Database Programming

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
- 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.

Purpose (cont.)

Have you ever wondered what a classroom will look like in 20 years? A new generation of students will be sitting in the chairs. Will they be staring at huge monitors or sitting comfortably using their own hand-held personal computer?

Maybe school will be something we do from home. Interesting thought, isn't it? In this lesson, you will have an opportunity to look at what's next in computing. You'll be part of shaping the future.

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 (cont.)

For example, the view shown at right was created for the managers of department 50 from the Oracle 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 employees
WHERE department_id = 50;
```

SQL Statement (All DDL statements are auto committed.)

```
select * from view_dept50;
```

SQL Query Results

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 departments.

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 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 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.

```
SELECT rownum, first_name
FROM employees
WHERE employee_id
BETWEEN 100 AND 105;
```

ROWNUM	FIRST_NAME
1	Steven
2	Neena
3	Lex
4	Alexander
5	Bruce

DML Restrictions (cont.)

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

```
SELECT rownum, first_name
FROM employees
WHERE employee_id
BETWEEN 100 AND 105;
```

ROWNUM	FIRST_NAME
1	Steven
2	Neena
3	Lex
4	Alexander
5	Bruce

DML Restrictions (cont.)

1. 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

```
SELECT rownum, first_name
FROM employees
WHERE employee_id
BETWEEN 100 AND 105;
```

ROWNUM	FIRST_NAME
1	Steven
2	Neena
3	Lex
4	Alexander
5	Bruce

DML Restrictions (cont.)

2. 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

```
SELECT rownum, first_name
FROM employees
WHERE employee_id
BETWEEN 100 AND 105;
```

ROWNUM	FIRST_NAME
1	Steven
2	Neena
3	Lex
4	Alexander
5	Bruce

DML Restrictions (cont.)

3. 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

```
SELECT rownum, first_name
FROM employees
WHERE employee_id
BETWEEN 100 AND 105;
```

ROWNUM	FIRST_NAME
1	Steven
2	Neena
3	Lex
4	Alexander
5	Bruce

What's Next in Computing?

Moore's Law--which states that the number of transistors on a given chip can be doubled every two years--has been the guiding principle of progress in electronics and computing since Moore first formulated the famous prediction in 1965.

What will technology "look like" in 20 years, in a hundred years? Many people are wondering the same thing and working to turn their dreams into reality. Let's look into the future of computing and technology. It's your future and you will be a part of it.

Future Trends To Consider

Wireless technologies -- when can we pull the plug?

How big is big? What technologies are being developed to store large quantities of information?

How much is too much? What are the trends in storing personal data and what are the issues being addressed related to personal privacy?

Future Trends To Consider (cont.)

What is data mining? How can businesses target product advertising gleaned from data stored about your buying habits or Internet browsing preferences?

How can we make computers know how we see and feel?

What technologies are being developed to protect copyrighted material?

Future Trends To Consider (cont.)

How small is small? What are the limits to miniaturizing computer technologies? Can a phone, computer, and camera be integrated into a wrist watch?

Terminology

Key terms used in this lesson included:

- ROWNUM
- 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
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