How to...

Handle Inventory Management Scenarios in BW

BUSINESS INFORMATION WAREHOUSE

ASAP “How to...” Paper

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1 OVERVIEW ...................................................................................................................................2

2 DETAILED DESCRIPTION ..............................................................................................................2

2.1 DataSources in R/3, upload sequence and compression .......................................................... 2
  2.1.1 DataSources in R/3 .............................................................................................................. 2
  2.1.2 Upload sequence and compression ............................................................................... 3

2.2 Marker update when uploading/compressing, executing a query .......................................... 11
  2.2.1 Marker update when uploading/compressing ................................................................ 11
  2.2.2 Executing a query ........................................................................................................... 13

2.3 Validity table ............................................................................................................................. 13

2.4 Important OSS notes ............................................................................................................... 16
1 Overview

In this document, we aim to discuss the most important settings and procedures when implementing inventory management scenarios. We will be focussing on the special features involved in implementing in the inventory management area. This document does not cover general customizing, for example, the definition of an InfoCube or the creation of a DataSource in a LO cockpit. A basic knowledge of LO extraction is especially required.

In the following, we will particularly pay close attention to subareas that make up the special features of inventory management scenarios. These are:

- the DataSources to be used and their sequence during data upload
- Special features in InfoCube compression
- Special features in query execution
- The validity table

The first two points are discussed in tandem, since data compression is strongly connected with the upload sequence.

2 Detailed description

2.1 DataSources in R/3, upload sequence and compression

2.1.1 DataSources in R/3

Since BW 2.0B and 4.0B, the next release up, the following DataSources are to be used in the extraction of an inventory scenario:¹

- 2LIS_40_S278  Transfer BW stock
- 2LIS_03_BF  Material movements
- 2LIS_03_UM  Revaluations

The first DataSource is used to extract an opening stock balance on a detailed level (material, plant, storage location, and so on). At this moment, the opening stock is the operative stock in the source system. “At this moment” is the point in time at which the statistical setup ran for structure S278. (This is because no documents are to be posted during this run and so the stock does not change during this run, as we will see below). It is not possible to freely choose a key date.

The second DataSource is used to extract the material movements into the BW system. This DataSource provides the data as material documents (MCMSEG structure).

¹ The earlier solution with LIS structures S195 / S197 or S196 / S198 is not discussed here.
The third of the above DataSources contains data from valuated revaluations in Financial Accounting (document BSEG). This data is required to update valuated stock changes for the calculated stock balance in the BW. This information is not required in many situations, since it is often only the quantities that are of importance. This DataSource only describes financial accounting processes, not logistical ones. In other words, only the stock value is changed here, no changes are made to the quantities. Everything that is subsequently mentioned here about the upload sequence and compression regarding DataSource 2LIS_03_BF also applies to this DataSource. This means a detailed description is not required for the revaluation DataSource.

2.1.2 Upload sequence and compression

Customers most often face the following scenario. A customer wants to be able to trace material movements and stock balances over a particular period of time in the past (for example, 3 months).² Of course, the customer also needs to be able to report on current stocks. These are the required steps:

1. Initialization of the current stock (opening balance) in the R/3 source system, in the S278 structure. For example, you can make restrictions to materials or plant, providing not all balances are relevant. Note: No material postings must be carried out during this process, since material movements influence the current stock. Postings can be made again once the run has been completed. This run is not very time-intensive because the system does not read the individual documents from the very large MSEG table. Instead, it accesses the substantially smaller tables MARC, MARD and so on.

You can find the initialization of the opening stock in transaction SBIW in the R/3 source system under the menu entry specified below:

After executing the menu entry you will come to the definition of the initialization run where you can restrict on plant, material and storage location. The definition screen is shown below. Please consider that the termination date is in the future.

² In the notes section at the end of the scenario, we will look at how the procedure is changed when historic material movements are not required.
HOW TO HANDLE INVENTORY MANAGEMENT SCENARIOS IN BW

Activate the extract structure MC03BF0 for corresponding DataSource 2LIS_03_BF in the LO cockpit after the successful initialization of the opening balance. This step has to be done before restarting the posting of material documents.

2. Setup of statistical data for material documents in the R/3 source system. Here, historical material movements (for example, 3 months in the past) are to be setup. Make sure that by limiting the posting date or the material document number you can guarantee that only those material documents are reorganized whose time value lies before the opening balance initialization (step 1). This means that those material movements lying between the end of the run to initialize the opening balance and the setup of statistical data must not be included in the statistical setup for material movements. If this cannot be ensured, you must set up a posting block for the whole time between the start of the run to initialize the opening balance and the end of the setup of statistical data for material movements. Activating the extract structure results in new material documents being included in both the setup of statistical data (if you cannot guarantee that the above prerequisite is met), and the V3 update. These material documents would be extracted twice, and thus incorrectly.
The setup of statistical data can also be parallelised by starting it separately for mutually exclusive selection criteria (for example, for a run for the previous month, for a run for the month before that, and so on). You should execute this program in the background.\(^3\)

As long as the above condition can be met, the following source system constellation applies after steps 1 and 2:

- Current stock balance in table S278.
- Historical material documents in the setup table MC03BF0SETUP belonging to extract structure MC03BF0.
- Postings done after the setup of the opening balance are found in the central update table VBDATA (which can be seen in transaction SM13). They can be later transferred into the BW using the delta queue (together with material movements posted up until this point).

If this condition cannot be met - and you need to block the postings - only the current stock appears in table S278 with the previous postings appearing in the setup table. There are no entries in the VBDATA table here, since no further postings have been made in the meantime.

\(^3\) In some cases, the setup of statistical data can require a very long time due to the volume of data involved. This means that, during the whole period, (newly created) material documents are written to the central update table VBDATA, without being received into the V3 update (step 7). Data is only extracted from the update table when the delta process of DataSource 2LIS_03_BF has been successfully initialized. For a very large data circulation, the danger also exists that the central update table receives more data than it can process. We are talking about approximately 300,000 records here. To circumvent this danger, it is advisable to only setup statistical data for a small number of data records (for just a week or a day, for example). This keeps the time for the setup to a minimum. Material documents not present in the setup - but still required (for example, all material documents older than one week) - can be setup after step 8. Thus, they can be extracted via DataSource 2LIS_03_BF using one or more full uploads (with selection criteria in the InfoPackage). It is also important to mention here that these requests must be compressed. You must carry out compression without marker update (We cover compression and the marker update later).
You can find the setup of statistical data under transaction SBIW in the R/3 system, under the menu entry shown in the following screenshot:

After executing the menu entry, a dialog box appears in which you must specify whether you want to want to carry out a setup for material movements (to be extracted using the DataSource 2LIS_03_BF) or for revaluations (DataSource 2LIS_03_UM). In the previous scenario, we only looked at material movements. For this reason, the reorganization of revaluations is to be ignored here as well (setup runs analogously to that of material movements). After selecting the activity, a screen appears in which the setup is started:
Note: Here, you need to ensure either by posting date or by material document number, that all documents to be reorganized are already contained in the current stock (step 1).

3. Loading the opening stock balance (InfoSource 2LIS_40_S278) into the InfoCube. In the InfoPackage, choose the upload mode “Create opening balance” (see screenshot).

4. Compressing the request containing the opening stock that was just uploaded. Make sure the “No marker update” indicator is not set.
5. Loading the historical movements into the InfoCube via the DataSource / InfoSource 2LIS_03_BF. Choose the upload mode “Initializing the delta process” here.

6. After successfully uploading the historical material movements, the associated request is to be compressed. You must make sure the “No marker update” indicator is set. This is necessary because the historical material movements are already contained in the opening stock. We'll look more closely at markers later on.

7. Material documents that appear in the system during this time (that is, between the end of step 1 and the successful initialization of DataSource 2LIS_03_BF) now appear in the central update table VBDATA (you can see this in transaction SM13). You must not start the V3 control run before this point. Executing this run before successfully initializing the DataSource for the movements results in the records contained in the VBDATA being lost. During this run, data is written from the central update table VBDATA into the delta queue. Only at this point is it available for extraction for the BW. Initialization of the run is described using the screenshots below:

Transaction SBIW in the R/3 system:

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4 Many customers also use program RSM13005 (schedule job periodically) to import data from an application from the update table VBDATA in the delta queue. In this case, also make sure that the program is not to be started before the initialization has been carried out successfully, since this results in the loss of data records in the VBDATA.
After executing the menu entry, the LO Cockpit appears (TA LBWE):

Here, you can manually start the V3 run for the different applications, or schedule it periodically (normally the case).

8. Successive (for example, daily) delta uploads can be started with the DataSource 2LIS_03_BF from this point in time on. These requests should also be compressed after successful validation. You need to use a marker update with this compression, meaning that the indicator must not be set.
Notes:

- You do not need to compress the requests directly after the upload. If you do compress afterwards, this has no effect on the compression settings. This means that, in all cases;
  - a. The request in which the opening stock was loaded must always be compressed with a marker update.
  - b. The request in which the historical material documents were contained must always be compressed without a marker update and
  - c. Successive delta uploads must always be compressed with marker updates.

You only need to compress the request when you have loaded historical material movements (step 5). In this case, not compressing the requests for the opening balance and for the historical movements leads to false results in reporting. Compression is optional where no historical data has been transferred into the BW, though it is recommended for performance reasons.

- You do not need to initialize the stock (steps 1 and 3). If you do not initialize, the system assumes a zero opening stock balance. You do not need to carry out a stock initialization if e.g. the following applies: The productive start of the R/3 system occurs at the same time as that of the BW system, and the existing stock (residing in other systems up until now) is imported in material document form into the R/3 system at time of going live. This is because the stock is received as material documents. In this case, the stock is modeled at the going-live date in the form of an material inflow to precisely this date.

- You can also model a stock scenario partially or completely using flat files. This allows you to define a flatfile DataSource as an “open balance” here. This is used to upload the opening stock and works in the same way as the R/3 DataSource 2LIS_40_S278. In addition, material movements are loaded via a “normal” DataSource. The above applies to the upload sequence and compression. (Steps taken in the R/3 system do not apply here of course).

- Where historical material movements are not required, the following changes are made to the procedure:
  - a. Step 2 is removed.
  - b. In step 5, the delta process is initialized without data transfer (see screenshot).
c. Step 6 is not required. The compression of the request from step 5 takes place with the successive delta requests. The marker has no importance for (only) this request since no data was transferred.

2.2 Marker update when uploading/compressing, executing a query

2.2.1 Marker update when uploading/compressing

We will use an example in this section to explain the procedure for a stock InfoCube when executing a query. The scenario is as follows:

- Current date: 31.03.2002
- You have setup an opening balance of 100 units on 01.01.2002 and loaded it into the stock InfoCube.
- Historical material movements from the three previous months (October 2001: 10 units; November 2001: 20 units; December 2001: 10 units) are loaded into the BW. The procedure here is the same as in steps 5 and 6 in section 2.1.
- Since this point, successive material movements have been transferred into the BW in the delta process. Delta requests transferred at the end of January (20 units) and February (10 units) were already compressed after successful validation, the last delta request from the end of March (10 units) is still in the InfoCube in uncompressed form.

To help explain the role of the marker (= Reference point), the different upload steps are considered over time.

After uploading the opening balance, the InfoCube looks like this:
You can see that the opening stock is not assigned to the actual date, but posted to a point in infinity (0CALDAY= 31.12.9999, for example).

After the three previous months have been uploaded and compressed, the InfoCube content looks like this:

Note here that the marker value remains unchanged at 100 units. This can be achieved using the “No marker update” indicator during compression (cf. Section 2.1.2, step 6). The marker is thus not changed.

After successively uploading deltas from January to March, of which only the first two are compressed, the InfoCube content has the following appearance:
Compressing the requests for January and February executes a marker update, which can be seen by the marker now having the value 130 units. The values for March have not been included in the marker yet. The following section will use this situation to show how a stock balance is calculated when executing a query.

2.2.2 Executing a query

Let us assume that the stock balance is to be evaluated in a query at the end of January. This is done by adding all values to the marker value that have yet to be compressed. This value is called the “last value” and is 140 units for the described situation (140 = 130 marker units + 10 units from March). All values that are older than the requested value are now subtracted from this value. In our case, this means that 10 units from March and a further 10 units from February are subtracted, which leads to a stock balance of 120 at the end of January. Thus, the system firstly carries out a forward calculation. The system then calculates back from the resulting amount to the required point in time in the query.

As a result of this procedure, we recommend you to compress as many requests as possible so as to minimize the time required for forward calculations. This can even reach zero (when all InfoCube requests are compressed).

2.3 Validity table

For InfoCubes with non-cumulative key figures, you need to maintain a validity table when creating the InfoCube. This table specifies the time interval for which the non-cumulatives are valid for a specific characteristic combination. You can find the validity table in the InfoCube maintenance, via the menu entry highlighted below.
For an InfoCube containing the characteristics 0CALDAY (and possibly other time characteristics), 0MATERIAL, 0PLANT, 0VERSION and 0VTYPE, the dialog box for maintaining the table structure has the following appearance:

By default, the validity table only has the time dimension checked (that is, the time reference characteristic). The time reference characteristic is the time characteristic, from which all other time characteristics can be derived. The hierarchy for deriving the time reference characteristic has the following appearance:
This hierarchy shows how you need to include the 0CALDAY time characteristic in an inventory management InfoCube, even when you are only really interested in the two characteristics 0CALWEEK and 0FISCPER. Generally, this means there needs to be a time reference characteristic from which all other time characteristics can be consistently derived. You can always include just one characteristic (for example, 0CALYEAR), meaning you do not need to include the characteristic 0CALDAY.

The validity table is automatically filled during the upload. If you leave the structure in its original state (that is, containing only the time reference characteristic), the lower validity interval limit is defined with the data record that is the first according to the time characteristic. Analogously, the upper limit is defined by the highest value according to the time characteristic. For example, if data with document data was loaded into the InfoCube with values from 01.01.2002 to 15.02.2002 (assigned to the respective time characteristic), the validity interval is also determined by these two date values. You can extend the intervals by maintaining the table (transaction RSDV). Stock balances are displayed for requests that relate to this period. If you start a query that requests the stock balance for 16.02.2002 or later, the result is displayed in parenthesis (a blank value is displayed in BW 2.0B /2.1C), since it lies outside the validity area (providing that the validity table was not manually extended using transaction RSDV).

In most cases, it is sufficient to include only the time dimensions in the validity table, that is, to leave the table in the state in which it is displayed. It is only worth including additional characteristics (for example, 0PLANT) when certain conditions apply. If these conditions are not met, enhancing the table with additional characteristics leads to unexpected query results. If additional characteristics are included in this table, validity intervals are updated for all resulting characteristic combinations. You should never use fine granular objects like material in the validity table due to performance reasons (besides the possibility of unexpected results in the query result).
We will use an example to outline the conditions for when it is worth enhancing the validity table structure. In this example, you want to load material movements from different plants from separate systems into the BW system. For some reason, the uploads may be delayed, for example, plant 2 may sometimes only be able to supply its data to the BW a few days after plant 1. Let us assume that the data is to be transferred from both plants into the BW at the end of every month. The assumption here would be that data from the previous month is already available at the beginning of a particular month. However, the uploads may be delayed, as mentioned before. If you want to avoid reporting on stock balances that are already old (since, in our example, plant 2 has not provided the changes in stock), you should include the plant in the validity table. In this case, plant 2 of our example does not display any balances for the previous month until these are actually transferred into the BW. The stock balances in plant 1 are displayed as expected. Thus, the table defines an individual validity interval for each plant.

By including additional characteristics in the validity table, the validity intervals are kept to a very detailed level. In this example, we have a plant and a time characteristic, for example the calendar day. An extreme case would be a validity table containing the characteristics calendar day, material and storage location. In this way, validity intervals are kept to a daily level for all possible material and storage location combinations. Where there were no movements for a specific day, storage location and material, a query does not display a balance for precisely this day, storage location and material, providing that material movements for the same characteristic combination (material and storage location) were not loaded on a later day.

2.4 Important OSS notes

360249: Non-cumulative: No or unintelligible data found in query
419490: Non-cumulatives: poor query performance
510680: Selective Deletion