NAME:AVINASH BHIWALE ROLL NO.:T1851050 DIV:A
PRN NO.:71901284J

Assignment 2

Aim: Install and configure client and server for MySQL and MongoDB (Show all commands and necessary steps for installation and configuration).

MYSQL:

MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company. MySQL is becoming so popular because of many good reasons −

- MySQL is released under an open-source license. So you have nothing to pay to use it.
- MySQL is a very powerful program in its own right. It handles a large subset of the functionality of the most expensive and powerful database packages.
- MySQL uses a standard form of the well-known SQL data language.
- MySQL works on many operating systems and with many languages including PHP, PERL, C, C++, JAVA, etc.
- MySQL works very quickly and works well even with large data sets.
- MySQL is very friendly to PHP, the most appreciated language for web development.
- MySQL supports large databases, up to 50 million rows or more in a table. The default file size limit for a table is 4GB, but you can increase this (if your operating system can handle it) to a theoretical limit of 8 million terabytes (TB).
- MySQL is customizable. The open-source GPL license allows programmers to modify the MySQL software to fit their own specific environments.

MySQL Features

- **Relational Database Management System (RDBMS):** MySQL is a relational database management system.
- **Easy to use:** MySQL is easy to use. You have to get only the basic knowledge of SQL. You can build and interact with MySQL with only a few simple SQL statements.
- **It is secure:** MySQL consist of a solid data security layer that protects sensitive data from intruders. Passwords are encrypted in MySQL.
- **Client/ Server Architecture:** MySQL follows a client /server architecture. There is a database server (MySQL) and arbitrarily many clients (application programs), which communicate with the server; that is, they query data, save changes, etc.
- **Free to download:** MySQL is free to use and you can download it from MySQL official website.
- **It is scalable:** MySQL can handle almost any amount of data, up to as much as 50 million rows or more. The default file size limit is about 4 GB. However, you can increase this number to a theoretical limit of 8 TB of data.

- **Compatibale on many operating systems:** MySQL is compatible to run on many operating systems, like Novell NetWare, Windows* Linux*, many varieties of UNIX* (such as Sun* Solaris*, AIX, and DEC* UNIX), OS/2, FreeBSD*, and others. MySQL

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also provides a facility that the clients can run on the same computer as the server or on another computer (communication via a local network or the Internet).

- **Allows roll-back:** MySQL allows transactions to be rolled back, commit and crash recovery.
- **High Performance:** MySQL is faster, more reliable and cheaper because of its unique storage engine architecture.
- **High Flexibility:** MySQL supports a large number of embedded applications which makes MySQL very flexible.
- **High Productivity:** MySQL uses Triggers, Stored procedures and views which allows the developer to give a higher productivity.

Installation Step of MYSQL:

Following steps are to be followed while installing MYSQL on Ubuntu operating System.

1. Connect the system with the Internet.
2. Open the terminal and Execute the command
   sudo apt-get update
   sudo apt-get install mysql-server
3. Enter the password for root as **"root"**
4. After installation enter the below command to get the MYSQL
   Terminal. mysql –u root -p
5. Enter the earlier chosen password ie. **root**
6. Then enter the command "show database", by this all the databases in the system will display on screen.
7. Create database.
8. Use that given database.

MongoDB

MongoDB is a cross-platform, document oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document.

Database

Database is a physical container for collections. Each database gets its own set of files on the file system. A single MongoDB server typically has multiple databases.

Collection

Collection is a group of MongoDB documents. It is the equivalent of an RDBMS table. A collection exists within a single database. Collections do not enforce a schema. Documents within a collection can have different fields. Typically, all documents in a collection are of similar or related purpose.

Document

A document is a set of key-value pairs. Documents have dynamic schema. Dynamic schema means that documents in the same collection do not need to have the same set of fields or structure, and common fields in a collection's documents may hold different types of data. The following table shows the relationship of RDBMS terminology with MongoDB.

MongoDB Features

- **General purpose database**, almost as fast as the key:value NoSQL type.
- **High availability**.
- **Scalability** (from a standalone server to distributed architectures of huge clusters). This allows us to shard our database transparently across all our shards. This increases the performance of our data processing.
- **Aggregation**: batch data processing and aggregate calculations using native MongoDB operations.
- **Load Balancing**: automatic data movement across different shards for load balancing. The balancer decides when to migrate the data and the destination Shard, so they are evenly distributed among all servers in the cluster. Each shard stores the data for a selected range of our collection according to a partition key.
  - **Native Replication**: syncing data across all the servers at the replica set.
  - **Security**: authentication, authorization, etc.
  - **Advanced users management**.
- **Automatic failover**: automatic election of a new primary when it has gone down.

Installation Steps for MongoDB

1. Connect the system with the Internet.
2. Open the terminal and Execute the command

   sudo apt-get update

   sudo apt-get install mongodb

   sudo service mongodb start
3. Type mongo to start the mongodb terminal.
4. Now write your queries.

Comparison between MYSQL and MongoDB

Date	MySQL	MongoDB
Written in	C++, C	C++, C and JavaScript
Type	RDBMS	Document-oriented
Main points	- Table - Row - Column	- Collection - Document - Field
License	GPL v2 / Commercial licenses available OD	GNU AGPL v3.0 / Commercial licenses available OD
Schemas	Strict	Dynamic
Scaling	Vertically	Horizontally
Key features	- Full-text searching and indexing - Integrated replication support - Triggers - SubSELECTs - Query caching - SSL support - Unicode support - Different storage engines with various performance characteristics	- Auto-sharding - Native replication - In-memory speed - Embedded data models support - Comprehensive secondary indexes - Rich query language support - Various storage engines support
Best used for	- Data structure fits for tables and rows - Strong dependence on multi-row transactions - Frequent updates and modifications of large volume of records - Relatively small datasets	- High write loads - Unstable schema - Your DB is set to grow big - Data is location based - HA (high availability) in unstable environment is required - No database administrators (DBAs)
Examples	NASA, US Navy, Bank of Finland, UCR, Walmart, Sony, S2 Security Corporation, Telenor, Italtel, iStock, Uber, Zappos, Booking.com, Twitter, Facebook, others.	Expedia, Bosch, Otto, eBay, Gap, Forbes, Foursquare, Adobe, Intuit, Metlife, BuzzFeed, Crittercism, CitiGroup, the City of Chicago, others.

Conclusion:-

We have studied the Installation and configuration of client and server for MySQL and MongoDB.