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Database Programming with SQL

15-2

DML Operations and Views

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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

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