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;
```

<table>
<thead>
<tr>
<th>DEPARTMENT_ID</th>
<th>EMPLOYEE_ID</th>
<th>FIRST_NAME</th>
<th>LAST_NAME</th>
<th>SALARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>124</td>
<td>Kevin</td>
<td>Mourgos</td>
<td>5800</td>
</tr>
<tr>
<td>50</td>
<td>141</td>
<td>Trenna</td>
<td>Rajs</td>
<td>3500</td>
</tr>
<tr>
<td>50</td>
<td>142</td>
<td>Curtis</td>
<td>Davies</td>
<td>3100</td>
</tr>
<tr>
<td>50</td>
<td>143</td>
<td>Randall</td>
<td>Matos</td>
<td>2600</td>
</tr>
<tr>
<td>50</td>
<td>144</td>
<td>Peter</td>
<td>Vargas</td>
<td>2500</td>
</tr>
</tbody>
</table>
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.

```sql
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.

```sql
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.

```sql
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