

#### Objectives

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

- Describe database triggers and their use
- Create database triggers
- · Describe database trigger firing rules
- Remove database triggers



- A trigger is a PL/SQL block that executes implicitly whenever a particular event takes place.
- A trigger can be either a database trigger or an application trigger.

#### **Designing Triggers: Guidelines**

- Design triggers to:
  - Perform related actions
  - Centralize global operations
- Do not design triggers:
  - Where functionality already exists
  - Which duplicate other triggers





#### **Trigger Components**

Trigger timing: When should the trigger fire?

- BEFORE: Execute the trigger body before the triggering DML event on a table.
- AFTER: Execute the trigger body after the triggering DML event on a table.
- INSTEAD OF: Execute the trigger body instead of the the triggering statement. Used for VIEWS that are not otherwise modifiable.

#### **Trigger Components**

Triggering user event: What DML statement will cause the trigger to execute?

- INSERT
- UPDATE
- DELETE

#### **Trigger Components**

Trigger type:

Should the trigger body execute for each row the statement affects or only once?

- Statement: The trigger body executes once for the triggering event. This is the default.
- Row: The trigger body executes once for each row affected by the triggering event.

#### **Trigger Components**

Trigger body: What action should the trigger perform? The trigger body is a PL/SQL block or a call to a procedure.





#### Syntax for Creating Statement Triggers

CREATE [OR REPLACE] TRIGGER trigger\_name timing event1 [OR event2 OR event3] ON table\_name trigger\_body

#### **Creating Statement Triggers** Using SQL\*Plus SOL> CREATE OR REPLACE TRIGGER secure emp 2 BEFORE INSERT ON emp 3 BEGIN 4 IF (TO\_CHAR (sysdate,'DY') IN ('SAT','SUN')) OR 5 (TO\_CHAR(sysdate,'HH24') NOT BETWEEN '08' AND '18') 6 7 THEN RAISE\_APPLICATION\_ERROR (-20500, 8 'You may only insert into EMP during business hours.'): END IF; 9 10 END: 11 1















USER_NAME	TIMESTAMP	ID	OLD_LA	AST_NAME	NEW	LAST	NAME
EGRAVINA	12-NOV-97	NULL	NULL		HUT	TON	
NGREENBE	10-DEC-97	7844	MAGEE		TURNER		نسر
Continuat	NEW_TITLE			OLD_SALA	RY	NEW_SA	LARY
NULL	ANALYST			NU	LL		3500
	SALESMAN			1100		1100	





#### Creating an INSTEAD OF Trigger

CREATE [OR REPLACE] TRIGGER trigger\_name INSTEAD OF event1 [OR event2 OR event3] ON view\_name [REFERENCING OLD AS old / NEW AS new] [FOR EACH ROW] trigger\_body



## Differentiating Between Triggers and Stored Procedures

Triggers	Procedures		
Defined with CREATE TRIGGER	Defined with CREATE PROCEDURE		
Data dictionary contains source and p-code	Data dictionary contains source and p-code		
Implicitly invoked	Explicitly invoked		
COMMIT, SAVEPOINT, ROLLBACK not allowed	COMMIT, SAVEPOINT, ROLLBACK allowed		





### DROP TRIGGER Syntax

To remove a trigger from the database, use the DROP TRIGGER syntax:

DROP TRIGGER trigger\_name

#### Example

SQL> DROP TRIGGER secure\_emp; Trigger dropped

#### **Trigger Test Cases**

- Test each triggering data operation, as well as nontriggering data operations
- Test each case of the WHEN clause
- Cause the trigger to fire directly from a basic data operation, as well as indirectly from a procedure
- Test the effect of the trigger upon other triggers
- · Test the effect of other triggers upon the trigger

#### Trigger Execution Model and Constraint Checking

- 1. Execute all BEFORE STATEMENT triggers
- 2. Loop for each row affected
  - a. Execute all BEFORE ROW triggers
  - b. Execute the DML statement and perform integrity constraint checking
  - c. Execute all AFTER ROW triggers
- 3. Complete deferred integrity constraint checking
- 4. Execute all AFTER STATEMENT triggers











# Practice Overview This practice covers the following topics: • Creating statement and row triggers • Creating advanced triggers to add to the capabilities of the Oracle database





This document was created with Win2PDF available at <a href="http://www.daneprairie.com">http://www.daneprairie.com</a>. The unregistered version of Win2PDF is for evaluation or non-commercial use only.