Creating Views and Sequences

Objectives

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

- Describe a view
- Create, alter the definition of, and drop a view
- Retrieve data through a view
- Insert, update, and delete data through a view
- Create and use an inline view

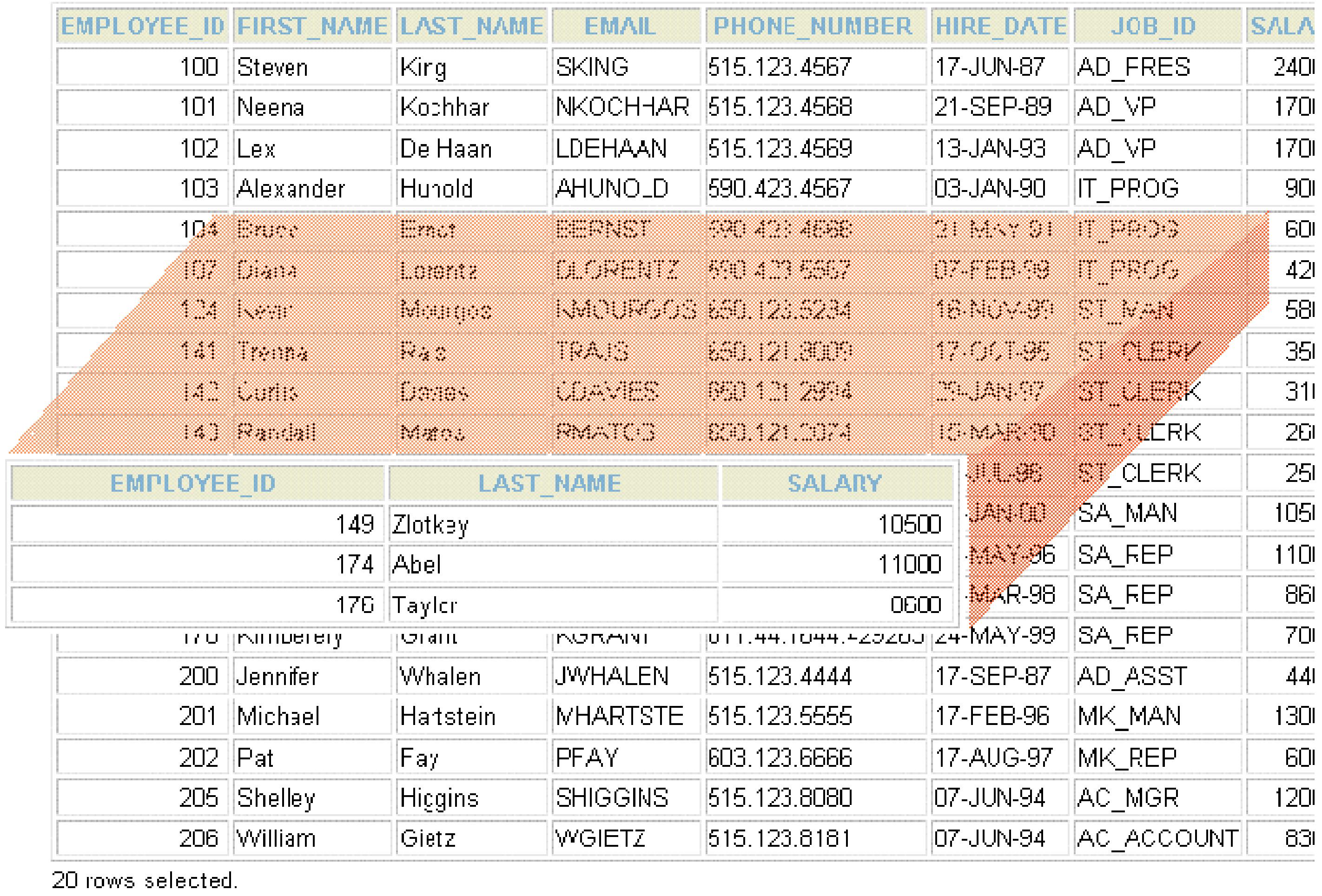
Database Objects

Object	Description
Table	Basic unit of storage; composed of rows and columns
View	Logically represents subsets of data from one or more tables
Sequence	Generates primary key values
Index	Improves the performance of some queries
Synonym	Alternative name for an object

What Is a View?

What Is a View?

EMPLOYEES Table:



EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALA
100	Steven	King	SKING	515.123.4567	17-JUN-87	AD_PRES	240
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	170
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	170
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90	IT_PROG	90
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91	IT_PROG	60
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-99	IT_PROG	42
124	Kevin	Mourgos	KMOURGOS	650.123.5234	16-NOV-99	ST_MAN	58
141	Trenna	Rajs	TRAJS	650.121.8009	17-OCT-95	ST_CLERK	35
142	Curtis	Davies	CDAVIES	650.121.2994	29-JAN-97	ST_CLERK	31
143	Randall	Matos	RMATOS	650.121.2874	15-MAR-98	ST_CLERK	26
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JUL-98	ST_CLERK	25
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JAN-00	SA_MAN	105
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	MAY-96	SA_REP	110
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	MAR-98	SA_REP	86
178	Kimberely	Grant	KGRANT	011.44.1644.429263	24-MAY-99	SA_REP	70
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87	AD_ASST	44
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96	MK_MAN	130
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97	MK_REP	60
205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94	AC_MGR	120
206	William	Gietz	WGIETZ	515.123.8181	07-JUN-94	AC_ACCOUNT	83

EMPLOYEE_ID	LAST_NAME	SALARY
149	Zlotkey	10500
174	Abel	11000
176	Taylor	8600

20 rows selected.

Why Use Views?

- To restrict data access
- To make complex queries easy
- To provide data independence
- To present different views of the same data

Simple Views
and Complex Views

Feature	Simple Views	Complex Views
Number of tables	One	One or more
Contain functions	No	Yes
Contain groups of data	No	Yes
DML operations through a view	Yes	Not always

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Creating a View

- You embed a subquery within the `CREATE VIEW` statement.

```
CREATE [OR REPLACE] VIEW view
  [(alias[, alias]...)]
 AS subquery
[WITH CHECK OPTION]
[WITH READ ONLY];
```

- The subquery can contain complex `SELECT` syntax.

Creating a View

- Create a view, EMPVU80, that contains details of employees in department 80.

```
CREATE VIEW  empvu80
 AS SELECT  employee_id, last_name, salary
    FROM    employees
    WHERE   department_id = 80;
View created.
```

Creating a View

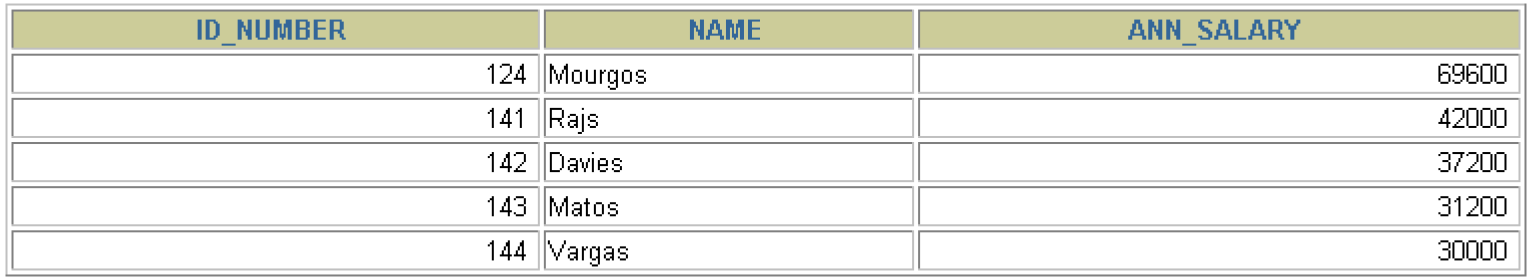
- Create a view by using column aliases in the subquery.

```
CREATE VIEW  salvu50
 AS SELECT   employee_id ID_NUMBER, last_name NAME,
             salary*12 ANN_SALARY
    FROM     employees
    WHERE    department_id = 50;
View created.
```

- Select the columns from this view by the given alias names.

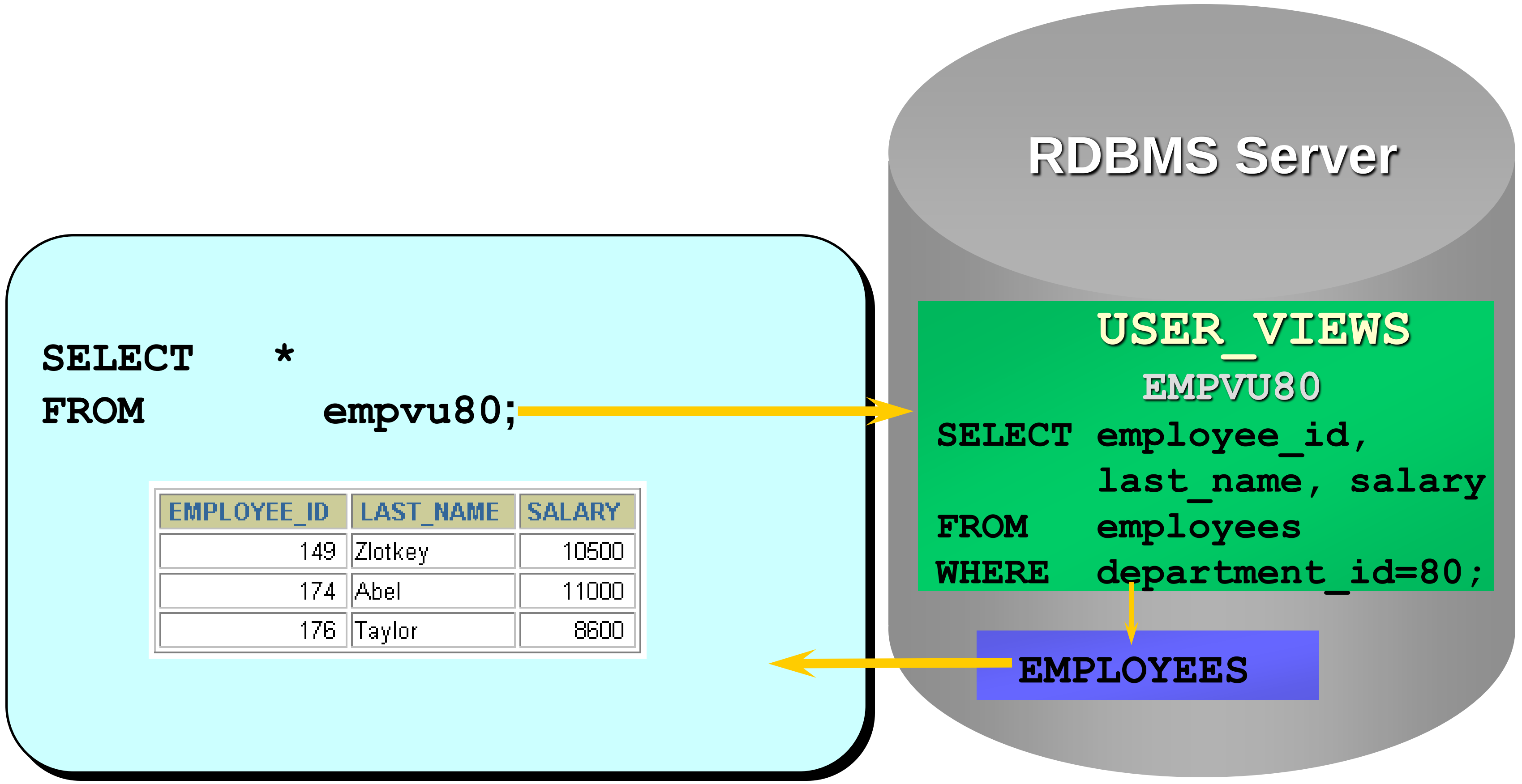
Retrieving Data from a View

```
SELECT *
FROM  salvu50;
```



ID_NUMBER	NAME	ANN_SALARY
124	Mourgos	69600
141	Rajs	42000
142	Davies	37200
143	Matos	31200
144	Vargas	30000

Querying a View



```
SELECT    *
FROM         empvu80;
```

EMPLOYEE_ID	LAST_NAME	SALARY
149	Zlotkey	10500
174	Abel	11000
176	Taylor	8600

```
SELECT  employee_id,
        last_name, salary
FROM    employees
WHERE   department_id=80;
```

Modifying a View

- Modify the `EMPVU80` view by using `CREATE OR REPLACE VIEW` clause. Add an alias for each column name.

```
CREATE OR REPLACE VIEW empvu80
  (id_number, name, sal, department_id)
AS SELECT  employee_id, first_name || ' ' || last_name,
           salary, department_id
   FROM    employees
   WHERE   department_id = 80;
View created.
```

- Column aliases in the `CREATE VIEW` clause are listed in the same order as the columns in the subquery.

Creating a Complex View

Create a complex view that contains group functions to display values from two tables.

```
CREATE VIEW dept_sum_vu
  (name, minsal, maxsal, avgsal)
AS SELECT    d.department_name, MIN(e.salary),
             MAX(e.salary),AVG(e.salary)
   FROM      employees e, departments d
   WHERE     e.department_id = d.department_id
   GROUP BY  d.department_name;
View created.
```

Rules for Performing DML Operations on a View

- You can perform DML operations on simple views.
- You cannot remove a row if the view contains the following:
  - Group functions
  - A `GROUP BY` clause
  - The `DISTINCT` keyword

Rules for Performing DML Operations on a View

You cannot modify data in a view if it contains:

•Group functions

•A `GROUP BY` clause

•The `DISTINCT` keyword

•Columns defined by expressions

Rules for Performing DML Operations on a View

You cannot add data through a view if the view includes:

- Group functions
- A `GROUP BY` clause
- The `DISTINCT` keyword
- Columns defined by expressions
- `NOT NULL` columns in the base tables that are not selected by the view

Using the WITH CHECK OPTION Clause

- You can ensure that DML operations performed on the view stay within the domain of the view by using the WITH CHECK OPTION clause.

```
CREATE OR REPLACE VIEW empvu20
AS SELECT   *
   FROM     employees
   WHERE    department_id = 20
   WITH CHECK OPTION CONSTRAINT empvu20_ck ;
View created.
```

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

Denying DML Operations

- You can ensure that no DML operations occur by adding the `WITH READ ONLY` option to your view definition.
- Any attempt to perform a DML on any row in the view results in an Oracle server error.

Denying DML Operations

```
CREATE OR REPLACE VIEW empvu10
    (employee_number, employee_name, job_title)
AS SELECT   employee_id, last_name, job_id
   FROM     employees
   WHERE    department_id = 10
   WITH READ ONLY;
View created.
```

Removing a View

You can remove a view without losing data because a view is based on underlying tables in the database.

```
DROP VIEW view;
```

```
DROP VIEW empvu80;
View dropped.
```

Database Objects

Object	Description
Table	Basic unit of storage; composed of rows and columns
View	Logically represents subsets of data from one or more tables
Sequence	Generates primary key values
Index	Improves the performance of some queries
Synonym	Alternative name for an object

What Is a Sequence?

A sequence:

- Automatically generates unique numbers
- Is a sharable object
- Is typically used to create a primary key value
- Replaces application code
- Speeds up the efficiency of accessing sequence values when cached in memory

The CREATE SEQUENCE Statement Syntax

Define a sequence to generate sequential numbers automatically:

```
CREATE SEQUENCE sequence
        [INCREMENT BY n]
        [START WITH n]
        [{MAXVALUE n | NOMAXVALUE}]
        [{MINVALUE n | NOMINVALUE}]
        [{CYCLE}]
        [{CACHE n}];
```

Creating a Sequence

- Create a sequence named DEPT_DEPTID_SEQ to be used for the primary key of the DEPARTMENTS table.
- Do not use the CYCLE option.

```
CREATE SEQUENCE dept_deptid_seq
                INCREMENT BY 10
                START WITH 120
                MAXVALUE 9999
;
Sequence created.
```

NEXTVAL and CURRVAL Pseudocolumns

- NEXTVAL returns the next available sequence value. It returns a unique value every time it is referenced, even for different users.
- CURRVAL obtains the current sequence value.
- NEXTVAL must be issued for that sequence before CURRVAL contains a value.

Using a Sequence

- Insert a new department named “Support” in location ID 2500.

```
INSERT INTO departments(department_id,
            department_name, location_id)
VALUES      (NEXTVAL(dept_deptid_seq),
            'Support', 2500);
1 row created.
```

```
SELECT   dept_deptid_seq.CURRVAL
FROM     dual;
```

Using a Sequence

- Caching sequence values in memory gives faster access to those values.
- Gaps in sequence values can occur when:
  - A rollback occurs
  - The system crashes
  - A sequence is used in another table
- If the sequence was created with `NOCACHE`, view the next available value, by querying the `USER_SEQUENCES` table.

Modifying a Sequence

Change the increment value, maximum value, minimum value, cycle option, or cache option.

```
ALTER SEQUENCE dept_deptid_seq
               INCREMENT BY 20
               MAXVALUE 999999
;
Sequence altered.
```

Guidelines for Modifying a Sequence

- You must be the owner or have the `ALTER` privilege for the sequence.
- Only future sequence numbers are affected.
- The sequence must be dropped and re-created to restart the sequence at a different number.
- Some validation is performed.

Removing a Sequence

- Remove a sequence from the data dictionary by using the `DROP SEQUENCE` statement.
- Once removed, the sequence can no longer be referenced.

```
DROP SEQUENCE dept_deptid_seq;
Sequence dropped.
```

Summary

In this lesson, you should have learned that a view is derived from data in other tables or views and provides the following advantages:

- Restricts database access
- Simplifies queries
- Provides data independence
- Provides multiple views of the same data
- Can be dropped without removing the underlying data

- Create, use , alter and drop a sequence