**Database Management Systems Laboratory**

**Assignment A1**

**Date of Submission: 11-08-2020**

**Title: Study of Open Source Relational Databases : MySQL**

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Problem Statement:

Study different DBMS architectures and compare them.

Learning Objectives:

1. To understand the working and functionalities of different open relational databases.
2. To perform a detailed analysis of open relational database systems to explore the advantages of each.
3. To conduct comparative study of Mysql and Oracle.

Learning Outcomes:

1. Students will understand how different open relational databases work.
2. Students will be able to do a detailed analysis of open relational database systems and explore the advantages of each.
3. Students will conduct comparative study of Mysql and Oracle.

Hardware and Software Requirements:  
 Dell Optiplex 3020 MT, USB, Keyboard, USB Mouse, monitor, i5 processor, IDE (eg. Eclipse), Fedora 2D

Theory

A relational database is a digital database based on the relational model of data. The term "relational database" was invented by E. F. Codd at IBM in 1970. The relational data model, which organizes data in tables of rows and columns, predominates in database management tools. Today there are other data models, including NoSQL and NewSQL, but relational database management systems (RDBMSs) remain dominant for storing and managing data worldwide.

Top 10 Relational Databases include:

* MySQL
* IBM Db2
* Amazon Relational Database Service (RDS)
* Amazon Aurora
* PostgreSQL
* SAP HANA
* IBM Informix
* MariaDB

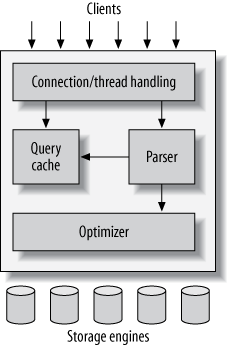
For this assignment we will focus on MySQL relational database.

* MySQL is the most popular Open Source Relational SQL Database Management System. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company. SQL stands for Structured Query Language. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database.
* DBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups.
* MySQL is also used by many popular websites, including Facebook, Flickr, MediaWiki, Twitter, and YouTube.

Major features as available in MySQL 5.6:

* A broad subset of ANSI SQL 99, as well as extensions
* Cross-platform support
* Stored procedures, using a procedural language that closely adheres to SQL/PSM[78]
* Triggers
* Cursors
* Updatable views
* Online Data Definition Language (DDL) when using the InnoDB Storage Engine.
* Information schema

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| Advantages | Disadvantages |
| It’s Easy To Use | Has some stability issues |
| Open Source | Suffers from relatively poor performance scaling |
| Free of Cost | Development is not community driven |
| Support is readily available | Functionality is heavily dependant on Addons |
| Industry standard and widely used | Tends to be limited in areas like Data Warehousing |



MySQL Internal Architecture

Comparative study between MySQL and Oracle Relational Database Systems:

Oracle is a relational database system that provides self-driving, self-securing, self-repairing, and designed to eliminate error-prone manual database management. Oracle is a cross-platform database system which can run on the various operating systems.

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| **Comparison Basis** | **MySQL** | **Oracle** |
| Introduction | It is an open-source, cross-platform relational database management system built by Swedish Company MYSQL AB and currently supported by the Oracle. | Oracle is a relational database system (RDBMS) that implements object-oriented features. It allows to store and retrieve data quickly and safely. It can handle a large amount of data. |
| Release | It was released in 1995. | It was released in 1980. |
| Cost | It is free and open-source. It is licensed under the GNU. | It is licensed for commercial purposes, but it provides the express edition for free. The express edition is recommended for students only. |
| Scalability | MySQL database is used for small and big businesses. | Oracle database is used for very large scale deployments. |
| Data Partitioning | It does not support data partitioning. | It supports data partitioning. |
| Security | It requires a username, password, and host to access the database. | It requires a username, password, and profile validation to access the database. |
| System Type | It only works with the static system. | It can work with both static and dynamic systems. |
| Null Value | MySQL supports the null value. | Oracle does not support the null value. |
| Character | MySQL support only two characters that are CHAR and VARCHAR. | Oracle supports four different characters that are CHAR, VARCHAR2, NCHAR, and NVARCHAR2. |
| Backup Mechanism | It offers only two backup mechanisms that are mysqlhotcopy and mysqldump. | It offers many backup mechanisms that are backup, hot backup, import, export, etc. |
| XML Support | It does not support XML. | It supports XML. |
| Storage Features | It contains only a few storage features like tablespace, synonym, packages, and many others. | It supports many storage features that are tablespace, synonym, packages, etc. |

Conclusion:

Thus we have successfully studied different RDBS and studied the special features of MySQL. We observed the internal structure of MySQL server, and learnt the advantages and disadvantages of MySQL. Finally, we performed a comparative study between MySQL and Oracle, and analysed why both are widely used for different applications.