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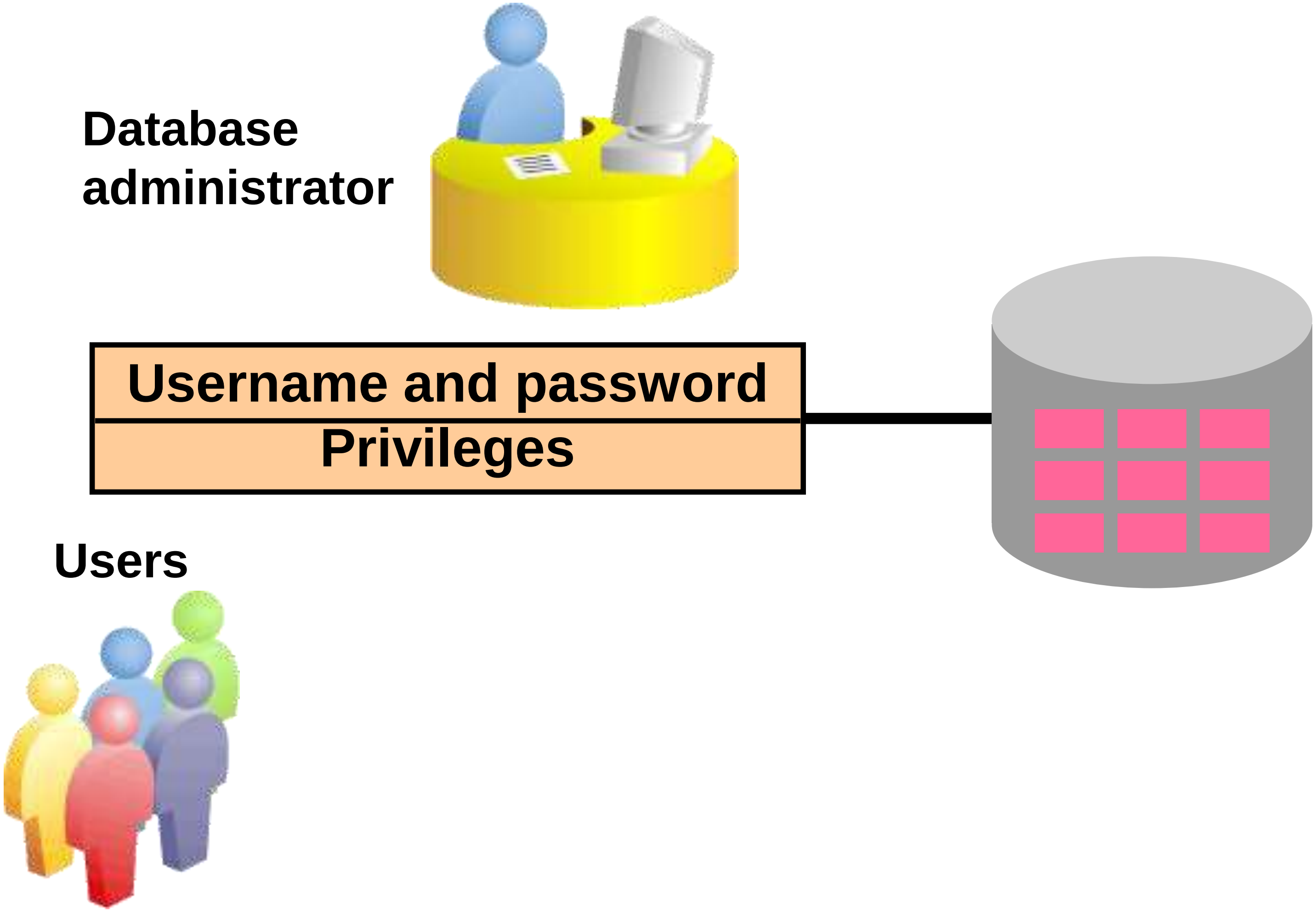
Controlling User Access

Objectives

After completing this lesson, you should be able to do the following:

- Differentiate system privileges from object privileges
- Grant privileges on tables
- View privileges in the data dictionary
- Grant roles
- Distinguish between privileges and roles

Controlling User Access



Database administrator

Username and password

Privileges

Users

Privileges

- Database security:
  - System security
  - Data security
- System privileges: Gaining access to the database
- Object privileges: Manipulating the content of the database objects
- Schemas: Collection of objects such as tables, views, and sequences

System Privileges

- More than 100 privileges are available.
- The database administrator has high-level system privileges for tasks such as:
  - Creating new users
  - Removing users
  - Removing tables
  - Backing up tables

Creating Users

The DBA creates users with the `CREATE USER` statement.

```
CREATE USER user
IDENTIFIED BY   password;
```

```
CREATE USER  HR
IDENTIFIED BY   HR;
User created.
```

User System Privileges

- After a user is created, the DBA can grant specific system privileges to that user.

```
GRANT privilege [, privilege...]
TO user [, user| role, PUBLIC...];
```

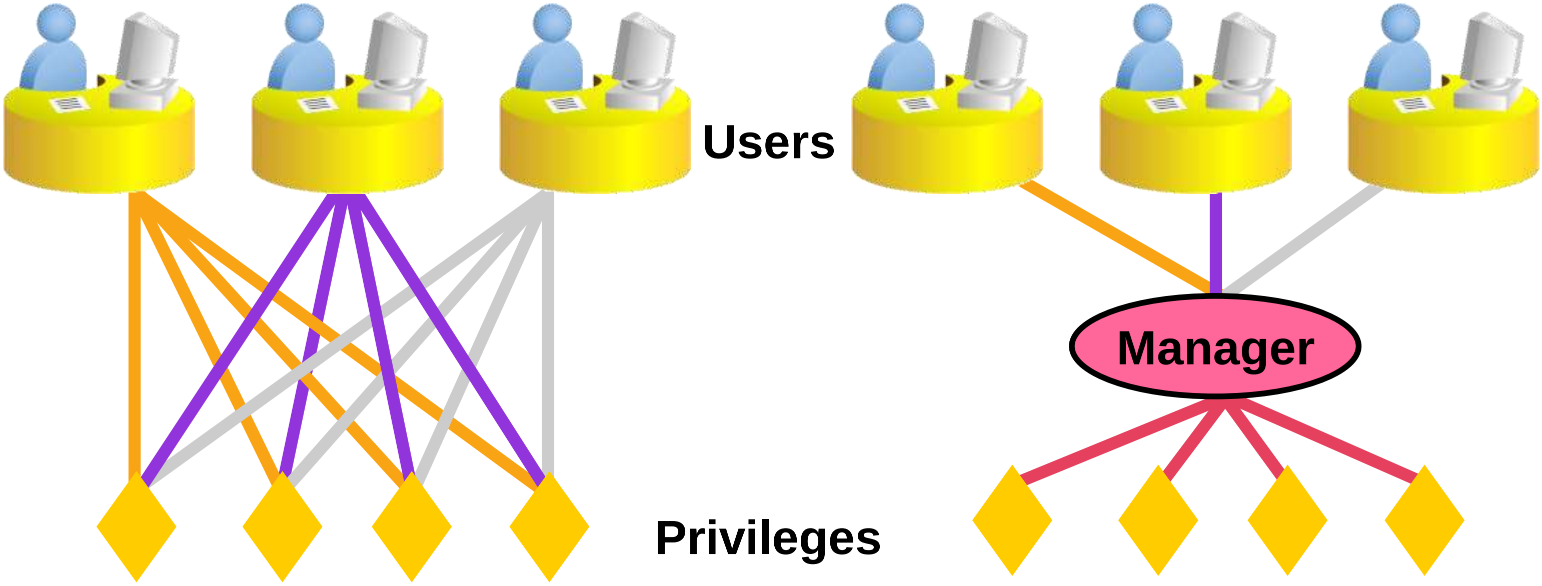
- An application developer, for example, may have the following system privileges:
  - `CREATE SESSION`
  - `CREATE TABLE`
  - `CREATE SEQUENCE`
  - `CREATE VIEW`
  - `CREATE PROCEDURE`

Granting System Privileges

The DBA can grant specific system privileges to a user.

```
GRANT  create session, create table,
       create sequence, create view
TO     scott;
Grant succeeded.
```

What Is a Role?



Allocating privileges without a role

Allocating privileges with a role

Creating and Granting Privileges to a Role

- Create a role

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

- Grant privileges to a role

```
GRANT create table, create view
TO manager;
Grant succeeded.
```

- Grant a role to users

```
GRANT manager TO DE HAAN, KOCHHAR;
Grant succeeded.
```

Changing Your Password

- The DBA creates your user account and initializes your password.
- You can change your password by using the **`ALTER USER`** statement.

```
ALTER USER HR
IDENTIFIED BY employ;
User altered.
```

Object Privileges

Object Privilege	Table	View	Sequence	Procedure
ALTER	√		√	
DELETE	√	√		
EXECUTE				√
INDEX	√			
INSERT	√	√		
REFERENCES	√			
SELECT	√	√	√	
UPDATE	√	√		

Object Privileges

- Object privileges vary from object to object.
- An owner has all the privileges on the object.
- An owner can give specific privileges on that owner’s object.

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

Granting Object Privileges

- Grant query privileges on the `EMPLOYEES` table.

```
GRANT   select
ON      employees
TO      sue, rich;
Grant succeeded.
```

- Grant privileges to update specific columns to users and roles.

```
GRANT   update (department_name, location_id)
ON      departments
TO      scott, manager;
Grant succeeded.
```

Passing On Your Privileges

- Give a user authority to pass along privileges.

```
GRANT  select, insert
ON     departments
TO     scott
WITH   GRANT OPTION;
Grant succeeded.
```

- Allow all users on the system to query data from Alice's `DEPARTMENTS` table.

```
GRANT  select
ON    alice.departments
TO    PUBLIC;
Grant succeeded.
```

Confirming Privileges Granted

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`	System privileges granted to the user

Revoking Object Privileges

- You use the `REVOKE` statement to revoke privileges granted to other users.
- Privileges granted to others through the `WITH GRANT OPTION` clause are also revoked.

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

Revoking Object Privileges

As user Alice, revoke the SELECT and INSERT privileges given to user Scott on the DEPARTMENTS table.

```
REVOKE  select, insert
ON      departments
FROM    scott;
Revoke succeeded.
```

Summary

In this lesson, you should have learned about statements that control access to the database and database objects.

Statement	Action
`CREATE USER`	Creates a user (usually performed by a DBA)
`GRANT`	Gives other users privileges to access the objects
`CREATE ROLE`	Creates a collection of privileges (usually performed by a DBA)
`ALTER USER`	Changes a user’s password
`REVOKE`	Removes privileges on an object from users

Practice 1: Overview

This practice covers the following topics:

- Granting other users privileges to your table
- Modifying another user’s table through the privileges granted to you
- Creating a synonym
- Querying the data dictionary views related to privileges