



SNS COLLEGE OF ENGINEERING
Kurumbapalayam (Po), Coimbatore – 641 107



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT
UNIT-I

COMPONENTS OF DBMS

All DBMS comes with various integrated components and tools necessary to carry out almost all database management tasks. Some DBMS software even provides the ability to extend beyond the core functionality by integrating with third-party tools and services, directly or via plugins.

In this section, we will look at the common components that are universal across all DBMS software, including:

- ✓ Storage engine
- ✓ Query language
- ✓ Query processor
- ✓ Optimization engine
- ✓ Metadata catalog
- ✓ Log manager
- ✓ Reporting and monitoring tools
- ✓ Data utilities

Storage engine

The storage engine is the core component of the DBMS that interacts with the file system at an OS level to store data. All SQL queries which interact with the underlying data go through the storage engine.

Query language

A database access language is required for interacting with a database, from creating databases to simply inserting or retrieving data. A proper DBMS must support one or multiple query languages and language dialects. Structured query language (SQL) and MongoDB Query Language (MQL) are two query languages that are used to interact with the databases.

In many query languages, the query language functionality can be further categorized according to specific tasks:

Data Definition Language (DDL). This consists of commands that can be used to define database schemas or modify the structure of database objects.

Data Manipulation Language (DML). Commands that directly deal with the data in the database. All CRUD operations come under DML.

Data Control Language (DCL). This deals with the permissions and other access controls of the database.

Transaction Control Language (TCL). Command which deals with internal database transactions.

Query processor



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This is the intermediary between the user queries and the database. The query processor interprets the queries of users and makes them actionable commands that can be understood by the database to perform the appropriate functionality.

Optimization engine

The optimization Engine allows the DBMS to provide insights into the performance of the database in terms of optimizing the database itself and queries. When coupled with database monitoring tools, it can provide a powerful toolset to gain the best performance out of the database.

Metadata catalog

This is the centralized catalog of all the objects within the database. When an object is created, the DBMS keeps a record of that object with some metadata about it using the metadata catalog. Then, this record can be used to:

- ✓ Verify user requests to the appropriate database objects
- ✓ Provide an overview of the complete database structure

Log manager

This component will keep all the logs of the DBMS. These logs will consist of user logins and activity, database functions, backups and restore functions, etc. The log manager ensures all these logs are properly recorded and easily accessible.

Reporting & monitoring tools

Reporting and monitoring tools are another standard component that comes with a DBMS. Reporting tools will enable users to generate reports while monitoring tools enable monitoring the databases for resource consumption, user activity, etc.

Data utilities

In addition to all the above, most DBMS software comes with additional inbuilt utilities to provide functionality such as:

- ✓ Data integrity checks
- ✓ Backup and restore
- ✓ Simple database repair
- ✓ Data validations
- ✓ Etc.