Name: Aditya Kangune

Roll No: 23365

Class: SE-11

Batch: G-11

# **Assignment: 1**

**TITLE**: Study of RDBMS

**PROBLEM STATEMENT:**

Study of Oracle Open-source software. Discuss the characteristics like efficiency, scalability,

performance, and transactional properties.

**OBJECTIVE:** To study the Oracle Database Management System.

**THEORY:**

**What is Database?**

• A database is an organized collection of data, so that it can be easily accessed and

managed. You can organize data into tables, rows, columns, and index it to make it

easier to find relevant information.

• Database handlers create a database in such a way that only one set of software

program provides access of data to all the users. The main purpose of the database is to

operate a large amount of information by storing, retrieving, and managing data.

• There are many databases available like MySQL, Sybase, Oracle, MongoDB,

Informix, PostgreSQL, SQL Server, etc. Modern databases are managed by the

database management system (DBMS). SQL or Structured Query Language is used to

operate on the data stored in a database.

What is DBMS?

• DBMS software primarily functions as an interface between the end user and the

database, simultaneously managing the data, the database engine, and the database

schema in order to facilitate the organization and manipulation of data.

• Though functions of DBMS vary greatly, general-purpose DBMS features and

capabilities should include: a user accessible catalog describing metadata, DBMS

library management system, data abstraction and independence, data security, logging

and auditing of activity, support for concurrency and transactions, support for

authorization of access, access support from remote locations,

• A database schema design technique that functions to increase clarity in organizing data

is referred to as normalization. DBMS Output is a built-in package SQL in DBMS that

enables the user to display debugging information and output, and send messages from

subprograms, packages, PL/SQL blocks, and triggers.

Advantages and Disadvantages of DBMS.

**Advantage of DBMS:**

• Improved data sharing:

The DBMS helps create an environment in which end users have better access to more and

better-managed data. Such access makes it possible for end users to respond quickly to changes

in their environment.

• Improved data security:

The more users access the data, the greater the risks of data security breaches . Corporations

invest considerable amounts of time, effort, and money to ensure that corporate data are used

properly.

A DBMS provides a framework for better enforcement of data privacy and security policies.

• Better data integration:

Wider access to well-managed data promotes an integrated view of the organization’s

operations and a clearer view of the big picture. It becomes much easier to see how actions in

one segment of the company affect other segments.

• Increased end-user productivity

The availability of data, combined with the tools that transform data into usable information,

empowers end users to make quick, informed decisions that can make the difference between

success and failure in the global economy.

**Disadvantage of DBMS**

• Increased costs:

Database systems require sophisticated hardware and software and highly skilled personnel.

The cost of maintaining the hardware, software, and personnel required to operate and manage

a database system can be substantial. Training, licensing, and regulation compliance costs are

often overlooked when database systems are implemented.

• Management complexity:

Database systems interface with many different technologies and have a significant impact on

a company’s resources and culture.

The changes introduced by the adoption of a database system must be properly managed to

ensure that they help advance the company’s objectives. Given the fact that database systems

hold crucial company data that are accessed from multiple sources, security issues must be

assessed constantly.

• Frequent upgrade/replacement cycles:

DBMS vendors frequently upgrade their products by adding new functionality. Such new

features often come bundled in new upgrade versions of the software.Some of these versions

require hardware upgrades. Not only do the upgrades themselves cost money, but it also costs

money to train database users and administrators to properly use and manage the new features.

RDBMS Terminology

Stands for "Relational Database Management System." An RDBMS is a DBMS designed

specifically for relational databases. Therefore, RDBMSes are a subset of DBMSes.

A relational database refers to a database that stores data in a structured format, using rows and

columns.

MySQL Database

MySQL is an open-source relational database management system. Its name is a combination

of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation

for Structured Query Language.

– MySQL Architecture

– MYSQL Features and Engines

**MYSQL Data types:**

• TINYINT

• SMALLINT

• MEDIUMINT

• INT

• BIGINT

• DECIMAL

• FLOAT

• DOUBLE

RDBMS System (Studied) based on points like efficiency, scalability, characteristics and

performance.

**Amazon Aurora:**

1) High Performance and Scalability:

➢ Get 5X the throughput of standard MySQL and 3X the throughput of standard

PostgreSQL.

➢ Easily scale your database deployment up and down from smaller to larger instance

types as your needs change.

➢ Amazon Aurora automatically grows storage as needed, up to 128TB per database

instance.

2) High Availability and Durability:

➢ Amazon Aurora is designed to offer greater than 99.99% availability, replicating 6

copies of your data across 3 Availability Zones and backing up your data continuously

to Amazon S3.

➢ It transparently recovers from physical storage failures; instance failover typically takes

less than 30 seconds.

➢ You can also backtrack within seconds to a previous point in time, to recover from user

errors.

3) Highly Secure:

➢ Amazon Aurora provides multiple levels of security for your database.

➢ These include network isolation using Amazon VPC, encryption at rest using keys you

create and control through AWS Key Management Service (KMS) and encryption of

data in transit using SSL.

➢ On an encrypted Amazon Aurora instance, data in the underlying storage is encrypted,

as are the automated backups, snapshots, and replicas in the same cluster.

4) MySQL and PostgreSQL Compatible:

➢ The Amazon Aurora database engine is fully compatible with existing MySQL and

PostgreSQL open source databases, and adds compatibility for new releases regularly.

➢ This means you can easily migrate MySQL or PostgreSQL databases to Aurora using

standard MySQL or PostgreSQL import/export tools or snapshots.

➢ The code, applications, drivers, and tools you already use with your existing databases

can be used with Amazon Aurora with little or no change.

5) Fully Managed:

➢ Amazon Aurora is fully managed by Amazon Relational Database Service (RDS).

➢ No longer need to worry about database management tasks such as hardware

provisioning, software patching, setup, configuration, or backups. Aurora automatically

and continuously monitors and backs up your database to Amazon S3, enabling

granular point-in-time recovery.

➢ You can monitor database performance using Amazon CloudWatch, Enhanced

Monitoring, or Performance Insights, an easy-to-use tool that helps you quickly detect

performance problems.

**Presentation:**

Uploaded along-with this file in the same folder.

**CONCLUSION:**

After completion of this assignment:

1. We learned what a database is and how it is useful.
2. We learnt about different data bases and explored more about Amazon Aurora.
3. Different types of DBMS were explored.
4. The features and characteristics of RDBMS- Amazon Aurora was studied and explored.

**Reference:**

1. Official Amazon Aurora website: <https://aws.amazon.com/rds/aurora/?aurora-whats-new.sort-by=item.additionalFields.postDateTime&aurora-whats-new.sort-order=desc>
2. Geeks for Geeks.
3. Google.
4. E-books available online.