

# 10

**PL/SQL**

ORACLE

# Objectives

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

- **Identify PL/SQL objects**
- **Describe triggers and triggering events**
- **Identify configuration options that affect PL/SQL performance**

# PL/SQL

**Procedural Language/Structured Query Language (PL/SQL) is a fourth generation (4GL) programming language. PL/SQL provides:**

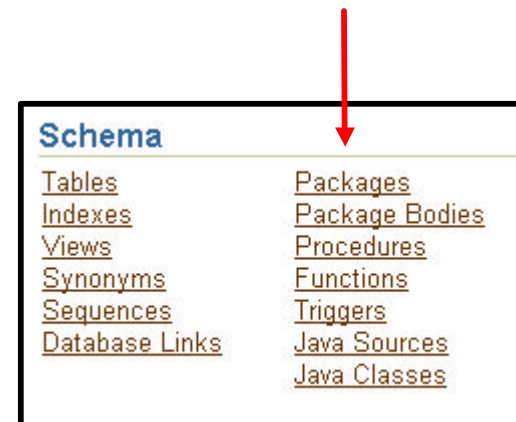
- **Procedural extensions to SQL**
- **Portability across platforms and products**
- **Support for object-oriented programming**



# Administering PL/SQL Objects

Database administrators should be able to:

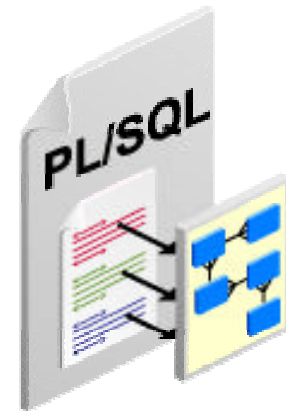
- Identify problem PL/SQL objects
- Recommend appropriate use of PL/SQL
- Load PL/SQL objects into the database
- Assist PL/SQL developers in troubleshooting



# PL/SQL Objects

**There are many types of PL/SQL database objects:**

- **Package**
- **Package body**
- **Type body**
- **Procedure**
- **Function**
- **Trigger**



# Functions

Database: [orcl.us.oracle.com](#) > Functions

Logged in As RIC

## Functions

### Search

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type  Schema  Object Name

To run an exact match search or to run a case sensitive search, double quote the search criteria. The wildcard (%) symbol can still be used in a double quoted search string.

### Results

Select	Schema	Function Name	Created	Last Modified	Status
	No search conducted				

Create

Database: [orcl.us.oracle.com](#) > Functions > Create Function

Logged in As RIC

## Create Function

Show SQL Cancel OK

\* Name

\* Schema

\* Source

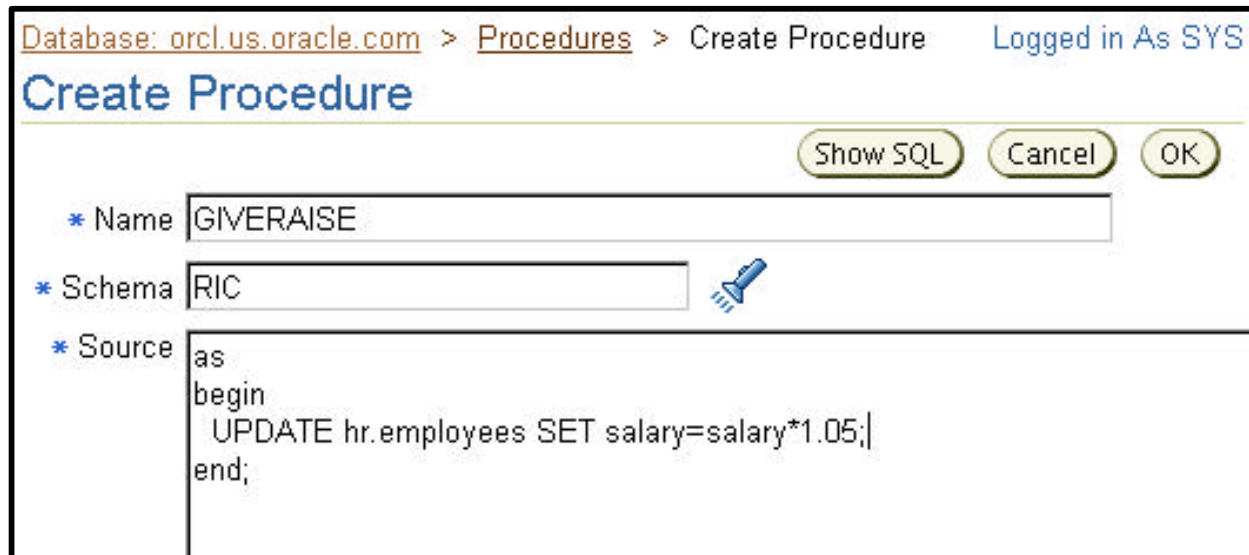
```
( salary NUMBER )  
RETURN NUMBER  
AS  
BEGIN  
  IF salary<5000 THEN  
    RETURN salary*.15;  
  ELSE  
    RETURN salary*.33;  
  END IF;  
END;
```

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# Procedures

**Procedures are used to perform a specific action.**  
**Procedures:**

- **Transfer values in and out through an argument list**
- **Are called with the `CALL` command**



The screenshot shows the 'Create Procedure' dialog box in Oracle SQL Developer. The title bar indicates the database is 'orcl.us.oracle.com', the path is 'Procedures > Create Procedure', and the user is 'Logged in As SYS'. The dialog has three buttons: 'Show SQL', 'Cancel', and 'OK'. It contains three fields: 'Name' with the value 'GIVERAISE', 'Schema' with the value 'RIC' (marked with a lock icon), and 'Source' with the following SQL code:

```
as  
begin  
  UPDATE hr.employees SET salary=salary*1.05;  
end;
```

# Packages

**Packages are collections of functions and procedures. Each package should consist of two objects:**


- **Package specification**
- **Package body**

Database: orcl.us.oracle.com > Packages > Create Package [Logged in As RIC](#)

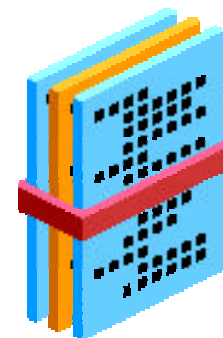
### Create Package

[Show SQL](#) [Cancel](#) [OK](#)

\* Name

\* Schema  

\* Source






# Package Body

Database: [orcl.us.oracle.com](#) > [Package Bodies](#) > Create Package Body Logged in As RIC

## Create Package Body

[Show SQL](#) [Cancel](#) [OK](#)

\* Name

\* Schema  

\* Source

```
as
FUNCTION computetax (salary NUMBER) RETURN NUMBER IS
    BEGIN
        IF salary<5000 THEN
            RETURN salary*.15;
        ELSE
            RETURN salary*.33;
        END IF;
    END computetax;
PROCEDURE giveraise AS
    BEGIN
        EXECUTE IMMEDIATE 'UPDATE hr.employees SET salary=salary*1.05';
    END giveraise;
END money;
```

# Built-In Packages

Oracle Database 10g comes with over 350 built-in PL/SQL packages providing:

- Administration and maintenance utilities
- Extended functionality

Use the DESCRIBE command to view subprograms

```
SQL> DESCRIBE dbms_stats
PROCEDURE ALTER_DATABASE_TAB_MONITORING
  Argument Name      Type        In/Out      Default?
  -----
  MONITORING          BOOLEAN      IN          DEFAULT
  SYSOBJJS            BOOLEAN      IN          DEFAULT
  ...
```

# Triggers

Database: [orcl.us.oracle.com](http://orcl.us.oracle.com) > Triggers Logged in As SYS

## Triggers

### Search

Select an object type and optionally enter a schema name and an object name to filter the data that is displayed in your results set.

Object Type  Schema  Object Name

To run an exact match search or to run a case sensitive search, double quote the search criteria. The wildcard (%) symbol can still be used in a double quoted search string.

### Results

Actions

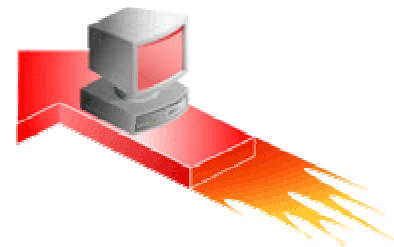
Select	Schema	Trigger Name	Type	Event	Base Object Type	Base Object Owner	Base Object Name	Status	Enabled?
<input checked="" type="radio"/>	HR	<a href="#">SECURE_EMPLOYEES</a>	BEFORE STATEMENT	INSERT OR UPDATE OR DELETE	TABLE	HR	EMPLOYEES	VALID	NO
<input type="radio"/>	HR	<a href="#">UPDATE_JOB_HISTORY</a>	AFTER EACH ROW	UPDATE	TABLE	HR	EMPLOYEES	VALID	YES

# PL/SQL Configuration Options

There are several PL/SQL compiler settings that control PL/SQL performance.

For fastest performance set:

- `PLSQL_CODE_TYPE=NATIVE`
- `PLSQL_DEBUG=FALSE`
- `PLSQL_OPTIMIZE_MODE=2`
- `PLSQL_WARNING=DISABLE:ALL`



# Summary

**In this lesson you should have learned how to:**

- **Identify PL/SQL objects**
- **Describe triggers and triggering events**
- **Identify configuration options that affect PL/SQL performance**

# Practice Overview

**There is no practice exercise for this lesson.  
You will be managing and creating PL/SQL objects  
several times during the rest of this course.**