

Report

Laboratory Work 4

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1. Prerequisites

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 – Reports

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.

Required points:

- Create all required Dim objects on DW Layer
- Grant all required Privileges to DW_CL (Cleansing Layer)
- Create Packages to reload Dim data (one package = one dimension.)
- Example future SAL.DIM_GEO_SCD will store all procedure on pkg_etl_dim_geo_dw. But this package will store all small sub dims – T_COUNTRIES, T_REGIONS etc.)
 - Use Explicit Cursor (One package)
 - Use Explicit Cursor and FORALL Bulk Insertion (One package)

- Use Variable Cursor and FORALL Bulk Insertion (One package)
- Use Merge (One packages)

Task Results:

Create required objects:

- Put objects script to Git.
- Prepare Document with Screenshot of Data on Dimensions
- Test data for consistent
- Test Procedure for Repeatable execution (Nothing should change)

69 ----- CREATED TABLES

70

71 SELECT

72 table_name, owner

73 FROM

74 all_tables

75 WHERE

76 owner='DW_CLEANSING'

77 ORDER BY

78 owner, table_name

79

Script Output x Query Result x

SQL | All Rows Fetched: 9 in 1.012 seconds

	TABLE_NAME	OWNER
1	CL_CUSTOMERS	DW_CLEANSING
2	CL_EMPLOYEES	DW_CLEANSING
3	CL_GEN_PERIODS	DW_CLEANSING
4	CL_GEO_LOCATIONS	DW_CLEANSING
5	CL_PAYMENT_METHODS	DW_CLEANSING
6	CL_PRODUCTS	DW_CLEANSING
7	CL_STORES	DW_CLEANSING
8	CL_TIME	DW_CLEANSING
9	CL_TRANSACTIONS	DW_CLEANSING

Firstly, I created tables on Cleansing level

```
SELECT
    table_name, owner
FROM
    all_tables
WHERE
    owner='DW_CLEANSING'
ORDER BY
    owner, table_name
```

- CL_CUSTOMERS
- CL_EMPLOYEES
- CL_GEN_PERIODS
- CL_GEO_LOCATIONS
- CL_PAYMENT_METHODS
- CL_PRODUCTS
- CL_STORES
- CL_TIME
- CL_TRANSACTIONS

Note. All scripts stored in GitHub, exit task folder. But also duplicated in lab4 folder AS CL folder.

Then I began **creating packages**, which consist of 2 files :

- *table_name*_define.sql
- *table_name*_body.sql

SQL Worksheet History

WorksheetQuery Builder

```
7
8  --drop package pkg_cl_transaction;
9  alter session set current_schema=DW_CLEANSING;
10 SELECT
11     *
12 FROM
13     ALL_OBJECTS
14 WHERE
15     OBJECT_TYPE
16         IN ('FUNCTION', 'PROCEDURE', 'PACKAGE')
17     AND OWNER = 'DW_CLEANSING'
```

Script Output x Query Result x Query Result 1 x Query Result 2 x Query Result 3 x

SQL | All Rows Fetched: 8 in 0.149 seconds

	OWNER	OBJECT_NAME	SUBOBJECT_NAME	OBJECT_ID	DATA_OBJECT_ID	OBJECT_TYPE
1	DW_CLEANSING	PKG_CL_CUSTOMERS	(null)	70497	(null)	PACKAGE
2	DW_CLEANSING	PKG_CL_PAYMENT_METHODS	(null)	70499	(null)	PACKAGE
3	DW_CLEANSING	PKG_CL_LOCATIONS	(null)	70500	(null)	PACKAGE
4	DW_CLEANSING	PKG_CL_PERIODS	(null)	70501	(null)	PACKAGE
5	DW_CLEANSING	PKG_CL_PRODUCTS	(null)	70502	(null)	PACKAGE
6	DW_CLEANSING	PKG_CL_STORES	(null)	70503	(null)	PACKAGE
7	DW_CLEANSING	PKG_CL_TIME	(null)	70504	(null)	PACKAGE
8	DW_CLEANSING	PKG_CL_TRANSACTION	(null)	70505	(null)	PACKAGE

Note. Later I will show the **Data Flow Diagram** to explain how I store files / sub – folders / folders

Now let's try to create package bodies. And of course execute them to move data from SA level to CL level

65	ALTER USER DW_CLEANSING quota unlimited on TS_DW_CLEANSING;
66	alter session set current_schema=DW_CLEANSING;
67	exec pkg_cl_customers.LOAD_CLEAN_CUSTOMERS;
Script Output x Query Result x	
Task completed in 0.145 seconds	
specified tablespaces.	
*Action: Grant the user the appropriate system privileges or grant the user space resource on the tablespaces.	
User DW_CLEANSING altered.	
Session altered.	
PL/SQL procedure successfully completed.	

***After almost an hour** I finally understood that it is a great idea to grant my user more space resource :)

<pre>70 alter session set current_schema = SA_CUSTOMERS; 71 select count (*) from sa_customers 72 commit;</pre>	<pre>69 alter session set current_schema=DW_CLEANSING; 70 select count (*) from cl_customers; 71 72 </pre>
Script Output x Query Result x Task completed in 0.07 seconds	Script Output x Query Result x Task completed in 0.059 seconds
COUNT (*) ----- 1000	COUNT (*) ----- 940

```
81 |
82 | alter session set current_schema=DW_CLEANSING;
83 | select count(*) from cl_employees;
84 |
85 | alter session set current_schema=SA_PRODUCTS;
86 | select count(*) from SA_employees;
87 |
88 | commit;
```

Script Output x
Task completed in 0.076 seconds

COUNT (*)

1500

Session altered.

COUNT (*)

1500

As you can see, if we **count** rows from the same tables (but on different layers(different tablespaces)) the number of rows differs because in *.SA table there were some rows with NULL values.

Note. Next I am going to make a body statements for every table (except of some(1 – 3), which are not needed to be cleansed)

Note. However, employees table **was not cleansed** because of they were created using **NOT NULL constraint**. It seems to be useless cleansing such

tables but if someone will change this table structure **in future** and try to use *null* values in some rows, then **it will be worthy**.

Note. I coded every package and executed their bodies before moving data from sa_* tables to cl_* tables, and generating transactions table on cleansing layer.

```
66 FROM
67 DW_CLEANSING.cl_products p
68
69 CROSS JOIN DW_CLEANSING.cl_customers c
70
71 CROSS JOIN DW_CLEANSING.cl_payment_methods pm
72
73 CROSS JOIN DW_CLEANSING.CL_EMPLOYEES e
74
75 INNER JOIN DW_CLEANSING.cl_time t ON t.date_id = c.CUSTOMER_SALE_DATE
76
77 WHERE c.CUSTOMER_SALE_DATE > TO_DATE( '01.01.20', 'MM/DD/YY' )
78 AND c.CUSTOMER_SALE_DATE < TO_DATE( '01.01.22', 'MM/DD/YY' ) and
79
80 (mod(c.PHONE_CUSTOMER,2) = 0 ) and
81
82 e.phone_EMPLOYEE LIKE '2%' AND
83
84 e.FIRST_NAME_EMPLOYEE LIKE 'D%'
85 );
```

Script Output x Query Result x Query Result 1 x
Task completed in 15.367 seconds
2,436,480 rows inserted.

Note. Finally, I got ~2.5 m rows inserted into cl.transaction table fulfilled with fully cleansed data (of course with some artificial constraints)!

Note. In fact, we need to add only decision – making data. I thought that I could throw away some columns (e.g. customers/employees emails, phones etc.), but then I realised I could use it to, for example, select customers emails to target marketing content. So, anyway if I decide it is not needed, I will alter this tables.

dim_customers.sql	28-Jul-22 1:47 PM	SQL File
dim_employees.sql	27-Jul-22 8:36 AM	SQL File
dim_gen_periods.sql	27-Jul-22 7:43 AM	SQL File
dim_geo_location.sql	27-Jul-22 7:43 AM	SQL File
dim_payment_methods.sql	27-Jul-22 8:36 AM	SQL File
dim_products.sql	27-Jul-22 8:36 AM	SQL File
dim_store.sql	28-Jul-22 1:47 PM	SQL File
dim_time.sql	28-Jul-22 1:47 PM	SQL File

Note. We have created dimension tables before. Copy of dimensions creation scripts duplicated in lab4 folder.

```
DROP SEQUENCE SEQ_CUSTOMERS;
CREATE SEQUENCE SEQ_CUSTOMERS
START WITH 1
INCREMENT BY 1
NOCACHE
NOCYCLE;
```

Note. I created such sequences to auto increment primary key id's. Then again added packages using following structure :

- *table_name*_define.sql
- *table_name*_body.sql

```
13
14 CREATE OR REPLACE PACKAGE body pkg_dw_customers
15 AS
16 PROCEDURE LOAD_DW_CUSTOMERS
17 AS
18 BEGIN
19 MERGE INTO DW_DATA.dim_customers A
20 USING ( SELECT FIRST_NAME_CUSTOMER, LAST_NAME_CUSTOMER, COUNTRY_CITY_CUSTOMER, ADDRESS_CUSTOMER, EMAIL, PHONE_CUSTOMER, AGE, IS_ACTIVE
21 FROM DW_CLEANSING.cl_customers) B
22 ON (a.PHONE_CUSTOMER = b.PHONE_CUSTOMER)
23 WHEN MATCHED THEN
24 UPDATE SET a.ADDRESS_CUSTOMER = b.ADDRESS_CUSTOMER
25 WHEN NOT MATCHED THEN
26 INSERT (a.CUSTOMER_ID, a.FIRST_NAME_CUSTOMER, a.LAST_NAME_CUSTOMER, a.COUNTRY_CITY_CUSTOMER, a.ADDRESS_CUSTOMER, a.EMAIL,
27 VALUES (SEQ_CUSTOMERS.NEXTVAL, b.FIRST_NAME_CUSTOMER, b.LAST_NAME_CUSTOMER, b.COUNTRY_CITY_CUSTOMER, b.ADDRESS_CUSTOMER,
28 COMMIT;
29 END LOAD_DW_CUSTOMERS;
30 END pkg_dw_customers;
```

CUSTOMER_ID	FIRST_NAME...	LAST_NAME...	COUNTRY_CITY_C...	ADDRESS_CUSTOMER	EMAIL	PHONE_CUSTOMER	AGE	IS_ACTIVE	CUSTOMER_SALE_DATE
1	Nikita...	Smith	Moldova Kishi...	Kosmonavtov st...	meme@g...	2090124	46	Error	31-MAR-21
2	Stan	Grey	UK Manchester...	Independent st...	dmdmd@...	5774337	35	yes	10-MAY-21
3	Nikita...	Sobolev	USA Californi...	Independent st...	gog@gm...	1102543	49	no	10-MAY-21
4	Masha	Lee	Poland Warsaw...	Independent st...	meme@g...	5768220	52	Error	10-MAY-21
5	Nikita...	Smith	Moldova Kishi...	Kosmonavtov st...	meme@g...	2090124	46	Error	27-FEB-20
6	Masha	Lee	Poland Warsaw...	Independent st...	meme@g...	5768220	52	Error	08-MAY-20
7	Nikita...	Smith	Moldova Kishi...	Kosmonavtov st...	meme@g...	2090124	46	Error	08-MAY-20

I used **Use Explicit Cursor** in pkg_cl_employees_body.sql

Merge in pkg_dw_employees_body.sql

Explicit Cursor and FOR ALL BLUNK Insertion in pkg_dw_stores_body.sql