CL203 – Database Systems Lab

Lab#11 – DCL

Agenda

- Creating a user
- Data Control Language
    - GRANT & REVOKE Statements
        - GRANT Statement
        - REVOKE Statement
        - Privileges provided by MySQL

Creating a user

Syntax

```
CREATE USER 'username'@'host' IDENTIFIED BY 'password';
```

For Example

```
CREATE USER 'john'@'localhost' IDENTIFIED BY 'doe';
```

To change the password of an existing database user use the alter user command:

```
ALTER USER 'john'@'localhost' identified by 'allen';
```

In order to switch to a different user in the mysql console do the following:

Type quit which will end the current user's session and write the following command:

```
mysql -u username -p
```

you will be asked for a password, enter the password and you will be logged in.

In order to delete a user, type the following command:

```
DROP USER 'username'@'host';
```

Data Control Language

GRANT & REVOKE Statements

GRANT Statement

SQL GRANT is a statement used to provide access or privileges on the database objects to the users.

Syntax

```
GRANT privilege_name ON object_name TO '[username]'@'localhost';
```

For Example

```
GRANT ALL PRIVILEGES ON * . * TO 'john'@'localhost';
```

The asterisks in this command refer to the database and table (respectively) that they can access—this specific command allows to the user to read, edit, execute and perform all tasks across all the databases and tables.

REVOKE Statement

The REVOKE statement removes user access rights or privileges to the database objects.

Syntax

```
REVOKE privilege_name ON object_name FROM ‘[username]’@'localhost’;
```

Once you have finalized the permissions that you want to set up for your new users, always be sure to reload all the privileges.

```
FLUSH PRIVILEGES;
```

Your changes will now be in effect.

Privileges provided by MySQL

The privileges granted to a MySQL account determine which operations the account can perform. MySQL privileges differ in the contexts in which they apply and at different levels of operation:

- Administrative privileges enable users to manage operation of the MySQL server. These privileges are global because they are not specific to a particular database.
- Database privileges apply to a database and to all objects within it. These privileges can be granted for specific databases, or globally so that they apply to all databases.
- Privileges for database objects such as tables, indexes, views, and stored routines can be granted for specific objects within a database, for all objects of a given type within a database (for example, all tables in a database), or globally for all objects of a given type in all databases).

Information about account privileges is stored in the user, db, tables_priv, columns_priv, and procs_priv tables in the mysql system database. The MySQL server reads the contents of these tables into memory when it starts and reloads them “When Privilege Changes Take Effect”. Access-control decisions are based on the in-memory copies of the grant tables.

The following list shows some of the privilege names used in GRANT and REVOKE statements, along with the column name associated with each privilege in the grant tables and the context in which the privilege applies.

- The ALL or ALL PRIVILEGES privilege specifier is shorthand. It stands for "all privileges available at a given privilege level" (except GRANT OPTION). For example, granting ALL at the global or table level grants all global privileges or all table-level privileges.
- The ALTER privilege enables use of the ALTER TABLE statement to change the structure of tables. ALTER TABLE also requires the CREATE and INSERT privileges. Renaming a table requires ALTER and DROP on the old table, CREATE, and INSERT on the new table.
- The ALTER ROUTINE privilege is needed to alter or drop stored routines (procedures and functions).
- The CREATE privilege enables creation of new databases and tables.
- The CREATE ROUTINE privilege is needed to create stored routines (procedures and functions).
- The CREATE USER privilege enables use of the ALTER USER, CREATE USER, DROP USER, RENAME USER, and REVOKE ALL PRIVILEGES statements.
- The CREATE VIEW privilege enables use of the CREATE VIEW statement.
- The DELETE privilege enables rows to be deleted from tables in a database.
- The DROP privilege enables you to drop (remove) existing databases, tables, and views.
- The EXECUTE privilege is required to execute stored routines (procedures and functions).
- The GRANT OPTION privilege enables you to give to other users or remove from other users those privileges that you yourself possess.
- The INDEX privilege enables you to create or drop (remove) indexes. INDEX applies to existing tables. If you have the CREATE privilege for a table, you can include index definitions in the CREATE TABLE statement.
- The INSERT privilege enables rows to be inserted into tables in a database.
- The SELECT privilege enables you to select rows from tables in a database. SELECT statements require the SELECT privilege only if they actually retrieve rows from a table. Some SELECT statements do not access tables and can be executed without permission for any database. For example, you can use SELECT as a simple calculator to evaluate expressions that make no reference to tables:

```
SELECT 1+1;
SELECT PI()*2;
```

The SELECT privilege is also needed for other statements that read column values. For example, SELECT is needed for columns referenced on the right hand side of ***col_name = expr*** assignment in UPDATE statements or for columns named in the WHERE clause of DELETE or UPDATE statements.

- The SHOW DATABASES privilege enables the account to see database names by issuing the SHOW DATABASE statement.
- The TRIGGER privilege enables trigger operations. You must have this privilege for a table to create, drop, execute, or display triggers for that table.

  When a trigger is activated (by a user who has privileges to execute INSERT, UPDATE, or DELETE statements for the table associated with the trigger), trigger execution requires that the user who defined the trigger still have the TRIGGER privilege.
- The UPDATE privilege enables rows to be updated in tables in a database.

A full list of MySQL privileges can be seen here (the text above is taken from the same link).