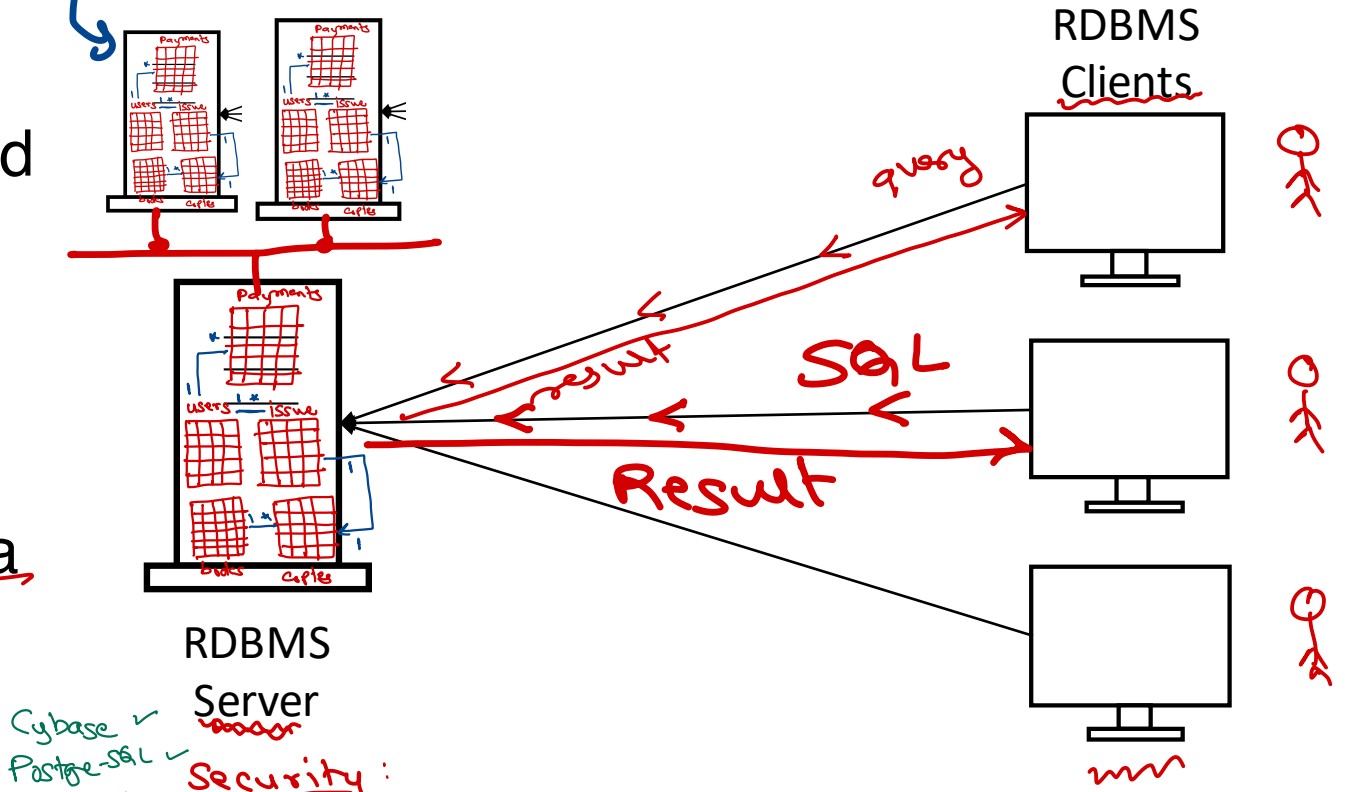
RDBMS

→ CRUD

DB cluster

Number of computers connected in a network for dedicated task.

- RDBMS is relational DBMS.
- It organizes data into Tables, rows and columns. The tables are related to each other.
- RDBMS follow table structure, more secure, multi-user, server-client architecture, server side processing, clustering support, manage huge data (TB), built-in relational capabilities, table-locking or row-locking and can be easily integrated with applications.
- e.g. DB2, Oracle, MS-SQL, MySQL, MS-Access, SQLite, ... relational frame enterprise apps open source file based RDBMS (small data)
- RDBMS design is based on Codd's rules developed at IBM (in 1970).



Cybase ✓
PostgreSQL ✓
Informatica ✓
...

Security:

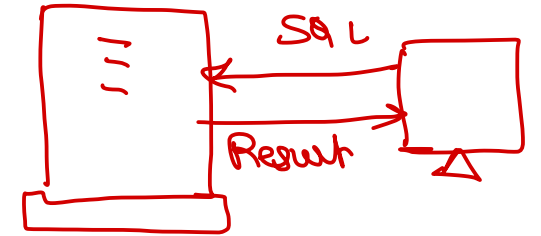
OS + DB authentication
+ object level privileges
x database/table/ops.

mathematician = 1 + 12 rules → based on set theory



SQL: Structured Query Language

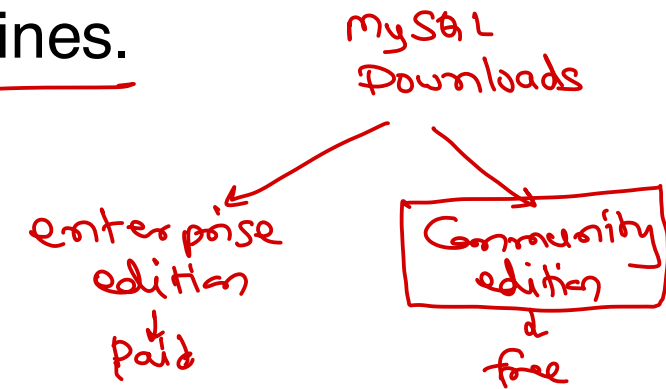
- Clients send SQL queries to RDBMS server and operations are performed accordingly.
→ IBM
- Originally it was named as RQBE (Relational Query By Example).
- SQL is ANSI standardised in 1987 and then revised multiple times adding new features. Recent revision in 2016.
- SQL is case insensitive. *except table & db names on Linux/UNIX platform - mysql.*
- There are five major categories:
 - DDL: Data Definition Language e.g. CREATE, ALTER, DROP, RENAME.
 - DML: Data Manipulation Language e.g. INSERT, UPDATE, DELETE.
 - DQL: Data Query Language e.g. SELECT.
 - DCL: Data Control Language e.g. CREATE USER, GRANT, REVOKE.
 - TCL: Transaction Control Language e.g. SAVEPOINT, COMMIT, ROLLBACK.
- Table & column names allows alphabets, digits & few special symbols. — *(\$ #)*
- If name contains special symbols then it should be back-quotes.
- e.g. Tbl1, T1#, T2\$ etc. Names can be max 30 chars long.



MySQL

→ open source

- Developed by Michael Widenius in 1995. It is named after his daughter name Myia.
- Sun Microsystems acquired MySQL in 2008.
- Oracle acquired Sun Microsystem in 2010.
- MySQL is free and open-source database under GPL. However some enterprise modules are close sourced and available only under commercial version of MySQL.
- MariaDB is completely open-source clone of MySQL.
- MySQL support multiple database storage and processing engines.
- MySQL versions:
 - < 5.5: MyISAM storage engine
 - 5.5: InnoDB storage engine
 - 5.6: SQL Query optimizer improved, memcached style NoSQL
 - 5.7: Windowing functions, JSON data type added for flexible schema
 - 8.0: CTE, NoSQL document store.
- MySQL is database of year 2019 (in database engine ranking).



MySQL installation on Ubuntu/Linux

remote mysql.com

- terminal> sudo apt-get install mysql-community-server mysql-community-client
- This installs MySQL server (mysqld) and MySQL client (mysql).

- MySQL Server (mysqld) → daemon

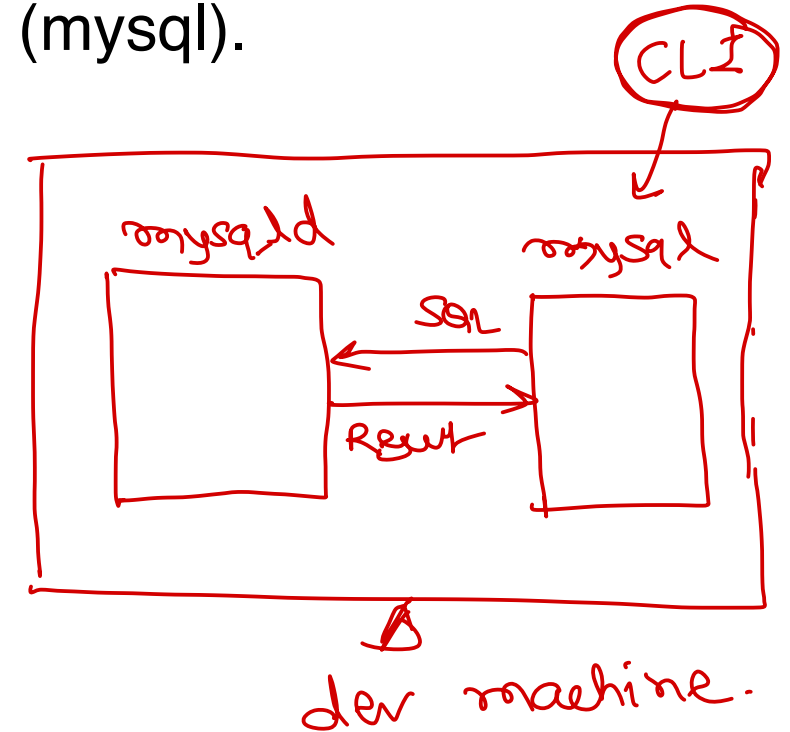
- Run as background process. (no gui)
- Implemented in C/C++.
- Process SQL queries and generate results.
- By default run on port 3306. (network socket = ip address + port).
- Controlled via systemctl. → (Linux)
 - terminal> sudo systemctl start|stop|status|enable|disable mysql

- MySQL client (mysql)

- Command line interface
- Send SQL queries to server and display its results.
- terminal> mysql -u root -p

- Additional MySQL clients

- MySQL workbench → Desktop client
- PHPMysqlAdmin → web client



Getting started *→ admin*

- root login can be used to perform CRUD as well as admin operations.
- It is recommended to create users for performing non-admin tasks. *der*
 - mysql> CREATE DATABASE db;
 - mysql> SHOW DATABASES;
 - mysql> CREATE USER dbuser@localhost IDENTIFIED BY 'dbpass';
 - mysql> SELECT user, host FROM mysql.user;
 - mysql> GRANT ALL PRIVILEGES ON db.* TO dbuser@localhost;
 - mysql> FLUSH PRIVILEGES;
 - mysql> EXIT;
- terminal> mysql -u dbuser -pdbpass
 - mysql> SHOW DATABASES;
 - mysql> SELECT USER(), DATABASE();
 - mysql> USE db;
 - mysql> SHOW TABLES;
 - mysql> CREATE TABLE student(id INT, name VARCHAR(20), marks DOUBLE);
 - mysql> INSERT INTO student VALUES(1, 'Abc', 89.5);
 - mysql> SELECT * FROM student;





Thank you!

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