Creating and Revoking Object Privileges

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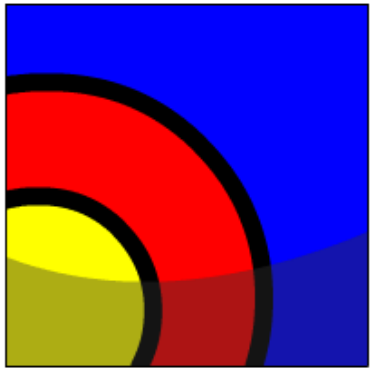
What Will I Learn?

In this lesson, you will learn to:



- Explain what a ROLE is and what its advantages are.
- Construct a statement to create a ROLE and GRANT privileges to it
- Construct a GRANT .. ON .. TO.. WITH GRANT OPTION statement to assign privileges to objects in their schema to other users and/or PUBLIC
- Construct and execute a statement to REVOKE object privileges from other users and/or from PUBLIC
- Explain the purpose of a database link

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Why Learn It?

If you share a computer with others, whether at school or at home, you've probably had something you're working on or something you've saved either viewed, changed or deleted by someone else. Wouldn't it be nice to be able to control the privileges others have to your personal files?

For databases, just as at school or home, data security is very important.

In this lesson, you will learn how to grant or take away access to database objects as a means to control who can alter, delete, update, insert, index or reference the database objects.

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ROLES

A role is a named group of related privileges that can be granted to the user. This method makes it

easier to revoke and maintain privileges. A user can have access to several roles, and several users can be assigned the same role. Roles are typically created for a database application.

```
SQL> CREATE ROLE manager;

Role created.

SQL> GRANT create table, create view TO manager;

Grant succeeded.

SQL> GRANT manager TO jennifer_cho;

Grant succeeded.
```

To create and assign a role, first the DBA must create the role. Then the DBA can assign

privileges to the role and the role to users.

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ROLES (continued)

Use the following syntax to create a role:

```
CREATE ROLE role_name;
```

```
SQL> CREATE ROLE manager;
Role created.

SQL> GRANT create table, create view TO manager;
Grant succeeded.

SQL> GRANT manager TO jennifer_cho;
Grant succeeded.
```

After the role is created, the DBA can use the GRANT statement to assign the role to users as well as assign privileges to the role. The example shown creates a manager role and then allows managers to create tables and views. It then grants the role to a user. Now the user can create tables and views. If users have multiple roles granted to them, they receive all of the privileges associated with all of the roles.

Note: The CREATE ROLE is a system privilege that has not been issued to Academy classrooms.

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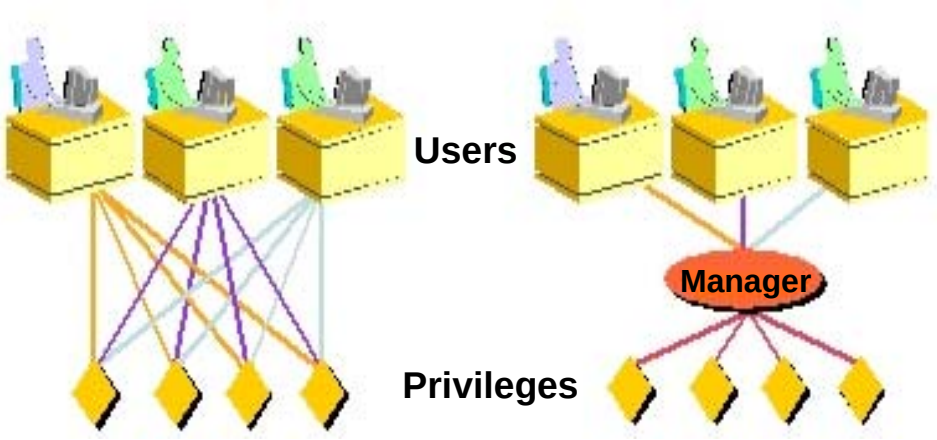
CHARACTERISTICS OF ROLES

- They are named groups of related privileges.
- They can be granted to users.
- They simplify the process of granting and revoking privileges.
- They are created by a DBA.



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GRANTING OBJECT PRIVILEGES

Use the following syntax to grant object privileges:

```
GRANT object_priv [(column_list)]
ON object_name
TO {user|role|PUBLIC}
[WITH GRANT OPTION];
```

Syntax	Defined
object_priv	is an object privilege to be granted
column_list	specifies a column from a table or view on which privileges are granted
ON object_name	is the object on which the privileges are granted
TO user|role	identifies the user or role to whom the privilege is granted
PUBLIC	grants object privileges to all users
WITH GRANT OPTION	Allows the grantee to grant the object privileges to other users and roles

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OBJECT PRIVILEGE Guidelines:

- To grant privileges on an object, the object must be in your own schema, or you must have been granted the object privileges WITH GRANT OPTION.
- An object owner can grant any object privilege on the object to any other user or role of the database.
- The owner of an object automatically acquires all object privileges on that object.

Syntax	Defined
object_priv	is an object privilege to be granted
column_list	specifies a column from a table or view on which privileges are granted
ON object_name	is the object on which the privileges are granted
TO user|role	identifies the user or role to whom the privilege is granted
PUBLIC	grants object privileges to all users
WITH GRANT OPTION	Allows the grantee to grant the object privileges to other users and roles

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GRANT Examples

Scott King (username scott_king) has created a d_songs table. In Example 1 on the right, all users are granted permission to SELECT from Scott's d_songs table.

Example 2 grants UPDATE privileges to Jennifer and to the manager role on specific columns in Scott's d_songs table.

```
1. GRANT  select
ON     d_songs
TO   PUBLIC;

2. GRANT  update (title, artist)
ON     d_songs
TO     jennifer_cho, manager;

3. SELECT  *
FROM    scott_king.d_songs;

4. CREATE SYNONYM songs
FOR scott_king.d_songs;

5. SELECT *
FROM songs;
```

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GRANT Examples (continued)

If Jennifer now wants to SELECT data from Scott's table, the syntax she must use is listed in Example 3.

Alternatively, Jennifer could create a synonym for Scott's table and SELECT from the synonym. See the syntax in Examples 4 and 5.

Different object privileges are available for different types of schema objects. A user automatically has all object privileges for schema objects contained in that user's schema. A user can grant any object privilege on any schema object that the user owns to any other user or role.

```
1. GRANT  select
ON     d_songs
TO   PUBLIC;

2. GRANT  update (title, artist)
ON     d_songs
TO     jennifer_cho, manager;

3. SELECT  *
FROM    scott_king.d_songs;

4. CREATE SYNONYM songs
FOR scott_king.d_songs;

5. SELECT *
FROM songs;
```

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WITH GRANT OPTION

A privilege that is granted using the WITH GRANT OPTION clause can be passed on to other users and roles by the grantee. Object privileges granted using the WITH GRANT OPTION clause are revoked when the grantor's privilege is revoked.

The example below gives user Scott access to your d_songs table with the privileges to query the table and add rows to the table. The example also allows Scott to give others these privileges:

```
GRANT  select, insert
ON     d_songs
TO     scott_king
WITH   GRANT OPTION;
```

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THE PUBLIC KEYWORD

An owner of a table can grant access to all users by using the PUBLIC keyword. The example shown below allows all users on the system to query data from Jason's d_songs table:

```
GRANT  select
ON     jason_tsang.d_songs
TO     PUBLIC;
```

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If you attempt to perform an unauthorized operation, such as deleting a row from a table on which you do not have the DELETE privilege, the Oracle Server does not permit the operation to take place.

If you receive the Oracle Server error message "table or view does not exist," you have done one of the following:

- Named a table or view that does not exist
- Attempted to perform an operation on a table or view for which you do not have the appropriate privileges

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You can access the data dictionary to view the privileges that you have. The chart at right describes various data dictionary views.

Data Dictionary View	Description
ROLE_SYS_PRIVS	System privileges granted to roles
ROLE_TAB_PRIVS	Table privileges granted to roles
USER_ROLE_PRIVS	Roles accessible by the user
USER_TAB_PRIVS_MADE	Object privileges granted on the user's objects
USER_TAB_PRIVS_RECD	Object privileges granted to the user
USER_COL_PRIVS_MADE	Object privileges granted on the columns of the user's objects
USER_COL_PRIVS_RECD	Object privileges granted to the user on specific columns
USER_SYS_PRIVS	Lists system privileges granted to the user

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REVOKING OBJECT PRIVILEGES

You can remove privileges granted to other users by using the REVOKE statement. When you use the REVOKE statement, the privileges that you specify are revoked from the users that you name and from any other users to whom those privileges were granted through the WITH GRANT OPTION clause.

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REVOKING OBJECT PRIVILEGES (continued)

Use the following syntax to revoke object privileges:

```
REVOKE {privilege [, privilege...]|ALL}
ON  object
FROM   {user[, user...]|role|PUBLIC}
[CASCADE CONSTRAINTS];
```

CASCADE CONSTRAINTS is required to remove any referential integrity constraints made to the object by means of the REFERENCES privilege.

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The example below revokes SELECT and INSERT privileges given to user Scott on the d_songs table.

```
REVOKE select, insert
ON d_songs
FROM scott_king;
```

If a user is granted a privilege with the WITH GRANT OPTION clause, that user can also grant the privilege using the WITH GRANT OPTION clause. This means that a long chain of grantees is possible, but no circular grants are permitted. If the owner revokes a privilege from a user who granted privileges to other users, the revoke statement cascades to all privileges granted.

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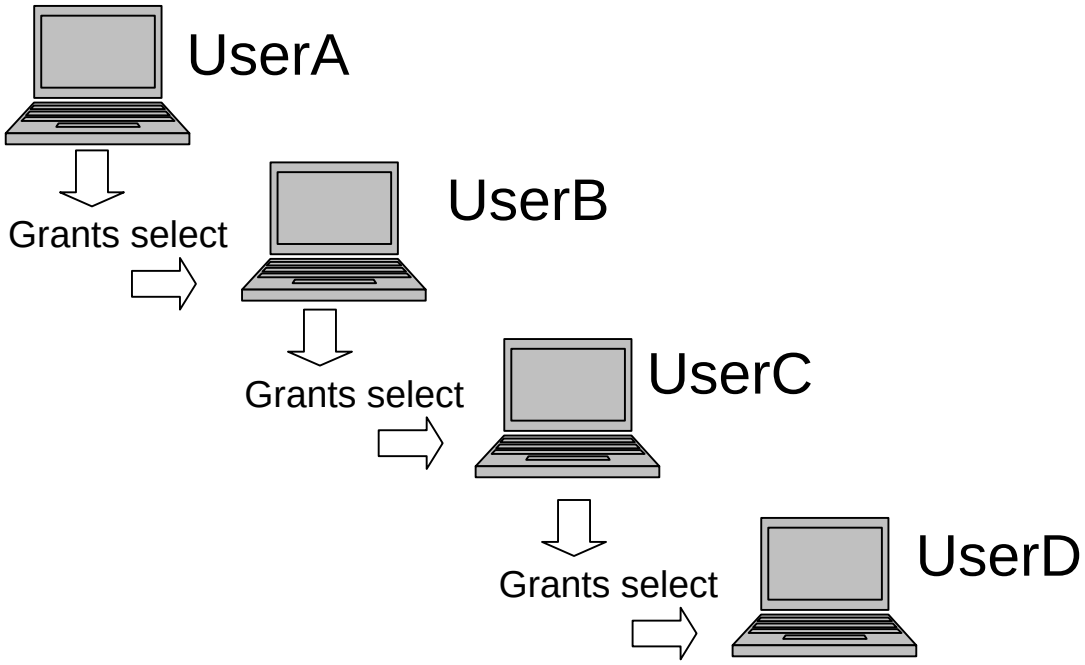
For example, if user A grants SELECT privileges on a table to user B, including the WITH GRANT OPTION clause, user B can grant to user C the SELECT privilege including the WITH GRANT OPTION clause as well. Now, user C can grant to user D the SELECT privilege.



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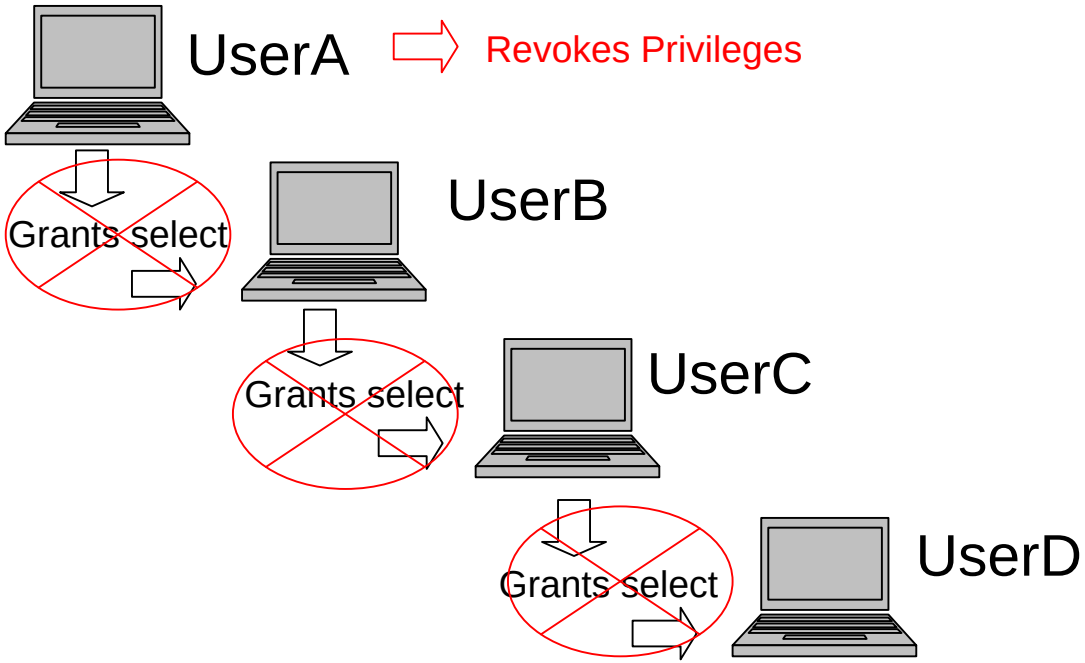
However, if user A revokes privileges from user B, then those privileges granted to users C and D are also revoked.



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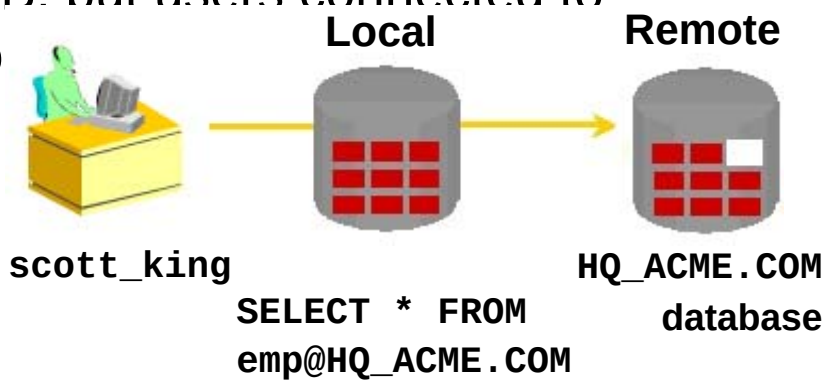
DATABASE LINKS

A database link is a pointer that defines a one-way communication path from one Oracle database to another Oracle database. The link pointer is actually defined as an entry in a data dictionary table. To access the link, you must be connected to the local database that contains the data dictionary entry.

A database link connection is “one-way” in the sense that a client connected to local database A can use a link stored in database A to access information in remote database B, but users connected to database B cannot use the same link to

CREATE DATABASE LINK –
In Oracle Application Express, there is no constant connection to the database therefore this feature is not available.



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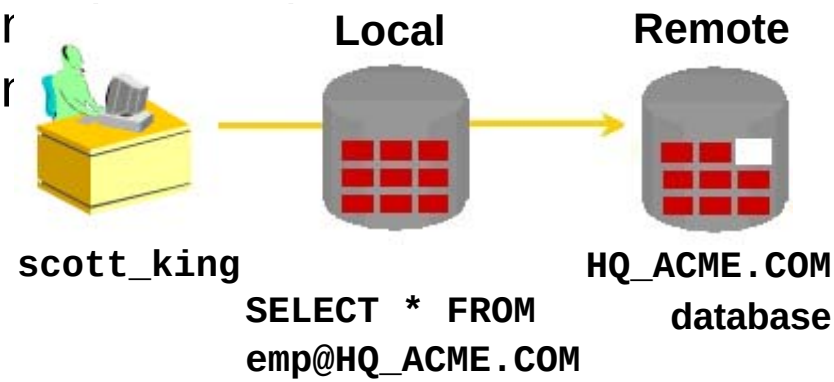
DATABASE LINKS (continued)

If local users on database B want to access data on database A, they must define a link that is stored in the data dictionary of database B. A database link connection gives local users access to data on a remote database. For this connection to occur, each database in the distributed system must have a unique global database name. The global database name uniquely identifies a database server in a distributed system.

The great advantage of database links is that they allow users to access another user's objects in a remote database so that they are bounded by the privilege set of the object's owner. Ir
access a remote database without havir
database.

The example shows a user scott_king accessing the EMP table on the remote database with the global name HQ.ACME.COM.



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Typically, the DBA is responsible for creating the database link. The dictionary view USER_DB_LINKS contains information on links to which a user has access. Once the database link is created, you can write SQL statements against the data in the remote site. If a synonym is set up, you can write SQL statements using the synonym. For example:

```
CREATE PUBLIC SYNONYM HQ_EMP
 FOR emp@HQ.ACME.COM;
```

Then write a SQL statement that uses the synonym:

```
SELECT * FROM HQ_EMP;
```

You cannot grant privileges on remote objects.

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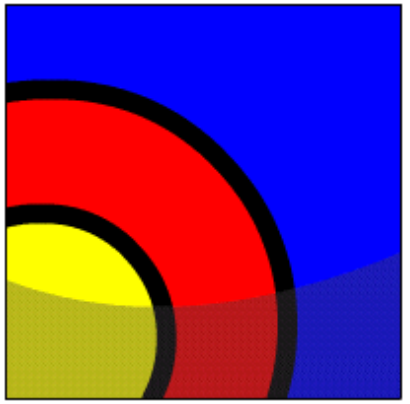
Summary



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Summary

Practice Guide

The link for the lesson practice guide can be found in the course resources in Section 0.

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