# Report

Laboratory Work 6

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August 14, 2022

# 1. Prerequisites Task Information

## 1.1. Passwords Index

| Password Group | Login Name | Password |
|---|---|---|
| Operation System | root | "rootadmin" |
| | oracle | "oracleadmin" |
| | | |
| Oracle System | sys | "sysadmin" |
| | system | "sysadmin" |
| | | |
| Oracle Users | All DB users | "%PWD%" |
| | | |
| | | |

## 1.2. Folder Paths Index

| Path Group | Path Description | Path |
|---|---|---|
| Operation System | Oracle RDBMS – BIN | /oracle/app/oracle |
| | Oracle Inventory | /oracle/app/oraInventory |
| | Oracle Database Storage | /oracle/oradata |
| | Oracle Install Directory | /oracle/install |
| Oracle | ORACLE_BASE | /oracle/app/oracle |
| | ORACLE_HOME | $ORACLE_BASE/product/11.2 |
| | | |
| FTP | ftp Incoming Folder | `/ftp/incoming` |
| | | |
| | | |

# 2. Business analyses tasks – Dimensions

## 2.1. Task 01: Create Packages for Reload Dimension from SA_*

**The Main Task** is to independent packages to reload dimension according your DWH solution concept which was developed on Module 6. Introduction to DWH.

***Note.*** Let's rewrite package which move data from cleansing level (cl_employees) to DW level (dim_employees)

1) Use Execute Immediate with Bind Parameters:

```
PROCEDURE LOAD_DW_EMPLOYEES
 AS
   BEGIN
   MERGE INTO DW_DATA.dim_employees A
   USING ( SELECT employee_id ,first_name_EMPLOYEE , last_name_EMPLOYEE, email_EMPLOYEE, phone_EMPLOYEE,POSITION_NAME_ACTUAL,
                  POSITION_DEGREE, SALES_TYPE , HIRE_DATE , salary, chief_id , position_name_previous, position_change_date
           FROM DW_CLEANSING.cl_employees) B
           ON (a.employee_id = b.employee_id)
           WHEN MATCHED THEN
              UPDATE SET a.salary = b.salary
           WHEN NOT MATCHED THEN
              INSERT (a.employee_id ,a.first_name_EMPLOYEE , a.last_name_EMPLOYEE, a.email_EMPLOYEE, a.phone_EMPLOYEE,a.POSITION_NAM
                  a.POSITION_DEGREE, a.SALES_TYPE , a.HIRE_DATE , a.salary, a.chief_id , a.position_name_previous, a.position_change_
              VALUES (b.employee_id ,b.first_name_EMPLOYEE , b.last_name_EMPLOYEE, b.email_EMPLOYEE, b.phone_EMPLOYEE,b.POSITION_NAM
                  b.POSITION_DEGREE, b.SALES_TYPE , b.HIRE_DATE , b.salary, b.chief_id , b.position_name_previous, b.position_change_
   COMMIT;
 END LOAD_DW_EMPLOYEES;
```

## 2) To_refcursor

```
31
32  ---------------------------------to_refcursor-------------------------------------
33  PROCEDURE LOAD_DW_EMPLOYEES_with_to_refcursor_func
34
35   AS
36    BEGIN
37    DECLARE
38      cursor_id NUMBER (25);
39      cur_count NUMBER (38);
40      query_cur VARCHAR2(2000);
41      TYPE ref_crsr IS REF CURSOR;
42      ref_cursor ref_crsr;
43      TYPE type_rec IS RECORD
44                    (    employee_id              NUMBER(5),
45                         first_name_EMPLOYEE      VARCHAR2(40),
46                         last_name_EMPLOYEE       VARCHAR2(40),
47                         email_EMPLOYEE           VARCHAR2(40),
48                         phone_EMPLOYEE           VARCHAR2(40),
```

Worksheet | Query Builder

```
58       one_record type_rec;
59
60        BEGIN
61     query_cur:= 'SELECT employee_id ,first_name_EMPLOYEE , last_name_EMPLOYEE, email_EMPLOYEE, phone_EMPLOYEE,POSITION_NAME_ACTUAL,
62                   POSITION_DEGREE, SALES_TYPE , HIRE_DATE , salary, chief_id , position_name_previous, position_change_date
63
64                   FROM
65
66                       (SELECT stage.employee_id ,stage.first_name_EMPLOYEE , stage.last_name_EMPLOYEE, stage.email_EMPLOYEE,
67                       stage.phone_EMPLOYEE, stage.POSITION_NAME_ACTUAL,  stage.POSITION_DEGREE, stage.SALES_TYPE ,
68                       stage.HIRE_DATE , stage.salary, stage.chief_id , stage.position_name_previous, stage.position_change_date
69
70                                FROM DW_CLEANSING.cl_employees source
71                   LEFT JOIN dw_data.dim_employees stage
72                   ON (source.employee_id=stage.employee_id))';
73
74
75     cursor_id:=DBMS_SQL.open_cursor;
```

Worksheet | Query Builder

```
75       cursor_id:=DBMS_SQL.open_cursor;
76
77       DBMS_SQL.PARSE(cursor_id, query_cur, DBMS_SQL.NATIVE);
78
79       cur_count:= DBMS_SQL.EXECUTE(cursor_id);
80
81       ref_cursor:= DBMS_SQL.TO_REFCURSOR(cursor_id);
82
83         LOOP
84       FETCH ref_cursor INTO one_record;
85       EXIT WHEN ref_cursor%NOTFOUND;
86       IF (one_record.employee_id IS NULL) THEN
87                INSERT INTO dw_data.dim_employees (employee_id ,first_name_EMPLOYEE , last_name_EMPLOYEE, email_EMPLOYEE,
88                phone_EMPLOYEE,POSITION_NAME_ACTUAL, POSITION_DEGREE, SALES_TYPE , HIRE_DATE , salary,
89                chief_id , position_name_previous, position_change_date)
90                VALUES (SEQ_EMPLOYEES.NEXTVAL,
91                one_record.first_name_EMPLOYEE , one_record.last_name_EMPLOYEE, one_record.email_EMPLOYEE,
92                one_record.phone_EMPLOYEE, one_record.POSITION_NAME_ACTUAL, one_record.POSITION_DEGREE, one_record.SALES_TYPE ,
93                one_record.HIRE_DATE , one_record.salary, one_record.chief_id , one_record.position_name_previous,
```

3) To_cursor_number

```
PROCEDURE LOAD_DW_EMPLOYEES_with_to_cursor_number_func
    AS
   BEGIN
 DECLARE
   l_rc_var1 SYS_REFCURSOR;
   l_n_cursor_id    NUMBER;
   l_n_rowcount     NUMBER;
   l_n_column_count NUMBER;


                  l_vc_employee_id              NUMBER(5);
                  l_vc_first_name_EMPLOYEE      VARCHAR2(40);
                  l_vc_last_name_EMPLOYEE       VARCHAR2(40);
                  l_vc_email_EMPLOYEE           VARCHAR2(40);
                  l_vc_phone_EMPLOYEE           VARCHAR2(40);
                  l_vc_POSITION_NAME_ACTUAL     VARCHAR2(40);
                  l_vc_l_vc_POSITION_DEGREE          VARCHAR2(40);
                  l_vc_SALES_TYPE               VARCHAR2(40);
```

Worksheet Query Builder

```
130   OPEN l_rc_var1 FOR
131   'SELECT employee_id ,first_name_EMPLOYEE , last_name_EMPLOYEE, email_EMPLOYEE,
132            phone_EMPLOYEE, POSITION_NAME_ACTUAL,  POSITION_DEGREE, SALES_TYPE ,
133            HIRE_DATE , salary, chief_id , position_name_previous, position_change_date
134
135    FROM DW_CLEANSING.cl_employees';
136
137   l_n_cursor_id:= DBMS_SQL.to_cursor_number(l_rc_var1);
138   dbms_sql.describe_columns(l_n_cursor_id,l_n_column_count,l_ntt_desc_tab);
139   FOR loop_col IN 1..l_n_column_count
140   LOOP
141     dbms_sql.define_column(l_n_cursor_id,loop_col,
142     CASE l_ntt_desc_tab(loop_col).col_name
143       WHEN 'employee_id' THEN
144       l_vc_employee_id
145
146            WHEN 'first_name_EMPLOYEE' THEN
147       l_vc_first_name_EMPLOYEE
```

Worksheet Query Builder

```
147       l_vc_first_name_EMPLOYEE
148
149     WHEN 'last_name_EMPLOYEE' THEN
150       l_vc_last_name_EMPLOYEE
151
152            WHEN 'email_EMPLOYEE' THEN
153       l_vc_email_EMPLOYEE
154
155     WHEN 'phone_EMPLOYEE' THEN
156       l_vc_last_name_EMPLOYEE
157
158            WHEN 'POSITION_NAME_ACTUAL' THEN
159       l_vc_POSITION_NAME_ACTUAL
160
161     WHEN 'POSITION_DEGREE' THEN
162       l_vc_POSITION_DEGREE
163
164            WHEN 'SALES_TYPE' THEN
165       l_vc_SALES_TYPE
166
167     WHEN 'HIRE_DATE' THEN
168       l_vc_HIRE_DATE
```

Worksheet Query Builder

```
168                    l_vc_HIRE_DATE
169
170                          WHEN 'salary' THEN
171                    l_vc_salary
172
173                  WHEN 'chief_id' THEN
174                    l_vc_chief_id
175
176                          WHEN 'position_name_previous' THEN
177                    l_vc_position_name_previous
178
179                  WHEN 'position_change_date' THEN
180                    l_vc_position_change_date
181
182                  END, 50);
183
184                END LOOP loop_col;
185                LOOP
186                  l_n_rowcount:=dbms_sql.fetch_rows(l_n_cursor_id);
187                  EXIT
188                WHEN l_n_rowcount=0;
189                  FOR loop_col IN 1..l_n_column_count
```

Worksheet Query Builder

```
190              LOOP
191                CASE l_ntt_desc_tab(loop_col).col_name
192
193                     WHEN 'employee_id' THEN
194                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_employee_id);
195
196                     WHEN 'first_name_EMPLOYEE' THEN
197                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_first_name_EMPLOYEE);
198
199                     WHEN 'last_name_EMPLOYEE' THEN
200                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_last_name_EMPLOYEE);
201
202                     WHEN 'email_EMPLOYEE' THEN
203                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_email_EMPLOYEE);
204
205                     WHEN 'phone_EMPLOYEE' THEN
206                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_phone_EMPLOYEE);
207
208                     WHEN 'POSITION_NAME_ACTUAL' THEN
209                       dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_POSITION_NAME_ACTUAL);
210
```

Worksheet Query Builder

```
229                          WHEN 'position_change_date' THEN
230                            dbms_sql.column_value(l_n_cursor_id,loop_col,l_vc_position_change_date);
231                          END CASE;
232                END LOOP loop_col;
233                IF(l_vc_employee_id IS NOT NULL) THEN
234                INSERT INTO dw_data.dim_employees(employee_id ,
235                                                  first_name_EMPLOYEE ,
236                                                   last_name_EMPLOYEE,
237                                                    email_EMPLOYEE,
238                                                     phone_EMPLOYEE,
239                                                     POSITION_NAME_ACTUAL,
240                                                       POSITION_DEGREE,
241                                                        SALES_TYPE ,
242                                                        HIRE_DATE ,
243                                                        salary,
244                                                         chief_id ,
245                                                          position_name_previous,
246                                                           position_change_date)
247
248                VALUES (    l_vc_employee_id          ,
249                            l_vc_first_name_EMPLOYEE      ,
250                            l_vc_last_name_EMPLOYEE       ,
```

```
Worksheet  Query Builder
250                              l_vc_last_name_EMPLOYEE       ,
251                              l_vc_email_EMPLOYEE           ,
252                              l_vc_phone_EMPLOYEE           ,
253                              l_vc_POSITION_NAME_ACTUAL     ,
254                              l_vc_l_vc_POSITION_DEGREE          ,
255                              l_vc_SALES_TYPE               ,
256                              l_vc_HIRE_DATE        ,
257                              l_vc_salary           ,
258                              l_vc_chief_id         ,
259                              l_vc_position_name_previous   ,
260                              l_vc_position_change_date);
261          END IF;
262        END LOOP;
263      COMMIT;
264      END;
265
266    END LOAD_DW_EMPLOYEES_with_to_cursor_number_func;
267
268 END pkg_dw_employees_independent;
```

***Note.*** All packages rewritten. Let' s execute the (and will not forget to truncate tables before executing to make sure packages work correctly)

```
279 TRUNCATE TABLE dim_employees
280
281 exec pkg_dw_employees_independent.LOAD_DW_EMPLOYEES;
```

```
Script Output
Task completed in 0.636 seconds

Table DIM_EMPLOYEES truncated.

PL/SQL procedure successfully completed.
```

```
283 TRUNCATE TABLE dim_employees
284
285 exec pkg_dw_employees_independent.LOAD_DW_EMPLOYEES_with_to_refcursor_func;
```

```
Script Output
Task completed in 0.077 seconds

1,000 rows selected.

Table DIM_EMPLOYEES truncated.

PL/SQL procedure successfully completed.
```

```
287  TRUNCATE TABLE dim_employees
288
289  exec pkg_dw_employees_independent.LOAD_DW_EMPLOYEES_with_to_cursor_number_func;
290  SELECT * FROM dim_employees
```

Script Output

Task completed in 0.077 seconds

```
Package Body PKG_DW_EMPLOYEES_INDEPENDENT compiled
```

# 3. Business analyses tasks – Reports

## 3.1. Task 02: CREATE Monthly Reports Layouts

**The Main Task** is to create Reports Layouts according your Business Solution Proposal, which was developed on Exit Task Module 6.Introduction to DWH.

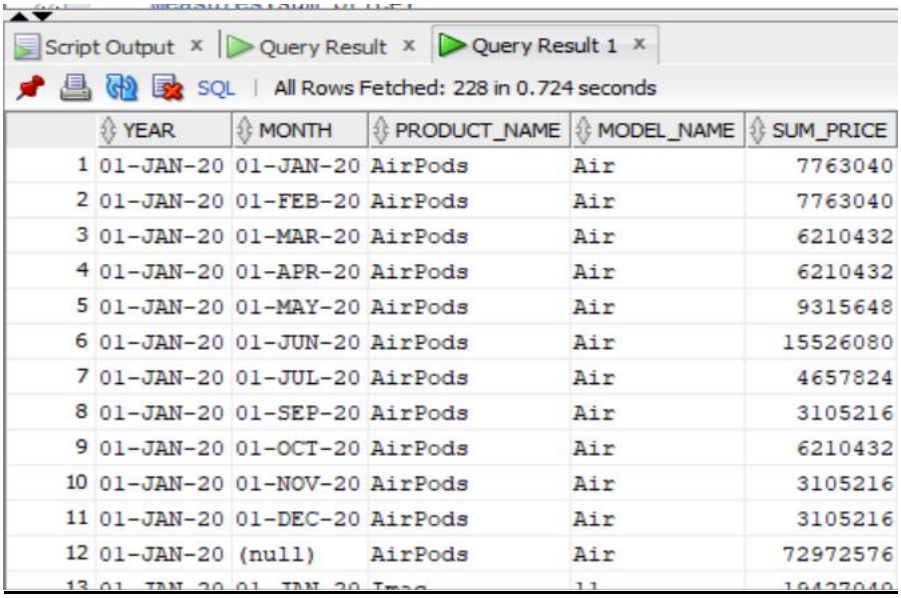
**Required points:**

- Refactoring Adhoc SQL, which was developed on Module 7 ETL - Extract, transform and load labwork 02;
- Use Module Clause

The **MODEL clause** enables you to specify rules to manipulate the measure values of the cells in the **multi-dimensional** array **defined by partition and dimension columns**. **Rules** access and update measure column values by directly specifying dimension values. The references used in rules result in a highly readable model.

```
with tmp
as
    (
    select t.product_name,t.model_name, TRUNC(t.customer_sale_date,'mm') as month,
    TRUNC(t.customer_sale_date,'yyyy') as YEAR,sum(t.price) as sum_price
--    ,
--    employee_id, t.phone_employee, 1 count
    from
    DW_CLEANSING.CL_TRANSACTIONS t
    GROUP BY  TRUNC(t.customer_sale_date,'yyyy'),TRUNC(t.customer_sale_date,'mm'),t.product_name,t.model_name
    )
        SELECT DISTINCT year, month, product_name, model_name,
--        employee_id, phone_employee,
        sum_price
    FROM
    tmp
    model
    partition by (product_name, model_name)
    dimension by (year,month)
    measures(sum_price)
    rules (
                sum_price[FOR year IN (SELECT DISTINCT year FROM tmp), null]=SUM(sum_price)[cv(year), any]
```

```
FROM
tmp
model
partition by (product_name, model_name)
dimension by (year,month)
measures(sum_price)
rules (
          sum_price[FOR year IN (SELECT DISTINCT year FROM tmp), null]=SUM(sum_price)[cv(year), any]
                )
ORDER BY product_name, model_name;
```



Script Output | Query Result | Query Result 1

SQL | All Rows Fetched: 228 in 0.724 seconds

| | YEAR | MONTH | PRODUCT_NAME | MODEL_NAME | SUM_PRICE |
|---|---|---|---|---|---|
| 1 | 01-JAN-20 | 01-JAN-20 | AirPods | Air | 7763040 |
| 2 | 01-JAN-20 | 01-FEB-20 | AirPods | Air | 7763040 |
| 3 | 01-JAN-20 | 01-MAR-20 | AirPods | Air | 6210432 |
| 4 | 01-JAN-20 | 01-APR-20 | AirPods | Air | 6210432 |
| 5 | 01-JAN-20 | 01-MAY-20 | AirPods | Air | 9315648 |
| 6 | 01-JAN-20 | 01-JUN-20 | AirPods | Air | 15526080 |
| 7 | 01-JAN-20 | 01-JUL-20 | AirPods | Air | 4657824 |
| 8 | 01-JAN-20 | 01-SEP-20 | AirPods | Air | 3105216 |
| 9 | 01-JAN-20 | 01-OCT-20 | AirPods | Air | 6210432 |
| 10 | 01-JAN-20 | 01-NOV-20 | AirPods | Air | 3105216 |
| 11 | 01-JAN-20 | 01-DEC-20 | AirPods | Air | 3105216 |
| 12 | 01-JAN-20 | (null) | AirPods | Air | 72972576 |

***Note.*** NULL values specified to show grouped values of summary revenue for every product -> model

**Task Results:**

Create report layouts:

- Refactoring report layouts
- Put report layouts on Git – Folder BI Tasks – Product Name (author) - Repots

**Laboratory Work Summary:** At this laboratory work we practised usage of more types of data movement methods, such as:

- Use Execute Immediate with Bind Parameters
- Use DBMS_SQL.TO_REFCURSOR Function
- Use DBMS_SQL.TO_CURSOR_NUMBER Function

We practiced using models to specify reports that we want to get by using different dimensions, partitions and measures