

Computer - Charles Babbage Sybase RDBMS → used by Sybase
↳ known as the difference Engine.

Database Technology

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\Rightarrow sol

\Rightarrow PBT RDBMS \rightarrow relational DBMS

Intro to Oracle RDBMS + OODBMS (Object Oriented DBMS) → ORDBMS (Object Relational)

Intro to NOSQL (Not only SQL) (new technology)

MongoDB v3.2 (Mongoose DB)

Database → Collection

$$\begin{array}{ccc} 10 & 20 & 30 \\ \hline 40 & 50 & 60 \end{array}$$

Various

DBMS ex:- MS Excel, dBase, FoxBase, DBWista, DataCare.

ANSI definition → DBMS is a collection of programs to Insert, update, delete & process.

Ms Excel → 83% of work done in IT industry.

- * MS Excel program is known as Macro (vBA programming)

MySQL (RDBMS → Relational DBMS)

MS Excel
DBMS vs RDBMS → MySQL, MS SQL Server
File / Table

DEPNO	DNAME	LOC	Field	Attribute / Column
10	Abc	MU		
20	Def	DL		
30	Ghi	PU		

Record / Tuple

a. Field
b. Record
c. File

a. Attribute / Column

b. Tuple / Row / Entity

c. Table, Relation, Entity class.

Diff b/w DBMS vs RDBMS

1) diff in nomenclature.

2) Relationship b/w 2 files has to be maintained programmatically.

Employee Table

Dept Table

foreign key

ENO	EName	Sal	DeptNo
101	Sudh	200	10
102	Sudha	100	20

Constraints

- 2) In RDBMS Relationship b/w 2 tables can be specified at time of table creation. (e.g. foreign key constraint)
- 3) More time needed for S/W development vs less time for S/W development

4) In DBMS we have high network traffic, in RDBMS we have low network traffic

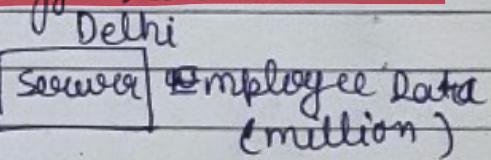
5) slow & expensive vs

faster & cheaper (in terms of

network traffic & cheaper in terms of hardware, network, IP cost)

network traffic costs.

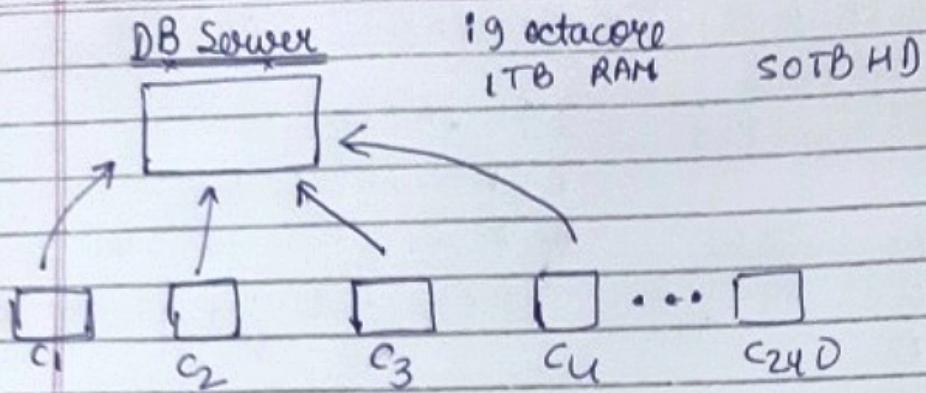
• metadata, data cost money.



accessing Sal > 5000

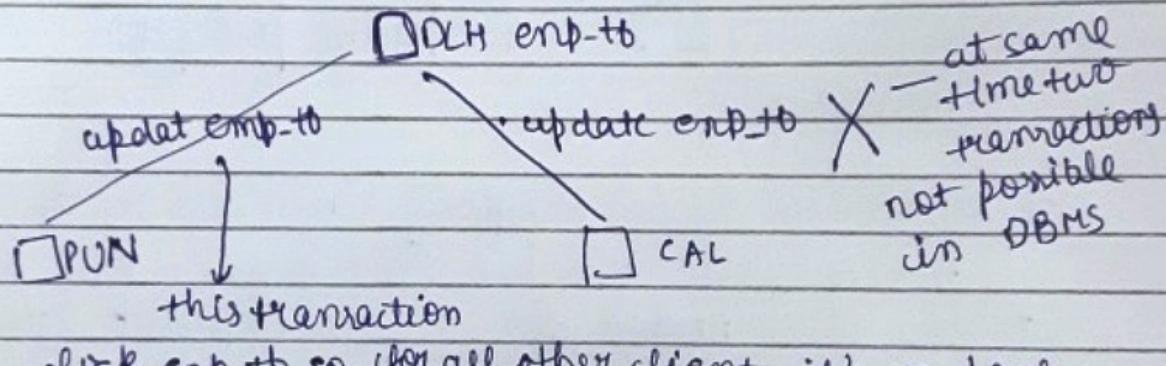
RDBMS → files from delhi copy to pane, → then go back.

RD BMS → done on server



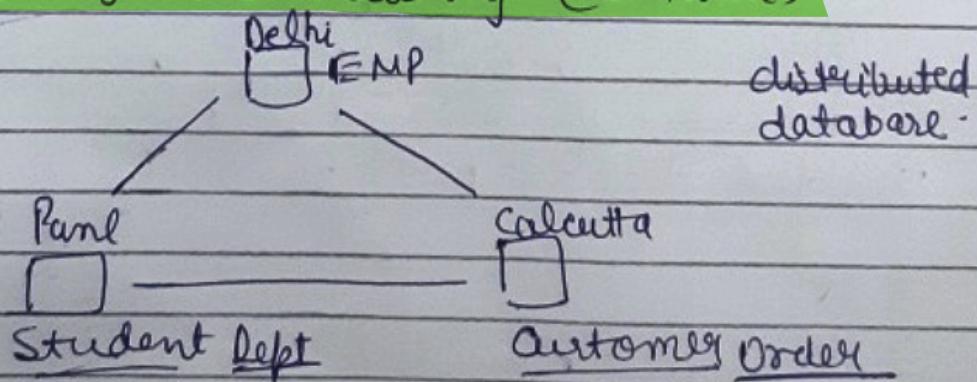
① Processing on server machine (known as Client-Server architecture)

② Most of the RDBMS support client server architecture
(the exception MS Access → local database)
Paradox → on same machine



In RDBMS if CAL trying to update same row as PUN then its not possible at same time.

③ RDBMS → file level locking (not suitable for multi-user)
ADBMS → row level locking (suitable)



What is the benefit of keeping databases distributed rather than keeping them at one place?

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③ In DBMS distributed databases not supported, while RDBMS support distributed databases.

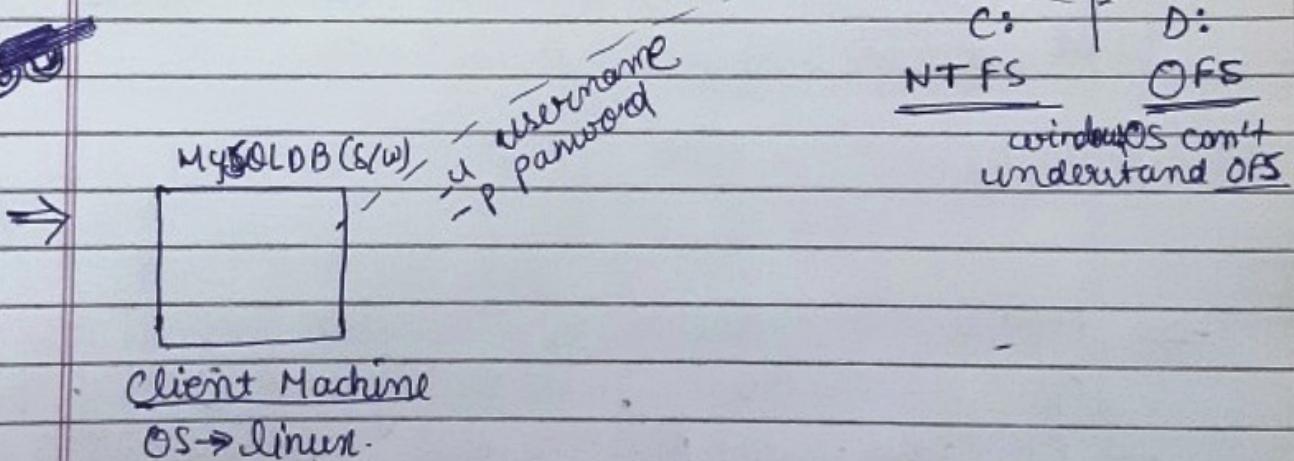
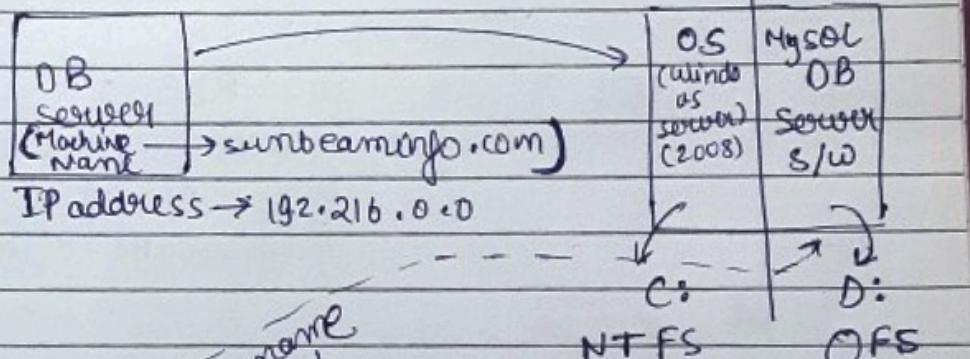
Eg:- Distributed databases :- (Banking System, book my show [com], Railways reservation system)

④ In DBMS, there is no security.

RDBMS -
- Logging in security (mysql DB username & password)
- Command level security (CREATE USER → not everyone have)
- Object level security (Permission to access tables of other users)
OS cannot access the table.

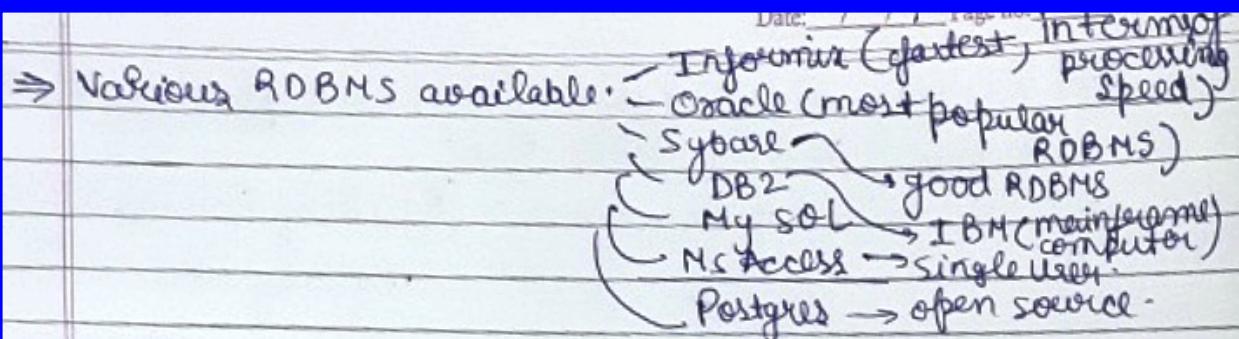
⑤ DBMS → allow access to data through OS.

How server OS
differs from client
side OS?



Resiliency: Because distributed databases locate data across multiple nodes in the distributed system, the risk of a single point of failure is significantly reduced.

Oracle Inc. → largest ^{overall} company in the world.
↪ #1 commercial programming has to be done in Assembly.



1. Create an Oracle account.
2. Subscribe to Oracle, MySQL, and Java Newsletter.
3. Subscribe to magazine.
4. Oracle - 63% of world commercial database market.
 - in client-server environment.
 - 83% in Internet environment.
 - works on 113 OS.

MySQL Server - good RDBMS

- competition for Oracle.
- 16% - 17% of market.
- only works with Windows OS.

What database used in android?

- ⇒ MySQL was launched by a Swedish company 1995.
open source RDBMS; most widely used (42% of open source)
- Full open source projects that require a RDBMS often use MySQL e.g; facebook, Twitter(X), Flickr, Instagram, Google (though not for search), YouTube, wordpress
- Google use Bigtable for search.
- MySQL is a part of widely used LAMP open-source web application software stack.

SQl is common for all RDBMS

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L → Linux

A → Apache web server.

M → MySQL

P → Perl, Python or PHP

W → Windows M → Mac OS

A

M

P

X - X - Windows

A

M

P

⇒ MySQL: - various S/W development tools from MySQL:
↳ what they do.

MySQL Workbench

Connectors

Notifier

Enterprise Backup

MySQL database

- MySQL DB servers / w
- store table data, retrieve table data, secure the table data, etc.

SQl - CRUD

- (ANSI standards (e.g. 1 char = 1 Byte))
conforms to ISO standards (for quality assurance)
- founded by IBM (1975-77)
 - Initially created using C/C++ (90%)
 - Assembly language (10%)
 - earlier known as RDBE (relational query by Example)
 - IBM gave RDBE full of cost to ANSI
 - ANSI renamed RDBE to SQL
 - now controlled by ANSI (and hence common for all RDBMS code)
 - in 2005, entire source of SQL rewritten in Java

MySQL-PL (programming language)

- used for database programming

How to transport ^{from} one DB to other DB of different type?
~~ERAC~~ MySQL → Oracle Date: / / Page no: _____

MySQL Command line client

- MySQL client S/W
- connect to MySQL database, run SQL commands, run MySQL commands, run MySQL-PL programs.
- character based (text based)

MySQL Workbench

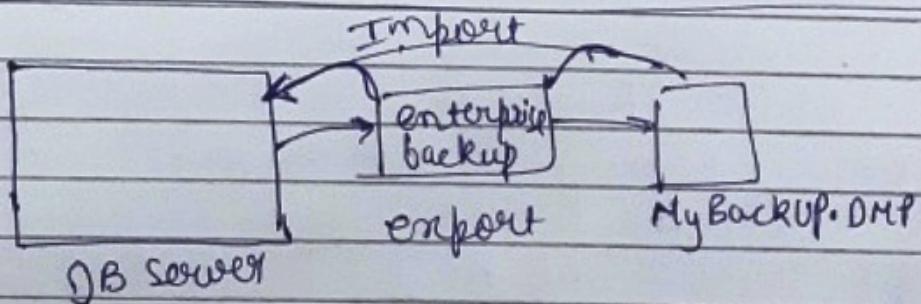
- MySQL Client + S/W
- GUI

MySQL Enterprise Backup:-

used to copy the table data.

used to take backups (~~EXPORT~~) - used to restore from the backups (~~IMPORT~~)

→ Every row in Table is a file, which helps in achieving ~~row-level~~ clocking.
Table is not a file.



MySQL - SQL (Structured query language)

common for all (hence also known as Standard Query language)

- ① DDL → Data definition language (Create, alter, drop)
- DML → Data manipulation language (Insert, update, delete)
- DCL → Data control language (Grant, Revoke)
- DQL → Data Query language (Select)
- DTL/TCL → Transaction control language (commit, rollback, savepoint)

Notation

ANSI
Standard

extra in

MySQL

RDBMS

and

Oracle

RDBMS

DDL → Truncate, Rename

↳ delete & commit

extra in Oracle RDBMS only:-

DML (Merge, Updrt) → update & Insert

↳ Merge data of two tables.

Rules for Table name:-

1) Max 30 characters

2) A-Z, 0-9, a-z, -

3) Under Linux & Unix, table name & column-name are

case-sensitive. But Windows & Mac OS are not case-sensitive.

④ Table name has to begin with alphabet

2024 EMP X → error

EMP 2024 ✓ → allowed

⑤ Special characters \$, #, _ are allowed.

⑥ In MySQL, there are reserved characters such as # in tablename and columnname, enclose it in back quotes.

" back-quotes

"EMP#"

134 reserved words in tablename → MySQL Documentation

Oracle Documentation <https://docs.oracle.com>.
Java Documentation

EMP

EMPNO	ENAME	SAL	CITY	DOB
char		float		date

MySQL Datatypes:-

- char: It allows any character (could be alphanumeric also)
- varchar: It allows any " " () " "
- max 255 characters | char is fixed length
default width ,
- max 65535 character.
no default width (width has to be specified)
- variable length

⇒ char(20) → padded with blanks (wastage of space)

AMIT

varchar(20) → not padded with blanks. (conserve space)

AMIT

⇒ Due to fixed length of char, searching & retrieval is fast.

char vs Varchar

Searching performance vs Hard disk space.

⇒ char → PAN NO., Mobile NO., Aadhar → fixed length

varchar → city, name etc.

⇒ long_text - allows any character (could be alpha-numeric)

- max 4,294,907,295 characters (4Gb - 1)

e.g.: Remarks, Comments, Resume, Experience.

- this datatype, used for those columns, that are only for storage & display purposes.

- not used for those columns that would be used for searching variable length.
- width does not have to be specified for this datatype

EXPERIENCE longtext

Emplm	EName	EExperience	Sal
101	King	100	5000
102	Queen	200	6000

longtext

King experience

100 Queen experience

these are harddisk
pointer known as locator

for longtext MySQL

Stores ~~experience~~ Experience outside
table, and address stored in column
to maintain performance.

200

- MySQL maintains a LOCATOR (hard disk pointer) from the longtext column to the longtext data.

⇒ BLOB → Binary Large Object.

Long BLOB :- allows upto 4 GB - 1 bytes of binary data.

Eg:- Barcodes, QR codes, fingerprints, Biometric,
Photographs, charts, graphs, maps, Sound.

Sound $\xrightarrow{\text{convert to}}$ binary.

- stores the data as character string of 1's and 0's.
- this is the multimedia datatype of MySQL.