8

Administering User Security

Objectives

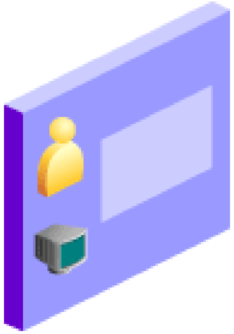
After completing this lesson, you should be able to:

- Create and manage database user accounts:
  - Authenticate users
  - Assign default storage areas (tablespaces)
- Grant and revoke privileges
- Create and manage roles
- Create and manage profiles:
  - Implement standard password security features
  - Control resource usage by users

Database User Accounts

Each database user account has:

- A unique username
- An authentication method
- A default tablespace
- A temporary tablespace
- A user profile
- An initial consumer group
- An account status



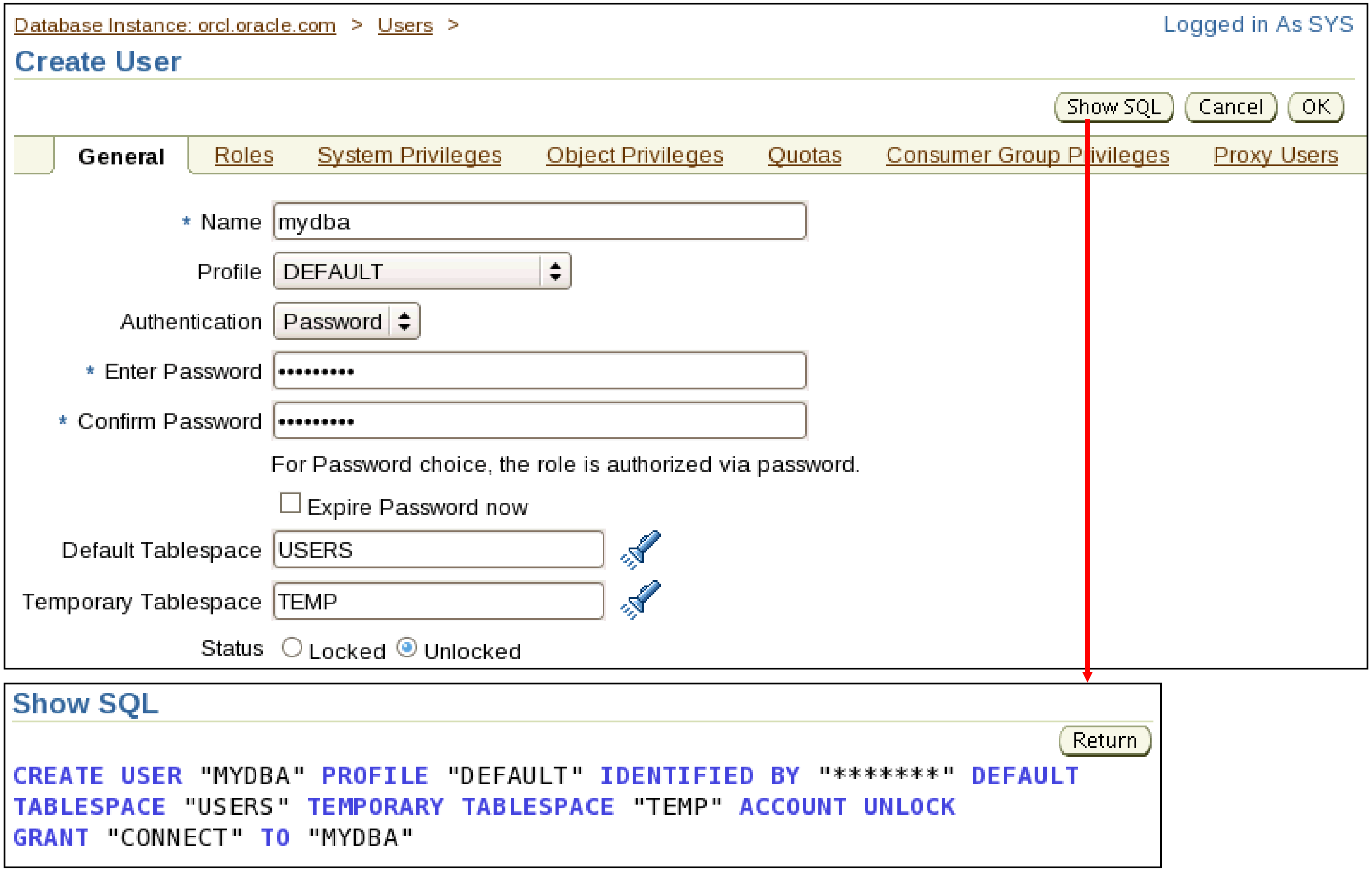
A schema:

- Is a collection of database objects that are owned by a database user
- Has the same name as the user account

Predefined Administrative Accounts

- SYS account:
  - Is granted the DBA role, as well as several other roles.
  - Has all privileges with ADMIN OPTION
  - Is required for startup, shutdown, and some maintenance commands
  - Owns the data dictionary and the Automatic Workload Repository (AWR)
- SYSTEM account is granted the DBA, MGMT_USER, and AQ_ADMINISTRATOR_ROLE roles.
- DBSNMP account is granted the OEM_MONITOR role.
- SYSMAN account is granted the MGMT_USER, RESOURCE and SELECT_CATALOG_ROLE roles.
- These accounts are not used for routine operations.

Creating a User



Create User

* Name: mydba

Profile: DEFAULT

Authentication: Password

* Enter Password: ••••••••••

* Confirm Password: ••••••••••

For Password choice, the role is authorized via password.

□ Expire Password now

Default Tablespace: USERS

Temporary Tablespace: TEMP

Status: ○ Locked ● Unlocked

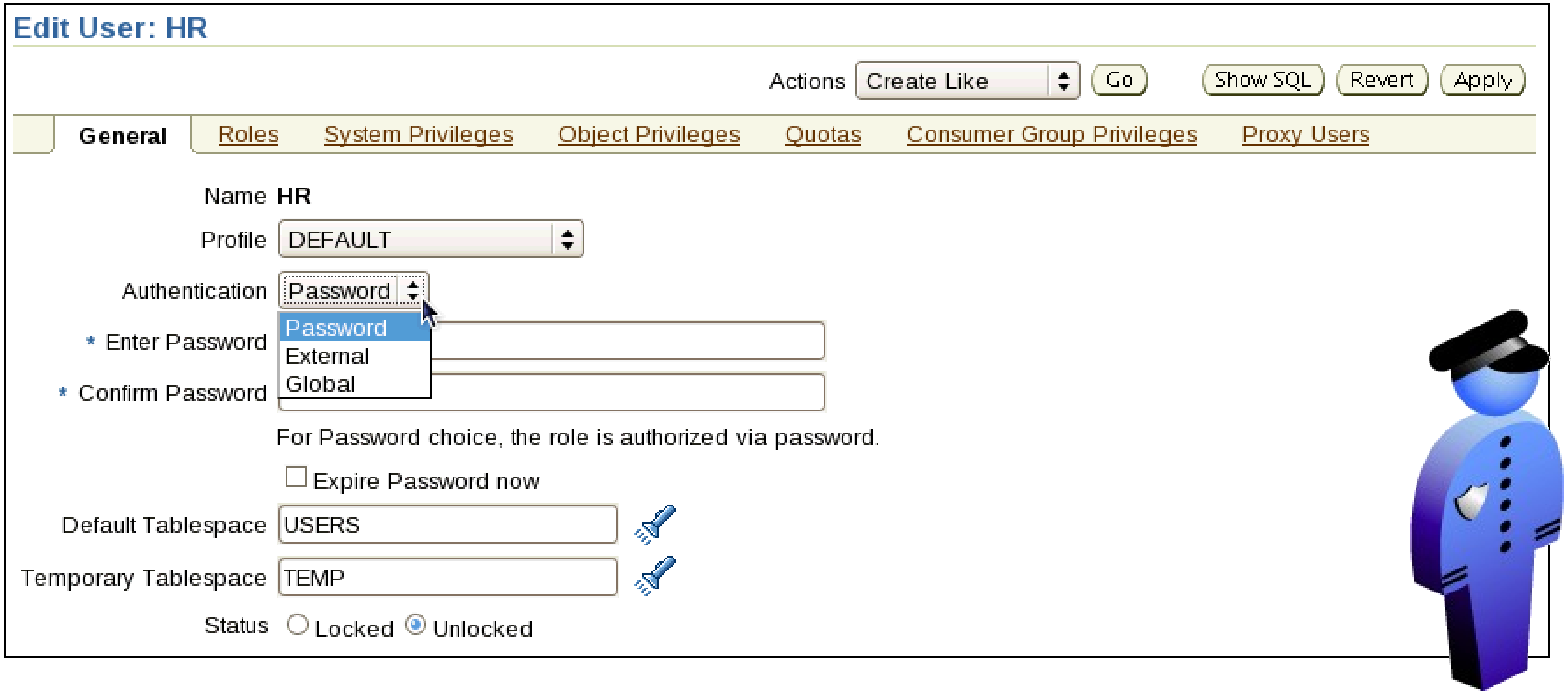
Show SQL

```
CREATE USER "MYDBA" PROFILE "DEFAULT" IDENTIFIED BY "*******" DEFAULT
TABLESPACE "USERS" TEMPORARY TABLESPACE "TEMP" ACCOUNT UNLOCK
GRANT "CONNECT" TO "MYDBA"
```

Select Server > Users, and then click the Create button.

Authenticating Users

- Password
- External
- Global



Edit User: HR

Actions: Create Like

Name **HR**

Profile DEFAULT

Authentication Password

* Enter Password

* Confirm Password

For Password choice, the role is authorized via password.

□ Expire Password now

Default Tablespace USERS

Temporary Tablespace TEMP

Status ○ Locked ● Unlocked

Administrator Authentication

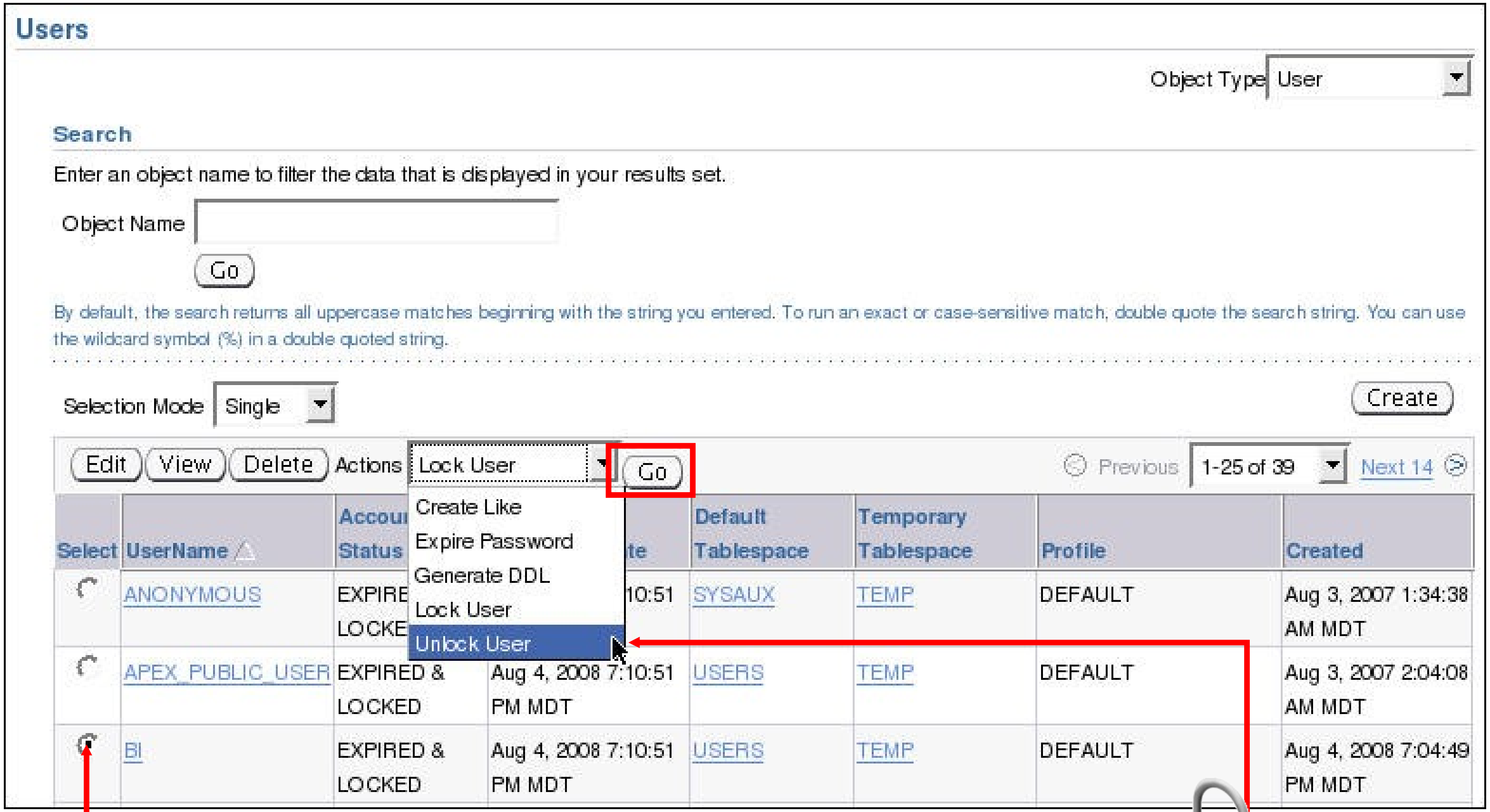
Operating system security:

- DBAs must have the OS privileges to create and delete files.
- Typical database users should not have the OS privileges to create or delete database files.

Administrator security:

- For `SYSDBA`, `SYSOPER`, and `SYSASM` connections:
  - DBA user by name is audited for password file and strong authentication methods
  - OS account name is audited for OS authentication
  - OS authentication takes precedence over password file authentication for privileged users
  - Password file uses case-sensitive passwords

Unlocking a User Account and Resetting the Password



Users

Object Type: User

Search

Enter an object name to filter the data that is displayed in your results set.

Object Name:

By default, the search returns all uppercase matches beginning with the string you entered. To run an exact or case-sensitive match, double quote the search string. You can use the wildcard symbol (%) in a double quoted string.

Selection Mode: Single

Actions: Lock User

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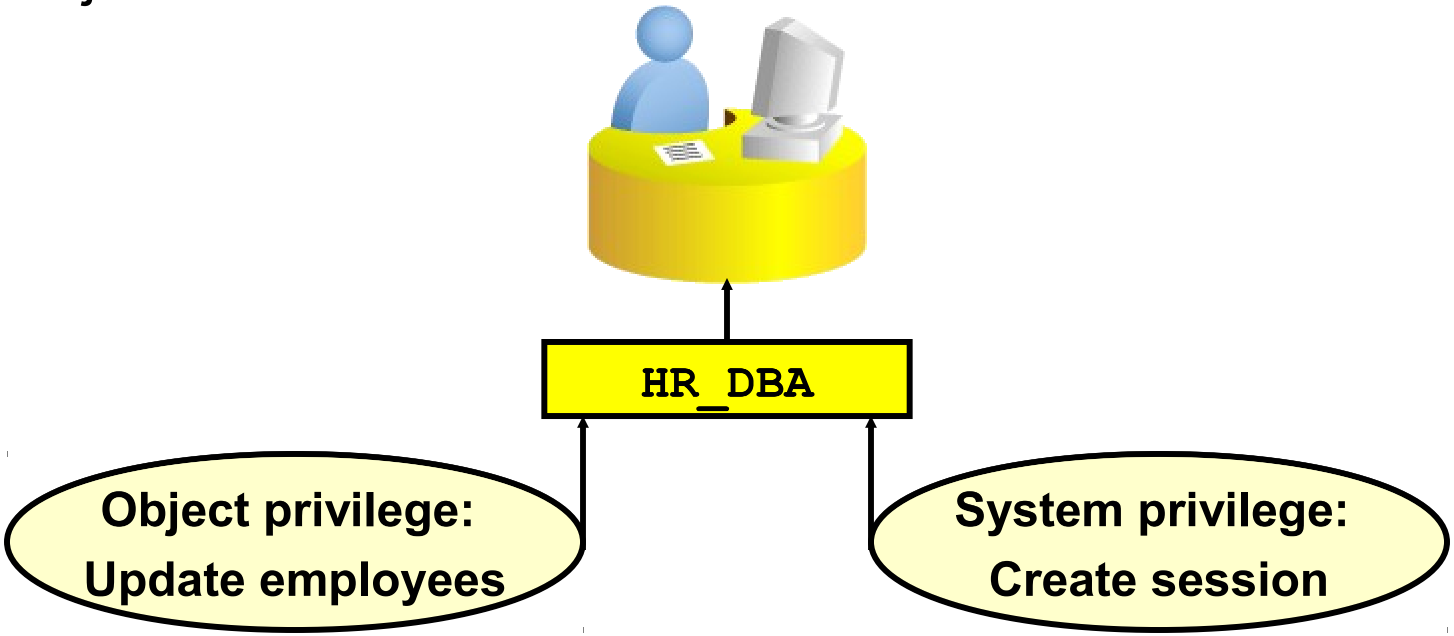
Select	UserName	Accou Status	te	Default Tablespace	Temporary Tablespace	Profile	Created
○	ANONYMOUS	EXPIRE LOCKE	10:51	SYSAUX	TEMP	DEFAULT	Aug 3, 2007 1:34:38 AM MDT
○	APEX_PUBLIC_USER	EXPIRED & LOCKED	Aug 4, 2008 7:10:51 PM MDT	USERS	TEMP	DEFAULT	Aug 3, 2007 2:04:08 AM MDT
●	BI	EXPIRED & LOCKED	Aug 4, 2008 7:10:51 PM MDT	USERS	TEMP	DEFAULT	Aug 4, 2008 7:04:49 PM MDT

Select the user, select Unlock User, and click Go.

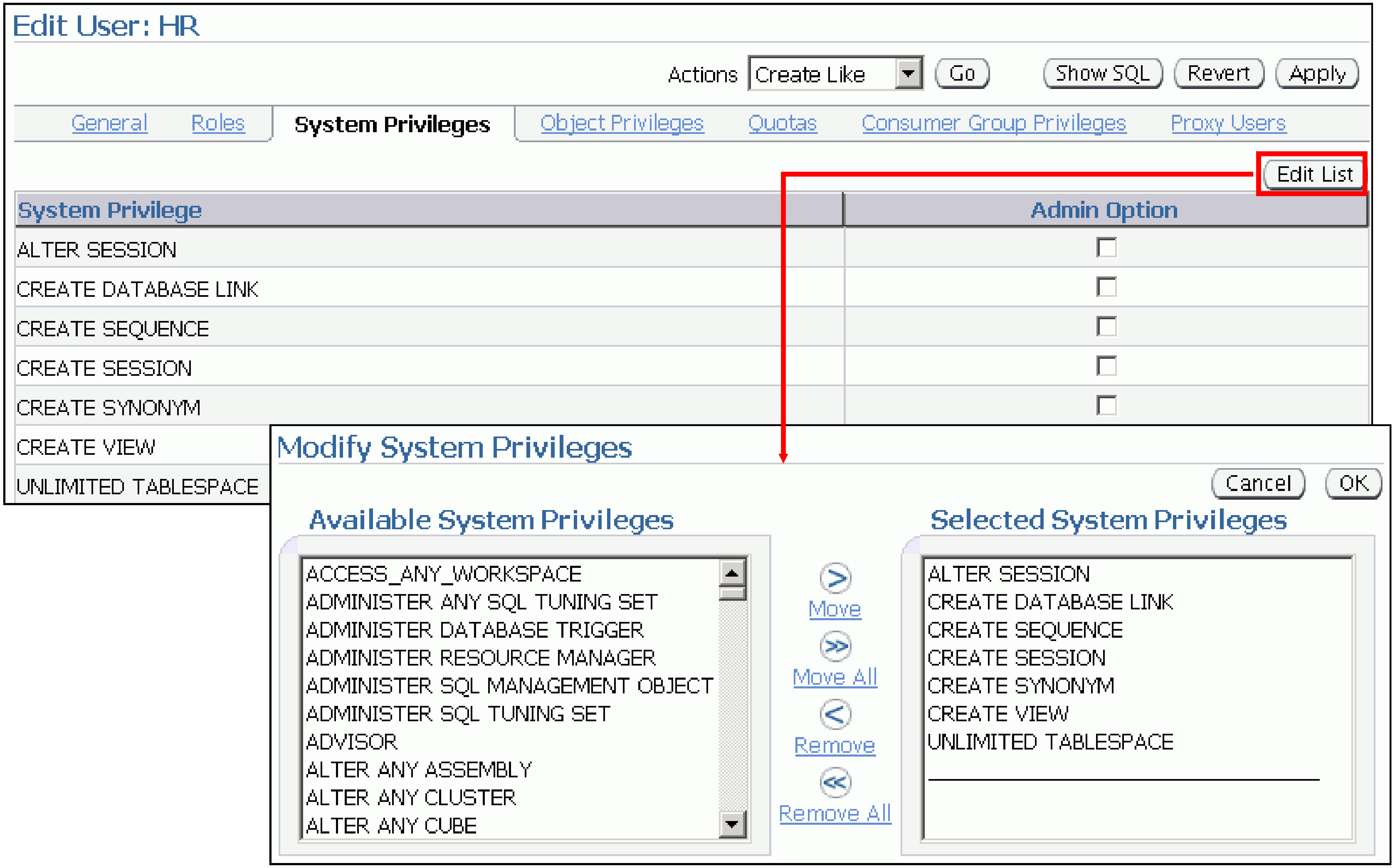
Privileges

There are two types of user privileges:

- System: Enables users to perform particular actions in the database
- Object: Enables users to access and manipulate a specific object



System Privileges



Edit User: HR

Actions: Create Like

System Privilege	Admin Option
ALTER SESSION	□
CREATE DATABASE LINK	□
CREATE SEQUENCE	□
CREATE SESSION	□
CREATE SYNONYM	□
CREATE VIEW	
UNLIMITED TABLESPACE	

Modify System Privileges

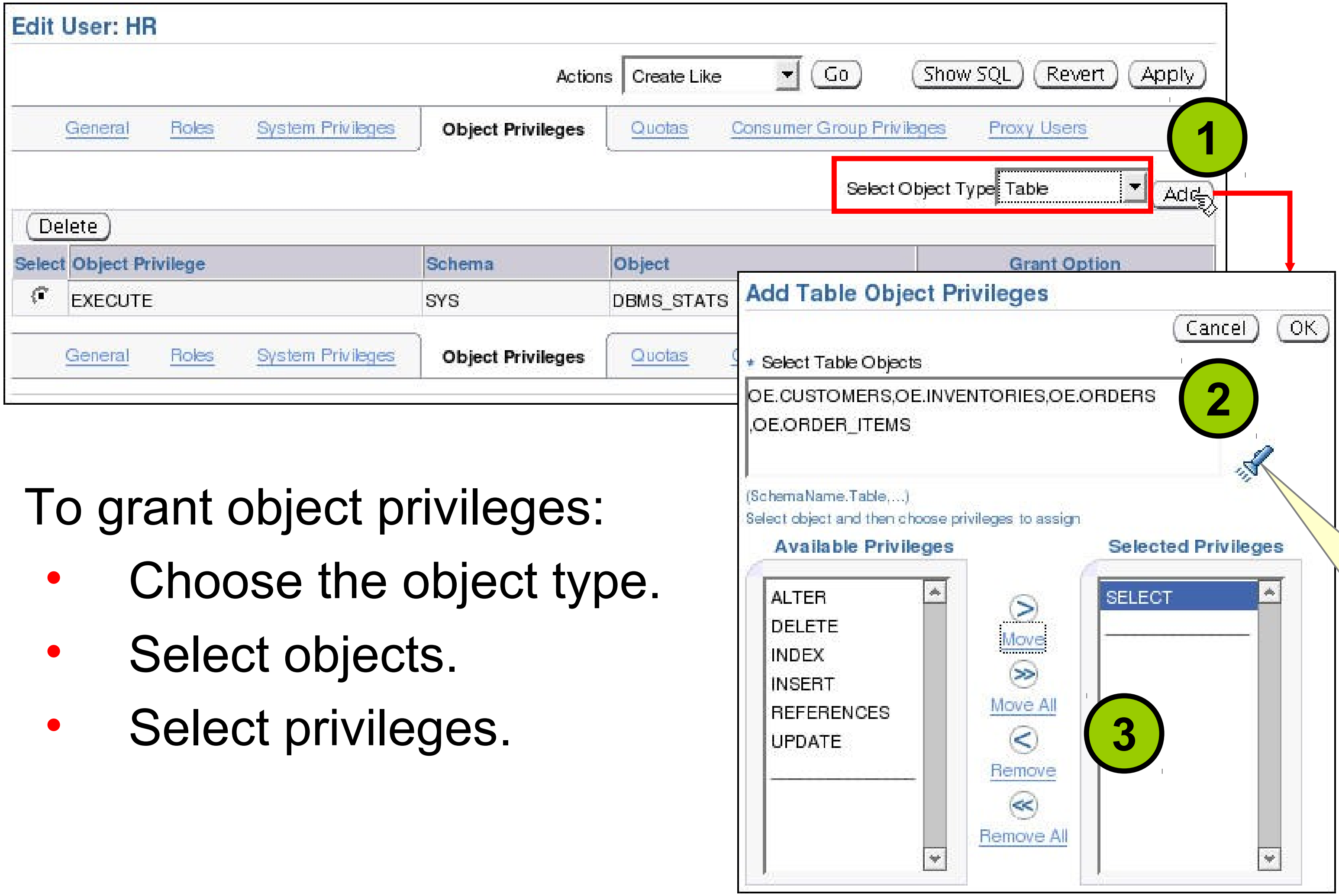
Available System Privileges

ACCESS_ANY_WORKSPACE
ADMINISTER ANY SQL TUNING SET
ADMINISTER DATABASE TRIGGER
ADMINISTER RESOURCE MANAGER
ADMINISTER SQL MANAGEMENT OBJECT
ADMINISTER SQL TUNING SET
ADVISOR
ALTER ANY ASSEMBLY
ALTER ANY CLUSTER
ALTER ANY CUBE

Selected System Privileges

ALTER SESSION
CREATE DATABASE LINK
CREATE SEQUENCE
CREATE SESSION
CREATE SYNONYM
CREATE VIEW
UNLIMITED TABLESPACE

Object Privileges



Edit User: HR

Actions: Create Like | Go | Show SQL | Revert | Apply

General | Roles | System Privileges | **Object Privileges** | Quotas | Consumer Group Privileges | Proxy Users

Select Object Type: Table | Add

Delete

Select	Object Privilege	Schema	Object	Grant Option
●	EXECUTE	SYS	DBMS_STATS	

General | Roles | System Privileges | **Object Privileges** | Quotas

Add Table Object Privileges

Cancel | OK

* Select Table Objects

OE.CUSTOMERS,OE.INVENTORIES,OE.ORDERS,OE.ORDER_ITEMS

(SchemaName.Table,...)
Select object and then choose privileges to assign

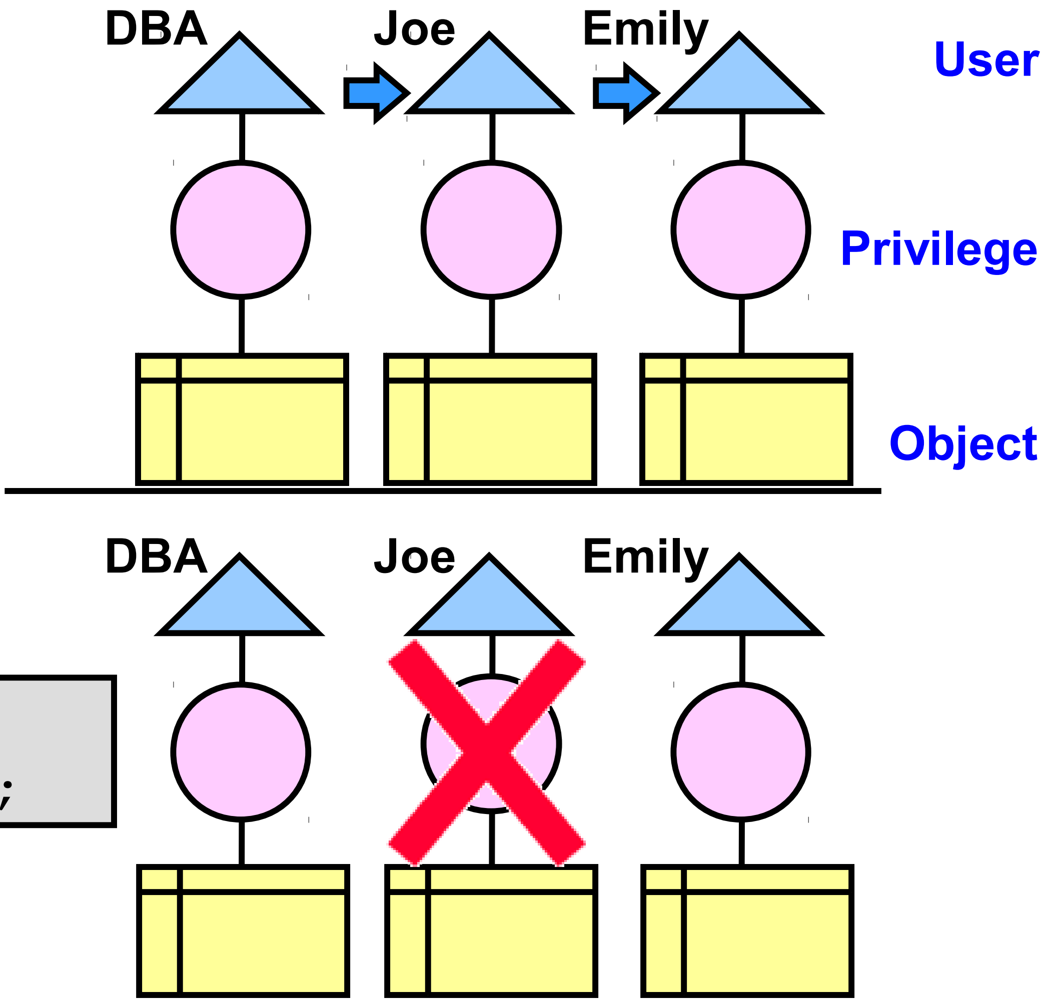
Available Privileges		Selected Privileges
ALTER DELETE INDEX INSERT REFERENCES UPDATE	Move Move All Remove Remove All	SELECT

Search and select objects.

To grant object privileges:

- Choose the object type.
- Select objects.
- Select privileges.

Revoking System Privileges with ADMIN OPTION

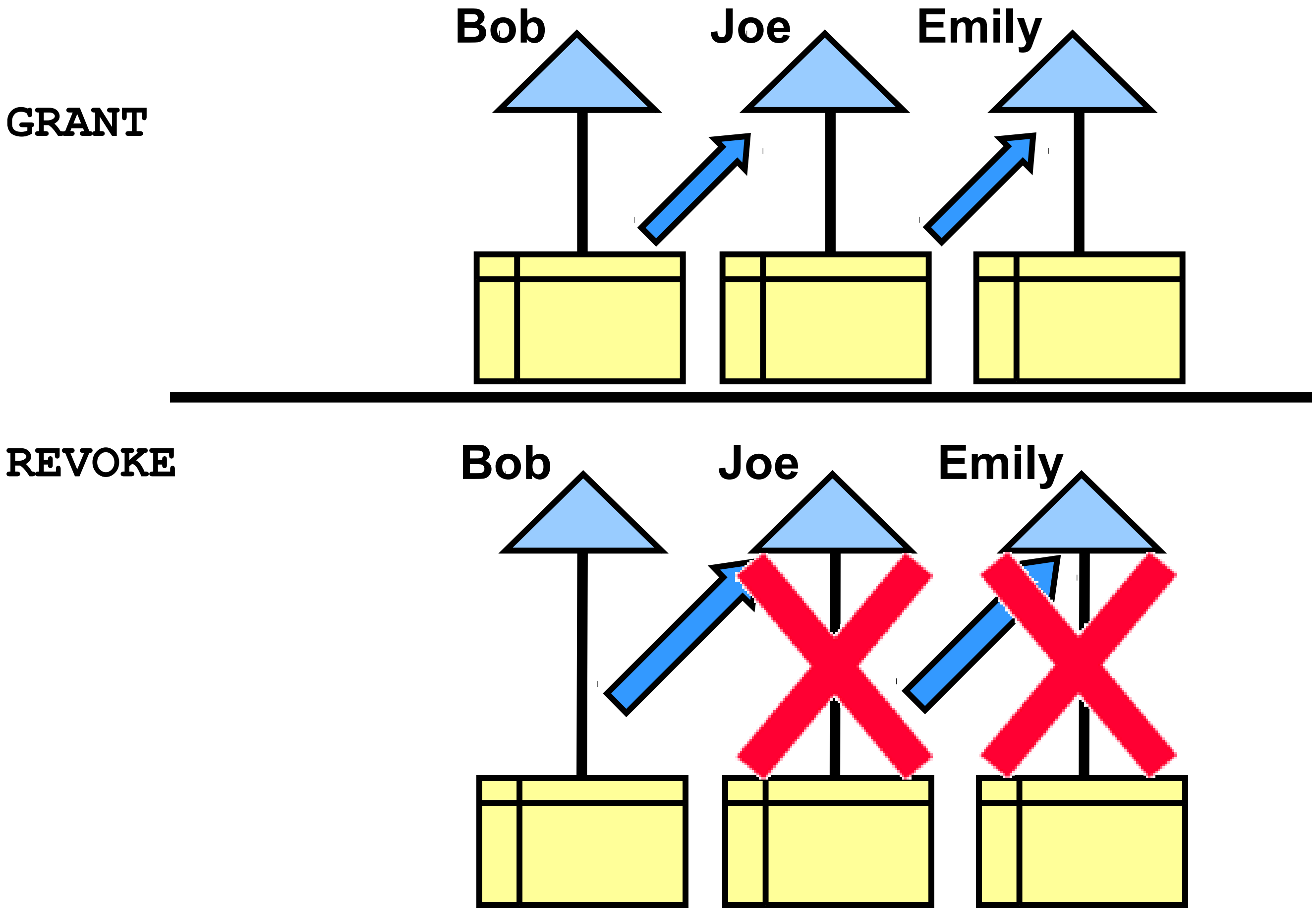


GRANT

REVOKE

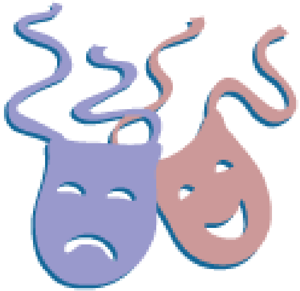
```
REVOKE CREATE
TABLE FROM joe;
```

Revoking Object Privileges with GRANT OPTION

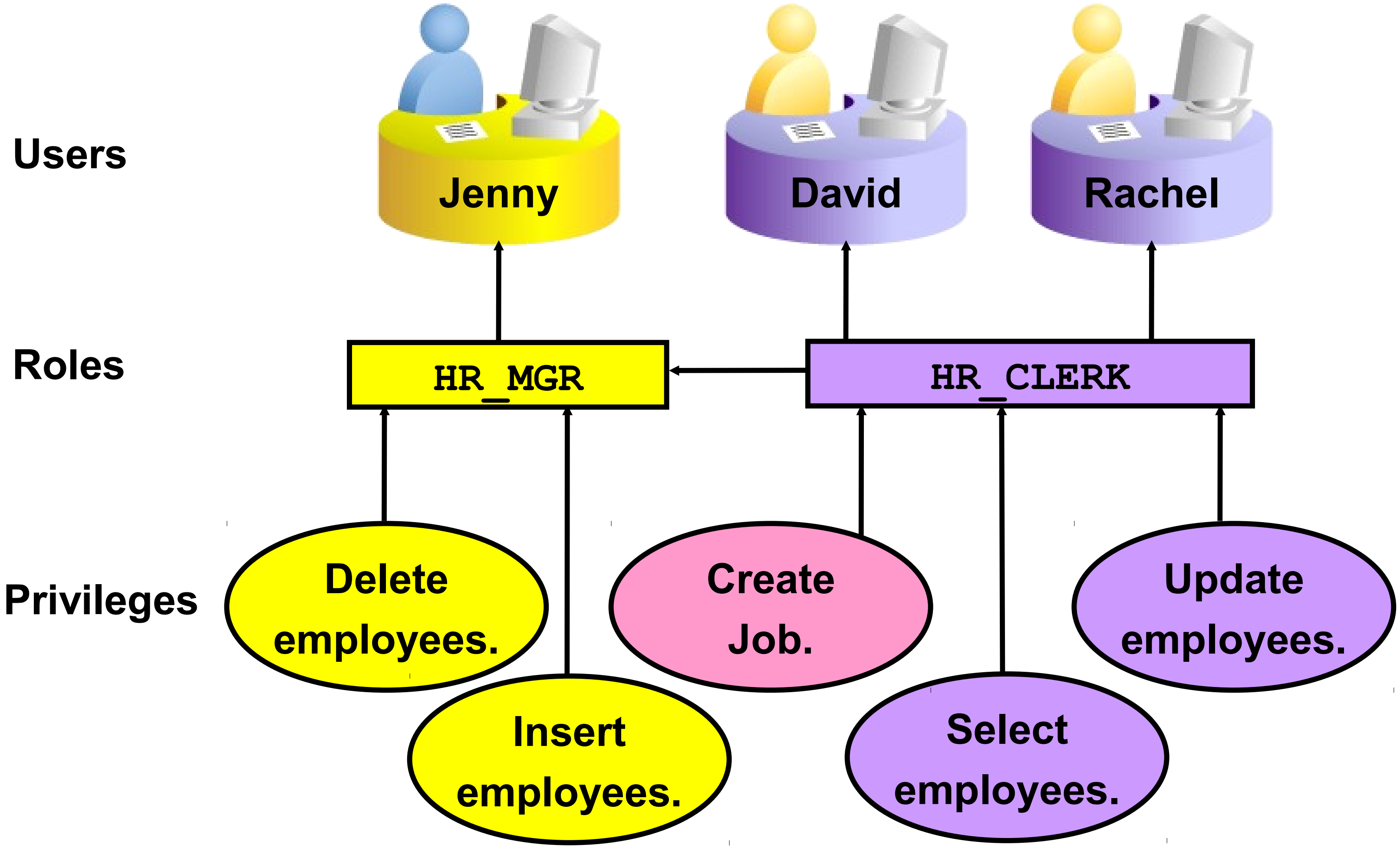


Benefits of Roles

- Easier privilege management
- Dynamic privilege management
- Selective availability of privileges



Assigning Privileges to Roles and Assigning Roles to Users

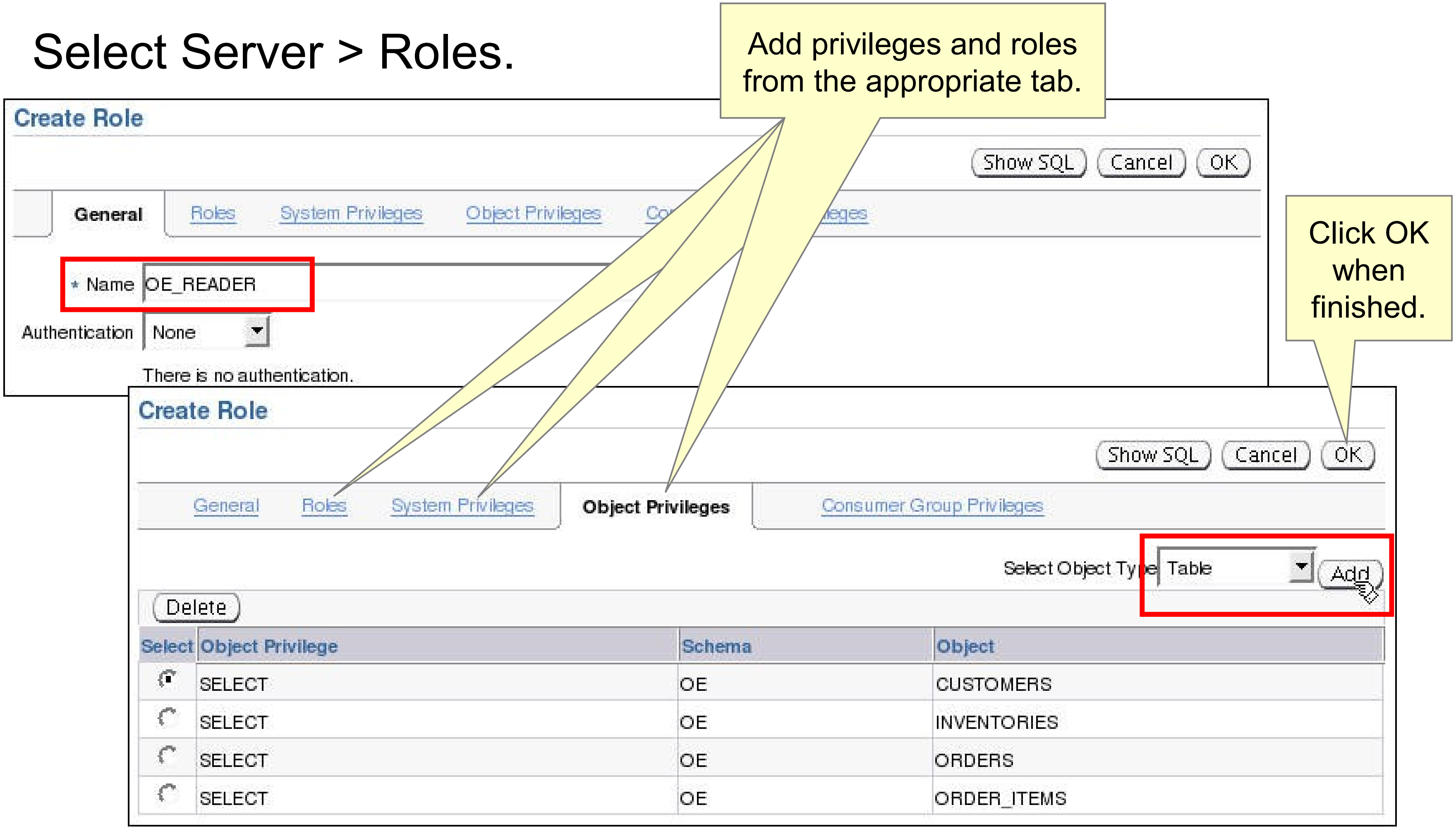


Predefined Roles

Role	Privileges Included
CONNECT	CREATE SESSION
RESOURCE	CREATE CLUSTER, CREATE INDEXTYPE, CREATE OPERATOR, CREATE PROCEDURE, CREATE SEQUENCE, CREATE TABLE, CREATE TRIGGER, CREATE TYPE
SCHEDULER_ ADMIN	CREATE ANY JOB, CREATE EXTERNAL JOB, CREATE JOB, EXECUTE ANY CLASS, EXECUTE ANY PROGRAM, MANAGE SCHEDULER
DBA	Most system privileges; several other roles. Do not grant to nonadministrators.
SELECT_ CATALOG_ROLE	No system privileges; HS_ADMIN_ROLE and over 1,700 object privileges on the data dictionary

Creating a Role

Select Server > Roles.



* Name	OE_READER
Authentication	None

There is no authentication.

Select Object Type Table

Select	Object Privilege	Schema	Object
●	SELECT	OE	CUSTOMERS
○	SELECT	OE	INVENTORIES
○	SELECT	OE	ORDERS
○	SELECT	OE	ORDER_ITEMS

Add privileges and roles from the appropriate tab.

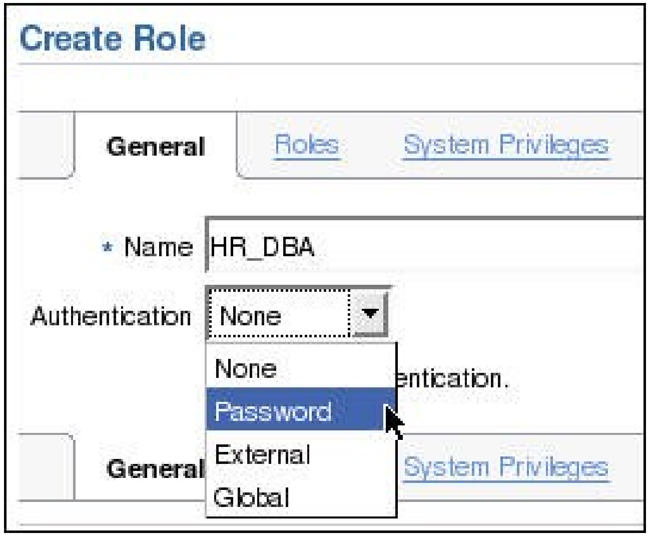
Click OK when finished.

Secure Roles

- Roles can be nondefault and enabled when required.

```
SET ROLE vacationdba;
```

- Roles can be protected through authentication.



Create Role

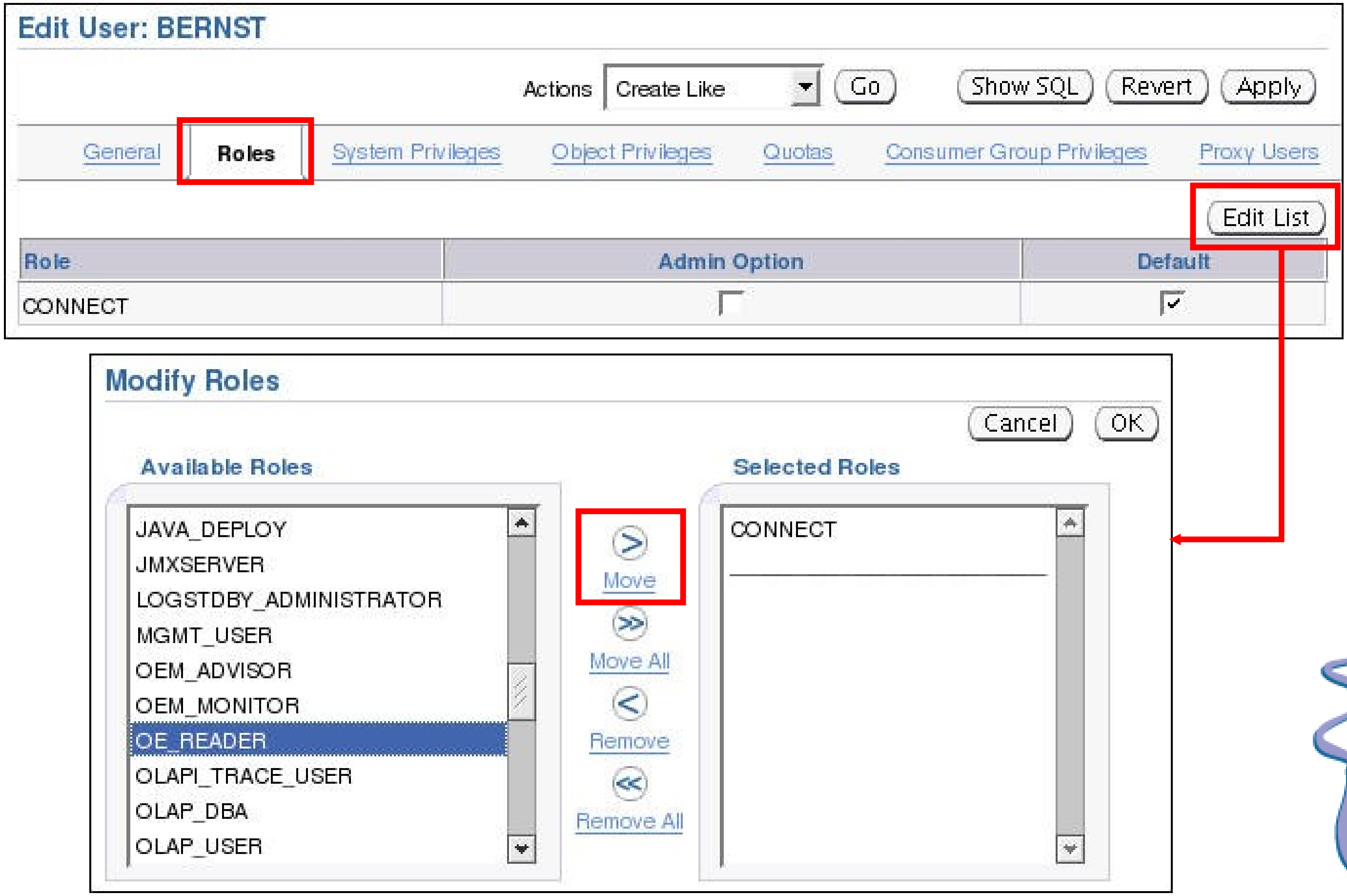
* Name HR_DBA

Authentication None

- Roles can also be secured programmatically.

```
CREATE ROLE secure_application_role
IDENTIFIED USING <security_procedure_name>;
```

Assigning Roles to Users



Edit User: BERNST

Actions: Create Like

Role	Admin Option	Default
CONNECT	□	☑

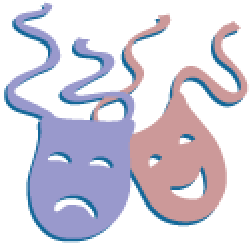
Modify Roles

Available Roles

- JAVA_DEPLOY
- JMXSERVER
- LOGSTDBY_ADMINISTRATOR
- MGMT_USER
- OEM_ADVISOR
- OEM_MONITOR
- OE_READER
- OLAPI_TRACE_USER
- OLAP_DBA
- OLAP_USER

Selected Roles

- CONNECT



Quiz

All passwords created in Oracle Database 11*g* are not case-sensitive by default.

1. True
2. False

Quiz

A database role:

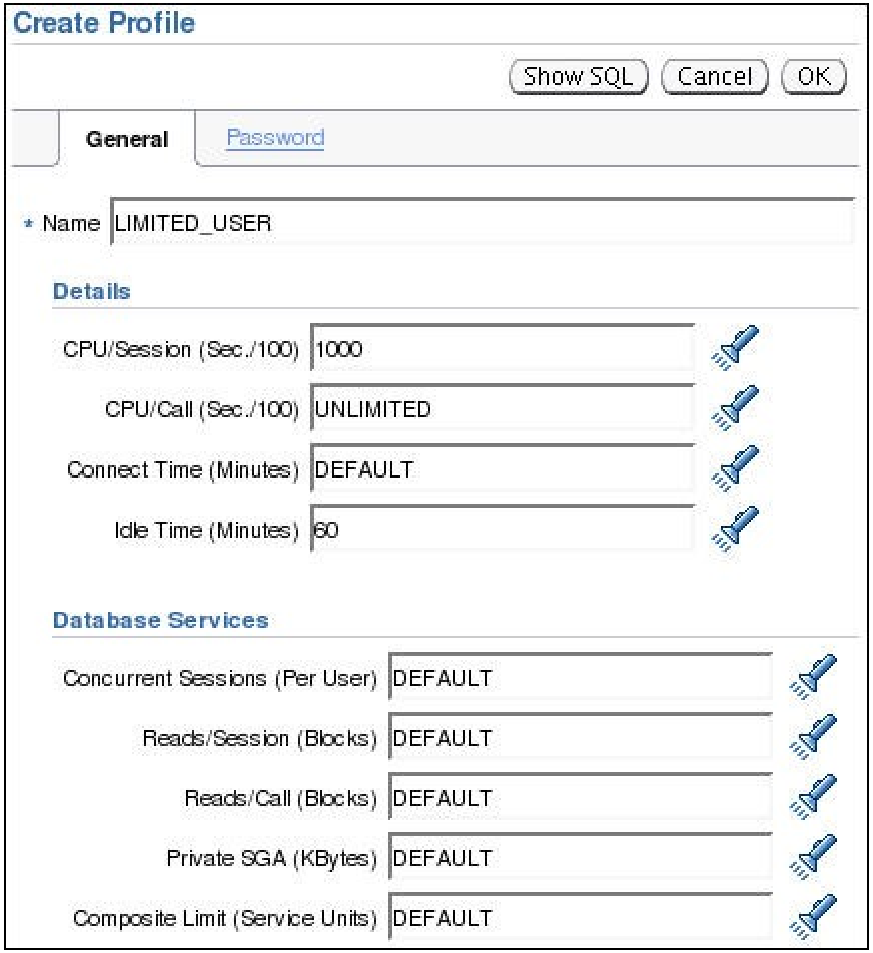
1. Can be enabled or disabled
2. Can consist of system and object privileges
3. Is owned by its creator
4. Cannot be protected by a password

Profiles and Users

Users are assigned only one profile at a time.

Profiles:

- Control resource consumption
- Manage account status and password expiration



Create Profile

* Name LIMITED_USER

Details

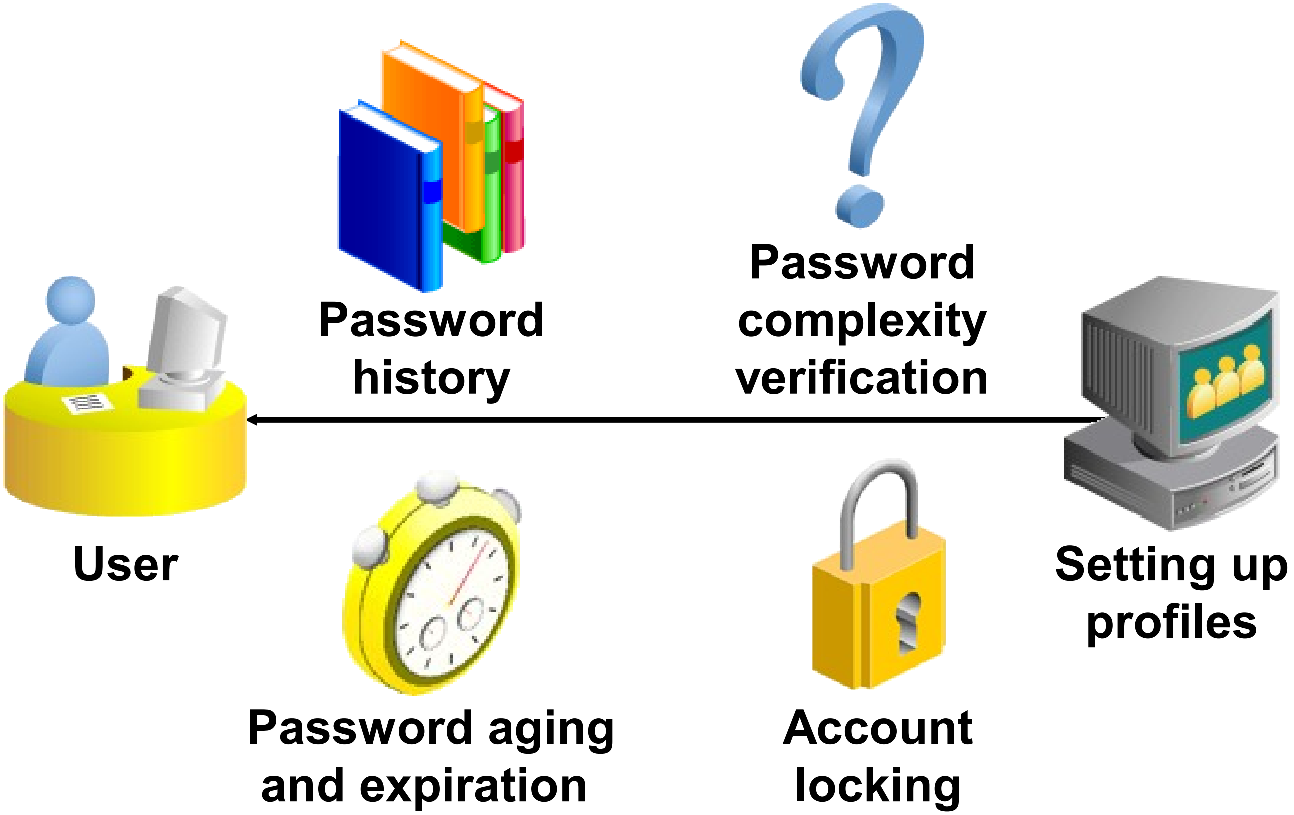
CPU/Session (Sec./100)	1000
CPU/Call (Sec./100)	UNLIMITED
Connect Time (Minutes)	DEFAULT
Idle Time (Minutes)	60

Database Services

Concurrent Sessions (Per User)	DEFAULT
Reads/Session (Blocks)	DEFAULT
Reads/Call (Blocks)	DEFAULT
Private SGA (KBytes)	DEFAULT
Composite Limit (Service Units)	DEFAULT

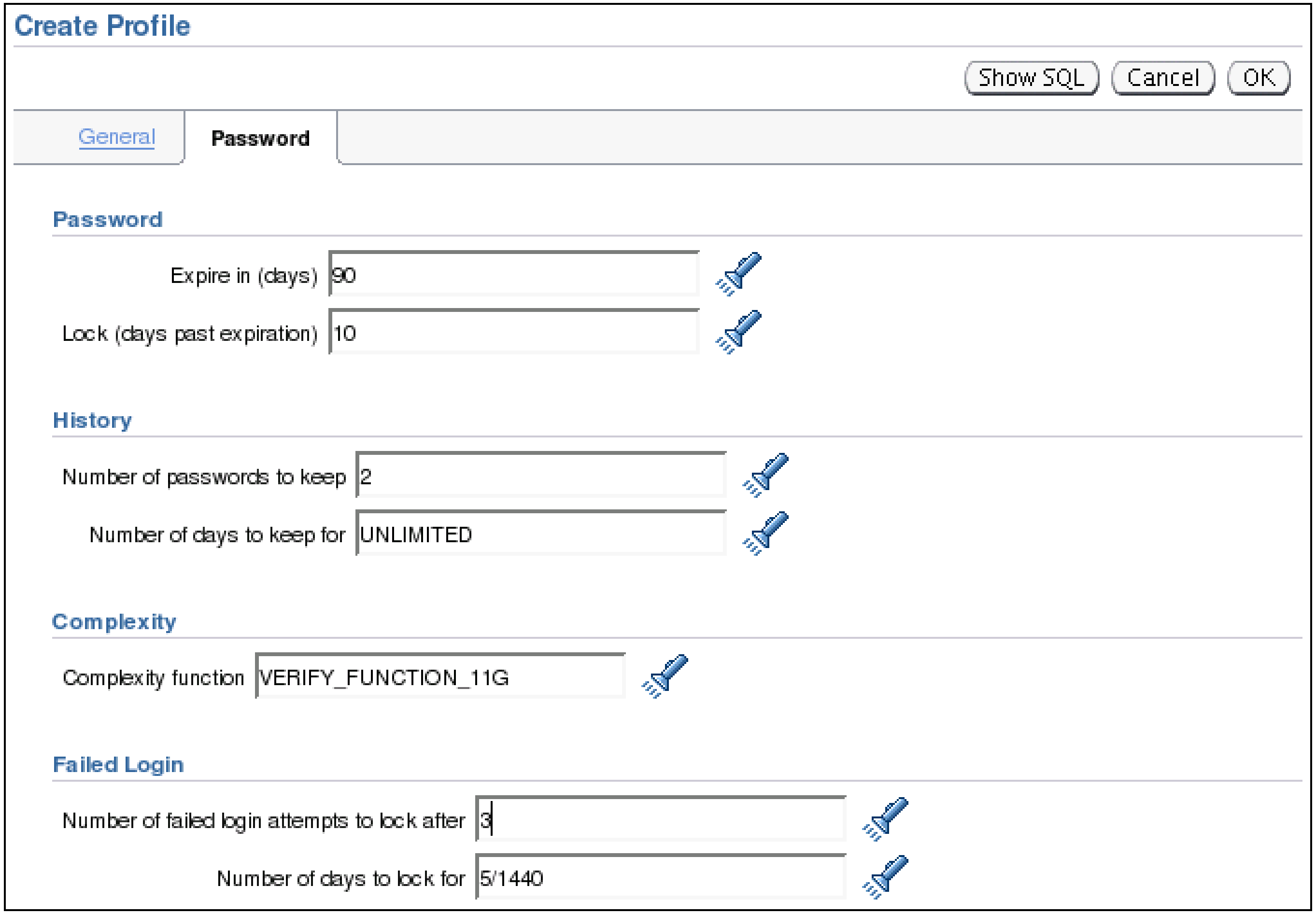
Note: `RESOURCE_LIMIT` must be set to `TRUE` before profiles can impose resource limitations.

Implementing Password Security Features


Password history
Password complexity verification
User
Setting up profiles
Password aging and expiration
Account locking

Note: Do not use profiles that cause the `SYS`, `SYSMAN`, and `DBSNMP` passwords to expire and the accounts to be locked.

Creating a Password Profile



Password

Expire in (days)	90
Lock (days past expiration)	10

History

Number of passwords to keep	2
Number of days to keep for	UNLIMITED

Complexity

Complexity function	VERIFY_FUNCTION_11G

Failed Login

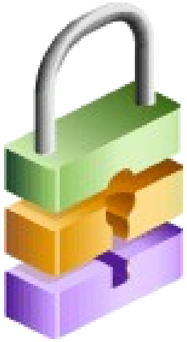
Number of failed login attempts to lock after	3
Number of days to lock for	5/1440

Supplied Password Verification Function: VERIFY_FUNCTION_11G

The VERIFY_FUNCTION_11G function insures that the password is:

- At least eight characters
- Different from the username, username with a number, or username reversed
- Different from the database name or the database name with a number
- A string with at least one alphabetic and one numeric character
- Different from the previous password by at least three letters

Tip: Use this function as a template to create your own customized password verification.

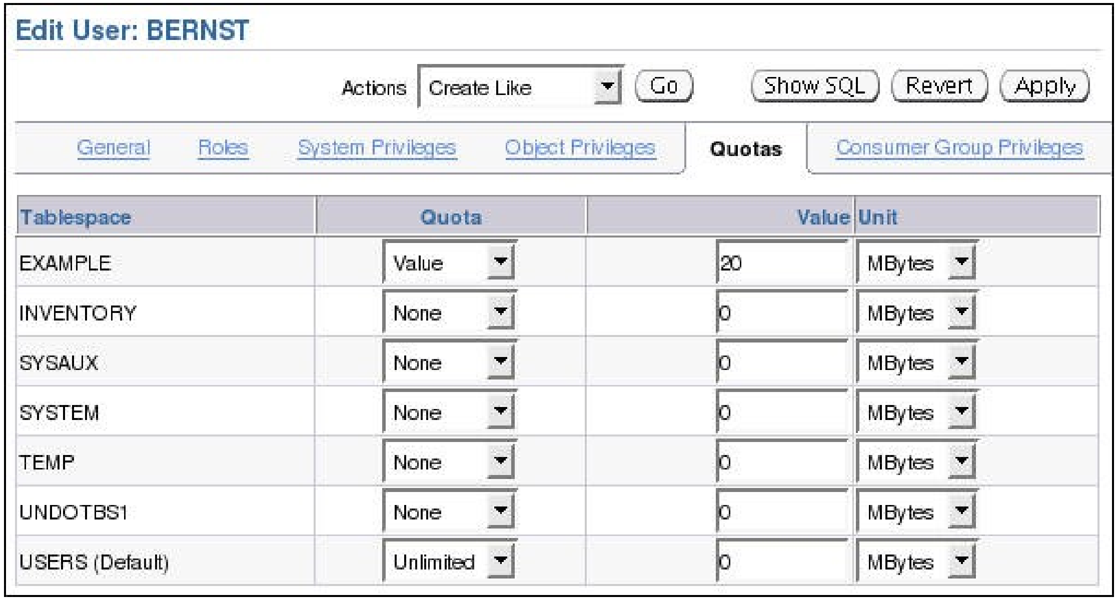


Assigning Quotas to Users

Users who do not have the `UNLIMITED TABLESPACE` system privilege must be given a quota before they can create objects in a tablespace.

Quotas can be:

- A specific value in megabytes or kilobytes
- Unlimited



Tablespace	Quota	Value	Unit
EXAMPLE	Value	20	MBytes
INVENTORY	None	0	MBytes
SYSAUX	None	0	MBytes
SYSTEM	None	0	MBytes
TEMP	None	0	MBytes
UNDOTBS1	None	0	MBytes
USERS (Default)	Unlimited	0	MBytes

Applying the Principle of Least Privilege

- Protect the data dictionary:

```
O7_DICTIONARY_ACCESSIBILITY=FALSE
```

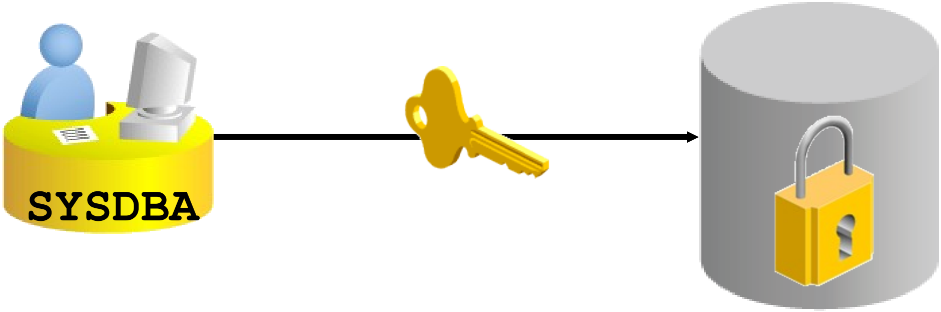
- Revoke unnecessary privileges from `PUBLIC`.
- Use access control lists (ACL) to control network access.
- Restrict the directories accessible by users.
- Limit users with administrative privileges.
- Restrict remote database authentication:

```
REMOTE_OS_AUTHENT=FALSE
```

Protect Privileged Accounts

Privileged accounts can be protected by:

- Using password file with case-sensitive passwords
- Enabling strong authentication for administrator roles



Quiz

Applying the principle of least privilege is not enough to harden the Oracle database.

1. True
2. False

Quiz

With RESOURCE_LIMIT set at its default value of FALSE, profile password limitations are ignored.

1. True
2. False

Summary

In this lesson, you should have learned how to:

- Create and manage database user accounts:
  - Authenticate users
  - Assign default storage areas (tablespaces)
- Grant and revoke privileges
- Create and manage roles
- Create and manage profiles:
  - Implement standard password security features
  - Control resource usage by users

Practice 8 Overview: Administering Users

This practice covers the following topics:

- Creating a profile to limit resource consumption
- Creating two roles:
  - `HRCLERK`
  - `HRMANAGER`
- Creating four new users:
  - One manager and two clerks
  - One schema user for the next practice session