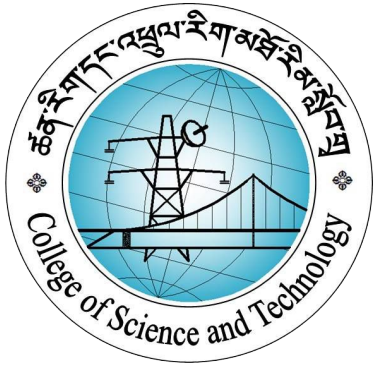

Royal University of Bhutan

LESSON – 25

DATABASE

LEARNING OUTCOMES

- Database Introduction
- Installation and Configuration
- Creating database and users
- Granting privileges
- pv - Pipe viewer tool
- Cronjobs

Database: Introduction

Database Server?

- Database servers manage data – facts and information
- It is also a large repository of raw data
- Raw data are processed into information with the help of database engine of database server.
- Database engine: Oracle & MS SQL Server

Database: Introduction

Server Types

There are several kinds of database server that supports different types of database model:

1. Flat files database model: single or 2-D array of data element (eg. Excel)
2. Relational Database Model: To make DBMS works more independently of any particular application
3. Object Database Model: Database and Application programming together (Eg. SQL and Visual Studio programming)
4. Hierarchical Relational Database Model: Data organized into tree-likestructure (Eg. Financial database)

Database: Introduction

Database Server on Ubuntu

mariadb Database Server

- mariadb is RDBMS which has a multi-users access capability
- More than 11 million installations

Installation

$ sudo apt update
$ sudo apt install mariadb-server
$ sudo mysql_secure_installation
$ sudo systemctl start mariadb

Database: Introduction

Setting root password

$ sudo mysql_secure_installation

Start mariadb Shell
#mysql
Enter Password:
MariaDB>

Normal User

#mysql –u root -p
Enter Password:
MariaDB>

Root User

Database: Introduction

Resetting password or removing password

```
#systemctl stop mariadb
#mysqld_safe --skip-grant-tables &
#mysql -u root mysql
# mariadb>use mysql;
# mariadb>update user set Password= ‘ ’ where User=‘root’;
      //Removing password for the root
#mariadb>commit
#mariadb>flush privileges;
#mariadb>quit;
```

Database: Introduction

Check mariadb server status

#mysqladmin –u root –p ping
Enter Password:
mariadb is alive

Check mariadb server status

#mysqladmin –u root –p version

Check all the running process of mariadb

#mysqladmin –u root –p processlist

Database: Introduction

Creating database

mariadb>create database <DatabaseName>;

[or]

#mysqladmin –u root –p create <DatabaseName>

Viewing databases and Using database

mariadb>show databases;

[or]

#mysqladmin –u root –p drop <DatabaseName>

[List all databases]

mariadb>use <DatabaseName>;

[Use specified database]

Database: Introduction

Showing database tables and its descriptions

mariadb>show tables;
mariadb>describe <TableName>;

Viewing users

mariadb>SELECT User, Host FROM mysql.user;
[Display all users information from user table]

Database Server

Managing users and privileges

mariadb>CREATE USER ‘user_name'@'localhost' IDENTIFIED BY ‘new_password';
mariadb>GRANT ALL PRIVILEGES ON DatabaseName. to user_name@localhost;*

Flush privileges

mariadb>FLUSH PRIVILEGES;

[Changes to take effect]

Database Server

Database Backup

#mysqldump –u root –p demodb > dbbackup.sql

#mysqldump -u [username] -p [database] | gzip > backup.sql.gz

#mysqldump -u [username] -p [database] | gzip > backup_$(date +%F.%H%M%S).sql.gz

Database Restore

#mysqldump –u root –p demodb < dbbackup.sql

[Or]

#mysql –u root –p demodb < dbbackup.sql

Cronjob

Cron

The cron command-line utility is a job scheduler on Unix-like operating systems. Users who set up and maintain software environments use cron to schedule jobs.

Crontab -l - List configured cronjobs

Cron job format

```
|------------------------------ Minute (0-59)
|     |------------------------ Hour (0-23)
|     |     |------------------ Day of the month (1-31)
|     |     |     |------------ Month (1-12; or JAN to DEC)
|     |     |     |     |------- Day of the week (0-6; or SUN to SAT; or 7 for Sunday)
|     |     |     |     |
|     |     |     |     |
*     *     *     *     *
```

In */2 * * * *, */2 in the first field specifies that the job runs every 2 minutes.

Cronjob

Automate mysqldump through crontab

To make the backup periodic, all you have to do is add it to the system's crontab:

$ sudo crontab -e

Now add a line at the end of the file as follows:

```
*/2 * * * * mysqldump -u [username] -p [database] | gzip > /home/backup.sql.gz
```

Cronjob

Automate mysqldump through crontab using bash script

Write a bash script and save it (Sample Bash Script Download link).

Create a file and paste the script. Save the file as backup.sh.

Remember the file path.

Open crontab and set the time as per your requirement

Example to run every 2 minutes

*/2 * * * * path/to/mysql_backup_script.sh

pv - Pipe Viewer

- is a terminal-based tool in Linux used to monitor data flow through pipes. It provides a visual representation of the progress, making it easier to track the status of long-running data transfers.

Key Features of the pv Command

'pv' helps the user by giving him a visual display of the following:

- **Time Elapsed:** Shows the total time taken since the transfer began.
- **Completed Progress:** Displays a percentage progress bar of the transfer.
- **Current Data Transfer Speed:** Also known as the throughput rate, it shows how quickly data is being transferred.
- **Data Transferred:** Indicates the amount of data transferred so far.
- **ETA (Estimated Time):** Provides an estimated remaining time for the transfer based on the current data rate.

Source: https://www.geeksforgeeks.org/pv-command-in-linux-with-examples/

pv - Pipe Viewer

Install pv

$ sudo apt install pv

Syntax of pv command:

pv fileName

pv OPTIONS fileName

pv fileName > outputFileName

pv OPTIONS | command > outputFileName

command1 | pv | command2

pv - Pipe Viewer

Usage:

To backup the database to a sql file with pv:

#mysqldump -u username -p databasename | pv -W > database.sql

To restore the database to a sql file with pv:

 # pv database.sql | mysql -u uname -p databasename

Compress the backup database file in gzipped version of the sql file

#mysqldump -u username -p databasename | pv -W | gzip > database.sql.gz

Restore the gzipped file

#pv database.sql.gz | gunzip | mysql -u root -p databasename

Source: https://sjamso.blogspot.com/2018/01/dump-and-restore-mysql-database-with.html

SUMMARY

- The types of database server
- How to install and configure mariadb database server
- How to create database and database users with granting privileges.
- The types of database engine used in your database.