U2M11.LW.ETL Overview - Advanced Refresh Scenarios

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https://github.com/VeraShkrabatouskaya/DataMola_Data-Camping-2022

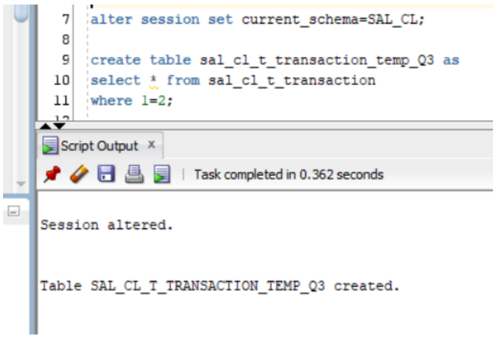
2. ETL Advanced Refresh Scenarios – Refactoring Load to SAL

Task 01 is common for LabWork 10 (Task 02), 11(Task 01).

2.1. Task 01: Loading to SAL Layer Data

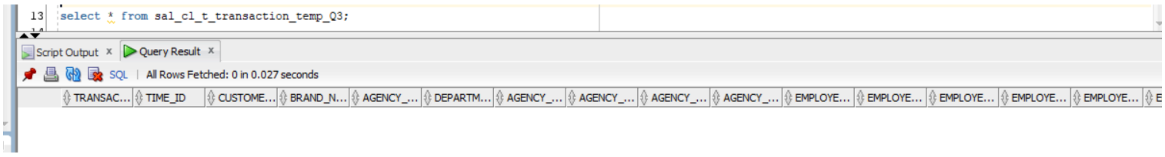
Let's create a table containing only Q3 data using Exchange Partition and Temporary table.

Creating a temporary table sal_cl_t_transaction_temp_Q3.



```
alter session set current_schema=SAL_CL;

create table sal_cl_t_transaction_temp_Q3 as
select * from sal_cl_t_transaction
where 1=2;
```

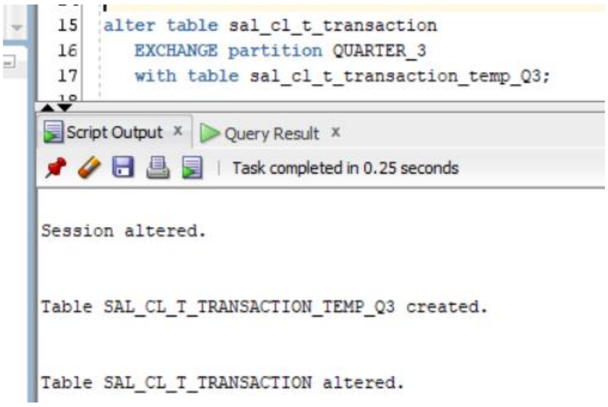
```
Session altered.


Table SAL_CL_T_TRANSACTION_TEMP_Q3 created.
```



```
select * from sal_cl_t_transaction_temp_Q3;
```

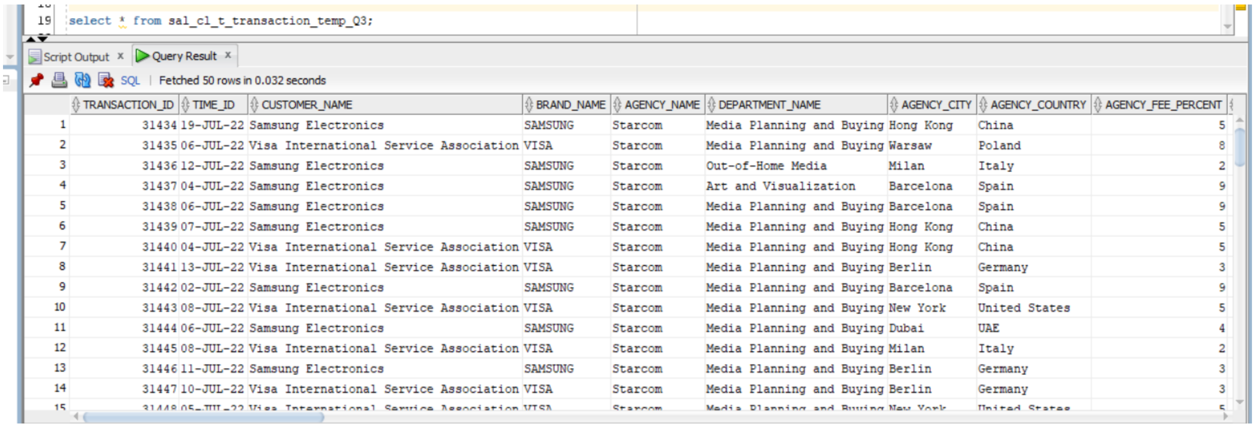
TRANSAC...	TIME_ID	CUSTOME...	BRAND_N...	AGENCY_...	DEPARTM...	AGENCY_...	AGENCY_...	AGENCY_...	AGENCY_...	EMPLOYE...	EMPLOYE...	EMPLOYE...	EMPLOYE...	EMPLOYE...	E

Let's migrate the data from the sal_cl_t_transaction table for Q3 using the Exchange Partition to a temporary table.



```
alter table sal_cl_t_transaction
    EXCHANGE partition QUARTER_3
    with table sal_cl_t_transaction_temp_Q3;
```

```
Session altered.


Table SAL_CL_T_TRANSACTION_TEMP_Q3 created.


Table SAL_CL_T_TRANSACTION altered.
```

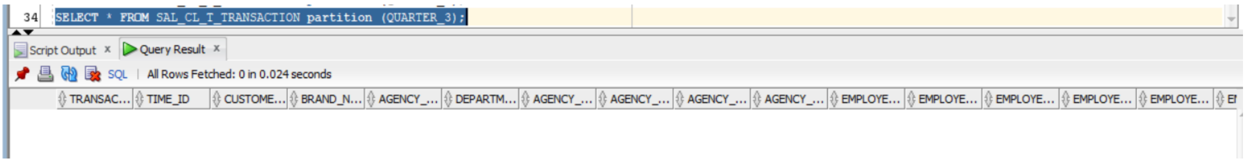


```sql
select * from sal_cl_t_transaction_temp_Q3;
```

Fetched 50 rows in 0.032 seconds

	TRANSACTION_ID	TIME_ID	CUSTOMER_NAME	BRAND_NAME	AGENCY_NAME	DEPARTMENT_NAME	AGENCY_CITY	AGENCY_COUNTRY	AGENCY_FEE_PERCENT
1	31434	19-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Hong Kong	China	5
2	31435	06-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	Warsaw	Poland	8
3	31436	12-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Out-of-Home Media	Milan	Italy	2
4	31437	04-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Art and Visualization	Barcelona	Spain	9
5	31438	06-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Barcelona	Spain	9
6	31439	07-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Hong Kong	China	5
7	31440	04-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	Hong Kong	China	5
8	31441	13-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	Berlin	Germany	3
9	31442	02-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Barcelona	Spain	9
10	31443	08-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	New York	United States	5
11	31444	06-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Dubai	UAE	4
12	31445	08-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	Milan	Italy	2
13	31446	11-JUL-22	Samsung Electronics	SAMSUNG	Starcom	Media Planning and Buying	Berlin	Germany	3
14	31447	10-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	Berlin	Germany	3
15	31448	05-JUL-22	Visa International Service Association	VISA	Starcom	Media Planning and Buying	New York	United States	5

We see that the data for Q3 has been moved to a temporary table. At the same time, in our main table Partition QUARTER_3 has become empty.



```sql
SELECT * FROM SAL_CL_T_TRANSACTION partition (QUARTER_3);
```

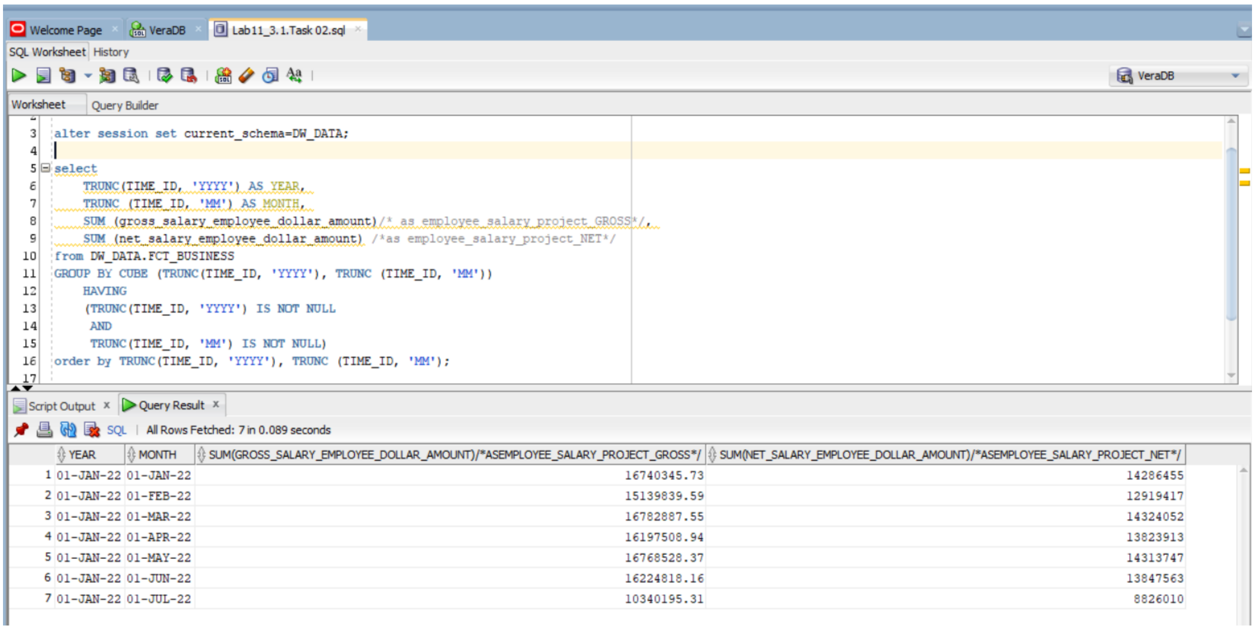
All Rows Fetched: 0 in 0.024 seconds

TRANSAC...	TIME_ID	CUSTOME...	BRAND_N...	AGENCY_...	DEPARTM...	AGENCY_...	AGENCY_...	AGENCY_...	AGENCY_...	EMPLOYE...	EMPLOYE...	EMPLOYE...	EMPLOYE...	EMPLOYE...	EI

3. Business Task – Performance of STAR Scheme

3.1. Task 02: Prepare Report Layout

Let's create a select to calculate employee salaries by month using the STAR schema.



```sql
alter session set current_schema=DW_DATA;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

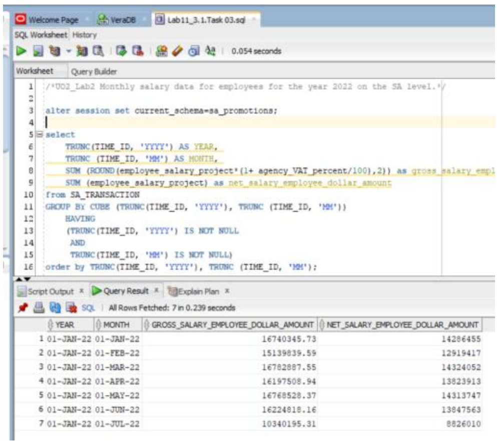
All Rows Fetched: 7 in 0.089 seconds

	YEAR	MONTH	SUM(GROSS_SALARY_EMPLOYEE_DOLLAR_AMOUNT)/*ASEMPLOYEE_SALARY_PROJECT_GROSS*/	SUM(NET_SALARY_EMPLOYEE_DOLLAR_AMOUNT)/*ASEMPLOYEE_SALARY_PROJECT_NET*/
1	01-JAN-22	01-JAN-22	16740345.73	14286455
2	01-JAN-22	01-FEB-22	15139839.59	12919417
3	01-JAN-22	01-MAR-22	16782887.55	14324052
4	01-JAN-22	01-APR-22	16197508.94	13823913
5	01-JAN-22	01-MAY-22	16768528.37	14313747
6	01-JAN-22	01-JUN-22	16224818.16	13847563
7	01-JAN-22	01-JUL-22	10340195.31	8826010

3.2. Task 03: Compare Report Layout Performance

Create summarize table with comparison performance of the monthly reports at different levels.

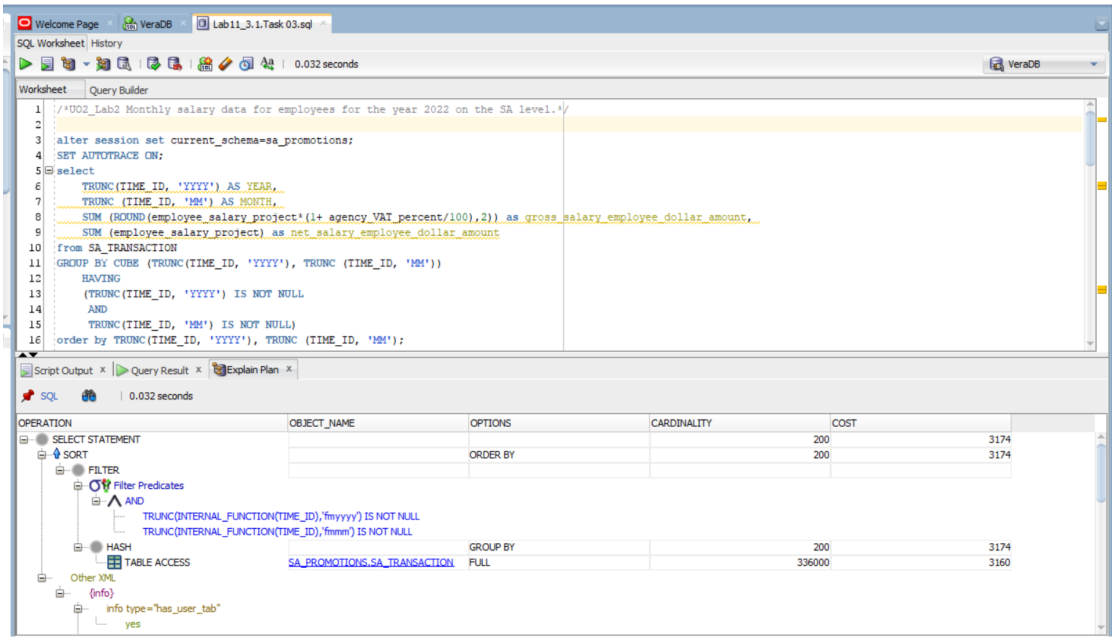
- Monthly salary data for employees for the year 2022 on the SA level.



```sql
/*U02_Lab2 Monthly salary data for employees for the year 2022 on the SA level.*/

alter session set current_schema=sa_promotions;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_empl
    SUM (employee_salary_project) as net_salary_employee_dollar_amount
from SA_TRANSACTION
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

All Rows Fetched: 7 in 0.239 seconds

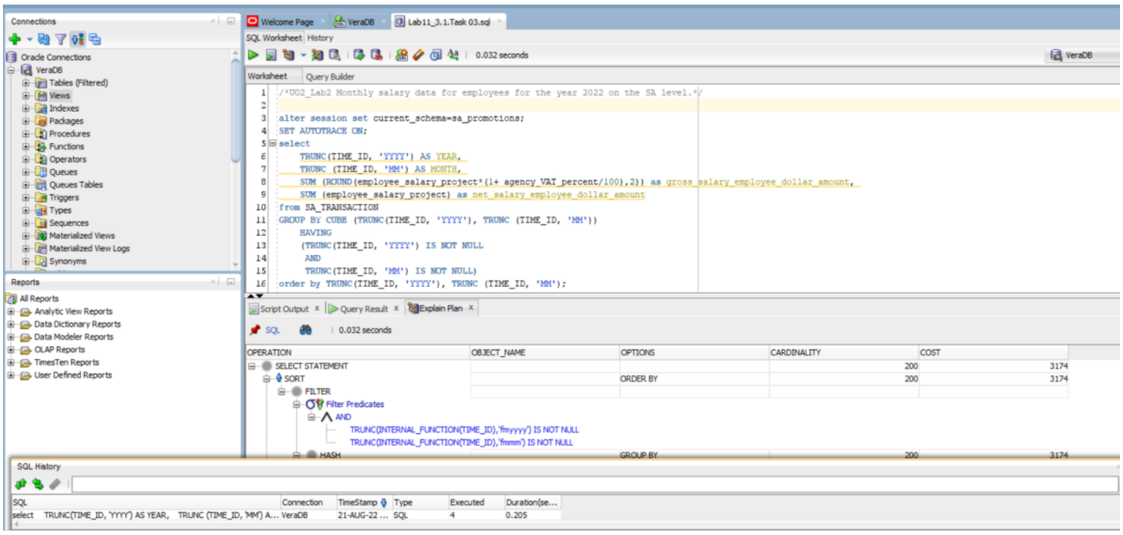
	YEAR	MONTH	GROSS_SALARY_EMPLOYEE_DOLLAR_AMOUNT	NET_SALARY_EMPLOYEE_DOLLAR_AMOUNT
1	01-JAN-22	01-JAN-22	16740345.73	14286455
2	01-JAN-22	01-FEB-22	15139839.59	12919417
3	01-JAN-22	01-MAR-22	16782887.55	14324052
4	01-JAN-22	01-APR-22	16197508.94	13823913
5	01-JAN-22	01-MAY-22	16768528.37	14313747
6	01-JAN-22	01-JUN-22	16224818.16	13847563
7	01-JAN-22	01-JUL-22	10340195.31	8826010



```sql
/*U02_Lab2 Monthly salary data for employees for the year 2022 on the SA level.*/

alter session set current_schema=sa_promotions;
SET AUTOTRACE ON;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount,
    SUM (employee_salary_project) as net_salary_employee_dollar_amount
from SA_TRANSACTION
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

0.032 seconds

```
OPERATION                                                        OBJECT_NAME                    OPTIONS     CARDINALITY   COST
SELECT STATEMENT                                                                                                    200   3174
  SORT                                                                                          ORDER BY            200   3174
    FILTER
      Filter Predicates
        AND
          TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmyyyy') IS NOT NULL
          TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmmm') IS NOT NULL
      HASH                                                                                      GROUP BY            200   3174
        TABLE ACCESS                                             SA_PROMOTIONS.SA_TRANSACTION   FULL             336000   3160
  Other XML
    {info}
      info type="has_user_tab"
        yes
```



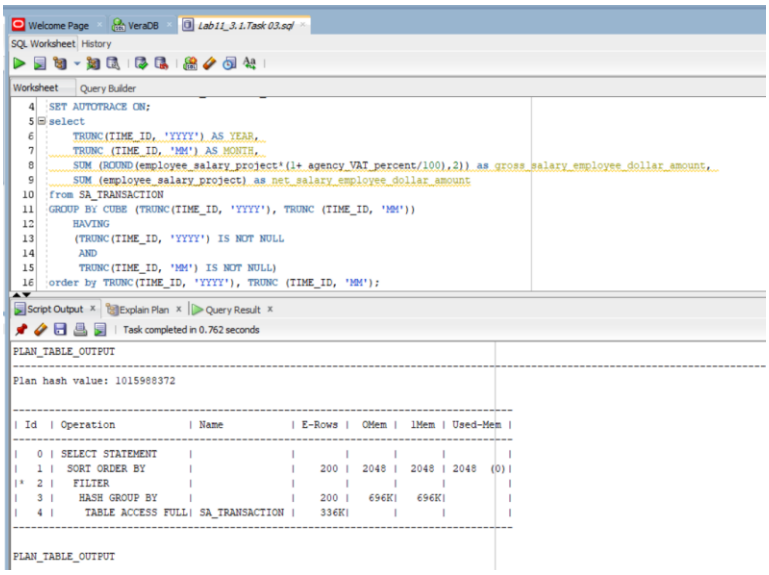
```sql
/*U02_Lab2 Monthly salary data for employees for the year 2022 on the SA level.*/

alter session set current_schema=sa_promotions;
SET AUTOTRACE ON;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount,
    SUM (employee_salary_project) as net_salary_employee_dollar_amount
from SA_TRANSACTION
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

0.032 seconds

```
OPERATION                                                        OBJECT_NAME   OPTIONS     CARDINALITY   COST
SELECT STATEMENT                                                                                   200   3174
  SORT                                                                         ORDER BY            200   3174
    FILTER
      Filter Predicates
        AND
          TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmyyyy') IS NOT NULL
          TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmmm') IS NOT NULL
      HASH                                                                     GROUP BY            200   3174
```

SQL History

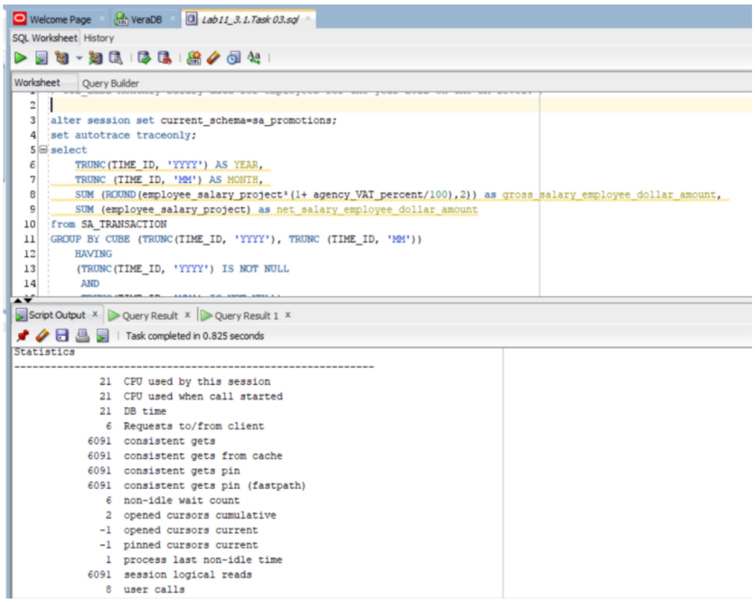
SQL	Connection	TimeStamp	Type	Executed	Duration(se...
select TRUNC(TIME_ID, 'YYYY') AS YEAR, TRUNC (TIME_ID, 'MM') A...	VeraDB	21-AUG-22 ...	SQL	4	0.205



```sql
SET AUTOTRACE ON;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount,
    SUM (employee_salary_project) as net_salary_employee_dollar_amount
from SA_TRANSACTION
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

Task completed in 0.762 seconds

```
PLAN_TABLE_OUTPUT
--------------------------------------------------------------------------------------------------
Plan hash value: 1015988372

-------------------------------------------------------------------------------------
| Id  | Operation            | Name           | E-Rows |  OMem |  1Mem | Used-Mem |
-------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT     |                |        |       |       |          |
|   1 |  SORT ORDER BY       |                |    200 |  2048 |  2048 | 2048  (0)|
|*  2 |   FILTER             |                |        |       |       |          |
|   3 |    HASH GROUP BY     |                |    200 |  696K|  696K|          |
|   4 |     TABLE ACCESS FULL| SA_TRANSACTION |    336K|       |       |          |
-------------------------------------------------------------------------------------


PLAN_TABLE_OUTPUT
```

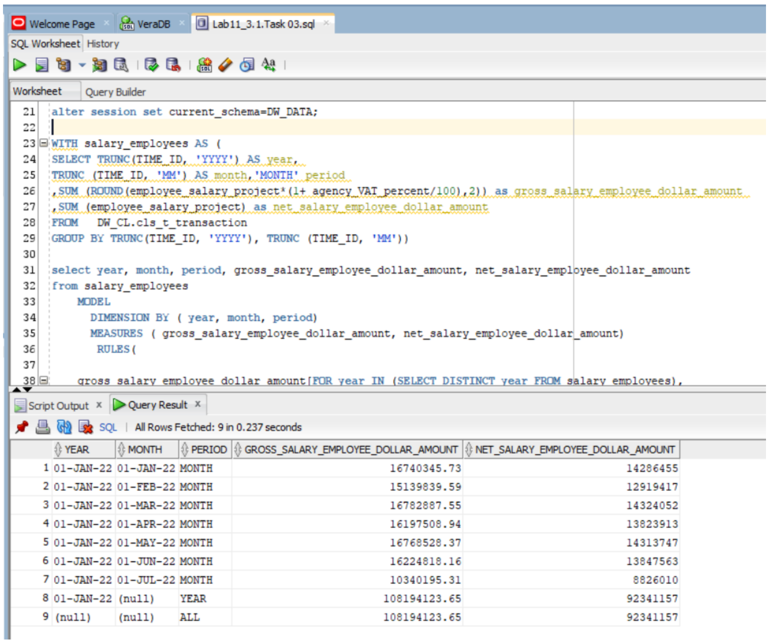


```sql

alter session set current_schema=sa_promotions;
set autotrace traceonly;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount,
    SUM (employee_salary_project) as net_salary_employee_dollar_amount
from SA_TRANSACTION
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
```

Task completed in 0.825 seconds

```
Statistics
-----------------------------------------------------------
              21  CPU used by this session
              21  CPU used when call started
              21  DB time
               6  Requests to/from client
            6091  consistent gets
            6091  consistent gets from cache
            6091  consistent gets pin
            6091  consistent gets pin (fastpath)
               6  non-idle wait count
               2  opened cursors cumulative
              -1  opened cursors current
              -1  pinned cursors current
               1  process last non-idle time
            6091  session logical reads
               8  user calls
```

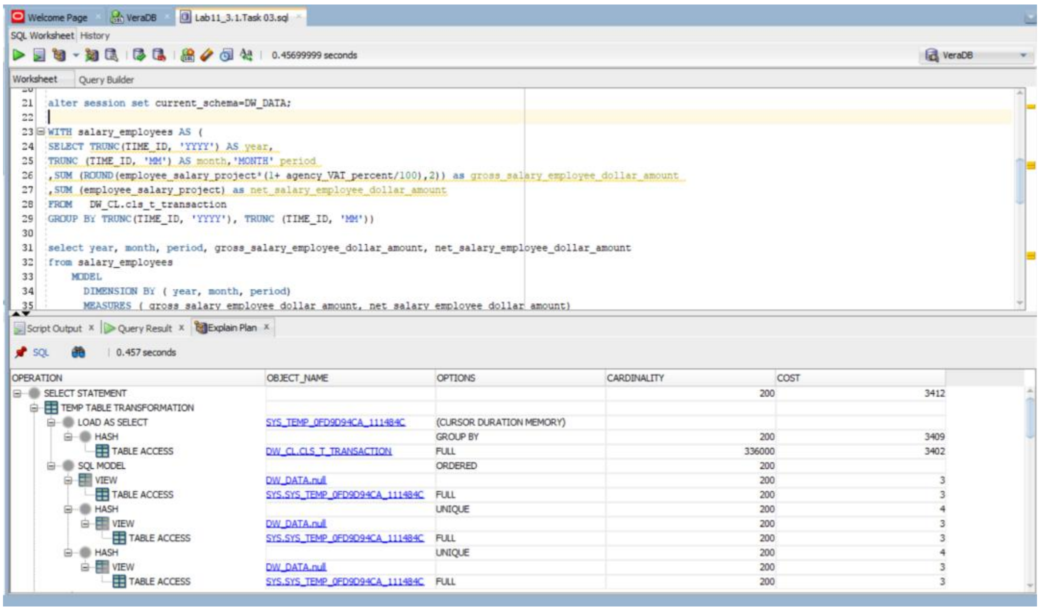
- Monthly salary data for employees for the year 2022 using Module Clause on the DW level.



```sql
alter session set current_schema=DW_DATA;

WITH salary_employees AS (
SELECT TRUNC(TIME_ID, 'YYYY') AS year,
TRUNC (TIME_ID, 'MM') AS month,'MONTH' period
,SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount
,SUM (employee_salary_project) as net_salary_employee_dollar_amount
FROM   DW_CL.cls_t_transaction
GROUP BY TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))

select year, month, period, gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount
from salary_employees
    MODEL
      DIMENSION BY ( year, month, period)
      MEASURES ( gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount)
       RULES(

    gross_salary_employee_dollar_amount[FOR year IN (SELECT DISTINCT year FROM salary_employees),
```

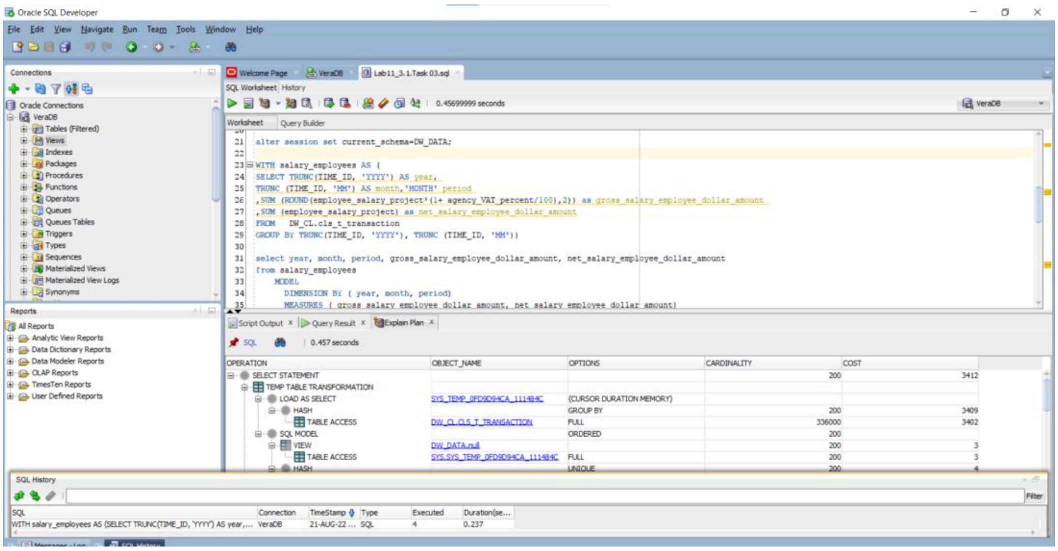
All Rows Fetched: 9 in 0.237 seconds

	YEAR	MONTH	PERIOD	GROSS_SALARY_EMPLOYEE_DOLLAR_AMOUNT	NET_SALARY_EMPLOYEE_DOLLAR_AMOUNT
1	01-JAN-22	01-JAN-22	MONTH	16740345.73	14286455
2	01-JAN-22	01-FEB-22	MONTH	15139839.59	12919417
3	01-JAN-22	01-MAR-22	MONTH	16782887.55	14324052
4	01-JAN-22	01-APR-22	MONTH	16197508.94	13823913
5	01-JAN-22	01-MAY-22	MONTH	16768528.37	14313747
6	01-JAN-22	01-JUN-22	MONTH	16224818.16	13847563
7	01-JAN-22	01-JUL-22	MONTH	10340195.31	8826010
8	01-JAN-22	(null)	YEAR	108194123.65	92341157
9	(null)	(null)	ALL	108194123.65	92341157



```sql
alter session set current_schema=DW_DATA;

WITH salary_employees AS (
SELECT TRUNC(TIME_ID, 'YYYY') AS year,
TRUNC (TIME_ID, 'MM') AS month,'MONTH' period
,SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount
,SUM (employee_salary_project) as net_salary_employee_dollar_amount
FROM   DW_CL.cls_t_transaction
GROUP BY TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))

select year, month, period, gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount
from salary_employees
    MODEL
      DIMENSION BY ( year, month, period)
      MEASURES ( gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount)
```

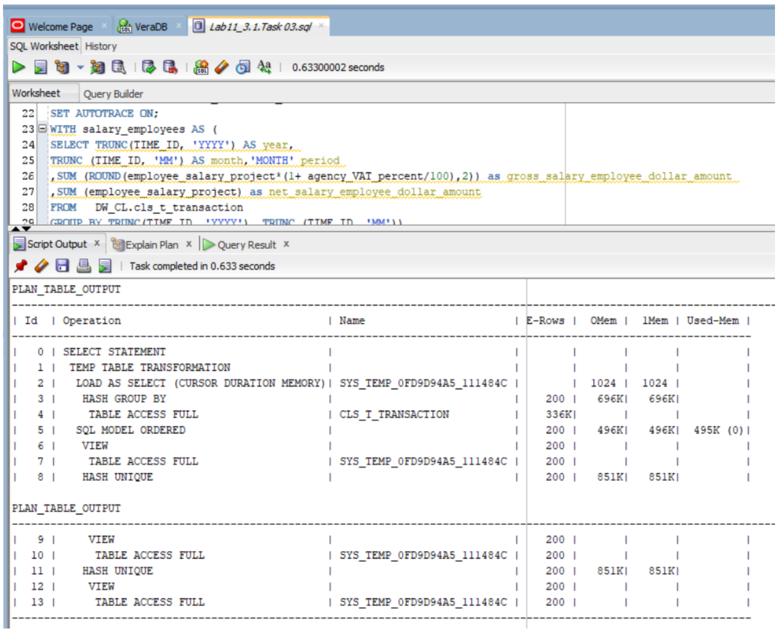
OPERATION	OBJECT_NAME	OPTIONS	CARDINALITY	COST
SELECT STATEMENT			200	3412
TEMP TABLE TRANSFORMATION				
LOAD AS SELECT	SYS_TEMP_0FD9D94CA_111484C	(CURSOR DURATION MEMORY)		
HASH		GROUP BY	200	3409
TABLE ACCESS	DW_CL.CLS_T_TRANSACTION	FULL	336000	3402
SQL MODEL		ORDERED	200	
VIEW	DW_DATA.null		200	3
TABLE ACCESS	SYS.SYS_TEMP_0FD9D94CA_111484C	FULL	200	3
HASH		UNIQUE	200	4
VIEW	DW_DATA.null		200	3
TABLE ACCESS	SYS.SYS_TEMP_0FD9D94CA_111484C	FULL	200	3
HASH		UNIQUE	200	4
VIEW	DW_DATA.null		200	3
TABLE ACCESS	SYS.SYS_TEMP_0FD9D94CA_111484C	FULL	200	3



```sql
alter session set current_schema=DW_DATA;

WITH salary_employees AS (
SELECT TRUNC(TIME_ID, 'YYYY') AS year,
TRUNC (TIME_ID, 'MM') AS month,'MONTH' period
,SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount
,SUM (employee_salary_project) as net_salary_employee_dollar_amount
FROM   DW_CL.cls_t_transaction
GROUP BY TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))

select year, month, period, gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount
from salary_employees
    MODEL
      DIMENSION BY ( year, month, period)
      MEASURES ( gross_salary_employee_dollar_amount, net_salary_employee_dollar_amount)
```

OPERATION	OBJECT_NAME	OPTIONS	CARDINALITY	COST
SELECT STATEMENT			200	3412
TEMP TABLE TRANSFORMATION				
LOAD AS SELECT	SYS_TEMP_0FD9D94CA_111484C	(CURSOR DURATION MEMORY)		
HASH		GROUP BY	200	3409
TABLE ACCESS	DW_CL.CLS_T_TRANSACTION	FULL	336000	3402
SQL MODEL		ORDERED	200	
VIEW	DW_DATA.null		200	3
TABLE ACCESS	SYS.SYS_TEMP_0FD9D94CA_111484C	FULL	200	3
HASH		UNIQUE	200	4

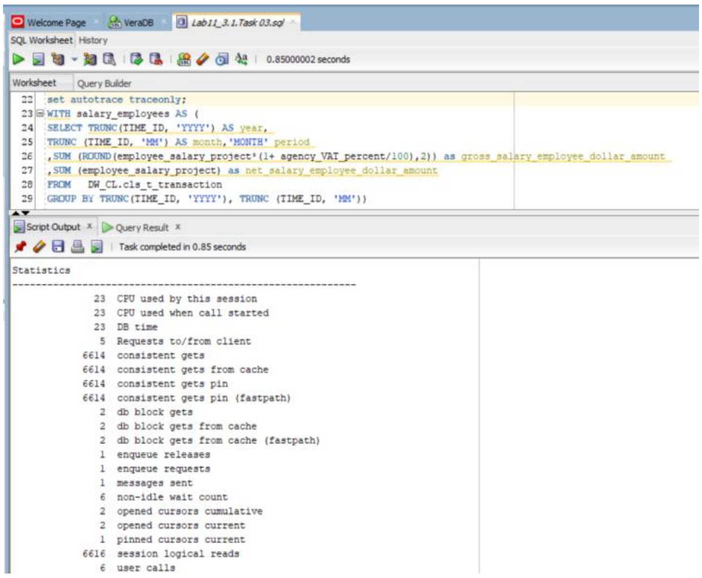
SQL	Connection	TimeStamp	Type	Executed	Duration(se...
WITH salary_employees AS (SELECT TRUNC(TIME_ID, 'YYYY') AS year,...	VeraDB	21-AUG-22 ...	SQL	4	0.237



```sql
SET AUTOTRACE ON;
WITH salary_employees AS (
SELECT TRUNC(TIME_ID, 'YYYY') AS year,
TRUNC (TIME_ID, 'MM') AS month,'MONTH' period
,SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount
,SUM (employee_salary_project) as net_salary_employee_dollar_amount
FROM   DW_CL.cls_t_transaction
GROUP BY TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
```

Task completed in 0.633 seconds

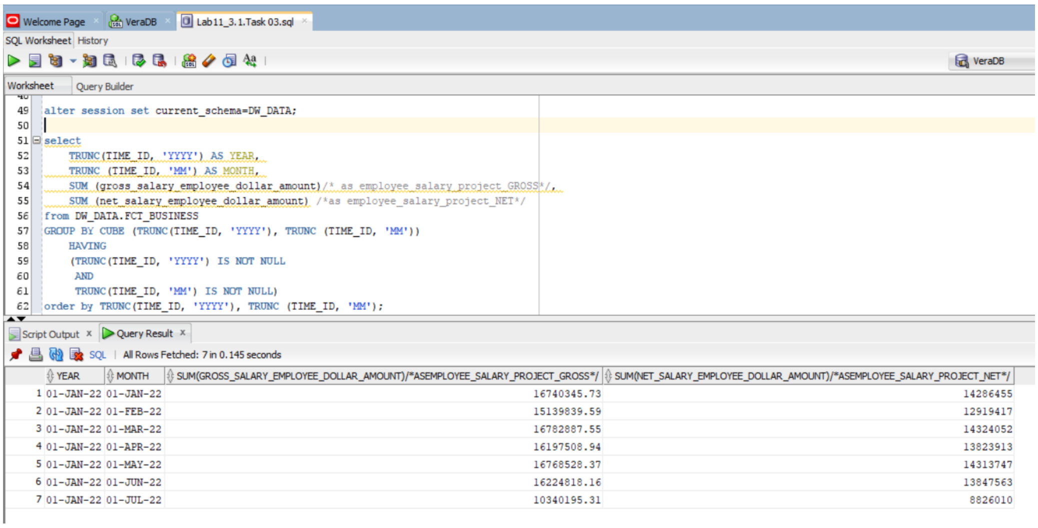
```
PLAN_TABLE_OUTPUT
-------------------------------------------------------------------------------------------------------------
| Id  | Operation                                 | Name                        | E-Rows |  OMem |  1Mem | Used-Mem |
-------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT                          |                             |        |       |       |          |
|   1 |  TEMP TABLE TRANSFORMATION                |                             |        |       |       |          |
|   2 |   LOAD AS SELECT (CURSOR DURATION MEMORY)| SYS_TEMP_0FD9D94A5_111484C  |        |  1024 |  1024 |          |
|   3 |    HASH GROUP BY                          |                             |    200 |   696K|   696K|          |
|   4 |     TABLE ACCESS FULL                     | CLS_T_TRANSACTION           |   336K|       |       |          |
|   5 |   SQL MODEL ORDERED                       |                             |    200 |   496K|   496K|  495K (0)|
|   6 |    VIEW                                   |                             |    200 |       |       |          |
|   7 |     TABLE ACCESS FULL                     | SYS_TEMP_0FD9D94A5_111484C  |    200 |       |       |          |
|   8 |    HASH UNIQUE                            |                             |    200 |   851K|   851K|          |

PLAN_TABLE_OUTPUT
-------------------------------------------------------------------------------------------------------------
|   9 |     VIEW                                  |                             |    200 |       |       |          |
|  10 |      TABLE ACCESS FULL                    | SYS_TEMP_0FD9D94A5_111484C  |    200 |       |       |          |
|  11 |    HASH UNIQUE                            |                             |    200 |   851K|   851K|          |
|  12 |     VIEW                                  |                             |    200 |       |       |          |
|  13 |      TABLE ACCESS FULL                    | SYS_TEMP_0FD9D94A5_111484C  |    200 |       |       |          |
-------------------------------------------------------------------------------------------------------------
```



```sql
set autotrace traceonly;
WITH salary_employees AS (
SELECT TRUNC(TIME_ID, 'YYYY') AS year,
TRUNC (TIME_ID, 'MM') AS month,'MONTH' period
,SUM (ROUND(employee_salary_project*(1+ agency_VAT_percent/100),2)) as gross_salary_employee_dollar_amount
,SUM (employee_salary_project) as net_salary_employee_dollar_amount
FROM   DW_CL.cls_t_transaction
GROUP BY TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
```

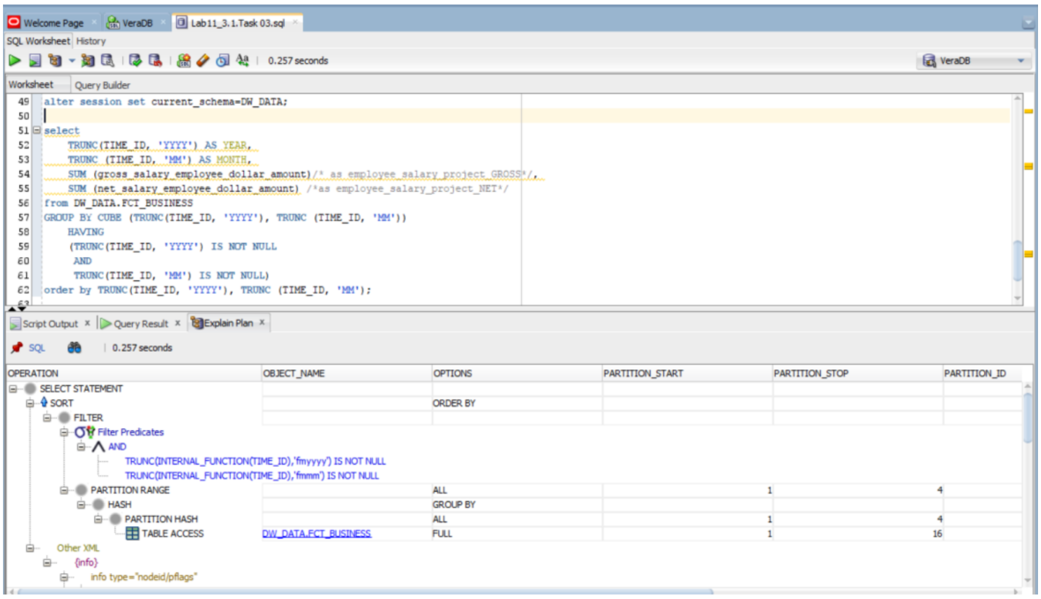
```
Statistics
-----------------------------------------------------------
             23  CPU used by this session
             23  CPU used when call started
             23  DB time
              5  Requests to/from client
           6614  consistent gets
           6614  consistent gets from cache
           6614  consistent gets pin
           6614  consistent gets pin (fastpath)
              2  db block gets
              2  db block gets from cache
              2  db block gets from cache (fastpath)
              1  enqueue releases
              1  enqueue requests
              1  messages sent
              6  non-idle wait count
              2  opened cursors cumulative
              2  opened cursors current
              1  pinned cursors current
           6616  session logical reads
              6  user calls
```

- Monthly salary data for employees for the year 2022 using Star Schema on the DW level.



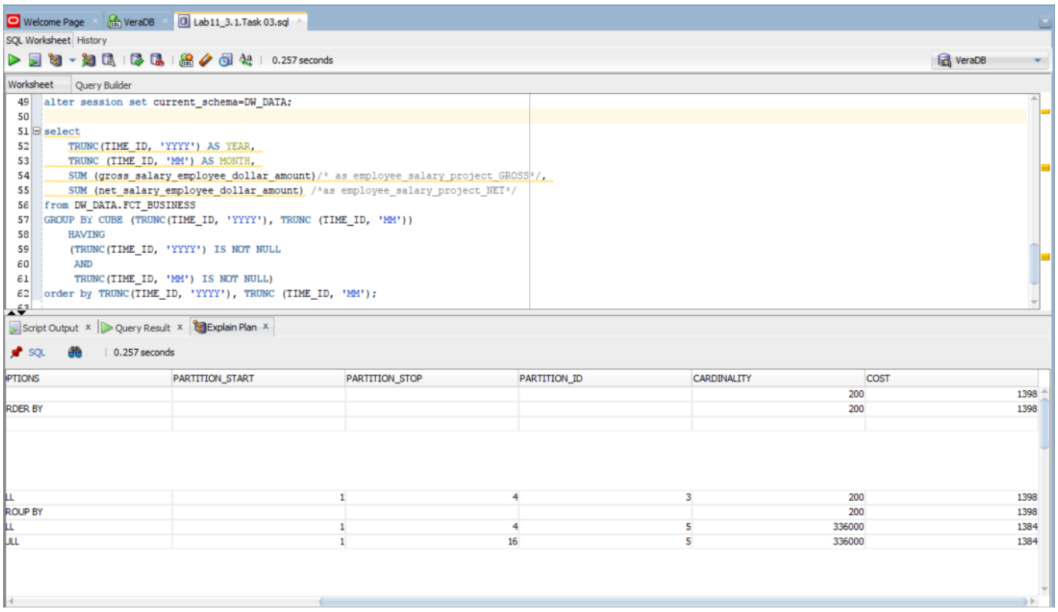
```sql
alter session set current_schema=DW_DATA;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

	YEAR	MONTH	SUM(GROSS_SALARY_EMPLOYEE_DOLLAR_AMOUNT)/*ASEMPLOYEE_SALARY_PROJECT_GROSS*/	SUM(NET_SALARY_EMPLOYEE_DOLLAR_AMOUNT)/*ASEMPLOYEE_SALARY_PROJECT_NET*/
1	01-JAN-22	01-JAN-22	16740345.73	14286455
2	01-JAN-22	01-FEB-22	15139839.59	12919417
3	01-JAN-22	01-MAR-22	16782887.55	14324052
4	01-JAN-22	01-APR-22	16197508.94	13823913
5	01-JAN-22	01-MAY-22	16768528.37	14313747
6	01-JAN-22	01-JUN-22	16224818.16	13847563
7	01-JAN-22	01-JUL-22	10340195.31	8826010



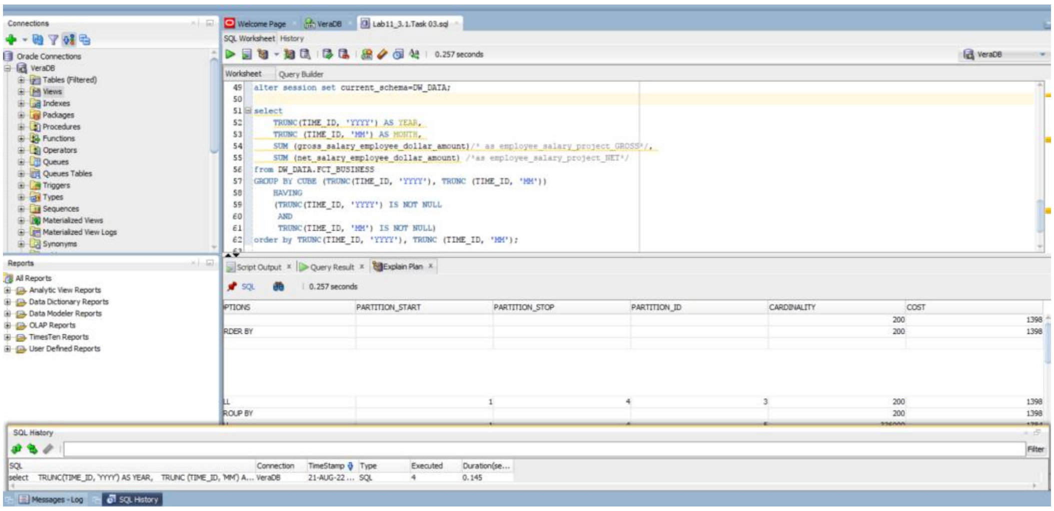
```sql
alter session set current_schema=DW_DATA;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

OPERATION	OBJECT_NAME	OPTIONS	PARTITION_START	PARTITION_STOP	PARTITION_ID
SELECT STATEMENT					
SORT		ORDER BY			
FILTER					
Filter Predicates					
AND					
TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmyyyy') IS NOT NULL					
TRUNC(INTERNAL_FUNCTION(TIME_ID),'fmmm') IS NOT NULL					
PARTITION RANGE		ALL	1	4	
HASH		GROUP BY			
PARTITION HASH		ALL	1	4	
TABLE ACCESS	DW_DATA.FCT_BUSINESS	FULL	1	16	
Other XML					
{info}					
info type="nodeid/pflags"					



```sql
alter session set current_schema=DW_DATA;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

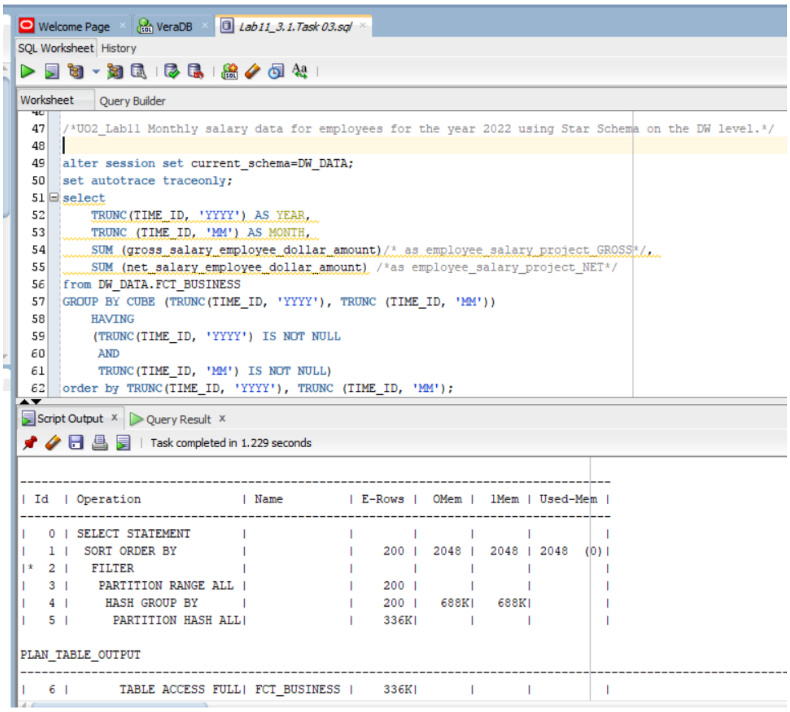
PTIONS	PARTITION_START	PARTITION_STOP	PARTITION_ID	CARDINALITY	COST
				200	1398
RDER BY				200	1398
LL	1	4	3	200	1398
ROUP BY				200	1398
LL	1	4	5	336000	1384
JLL	1	16	5	336000	1384



```sql
alter session set current_schema=DW_DATA;

select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

PTIONS	PARTITION_START	PARTITION_STOP	PARTITION_ID	CARDINALITY	COST
				200	1398
RDER BY				200	1398
LL	1	4	3	200	1398
ROUP BY				200	1398

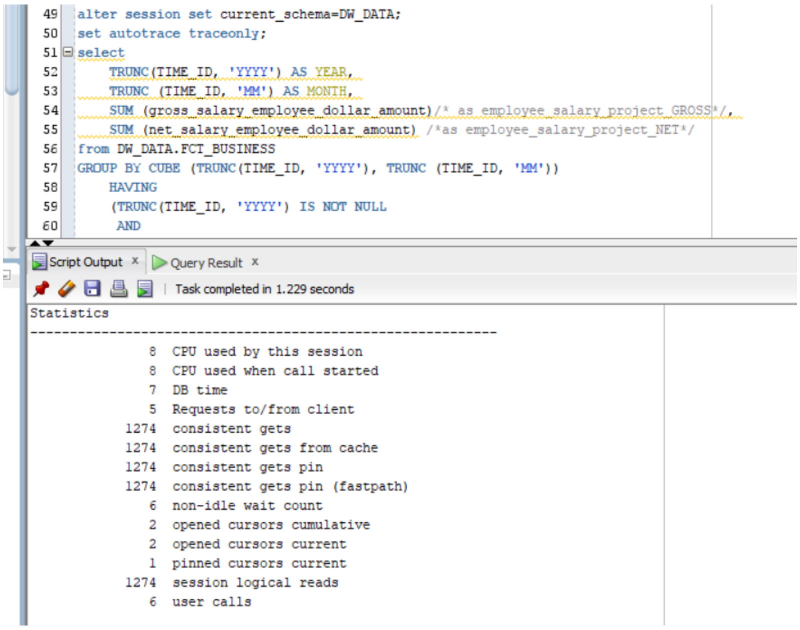
SQL	Connection	TimeStamp	Type	Executed	Duration(se...
select TRUNC(TIME_ID, 'YYYY') AS YEAR, TRUNC (TIME_ID, 'MM') A...	VeraDB	21-AUG-22 ...	SQL	4	0.145



```sql
/*U02_Lab11 Monthly salary data for employees for the year 2022 using Star Schema on the DW level.*/

alter session set current_schema=DW_DATA;
set autotrace traceonly;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
     TRUNC(TIME_ID, 'MM') IS NOT NULL)
order by TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM');
```

Task completed in 1.229 seconds

```
--------------------------------------------------------------------------------
| Id  | Operation               | Name           | E-Rows |  OMem |  1Mem | Used-Mem |
--------------------------------------------------------------------------------
|   0 | SELECT STATEMENT        |                |        |       |       |          |
|   1 |  SORT ORDER BY          |                |    200 |  2048 |  2048 | 2048  (0)|
|*  2 |   FILTER                |                |        |       |       |          |
|   3 |    PARTITION RANGE ALL  |                |    200 |       |       |          |
|   4 |     HASH GROUP BY       |                |    200 |  688K|   688K|          |
|   5 |      PARTITION HASH ALL|                |   336K|       |       |          |

PLAN_TABLE_OUTPUT
------------------------------------------------------------------------------------------------------------
|   6 |       TABLE ACCESS FULL| FCT_BUSINESS |   336K|       |       |          |
```



```
alter session set current_schema=DW_DATA;
set autotrace traceonly;
select
    TRUNC(TIME_ID, 'YYYY') AS YEAR,
    TRUNC (TIME_ID, 'MM') AS MONTH,
    SUM (gross_salary_employee_dollar_amount)/* as employee_salary_project_GROSS*/,
    SUM (net_salary_employee_dollar_amount) /*as employee_salary_project_NET*/
from DW_DATA.FCT_BUSINESS
GROUP BY CUBE (TRUNC(TIME_ID, 'YYYY'), TRUNC (TIME_ID, 'MM'))
    HAVING
    (TRUNC(TIME_ID, 'YYYY') IS NOT NULL
     AND
```

Task completed in 1.229 seconds

```
Statistics
-----------------------------------------------------------
               8  CPU used by this session
               8  CPU used when call started
               7  DB time
               5  Requests to/from client
            1274  consistent gets
            1274  consistent gets from cache
            1274  consistent gets pin
            1274  consistent gets pin (fastpath)
               6  non-idle wait count
               2  opened cursors cumulative
               2  opened cursors current
               1  pinned cursors current
            1274  session logical reads
               6  user calls
```

Summarize table:

№	Source Type	Explain Plan - Statistics			Time, Sec.
		CARDINALITY	COST	CONSISTENT GETS	
1	Advancing Grouping	200	3174	6091	0.205 sec
2	Model Clause	200	3412	6614	0.237 sec
3	Star Schema	200	1398	1274	0.145 sec

Summary: As we can see, with the same number of query strings returned, by examining the TIME, COST and CONSISTENT GETS we can conclude that a query that works with Star Schema works faster and costs less.