

How to...

Locking of Transaction Data

BUSINESS PLANNING AND SIMULATION



Applicable Releases:

SEM 3.1B SP15, SEM 3.2 SP10, SEM 3.5 SP5, BW-BPS 3.5

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1 Business Scenario

When implementing a planning scenario it has to be ensured, that users work on a separate non-interfering set of transaction data. If this is not the case, they will be faced with messages saying that someone else is already procession the data. Hence he can't continue with the planning process.

These kinds of issues might become critical close to go live if not carefully planned before.

This *How to* outlines the rules of the locking mechanism and gives examples of typical problems and how to solve them.

Please be aware of the fact that other ways of locking transaction data like Status and Tracking System (STS) or data slices will not be covered in this how to paper.

Rules of Locking Transaction Data

The table contains sample data for the following examples:

Year	Customer Group	Customer	Revenue	Costs
2004	IT	SAP	1000	500
2004	IT	IBM	2000	1000
2004	CARS	BMW	3000	2000
2004	CARS	VW	4000	3000

Example 1:

In the definition of the planning level we have specified:

Characteristic(s): *Key figure(s):*
 Year = 2004 Revenue

The result would look like the following table:

Year	Revenue
2004	10000

The system has now locked the key figure revenue for all four records (blue area in the sample data table). The reason is that all records are needed to determine the total value. Each change of one of the data records would lead to a change of the total value and is therefore not allowed by another user at the same time.

Example 2:

In the definition of the planning level we have specified:

Characteristic(s): *Key figure(s):*
 Customer Group = CARS Costs

The result would look like the following table:

Customer Group	Costs
----------------	-------

CARS	5000
------	------

The system has locked now the key figure costs for two records belonging to the customer group CARS. The reason is that the records are needed to determine the total value. Each change of one of the detailed records would lead to a change of the total and is therefore not allowed by another user.

Summary:

The system will not only lock the result values but also all data records needed to determine the result. Please consider the fact that the names of the key figures are also taken into account. Hence example 1 locks only the blue area of data that refers to revenue and example 2 locks only the green area that refers to costs.

In the examples given the selection criteria and the existing records matched exactly. As this is normally not the case (e.g. there is no transaction data available) the system creates the set of locks based on selection criteria. In other words: the creation of locks is independent of the existing transaction data.

Example: When executing a planning function the system will lock the complete package selection. For the creation of new data records no additional lock entries are created as the new records have to be part of the package selection.

2 Introduction

When creating or designing planning levels you have to keep in mind that users will be planning in parallel. It has to be ensured by the customizing that the (user specific) selections do not interfere with each other. As a starting point some rules will be proposed to check out this problem area.

Once you have executed a planning step and locks are created they will persist normally until you leave the planning session. This behaviour could be changed by using the user parameter SEM_BPS_SAVE_UNLOCK. Please refer to note 635244 for more details.

No Interference of Selections

Some indicators to check that there is no interference:

- There is no interference between the selections (that would lead to a locking message) if they are using different key figures. This can be derived from the table showing the sample data records: the colored regions derived from the examples have no overlap.
- As the locking of transaction is done per basis planning area two selections can only interfere if they are accessing data from the same basis area. When using a multi planning area please keep in mind that the locking is done on the basis areas, which are contained in the multi planning area.
- On the other hand they will not lock each other if the selections are part of two different basis areas (InfoCubes) or if the selection of at least one characteristic has no intersection.
- A layout executed in display mode doesn't create any lock entries.

Interference of Selections

There is interference between the selections if there is at least one common data record that is needed to create the result values. Here are some examples for this:

Example 1: User A and B try to execute a manual planning

Result of user A (Planning Level contains year and the key figure revenue):

Year	Revenue
2004	10000

Result of user B (Planning Level contains year, customer group = IT and key figure revenue):

Year	Customer Group	Revenue
2004	IT	3000

These records are used in both results:

Year	Customer Group	Customer	Revenue	Costs
2004	IT	SAP	1000	500
2004	IT	IBM	2000	1000

The two selections interfere and could not be executed by two different users at the same time. Hence the system would create a locking message.

How to treat characteristics that are not part of the planning level

From a locking point of view the following selections are equal as all records for the year 2004 are locked. In other words: if a characteristic is not part of the planning level, it will/can be seen with the selection of '*' (all values).

Identical from locking perspective:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue

and

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue
Customer Group = *

What is the potential benefit of this conversion? It makes it easier to compare the selections and detect potential locking problems. Please see the following example.

Example 1: Determine the intersection

We would like to determine the intersection of the two selections:

Selection A:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue
Customer Group = IT

Selection B:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue

Now convert it following the rule mentioned above:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue
Customer Group = *

By comparing the selections char by char the intersection is

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Year = 2004	Revenue
Customer Group = IT	

Example 2: Do the selections interfere?

Selection A:

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Customer Group = IT	Revenue

Selection B:

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Year = 2004	Revenue

In order to compare the selections both should contain the same set of characteristics. Based on our conversion rule, we add the year to the selection A and Customer Group to selection B. The result looks like this:

Selection A:

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Customer Group = IT	Revenue
Year = *	

Selection B:

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Year = 2004	Revenue
Customer Group = *	

By comparing the selections characteristic by characteristic the intersection is

<i>Characteristic(s):</i>	<i>Key figure(s):</i>
Year = 2004	Revenue
Customer Group = IT	

3 Examples

Budgeting

Assuming you like to implement a budgeting process where you like to use a bottom-up and top-down approach in parallel:

- The central planner starts capturing revenue values for all customers for budget year
- The customer contacts key in the revenue for their customers
- The group level should be used to compare the results.

3.2.1 First approach and consequences

As in the examples above I add the year, customer group and customer to my InfoCube. The revenue is stored in the key figure revenue.

The selection for the central planner:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue

And for the customer contact:

Characteristic(s): *Key figure(s):*
Year = 2004 Revenue
Customer Group = IT
Customer = SAP

As soon as both planners start working, the second one starting will be faced with a locking message. Hence no parallel access is possible. This is an example of not well-defined customizing.

3.2.2 Proposals for solution

To avoid this locking problem we have to change our data model in a way that the two groups work on independent set of data. To achieve this, there are the following options:

- One option could be to add a key figure: One is used for the top-down direction, the other user for bottom-up.
- The other option is to add a characteristic (like a budgeting version) and use it as an indicator for the budgeting direction.

Layouts and comparison columns

The following table shows a simple layout where the data columns contain a combination of key figure and versions (plan and actual). The actual column is set to comparison.

Year	Revenue	
	Version = plan	Version = actual
2004	1000	2000
2005	2000	3000
2006		

Although you can't change any actual revenue value, the system will lock the data. This is somehow different to the behavior of a planning function where the reference data is not locked. As a consequence, two different user can't display the same reference data at the same time. If you have reference data per e.g. profit center there is a separation characteristic and hence no problem.

If you are in the first situation, the following options could help:

- If the reference information is not really required in a planning layout, the layout could be replaced by a BW query.
- The plan and actual data could be stored in different planning area/InfoCubes. Please read through note 555849.
- A layout executed in display mode doesn't create any lock entries. Hence you should check if you can transfer the reference data into a new separate output layout.

4 How to analyze locking situations

A typical locking situation:

Several planners work in parallel in the same business area. When executing a planning function or layout one user is faced with an error message indicating that the data the function needs is already locked / in use by another user.

This situation could be caused

- By wrong assignment of user dependent values like two users are assigned to the same profit center. If this is the case there is no need to change the planning customizing but check the user dependent settings like authorizations etc.
- By wrong customizing that uses common data records although all user dependent settings are correct from business perspective. If this is the case you normally have to correct the customizing.

In order to clarify which situation we are faced with we need the selection criteria and the planning function or layout to be executed by the interfering user. Once we have identified the planning items we can categorize the reason and follow the appropriate solution path.

Step by step instruction:

1. Collect important information (could be done by first level support):
 - Ask the users to stop planning but not to leave their planning application in order to keep the example in the system.
 - The user faced with the error message (user A) notes the planning area, level and package given in the long text of the message. Additionally, he should look into the error log and note the name of the planning function or layout that caused the problem.
 - When using the SAP-GUI as the user interface, set the user parameter 'SEM_BPS_DUMP_SEL' to 'X' and ask user A to re-execute the step causing the error. This results in a text file in the local temp directory containing the requested selection criteria. The name of the file is SEM_BPS_SEL_<user id>_<date>.TXT.

Example: When user A creates the file on the 9th of November, 2003, the name would be SEM_BPS_SEL_A_20031109.TXT

Hint: If you use the WEB Planning application, you have to restart the WEB Application using the program UPWB_HTML_DEBUG and follow the same instructions as with the SAP-GUI.

- Determine the selections which are locked by the other user (user B) by executing the program 'UPC_ENQUEUE_READ'. The program requires the name of the user (= B) and the name of the planning area (the one given by user A).
- Compare the selection criteria of user A (content of text file) and B (output of program UPC_ENQUEUE_READ) and determine the cause for interference from a selection point of view. Please keep in mind that the selections are given in internal format.

Example: The value '#' has the internal representation of the initial value like <space> or zeros.

2. Evaluate the information (could be done by BPS administrator or power user)

Based on these information, the BPS administrator (the one who understand the business processes and the customizing) can determine the reason and decide whether it was a surprise from customizing point of view (customizing has be changed to avoid the situation) or if the user dependent settings has to be changed.

5 Appendix

Where used list: basis areas and planning layouts

When searching for reasons of unexpected locking situations, it is a good starting point to check if there are planning layouts accessing data in the basis planning area, where the locking situation appeared. Unfortunately the examination of planning levels or packages are not sufficient, as the access might be defined in the layout definition itself.

If order to make this job easier, you can use the following program, that lists all planning layouts accessing a specific basis planning area. If the area is restricted using a variable the program will list them separately without trying to resolve the variable values.

It will return a 'where-used' list with all layouts. When clicking on a result row you jump straight to the planning framework for further analysis.

```
REPORT z_find_layout.
```

```
DATA:
```

```
  lt_ema    TYPE TABLE OF upp_ema,
  lt_elem   TYPE TABLE OF upp_elem,
  ls_elem   TYPE upp_elem,
  lt_optio  TYPE TABLE OF upc_optios.
```

```
TABLES: upc_area.
```

```
PARAMETERS g_area TYPE upc_area-area.
```

```
START-OF-SELECTION.
```

```
* -----
* find layouts using a specific planning area
SELECT * FROM upp_ema INTO TABLE lt_ema.
IF sy-subrc <> 0.
  MESSAGE ID 'UPF' TYPE 'E' NUMBER '001'
  WITH 'No layout customizing found.'.
  EXIT.
ENDIF.

* header information
WRITE: / sy-datum, sy-zeit,
       'Layouts accessing planning area ', g_area.
WRITE: / 'Click on result lines to open planning framework' color 3.
SKIP.

* -----
* find all layouts where area is specified by fixed value
clear lt_optio.
clear lt_elem.
SELECT * FROM upc_optios INTO TABLE lt_optio
  FOR ALL ENTRIES IN lt_ema
  WHERE   guid = lt_ema-guid
  AND    fielname = '_AREA____'
  AND    low = g_area.

IF sy-subrc = 0.
  SELECT DISTINCT mandt area plevel param
  FROM upp_ema INTO TABLE lt_elem
  FOR ALL ENTRIES IN lt_optio
  WHERE guid = lt_optio-guid.
ENDIF.

PERFORM output
using 'Layouts using the selected area explicitly'.

* -----
* find all layouts where area is specified by variable
clear lt_optio.
clear lt_elem.
SELECT * FROM upc_optios INTO TABLE lt_optio
  FOR ALL ENTRIES IN lt_ema
  WHERE   guid = lt_ema-guid
  AND    fielname = '_AREA____'
```

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```
AND varnm <> '' .

IF sy-subrc = 0.
  SELECT DISTINCT mandt area plevel param
  FROM upp_elem INTO TABLE lt_elem
  FOR ALL ENTRIES IN lt_optio
  WHERE guid = lt_optio-guid.
ENDIF.

PERFORM output
using 'Layouts using variable for planning area - value unknown'.

* -----
* find all layouts of basis planning area
clear lt_elem.
SELECT DISTINCT mandt area plevel param
FROM upp_param INTO TABLE lt_elem
WHERE area = g_area.
PERFORM output
using 'Layouts defined in basis planning area'.

AT LINE-SELECTION.

CALL FUNCTION 'UPC_FW_START'
EXPORTING
  i_node_type      = 'PARAM'
  i_area           = ls_elem-area
  i_plevel        = ls_elem-plevel
  i_method         = '0-MP'
  i_param         = ls_elem-param
  i_fcode         = 'LB_DISPLAY'
EXCEPTIONS
  object_not_existing = 1
  profile_not_existing = 2
  error_init         = 3
  OTHERS            = 4.

IF sy-subrc <> 0.
  IF NOT sy-msgid IS INITIAL OR NOT sy-msgno IS INITIAL.
    MESSAGE ID sy-msgid TYPE sy-msgty NUMBER sy-msgno
    WITH sy-msgv1 sy-msgv2 sy-msgv3 sy-msgv4.
  ELSE.
    MESSAGE ID 'UPF' TYPE 'E' NUMBER '001'
    WITH 'Error occurred. Perhaps the level is not consistent?' .
  ENDIF.
ENDIF.

*&-----*
*& Form output
*&-----*
FORM output USING text TYPE string.
* write output table
check not lt_elem is initial.
skip.
SORT lt_elem BY area plevel param.
write text COLOR 1.
WRITE: / (10) 'Area', (10) 'Level', (10) 'Layout' .
LOOP AT lt_elem INTO ls_elem.
  FORMAT HOTSPOT ON.
  WRITE: / (10) ls_elem-area, (10) ls_elem-plevel, (10) ls_elem-param.
  FORMAT HOTSPOT OFF.
  HI DE: ls_elem-area, ls_elem-plevel, ls_elem-param.
ENDLOOP.
ENDFORM.          " output
```