ORACLE® ACADEMY

Database Programming with SQL

15-2
DML Operations and Views

Objectives

This lesson covers the following objectives:

- Write and execute a query that performs DML operations on a simple view

- Name the conditions that restrict your ability to modify a view using DML operations

- Write and execute a query using the WITH CHECK OPTION clause

Objectives

This lesson covers the following objectives:

- Explain the use of WITH CHECK OPTION as it applies to integrity constraints and data validation

- Apply the WITH READ ONLY option to a view to restrict DML operations

Purpose

- As you learned in the last lesson, views simplify user access to data contained in one or more tables in the database.

- However, views also allow users to make changes to the underlying tables.

- As the DBA and the person whose job it is to maintain the integrity of the database, you may want to put constraints on certain views of data.

- In this lesson, you will learn how to allow data access and at the same time ensure data security.

DML Statements and Views

- The DML operations INSERT, UPDATE, and DELETE can be performed on simple views.

- These operations can be used to change the data in the underlying base tables.

- If you create a view that allows users to view restricted information using the WHERE clause, users can still perform DML operations on all columns of the view.

DML Statements and Views

- For example, the view shown on the right was created for the managers of department 50 from the employees database.

- The intent of this view is to allow managers of department 50 to see information about their employees.

```
CREATE VIEW view_dept50 AS
 SELECT department_id, employee_id,first_name, last_name, salary
 FROM copy_employees
 WHERE department_id = 50;
```

```
SELECT * FROM view_dept50;
```

DEPARTMENT_ID	EMPLOYEE_ID	FIRST_NAME	LAST_NAME	SALARY
50	124	Kevin	Mourgos	5800
50	141	Trenna	Rajs	3500
50	142	Curtis	Davies	3100
50	143	Randall	Matos	2600
50	144	Peter	Vargas	2500

Controlling Views

- Using the view as stated, it is possible to INSERT, UPDATE, and DELETE information for all rows in the view, even if this results in a row no longer being part of the view.

- This may not be what the DBA intended when the view was created.

- To control data access, two options can be added to the CREATE VIEW statement:
  - WITH CHECK OPTION
  - WITH READ ONLY

Views with CHECK Option

- The view is defined without the WITH CHECK OPTION.

```
CREATE VIEW view_dept50 AS SELECT department_id, employee_id,
    first_name, last_name, salary
FROM copy_employees
WHERE department_id = 50;
```

- Using the view, employee_id 124 has his department changed to dept_id 90.

```
UPDATE view_dept50
SET department_id = 90
WHERE employee_id = 124;
```

1 row(s) updated.

- The update succeeds, even though this employee is now not part of the view.

Views with CHECK Option

- The WITH CHECK OPTION ensures that DML operations performed on the view stay within the domain of the view.

- Any attempt to change the department number for any row in the view fails because it violates the WITH CHECK OPTION constraint.

- Notice in the example below that the WITH CHECK OPTION CONSTRAINT was given the name view_dept50_check.

```
CREATE OR REPLACE VIEW view_dept50 AS
SELECT department_id, employee_id, first_name, last_name, salary
FROM employees
WHERE department_id = 50
WITH CHECK OPTION CONSTRAINT view_dept50_check;
```

Views with CHECK Option

- Now, if we attempt to modify a row in the view that would take it outside the domain of the view, an error is returned.

```
UPDATE view_dept50
SET department_id = 90
WHERE employee_id = 124;
```

ORA-01402: view WITH CHECK OPTION where-clause violation

Views with READ ONLY

- The WITH READ ONLY option ensures that no DML operations occur through the view.

- Any attempt to execute an INSERT, UPDATE, or DELETE statement will result in an Oracle server error.

```
CREATE OR REPLACE VIEW view_dept50 AS
 SELECT department_id, employee_id, first_name, last_name, salary
 FROM employees
 WHERE department_id = 50
WITH READ ONLY;
```

DML Restrictions

- Simple views and complex views differ in their ability to allow DML operations through a view.

- For simple views, DML operations can be performed through the view.

- For complex views, DML operations are not always allowed.

- The following three rules must be considered when performing DML operations on views.

DML Restrictions

- You cannot remove a row from an underlying base table if the view contains any of the following:

  – Group functions

  – A GROUP BY clause

  – The DISTINCT keyword

  – The pseudocolumn ROWNUM Keyword

DML Restrictions

- You cannot modify data through a view if the view contains:
  - Group functions
  - A GROUP BY clause
  - The DISTINCT keyword
  - The pseudocolumn ROWNUM keyword
  - Columns defined by expressions

DML Restrictions

- You cannot add data through a view if the view:
    - includes group functions
    - includes a GROUP BY clause
    - includes the DISTINCT keyword
    - includes the pseudocolumn ROWNUM keyword
    - includes columns defined by expressions
    - does not include NOT NULL columns in the base tables

Terminology

Key terms used in this lesson included:

- WITH CHECK OPTION
- WITH READ ONLY

Summary

In this lesson, you should have learned how to:

- Write and execute a query that performs DML operations on a simple view

- Name the conditions that restrict your ability to modify a view using DML operations

- Write and execute a query using the WITH CHECK OPTION clause

Summary

In this lesson, you should have learned how to:

- Explain the use of WITH CHECK OPTION as it applies to integrity constraints and data validation

- Apply the WITH READ ONLY option to a view to restrict DML operations