



RDBMS & SQL Introduction

Trainer: Mr. Nilesh Ghule



DBMS

- 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, Update 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 table

Columns (attributes/fields)

roll	name	group	marks
7	James	D1	100.0
2	Superman	D2	90.0
—	—	—	—
—	—	—	—

Students ← table

Column

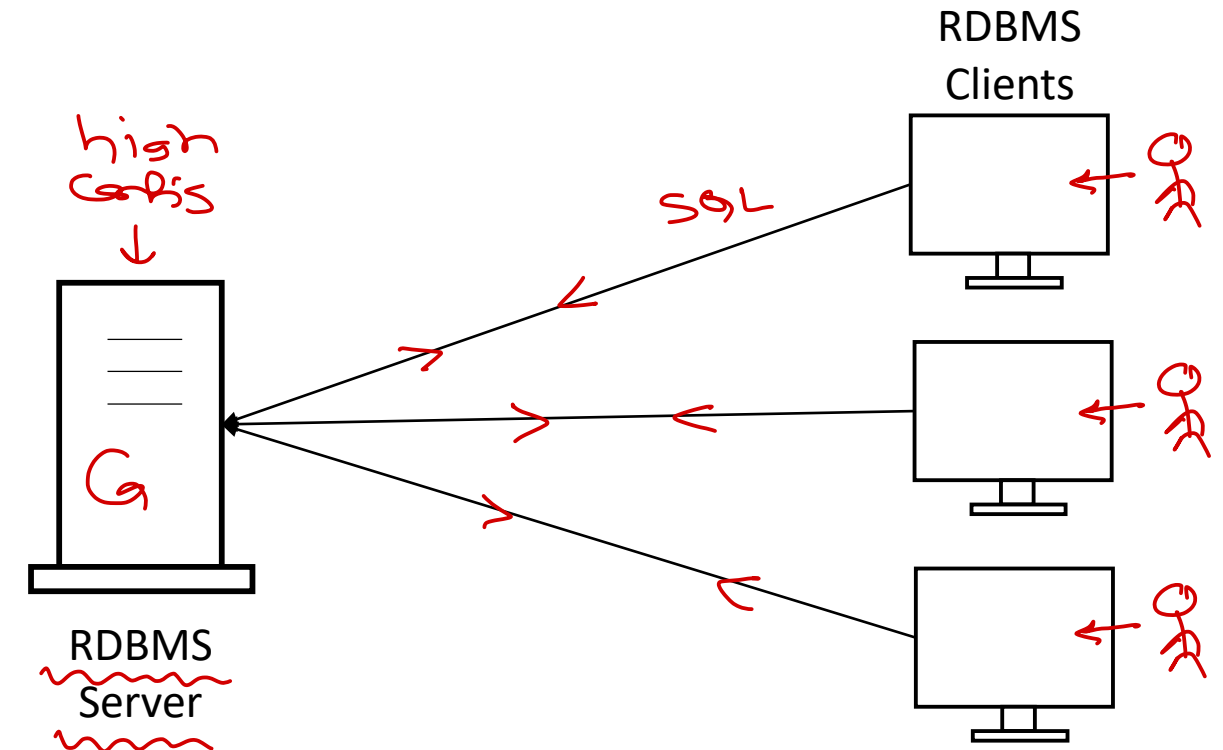
id	name	group
1	DAC	D1
2	DAC	D2
3	DAC	D3
4	Dmc	W1
5	Dmc	W2
⋮	⋮	

Courses → table

inter-
related

RDBMS

- RDBMS is relational DBMS.
- It organizes data into Tables, rows and columns. The tables are related to each other. *logically*
- 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, ...
- RDBMS design is based on Codd's rules developed at IBM (in 1970).

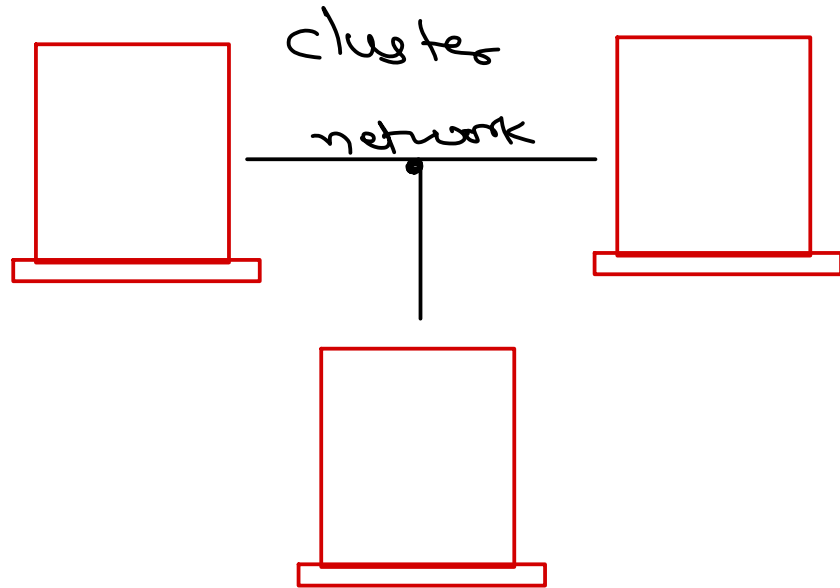


intra-net or internet/cloud

*E.F. Codd → Mathematician
Set Theory*



clustering - distributed systems.

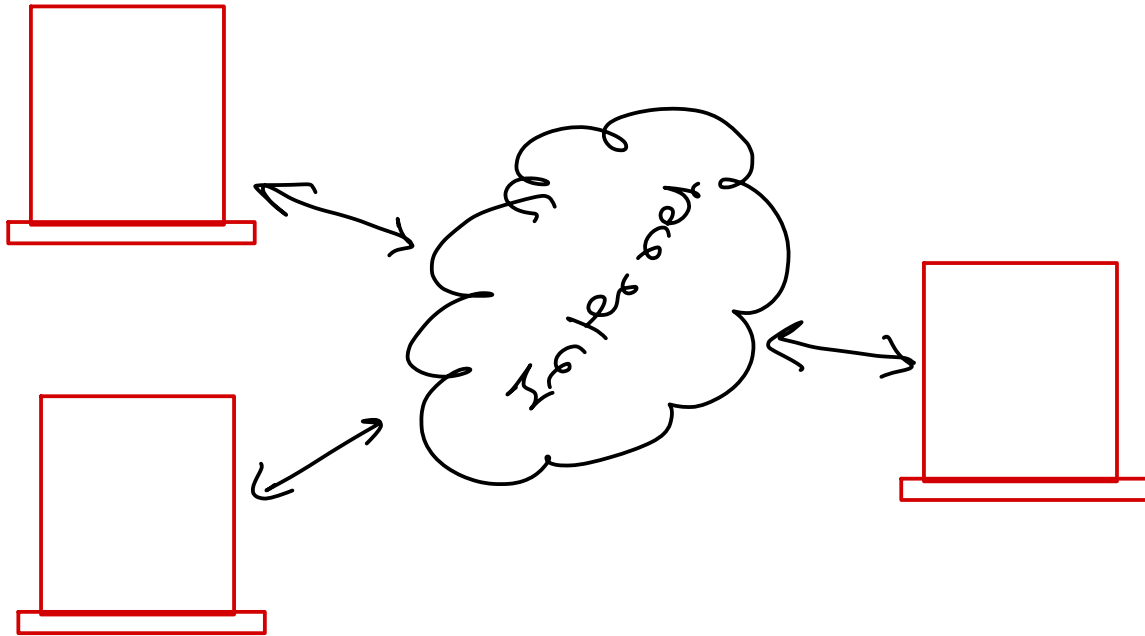


eg. database cluster
webserver cluster.

cluster is set of computers
connected in a network for
a specific task.

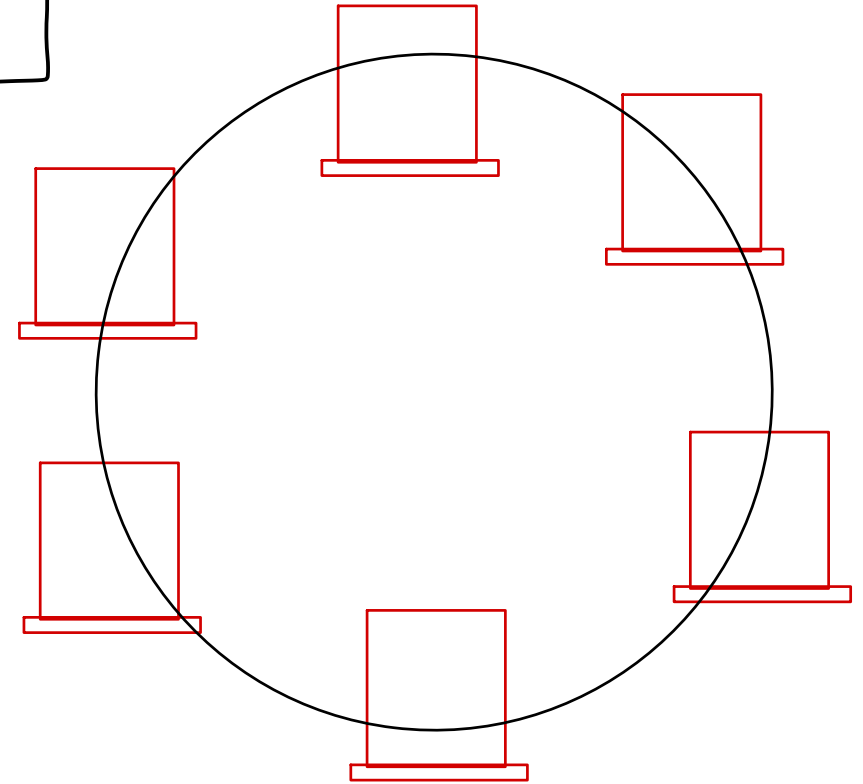


Internet



Internet

Star
Ring
Bus

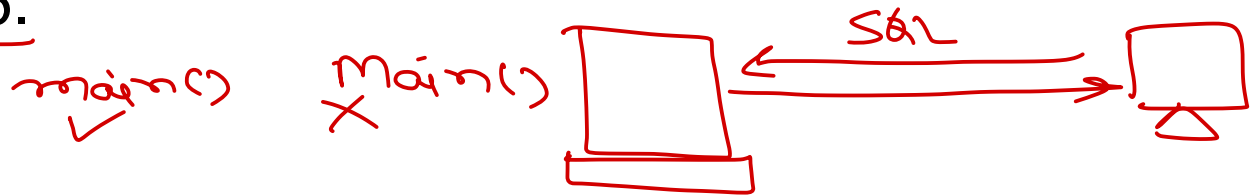


LAN, MAN, WAN



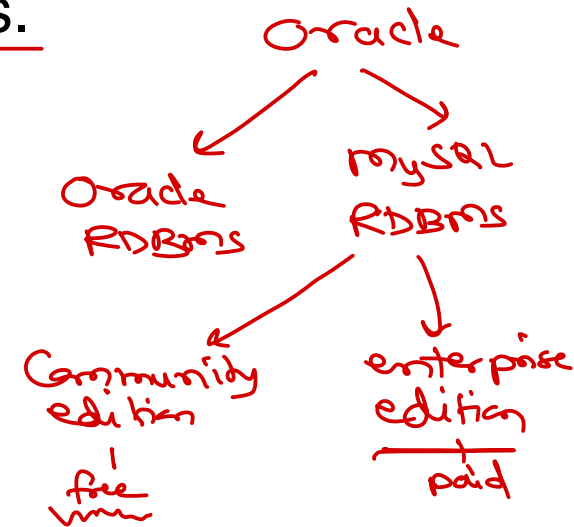
SQL - Structured Query Language.

- Clients send SQL queries to RDBMS server and operations are performed accordingly.
- 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.
- 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 - RDBMS Software → (of Oracle)

- 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

- `terminal> sudo apt-get install mysql-community-server mysql-community-client`
- This installs MySQL server (mysqld) and MySQL client (mysql).
- MySQL Server (mysqld)
 - Run as background process.
 - Implemented in C/C++.
 - Process SQL queries and generate results.
 - By default run on port 3306.
 - Controlled via systemctl.
 - `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
 - PHPMysqlAdmin





Thank you!

Nilesh Ghule <nilesh@sunbeaminfo.com>

