



Data Control Language Commands

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Abstract: Data control language commands are GRANT and REVOKE which deal with the rights, permissions, and other controls of the database system.

Keywords: DCL data control language.

I. INTRODUCTION

Data control language (DCL) is used to access the stored data. It is mainly used for revoke and to grant the user the required access to a database. In the database, this language does not have the feature of rollback.

Creating, Altering and Deleting users:

II. SYNTAX OF DML COMMANDS

A database may have many users. Each user has a user account. The job of database administrator is to create new users, assign privileges to users, revoke privileges from users, alter users and delete users.

Create user: The create user command is used to create new user in a database.

Syntax: create user username identified by password;

Example: To create user xyz having password xyz123

create user xyz identified by xyz123;

Alter user: The alter user command is used to change password of user in a database.

Syntax: alter user username identified by new password;

Example: To change password of user xyz to xyz@123

alter user xyz identified by xyz@123;

Delete user: To delete a user from database drop user statement is used.

Syntax: drop user username;

Example: To delete user xyz from database

drop user xyz ;

In protecting data within database-

- We can protect data from database using Authorization process
- Authorization means assigning privileges to user to access data from database.
- We can protect data from database by using: Privilege and Role

Database privileges

A privilege is a right to execute a particular type of SQL statement or to access another user's object. Some examples of privileges include:

- The right to connect to the database (create a session)
- The right to create a table
- The right to select rows from another user's table
- The right to execute another user's stored procedure

Privileges are granted to users so that user can perform specific task. We should grant only required privilege to user. Excessive granting of unnecessary privileges can lead to compromised security.



There are two types of privileges:

1. System privileges

System privileges are permissions to perform particular database operation. A system privileges are normally granted by a DBA.

For example, to create a table, the user needs the create table system privilege.

Following are system privileges: create session, create user, create table, create view, create sequence, create index, create procedure, create trigger, alter any user, alter any table, alter any view, alter any sequence, alter any index, alter any procedure, alter any trigger, drop any user, drop any table, drop any view, drop any sequence, drop any index, drop any procedure, drop any trigger, etc

2. Object privileges

An object privileges are permissions to perform specific operations on a database objects such as table, view, sequence, procedure, function. The object privileges are normally granted by owner of object.

For example, to insert data into emp table, the user needs insert object privilege.

Following are object privileges:

Select, insert, update, delete, execute.

Granting and Revoking Privileges and Roles

We can assign privileges and roles to users using GRANT command and we can remove privileges and roles from users using REVOKE command.

The job of Database Administrators (DBAs) and Security Officers to grant privileges and roles to users and to revoke privileges and roles from users

GRANT Command

The GRANT command is used to grant (assign) privileges users.

Syntax of GRANT command:

```
GRANT {ALL| privilege list} ON {object name} TO {user list | PUBLIC | Role_name} [WITH GRANT OPTION]
```

Here, privilege list means list of privileges granted to users

If ALL is specified then all privileges granted to users

The ON clause is used to specify object name on which privileges are granted

The TO clause is used to specify users to whom privileges are granted

The PUBLIC is used to grant privileges to all users of the system.

The Role name is used to grant privileges to role.

WITH GRANT OPTION means user has privilege to grant privileges to other users

Examples of GRANT command:

1. Assign the SELECT privilege on emp table to all users

```
GRANT SELECT ON emp TO PUBLIC;
```

2. Assign ALL privilege on emp table to users 'xyz' and 'abc'

```
GRANT ALL ON BOOK TO xyz abc
```

3. Grant the SELECT,INSERT authority with capability to grant those privileges to other users on STUDENT table to user 'abc'

```
GRANT SELECT, INSERT ON STUDENT TO abc WITH GRANT OPTION;
```



4. Give the system privileges for creating tables and views to 'abc'

```
GRANT CREATE TABLE, CREATE VIEW TO abc
```

5. Grant the UPDATE authority on the SAL column of the EMP table to user 'aaa'.

```
GRANT UPDATE ON EMP(SAL) TO aaa;
```

REVOKE Command

The REVOKE command is used to remove (take out) the granted privileges from users.

Syntax of REVOKE command:

REVOKE { ALL | privilege list } ON { object name } FROM { user list | PUBLIC | Role_name } Here, privilege list means list of privileges removed from users.

If ALL is specified then all privileges are removed from users.

The ON clause is used to specify object name from which privileges are removed. The TO clause is used to specify users from whom privileges are removed. The PUBLIC is used to remove privileges from all users of the system. The Role_name is used to remove privileges from role.

Examples of REVOKE command:

1. Revoke the system privilege for creating table from 'aaa'

```
REVOKE CREATE TABLE FROM 'aaa';
```

2. Revoke the SELECT privileges on EMP table from users 'aaa' and 'xyz'.

```
REVOKE SELECT ON EMP FROM aaa, xyz;
```

3. Revoke the UPDATE privileges on EMP table from all users.

```
REVOKE UPDATE ON EMP FROM PUBLIC;
```

4. Remove ALL privileges on EMP table from user 'xyz'.

```
REVOKE ALL ON EMP FROM xyz;
```

5. Remove DELETE and UPDATE authority on the EMPNO and MGR columns of the EMP table from user 'aaa'.

```
REVOKE DELETE, UPDATE ON EMP(EMPNO, MGR) FROM aaa;
```

Roles

- Role is a group of privileges that can be granted to users. DBMS provide easy and controlled privilege management through roles.
- If we want to assign same set of privileges to multiple users, then we can create a role, grant privileges to role and then grant role to users.
- The Privileges granted to Predefined roles are as follows

Predefined role

Resource

DBA

Creating a role:

Syntax: Create role role_name;

For example: you have four clerk users:aaa, bbb, ccc, ddd in the database.

To these users you want to grant select, update privilege on emp table, select,delete privilege on dept table.



To do this first create a role by giving the following statement:

Create role clerks

Granting privileges to role:

Syntax: Grant privilege list on object name to role_name;

Then grant privileges to this role.
grant select,update on emp to clerk;
grant select,delete on dept to clerk;

Granting role to users:

Syntax: Grant role_name to users;

Now grant this clerk role to users like this
grant clerk to aaa, bbb, ccc, ddd;

Now aaa, bbb, ccc, ddd have all the privileges granted on clerk role.

Suppose after one month you want grant delete privilege on emp table to all these users then just grant this privilege to clerk role.so automatically delete privilege on emp table is granted to all users.

Revoking privileges from role:

Syntax: Revoke privilege list on object name from role_name;

Example:

If you want to take back update privilege on emp table from clerk role.
revoke update on emp from clerk;

Drop a role from the database

Syntax: Drop role role_name;

Example:

If you want to drop role clerk from database

Drop role clerks;

III. CONCLUSION

The DCL commands are used to GRANT and REVOKE privileges to, from users.

REFERENCES

- [1]. W3school.
- [2]. tutorialspoint.com