UNIVERSITY OF ENGINEERING & MANAGEMENT, KOLKATA

Course Name : Database Management System

Dr. Sandip Mandal
Dept. of CSE, UEM Kolkata
WhatsApp : +91-8449007365
Email : sandip.mandal@uem.edu.in

Module 1: History of DBMS and Advantages

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

History of Database Systems

- 1950s and early 1960s:
  - Data processing using magnetic tapes for storage
    - Tapes provided only sequential access
  - Punched cards for input

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

History of Database Systems

- Late 1960s and 1970s:
  - Hard disks allowed direct access to data
  - Network and hierarchical data models in widespread use
  - Ted Codd defines the relational data model
    - Would win the ACM Turing Award for this work
    - IBM Research begins System R prototype
    - UC Berkeley begins Ingres prototype
  - High-performance (for the era) transaction processing

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

History (cont.)

- 1980s:
  - Research relational prototypes evolve into commercial systems
    - SQL becomes industrial standard
  - Parallel and distributed database systems
  - Object-oriented database systems
- 1990s:
  - Large decision support and data-mining applications
  - Large multi-terabyte data warehouses
  - Emergence of Web commerce

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

Advantages of DBMS over file system

- **Drawbacks of File system**
  - Data redundancy
  - Data inconsistency
  - Data Isolation
  - Dependency on application programs
  - Atomicity issues
  - For example: Lets say Steve transfers 100$ to Negan's account. This transaction consists multiple operations such as debit 100$ from Steve's account, credit 100$ to Negan's account. Like any other device, a computer system can fail lets say it fails after first operation then in that case Steve's account would have been debited by 100$ but the amount was not credited to Negan's account, in such case the rollback of operation should occur to maintain the atomicity of transaction. It is difficult to achieve atomicity in file processing systems.
  - Data Security

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

Advantages of DBMS over file system

- **No redundant data**: Redundancy removed by data normalization. No data duplication saves storage and improves access time.
- **Data Consistency and Integrity**: As we discussed earlier the root cause of data inconsistency is data redundancy, since data normalization takes care of the data redundancy, data inconsistency also been taken care of as part of it
- **Data Security**: It is easier to apply access constraints in database systems so that only authorized user is able to access the data. Each user has a different set of access thus data is secured from the issues such as identity theft, data leaks and misuse of data.
- **Privacy**: Limited access means privacy of data.
- **Easy access to data** – Database systems manages data in such a way so that the data is easily accessible with fast response times.
- **Easy recovery**: Since database systems keeps the backup of data, it is easier to do a full recovery of data in case of a failure.
- **Flexible**: Database systems are more flexible than file processing systems.

Disadvantages of DBMS

- DBMS implementation cost is high compared to the file system
- Complexity: Database systems are complex to understand
- Performance: Database systems are generic, making them suitable for various applications. However this feature affect their performance for some applications

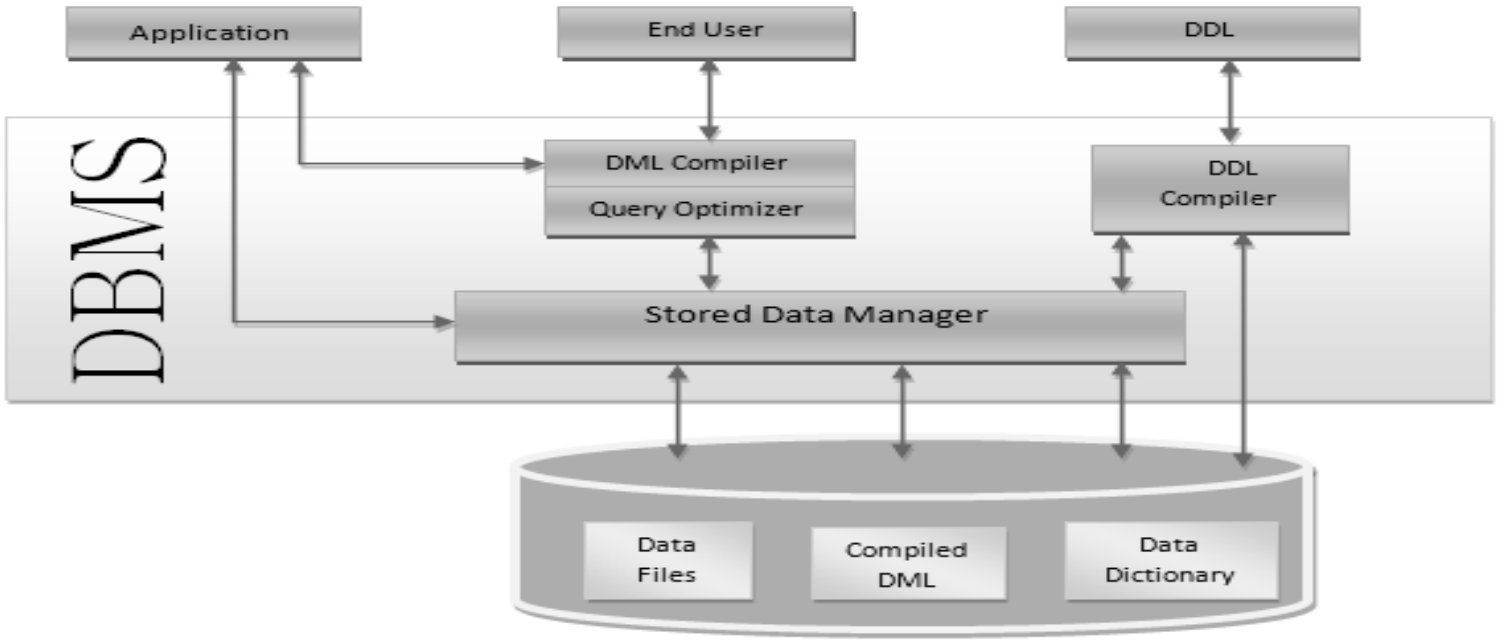
Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

DBMS Components

- **Data Files: -** It has the real data stored in it. It can be stored as magnetic tapes, magnetic disks or optical disks.
- **Compiled DML: -** Some of the processed DML statements (insert, update, delete) are stored in it so that if there is similar requests, it will be re-used.
- **Data Dictionary: -** It contains all the information about the database. As the name suggests, it is the dictionary of all the data items. It contains description of all the tables, view, materialized views, constraints, indexes, triggers etc.

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

DBMS Components



Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in

Thank You

Sandip Mandal WhatsApp - 8449007365
sandip.mandal@uem.edu.in