**ETL Advanced Refresh Scenarios – Refactoring Load to SAL**

Task 01. Loading to SAL Layer Data

Users SAL\_DW\_CL, SAL\_CL, SAL were created and granted with necessary privileges which were added in attached file init\_users.sql.

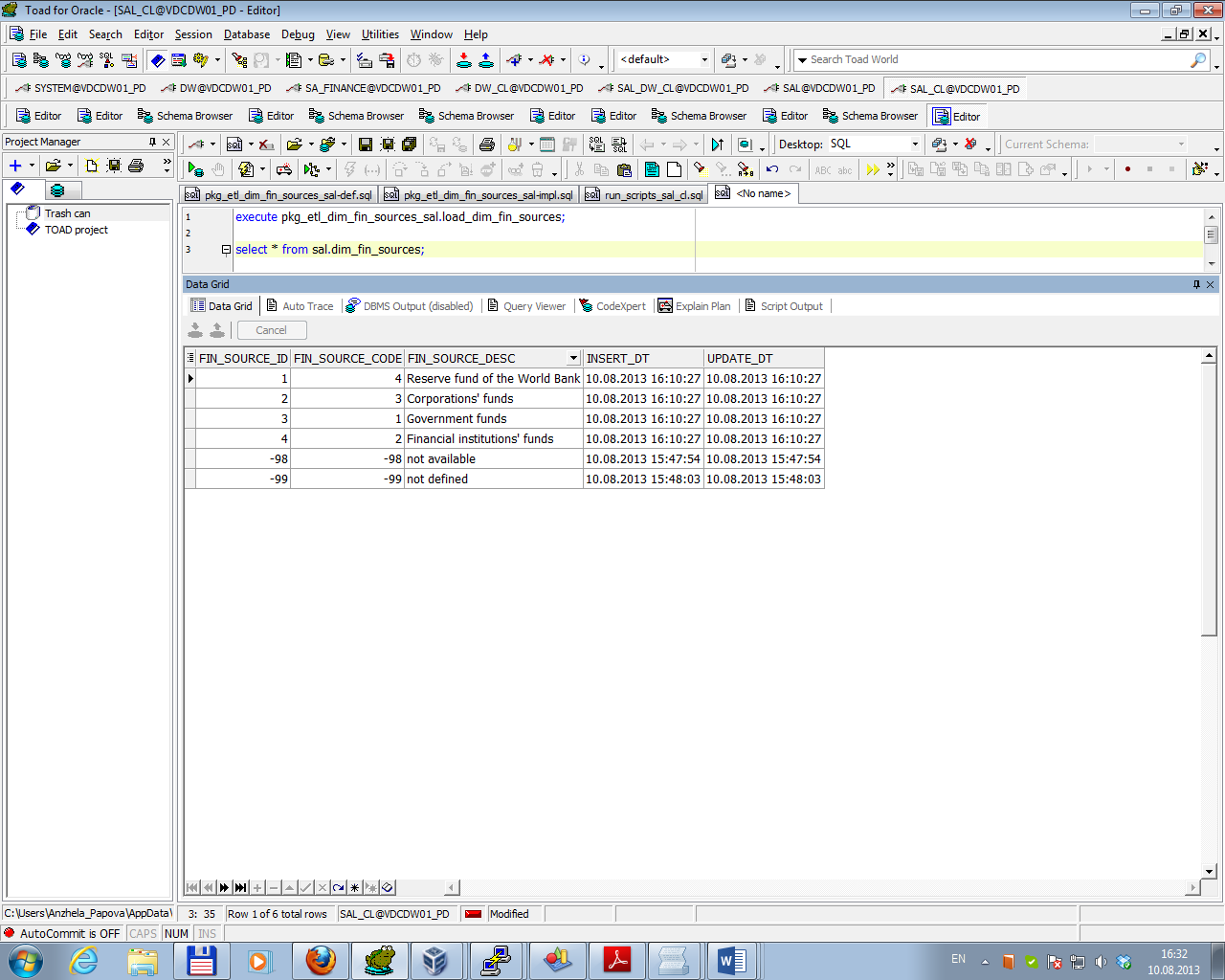
***1. Loading Dimensions SCD Type 1.***

Loading dimensions SCD Type 1 (Dim\_fin\_sources, Dim\_gen\_periods, Dim\_time\_mm) consisted of the following steps:

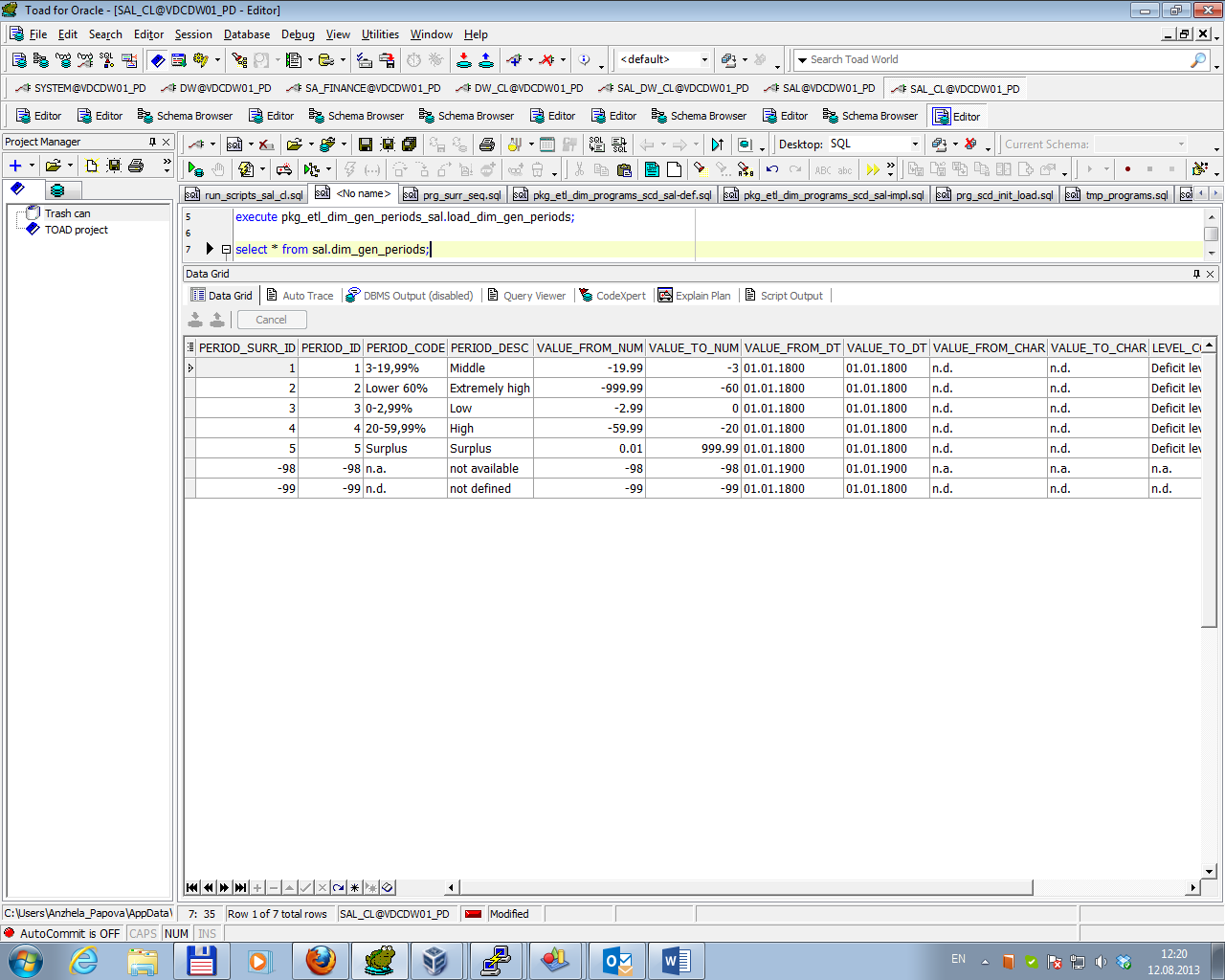
* Creating views with actual data from DW Layer (by running scripts from directory \sal\_dw\_cl\views\);
* Creating sequences for surrogate keys generating (by running scripts from directory \sal\_cl\sequences\);
* Creating tables for loading data on SAL Layer and inserting rows for not available and not defined values into them (by running scripts from directory \sal\tables\);
* Loading data in the tables from views with actual data. Packages are presented in directory \sal\_cl\packages\).

Results of procedure executions for dimensions SCD Type 1 are presented below.

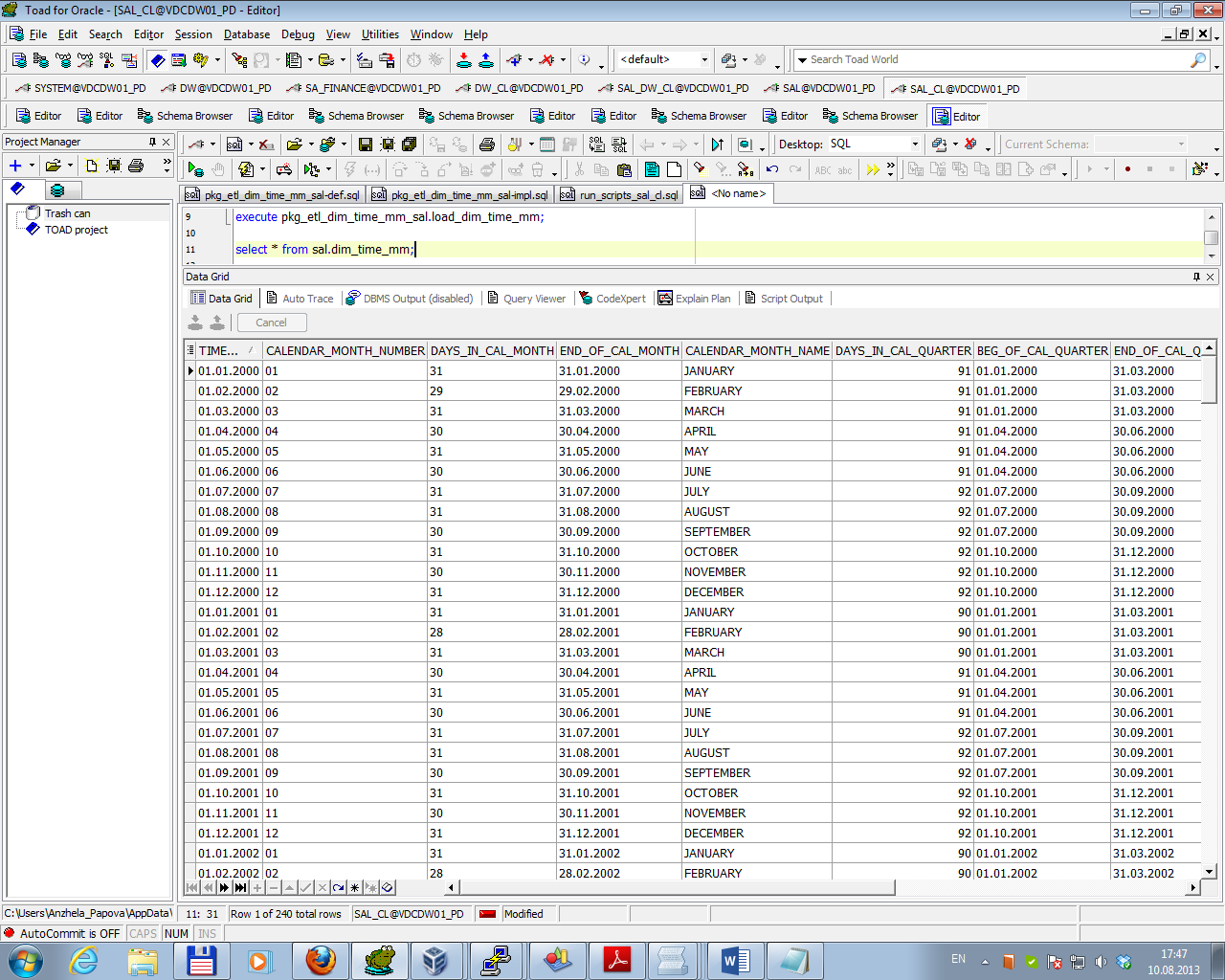
Dim\_fin\_sources:



Dim\_gen\_periods:



Dim\_time\_mm:



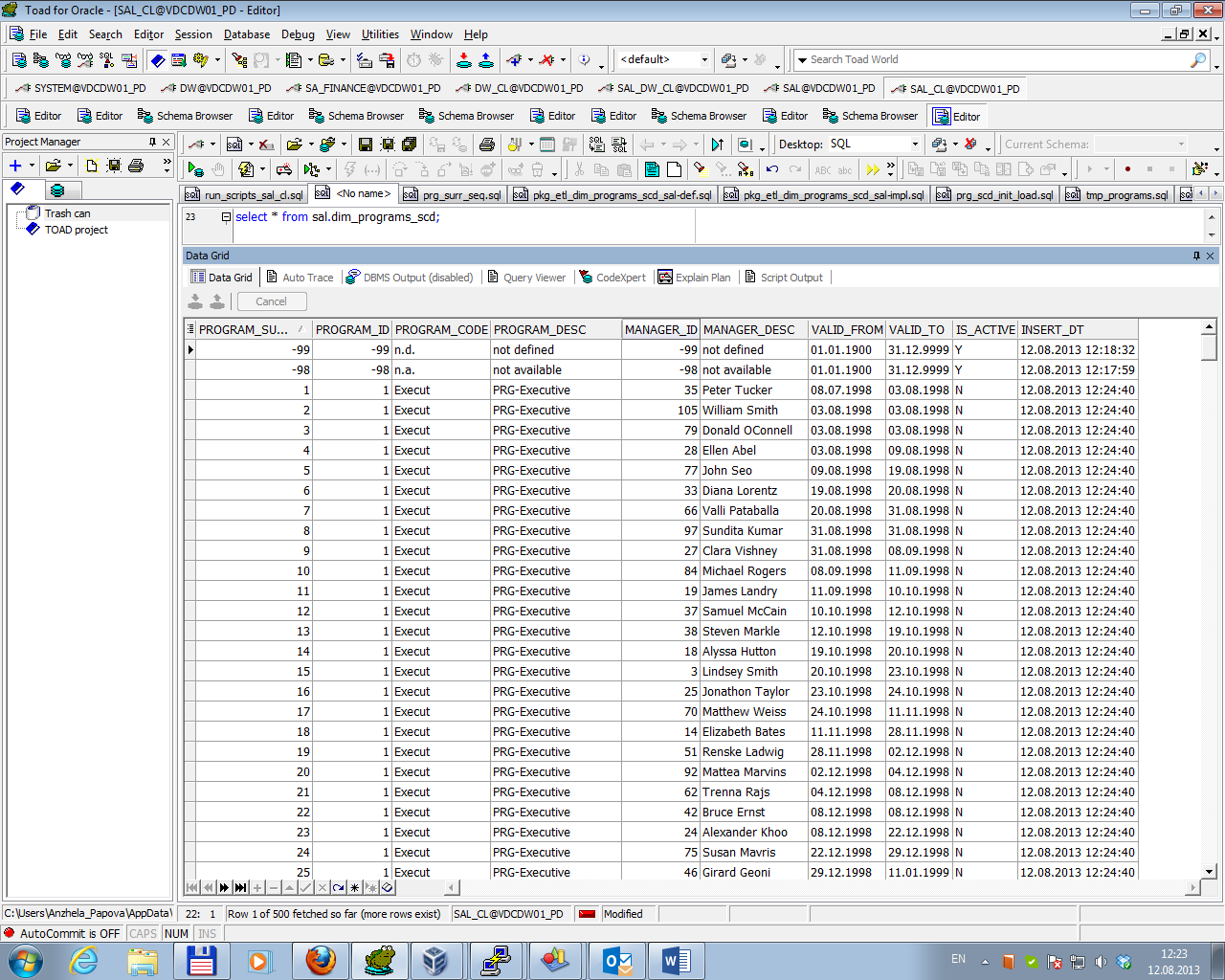
***2. Loading Dimensions SCD Type 2.***

2.1. DIM\_PROGRAMS\_SCD

Loading dimension Dim\_programs\_SCD consisted of the following steps:

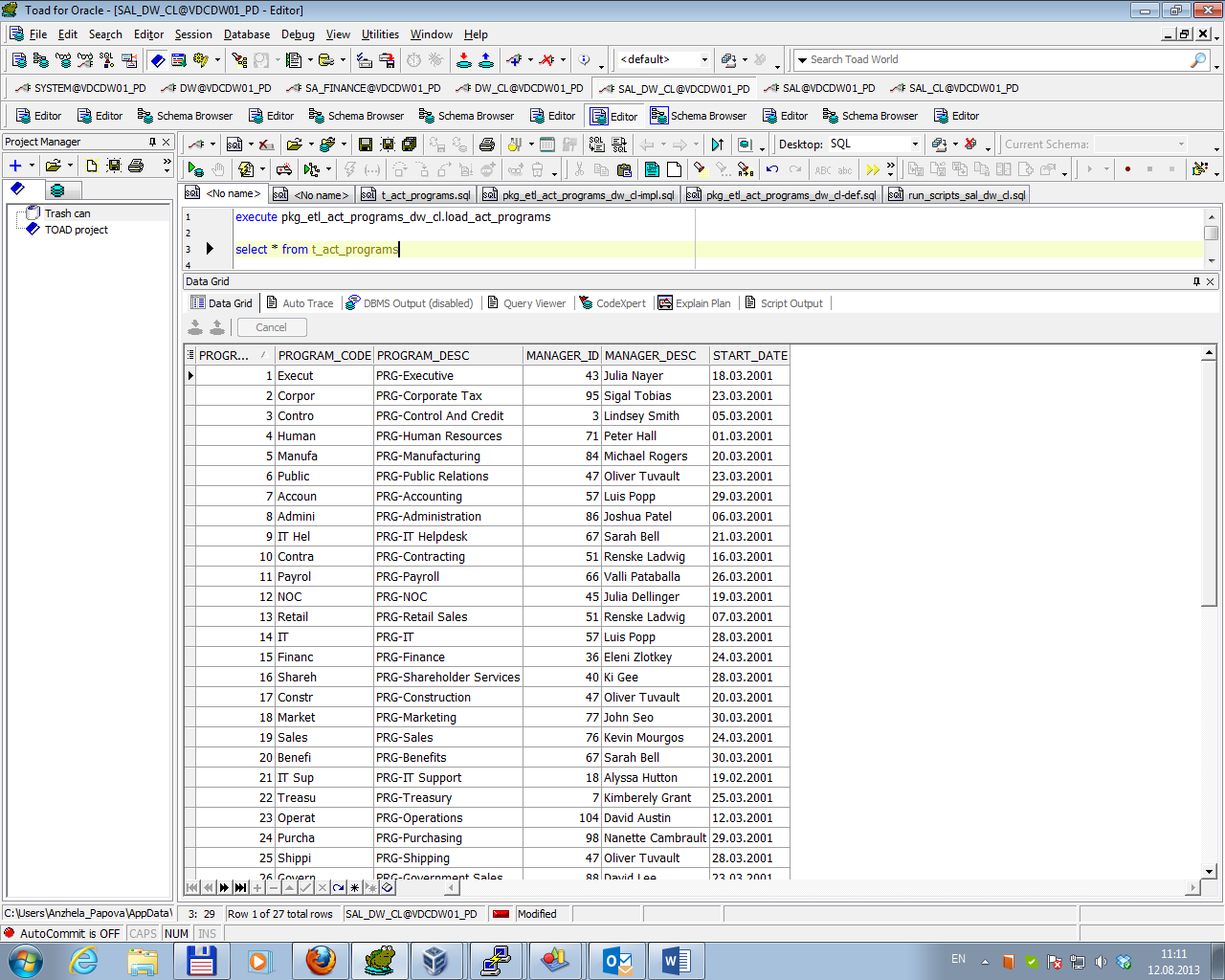
* Creating sequence for surrogate key generating (by running script \sal\_cl\ sequences\prg\_surr\_seq.sql);
* Creating table for loading data on SAL Layer and inserting rows for not available and not defined values into it (by running script \sal\tables\dim\_programs\_scd.sql);
* Initial data loading (as source data consists complete history programs’ managers changing) by running script \sal\_cl\prg\_scd\_init\_load.sql;

Result of initial loading is presented below.



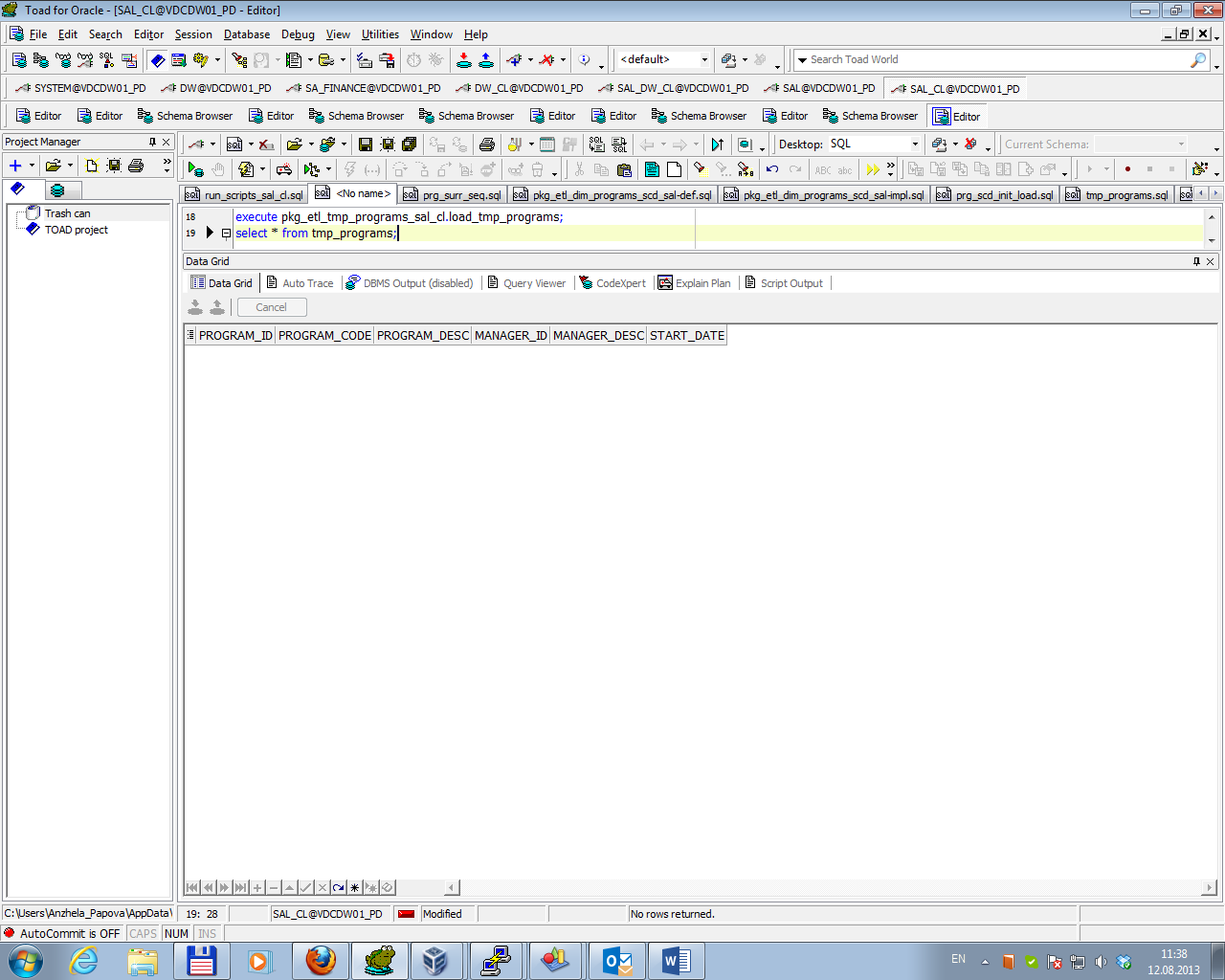
* Creating table for actual data from DW Layer (by running script \sal\_dw\_cl\tables\ t\_act\_programs.sql);
* Loading actual data in the table t\_act\_programs from DW Layer (by running procedure from package \sal\_dw\_cl\packages\pkg\_etl\_act\_programs\_dw\_cl\).

Result of procedure execution is presented below.



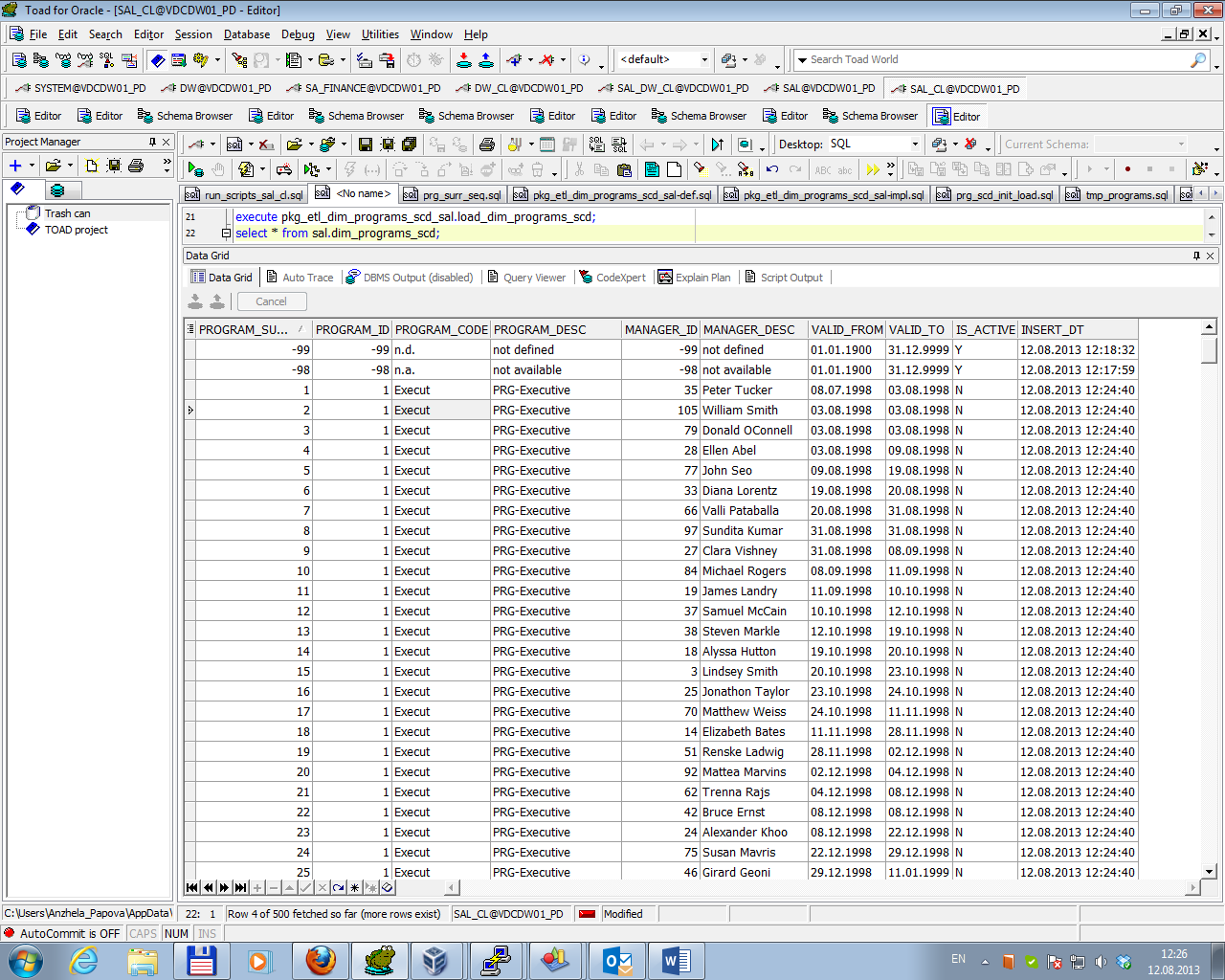
* Creating table for data to update or insert in the dimension entity dim\_programs\_scd (by running script \sal\_cl\tables\tmp\_programs.sql);
* Loading data in the table tmp\_programs as difference between actual data in the table t\_act\_programs and data on SAL Layer from dim\_programs\_scd (by running procedure from package \sal\_cl\packages\pkg\_etl\_tmp\_programs\_sal\_cl\).

Result of procedure execution is presented below (table is empty because no data changes is gotten)



* Updating and inserting data from the table tmp\_programs in the dimension entity dim\_programs\_scd (by running procedure from package \sal\_cl\packages\ pkg\_etl\_dim\_programs\_scd\_sal\).

Result of procedure execution for dimension Dim\_programs\_SCD is presented below.

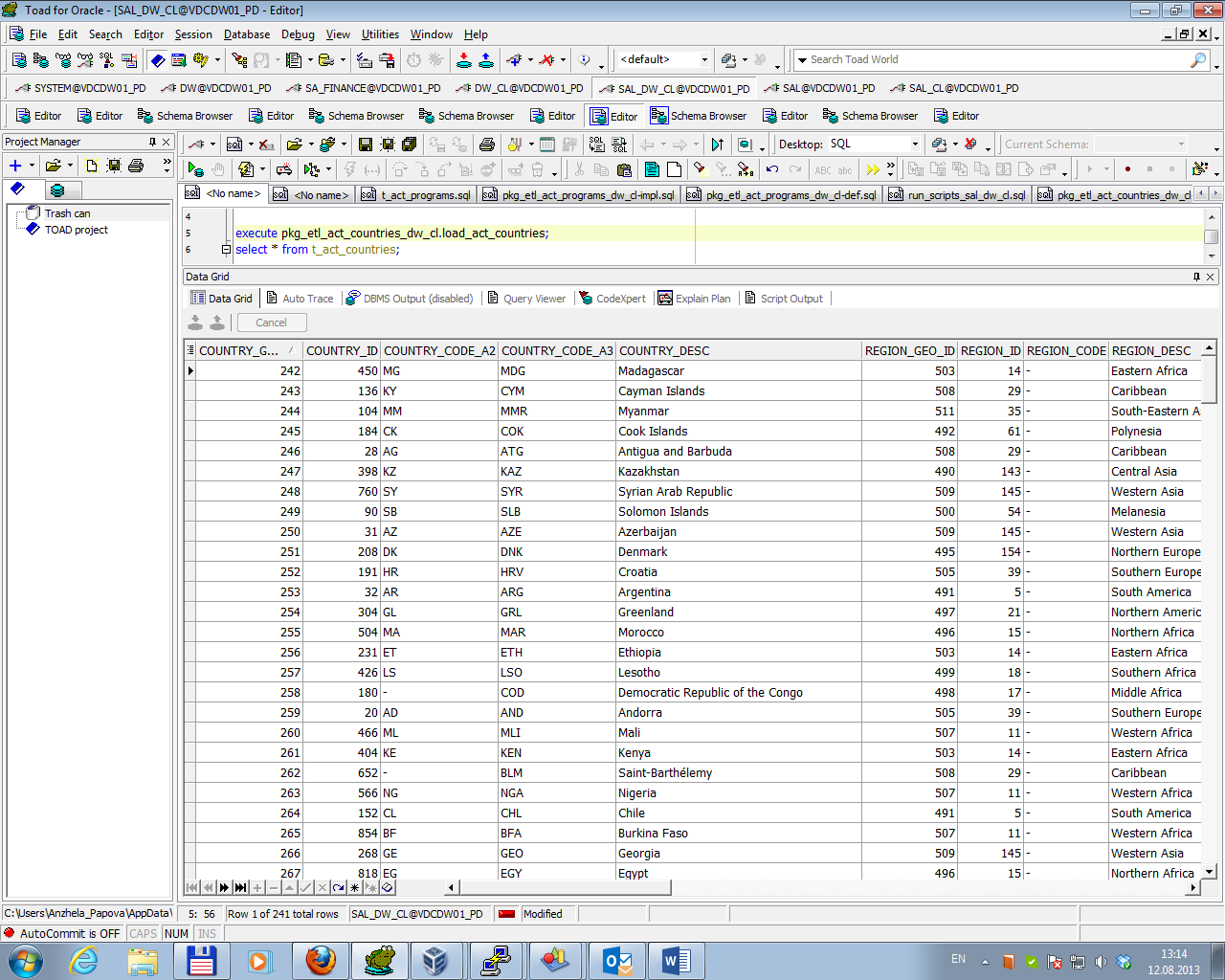


2.2. DIM\_COUNTRIES\_SCD

Loading dimension Dim\_countries\_SCD consisted of the following steps:

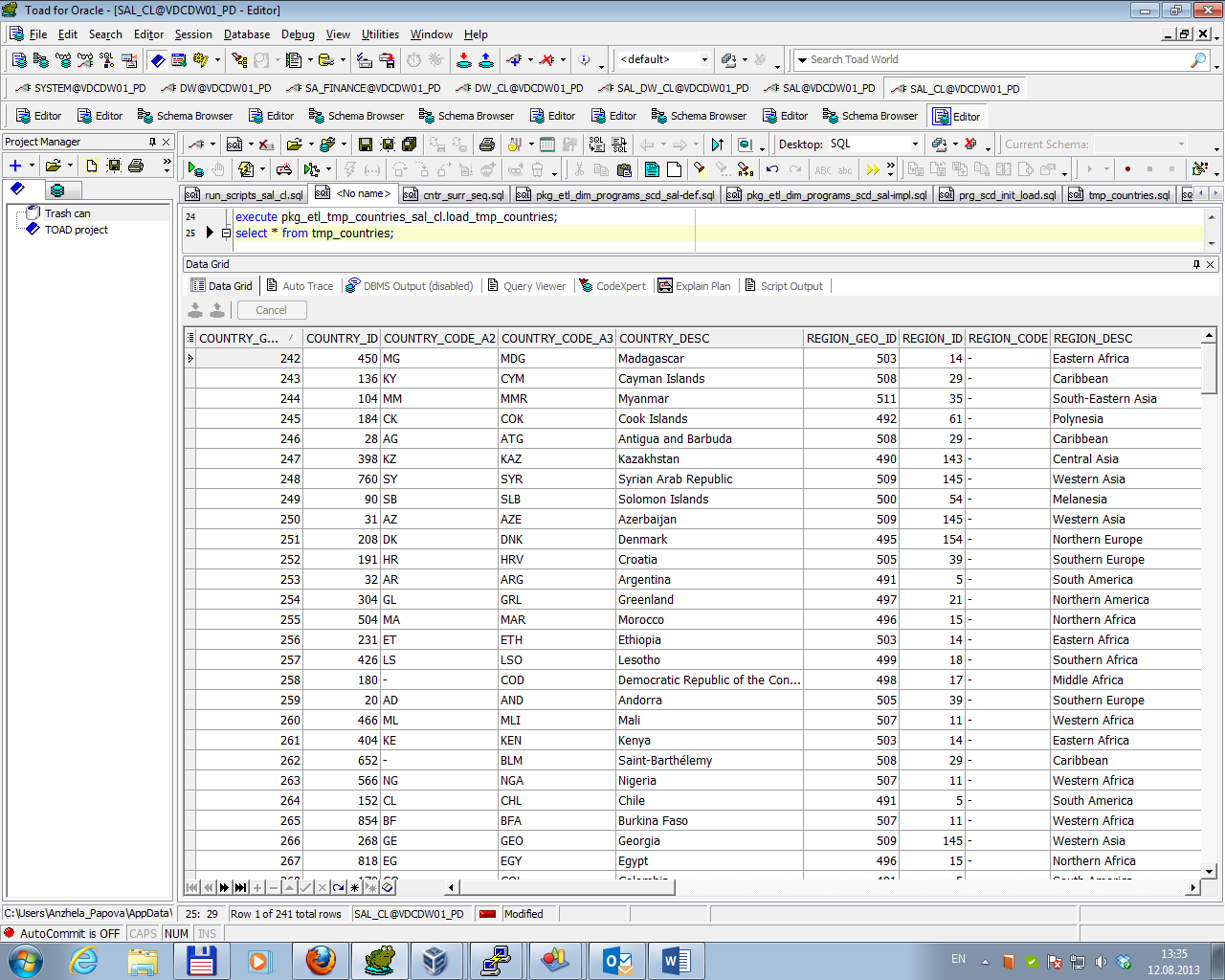
* Creating sequence for surrogate key generating (by running script \sal\_cl\ sequences\cntr\_surr\_seq.sql);
* Creating table for loading data on SAL Layer and inserting rows for not available and not defined values into it (by running script \sal\tables\ dim\_countries\_scd.sql);
* Creating table for actual data from DW Layer (by running script \sal\_dw\_cl\tables\ t\_act\_countries.sql);
* Loading actual data in the table t\_act\_countries from DW Layer (by running procedure from package \sal\_dw\_cl\packages\ pkg\_etl\_act\_countries\_dw\_cl\).

Result of procedure execution is presented below.



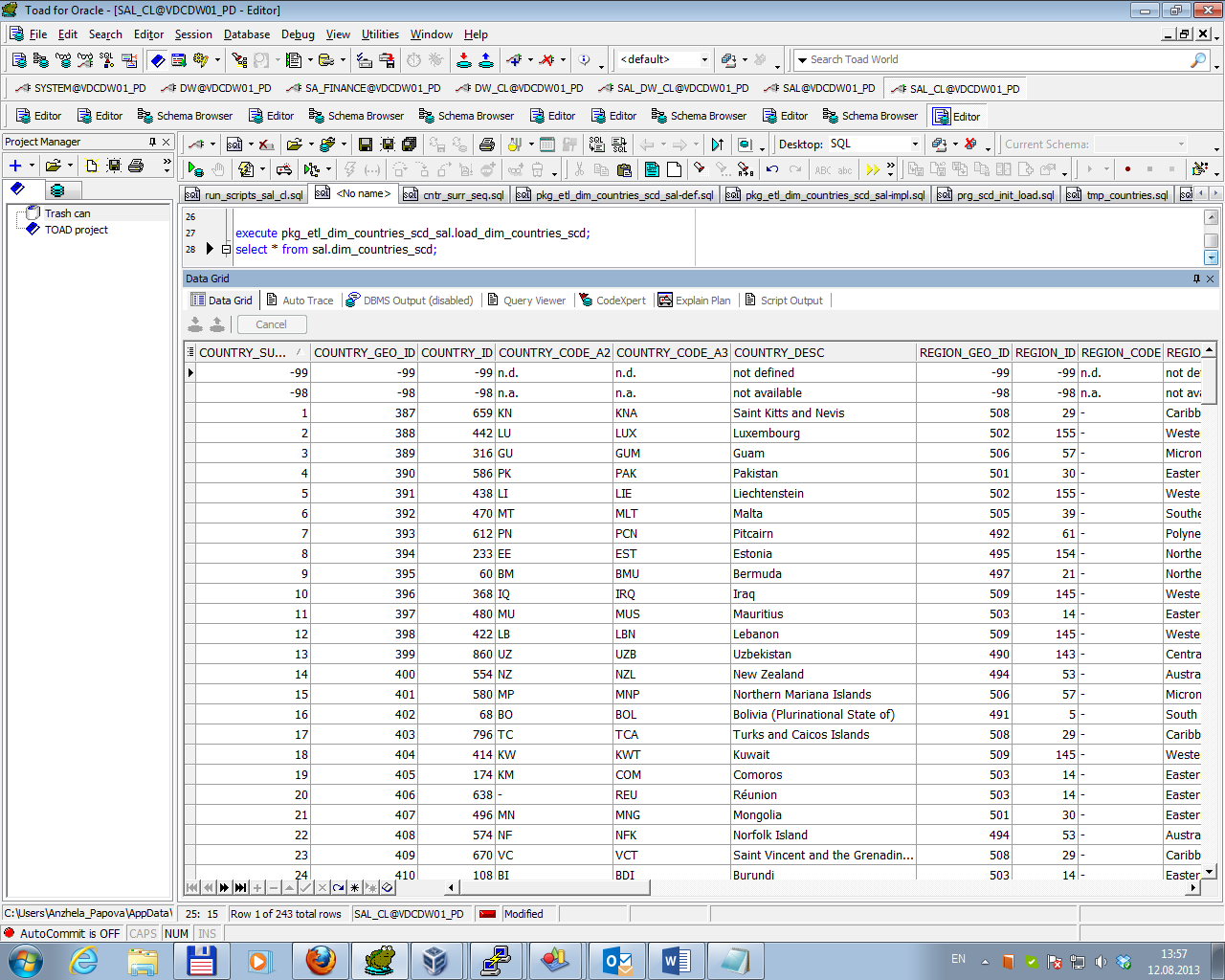
* Creating table for data to update or insert in the dimension entity dim\_countries\_scd (by running script \sal\_cl\tables\tmp\_countries.sql);
* Loading data in the table tmp\_countries as difference between actual data in the table t\_act\_countries and data on SAL Layer from dim\_countries\_scd (by running procedure from package \sal\_cl\packages\pkg\_etl\_tmp\_countries\_sal\_cl\).

Result of procedure execution is presented below.



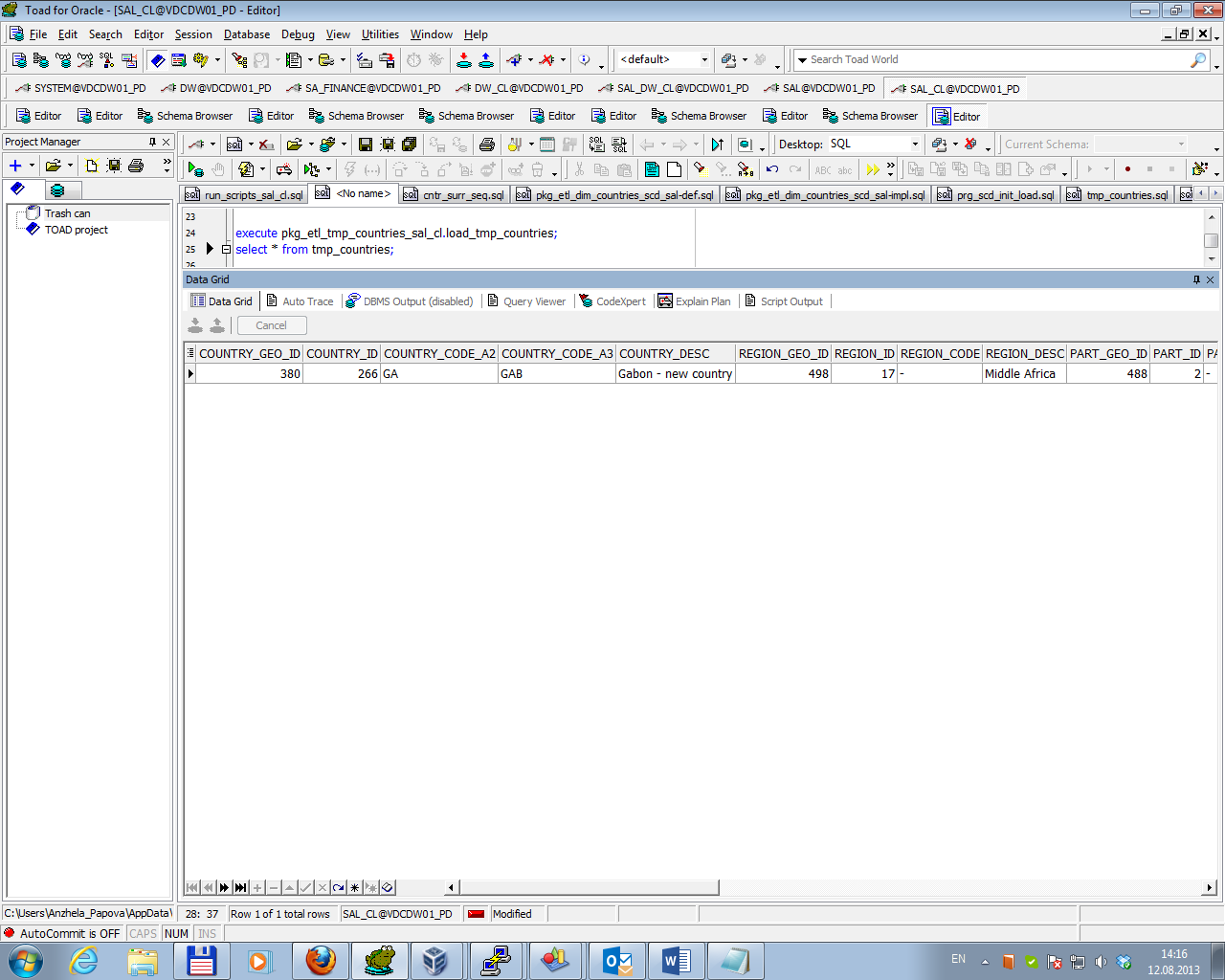
* Updating and inserting data from the table tmp\_countries in the dimension entity dim\_countries\_scd (by running procedure from package \sal\_cl\packages\ pkg\_etl\_dim\_countries\_scd\_sal\).

Result of procedure execution for dimension Dim\_countries\_SCD is presented below.

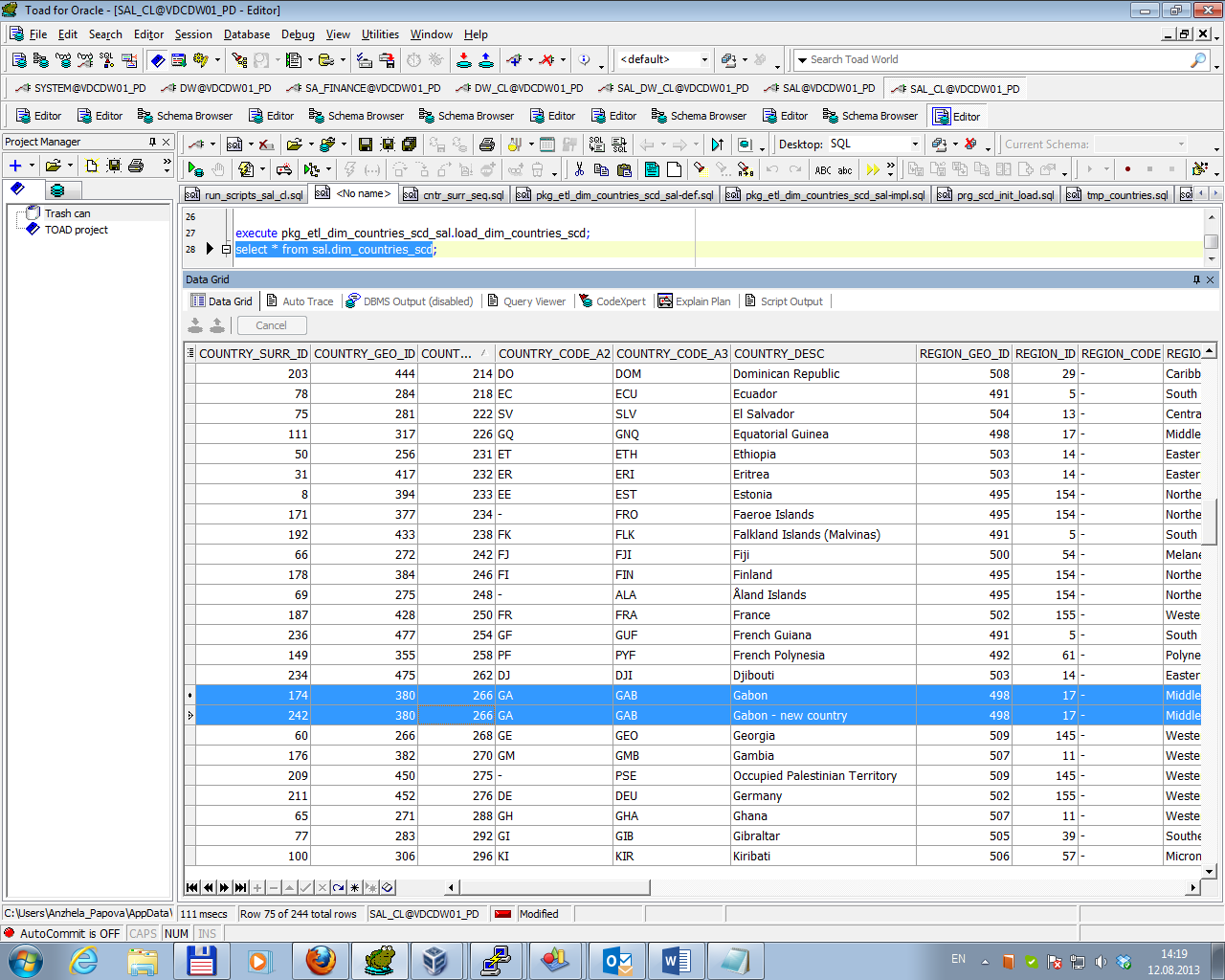


To test correctness of the scripts for country\_id = 266 (country\_geo\_id = 380) Country\_desc was changed from ‘Gabon’ to ‘Gabon – new country’. Then the actual data was loaded into table t\_act\_countries.

Difference between actual data in the table t\_act\_countries and data on SAL Layer from dim\_countries\_scd was gotten by running procedure from package \sal\_cl\packages\pkg\_etl\_tmp\_countries\_sal\_cl\. Result of procedure execution is presented below.



Then data was updated and inserted in the dimension entity dim\_countries\_scd (by running procedure from package \sal\_cl\packages\ pkg\_etl\_dim\_countries\_scd\_sal\). Result of procedure execution for dimension Dim\_countries\_SCD is presented below (two rows with country\_id = 266 and country\_geo\_id = 380 and different values of Country\_desc).

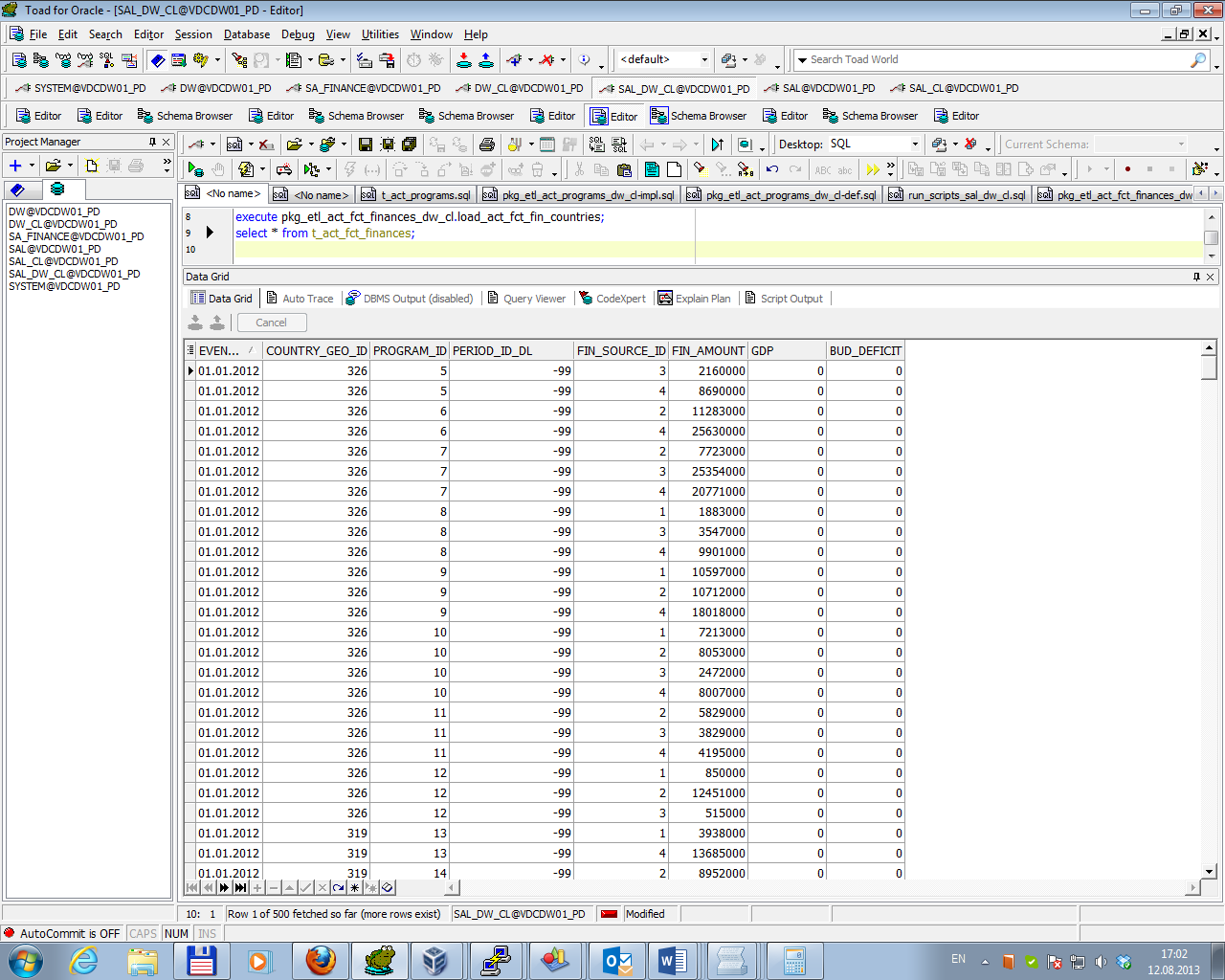


***3. Loading Fact entity.***

Loading fact table FCT\_WB\_Fin\_countries\_MM consisted of the following steps:

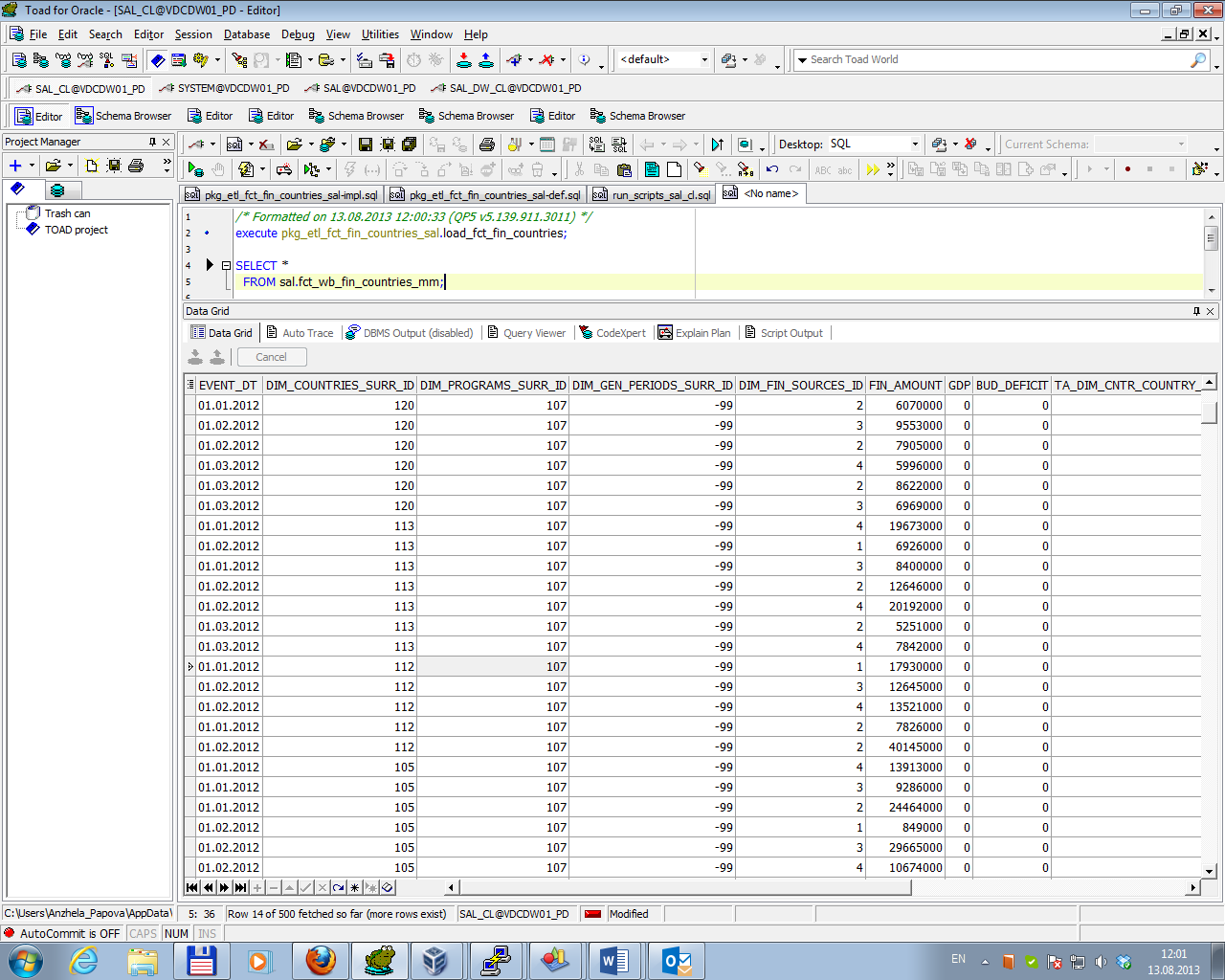
* Creating table for loading data on SAL Layer by running script \sal\tables\ fct\_wb\_fin\_countries\_mm.sql);
* Creating table for all data from DW Layer which should be inserted into fact table FCT\_WB\_Fin\_countries\_MM by running script \sal\_dw\_cl\tables\ t\_act\_fct\_finances.sql;
* Loading data in the table t\_act\_fct\_finances from DW Layer for current and previous years by running procedure from package \sal\_dw\_cl\packages\ pkg\_etl\_act\_countries\_dw\_cl\ (according business requirements data should be updated by overwriting data for current and previous years);

Result of procedure execution is presented below.



* Creating table (with the same structure as fact table) for data from DW Layer which should be inserted into fact table FCT\_WB\_Fin\_countries\_MM using the Exchange Partition operation by running script \sal\_cl\tables\tmp\_fct\_finances.sql;
* Inserting data from the table t\_act\_fct\_finances into table tmp\_fct\_finances (with dividing data according partition rules of fact table) and overwriting data in the fact table FCT\_WB\_Fin\_countries\_MM using the Exchange Partition operation by running procedure from package \sal\_cl\packages\pkg\_etl\_fct\_wb\_fin\_countries\_ mm\_sal\.

Result of procedure execution for fact table FCT\_WB\_Fin\_countries\_MM is presented below.

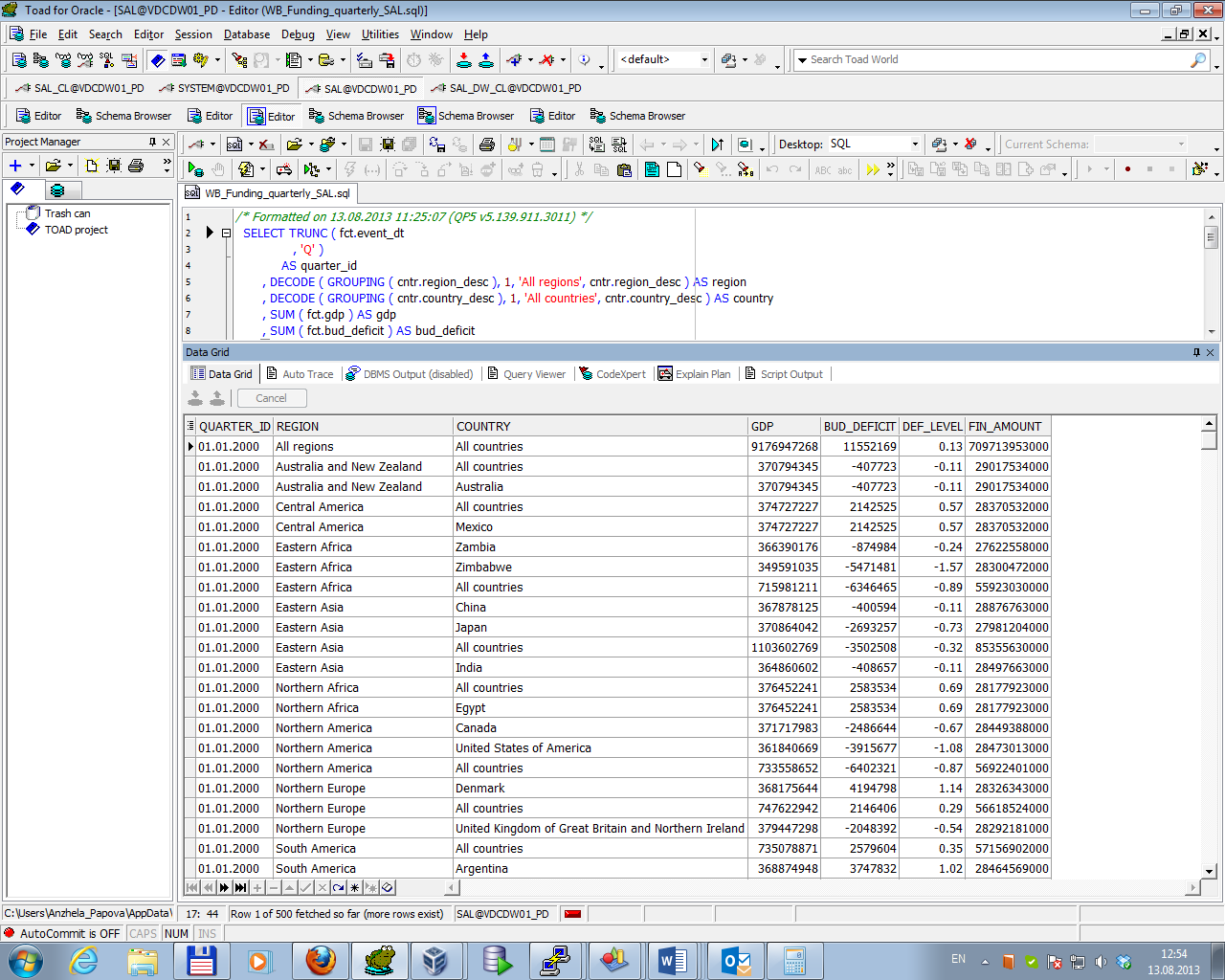


**Business Task – Performance of STAR Scheme**

Task 02. Prepare Report Layout

Ad Hoc SQL for Report Layout Quarterly that was developed on Labwork 2 using STAR schema objects for source of Data is in file WB\_Funding\_quarterly\_SAL.sql.

Result of script running is presented below.



Task 03. Compare Report Layout Performance

Summarize table with comparison performance of different Report Layouts is presented below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| № | Source Type | Explain Plan – Statistics (Cost) | | | Time |
| cost | bytes | cardinality |
| 1 | Advancing Grouping (Labwork 02) | 3 526 | 6 035 | 71 | 1:02 mins |
| 2 | Model Clause (Labwork 05) | 6 | 223 200 | 1 800 | 51msecs |
| 3 | Star Schema (Labwork 11) | 4 353 | 1 480 380 | 26 916 | 359msecs |