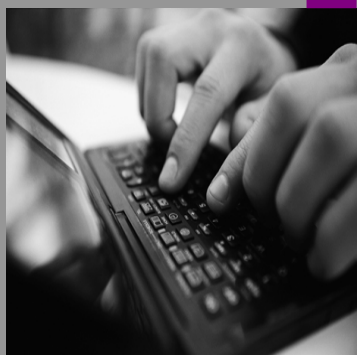

How-to Guide
SAP NetWeaver '04

How To... Hierarchies in Several Characteristics

Version 1.00 – November 2004

Applicable Releases:
SAP NetWeaver '04
(BW 3.5, SEM 3.1B – SEM3.5)

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1 Scenario

1.1 Planning in BPS using Hierarchies with Several Characteristics

In planning the data structure often has a hierarchical order. Usually these hierarchies are between several characteristics and data exists at several levels of the hierarchy. This paper describes various options for planning on hierarchical structures, which are based on several characteristics.

1.2 Sample Scenario

In our sample scenario a customer wants to plan data on products and products groups using the obvious hierarchical relation between products and product groups (each product belongs to exactly one product group; each product group can contain several products). The customer wants to enter data on the product group level as well as on the product/product group level. The hierarchical relation between the two characteristics should be displayed in the manual entry sheet.

2 Introduction

2.1 Why Use Hierarchies in a Layout

When displaying data in a planning layout or a report, it is a standard requirement by the end users that the data should be displayed using a hierarchy. When we go a little into detail and analyze why a user wants a hierarchy to be used, we come up with three main aspects:

- The user wants to have a hierarchical display so it is easier for him to understand the data. The user also wants to focus on certain subsets of the data collection by collapsing or expanding certain hierarchy nodes. This function of a hierarchy is more or less a pure display option.
- The user wants to see hierarchical relationships between the nodes in the hierarchy (each node/leaf belongs to some hierarchical upper node) and needs to see the proper sum values over all the nodes/leafs contained in a given sub tree.
- The user wants to select exactly that data that is contained in the hierarchy or a part of that hierarchy. Thus a hierarchy is also used for defining selection criteria for the data that is to be displayed.

When using BW hierarchies in BPS they can fulfill all of the three aspects. If you use a single characteristic in the lead column of a layout and use a hierarchy for the data selection a switch is set in the layout (you can even change that setting when executing the layout) in order to enable the hierarchical display in the layout. The hierarchy will then fulfill all aspects mentioned above. When using more than one characteristic in the lead columns you cannot directly use the hierarchy. In order to demonstrate how to use hierarchies in layouts with more than one lead column we go into detail with the different options of using hierarchies.

2.2 Hierarchies in Characteristic Relationships

Characteristic relationships can be defined on planning area and model the interdependencies between characteristics and their values. They are used to limit the combinations of characteristic values to only those combinations that make sense in the business environment. They can be used for checking characteristic combinations that have been entered manually or been created by a planning function (combination check), to fill in values for characteristics that are not contains in the planning level (derivation), and to generate a list of allowed combinations in the manual planning (combination proposal).
When using a BW hierarchy in a characteristic relationship the hierarchy has to satisfy some conditions:

- Except for the top most node (root node), each node/leaf in the hierarchy must be a characteristic value.
- For a given level in the hierarchy, every node/leaf must belong to the same characteristic, and no two levels can use the same characteristic. Thus the hierarchy has to be weighted. As BW is not based on hierarchical data storage but uses flat records modeling, non weighted hierarchies in planning do not make sense as the automatic aggregation function does not know about the hierarchies. Thus the hierarchies have to be seen as external hierarchies.
- Each node/leaf occurs in the hierarchy at most once. If say a leaf belonged to two nodes in the hierarchy then a derivation could not be done.

2.3 Hierarchies in Data Selections

In BW-BPS you can use hierarchies also for data selection. In the planning level or package (or a variable) you can choose a BW hierarchy defined for the characteristic you want to restrict and specify a node for selection. The system will go through the sub tree specified by this node and will select all characteristic values of the chosen characteristic that can be found there. You can only select one sub tree at a time. You can use the hierarchy also in a variable. Note that the data selection is somewhat different from selection hierarchy levels in BW. BPS will convert the hierarchy selection into a selection of characteristic values. Thus BW aggregates on hierarchy levels will not be used. You can use hierarchies for selection for as many characteristics as you want.
As an additional feature when using a hierarchy, the characteristic values in the lead column(s) will be sorted according to the hierarchy (normally the system will sort in alphanumeric order). This feature works also if you are using several characteristics in the lead column and if you are using different hierarchies for these characteristics.

2.4 Hierarchical Display in Layouts

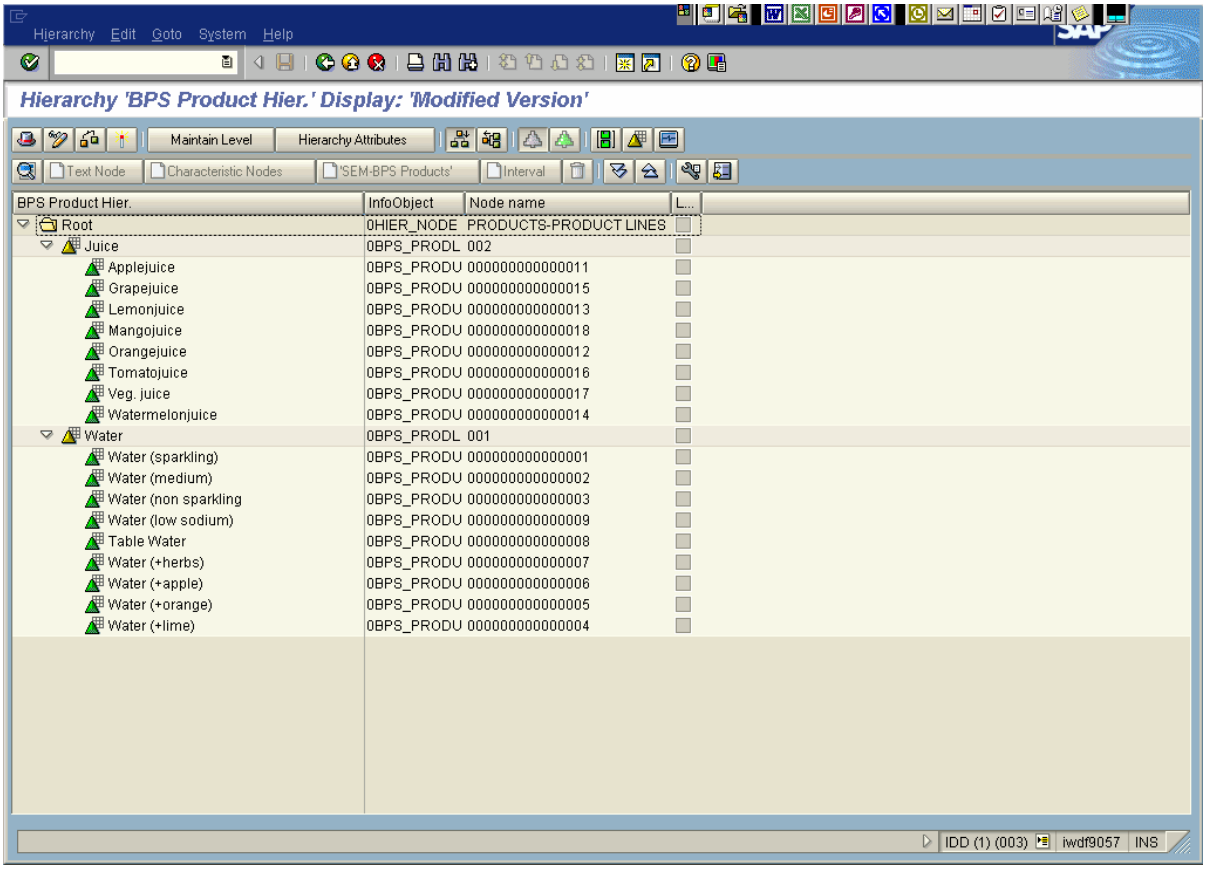
In BPS there are three different options to produce a hierarchical display of the data in a layout.

- For a given characteristic use a hierarchy for selecting data. If you use only this characteristic in the lead column and switch the hierarchical display on in the layout, the hierarchy will be used. Nevertheless, this is only an option if you have one characteristic in the lead column.
- You can display subtotals in a hierarchical way. This feature is merely a display option that allows the user to expand or collapse subtotals to arrange to data. Note that the user cannot change the subtotals.
- Even if there are no hierarchies defined in your data model the characteristics usually have an implicit hierarchical structure. Thus a product group can always be regarded as hierarchically "above" the products itself. Thus it can make sense to generate hierarchies in layouts. In order to specify which characteristic is the hierarchical upper one, the system uses the sort order of the characteristics in the layout. The generated hierarchies are used for budgeting functionality. Thus the values on the nodes (corresponding to subtotals) can be changed. There is an option for a top down and a bottom up mode as well. You can switch between these options by setting a flag on in the popup for hierarchies on the first screen of the layout builder (press button "hierarchies").

3 The Step By Step Solution

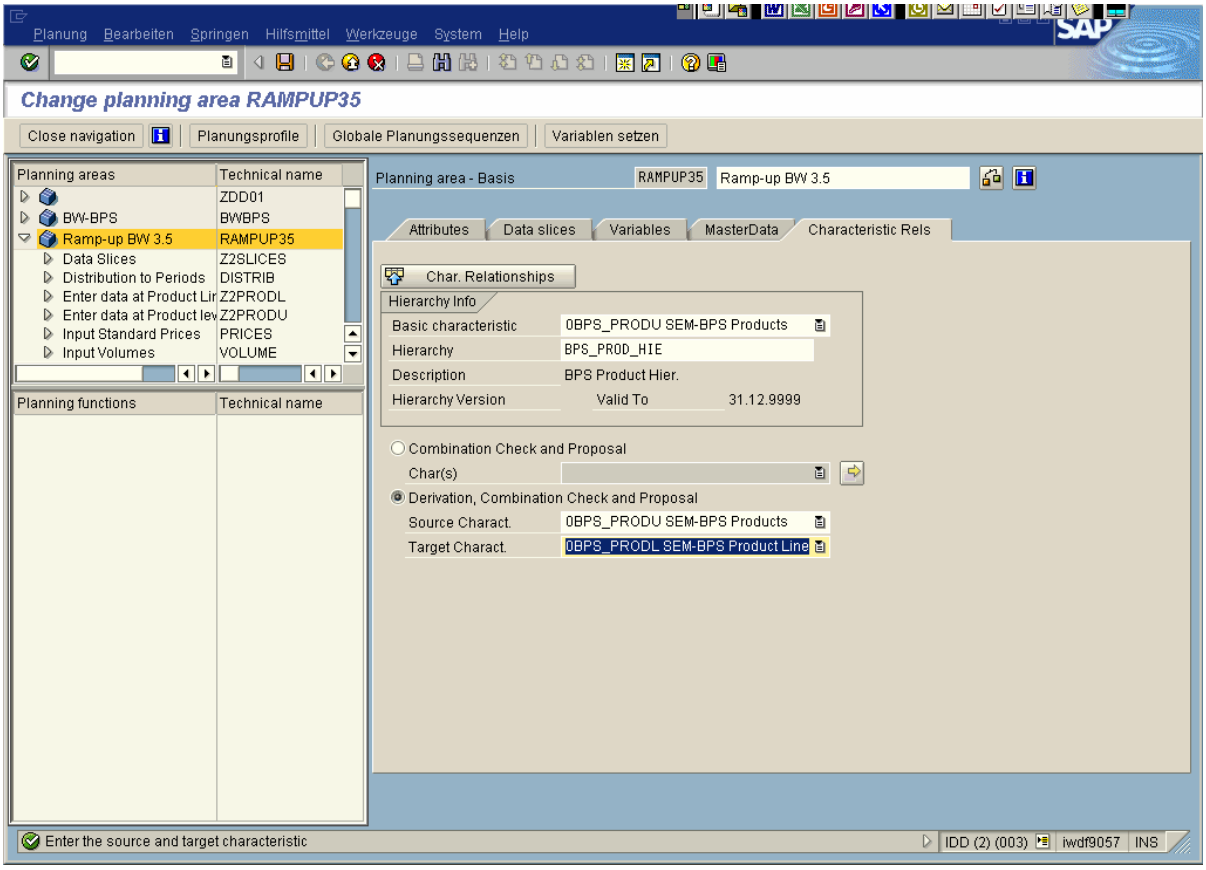
3.1 Introduction

We will use our business scenario sketched in the introduction as an example of how you can work with hierarchies with more than one characteristic in BPS and actually display them in a layout.
The user should plan his data using a hierarchical display of product group and product in the lead columns. In our example we will use different types of beverages as products and will use the product lines “water” and “juice”. We use a planning level that contains (beside other characteristics such as year or version) both product line and product.



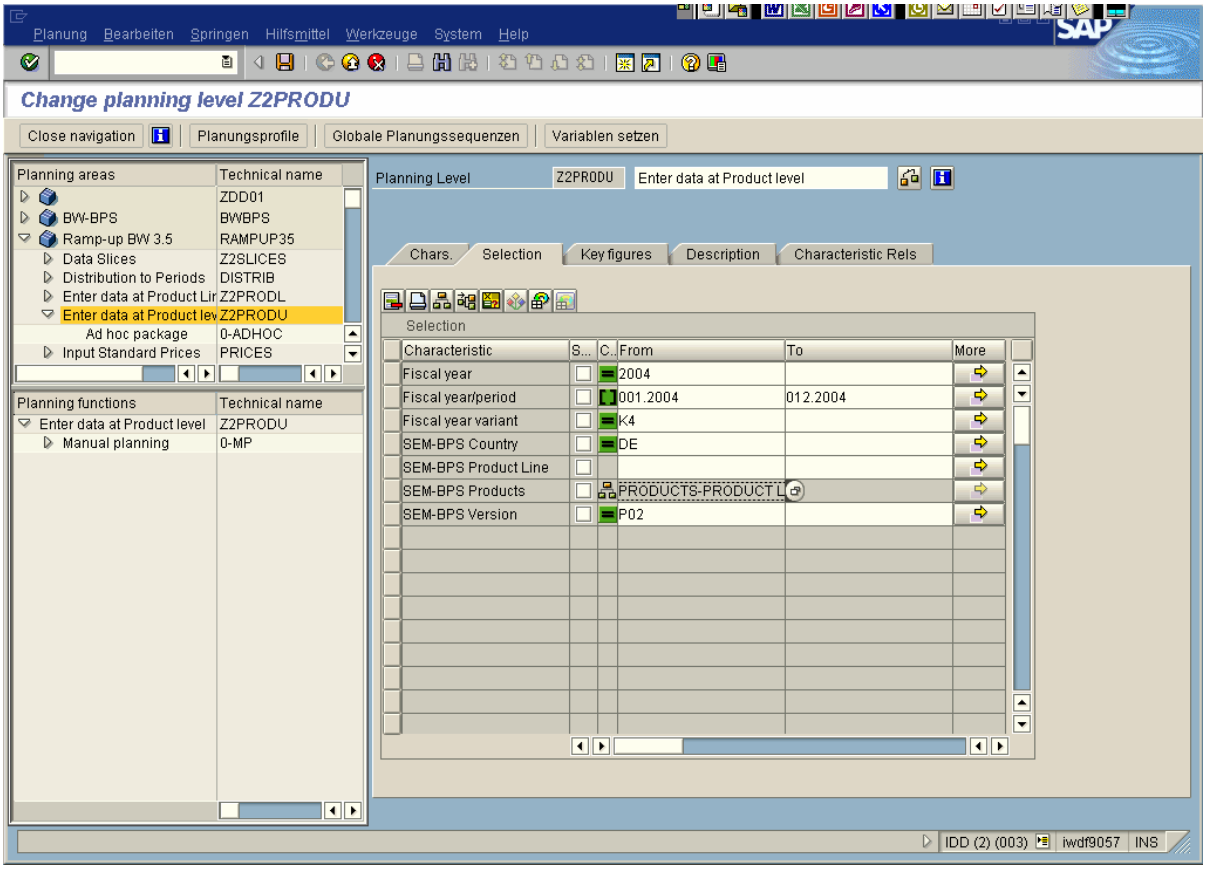
3.2 Characteristic Relationship

First of all we make sure that we have the proper hierarchical relationship between the two characteristics. As indicated above we use a BW hierarchy for a characteristic relationship.
Note that the hierarchical relationship can also be modeled by using any other type of characteristic relationship such as attributes or reference data.



3.3 Data Selection

We want to make sure that only data is selected that is contained in the defined hierarchy. One way to do that is to set the selection for product line to “water” and “juice“ and select the products using the hierarchy itself (either in the planning level or in the package). In order to select all characteristic values for the products that are contained in the hierarchy, we select the top node of the hierarchy.
The use of a hierarchy for selecting the data is not mandatory. You can also use other options for selection the data. Note that if you do use a hierarchy in the selection, the characteristic values will be sorted according to the hierarchy. If you do not use the hierarchy for selecting – for example by restricting the characteristic to certain attribute values, the system will use the usual alphanumeric sort order.

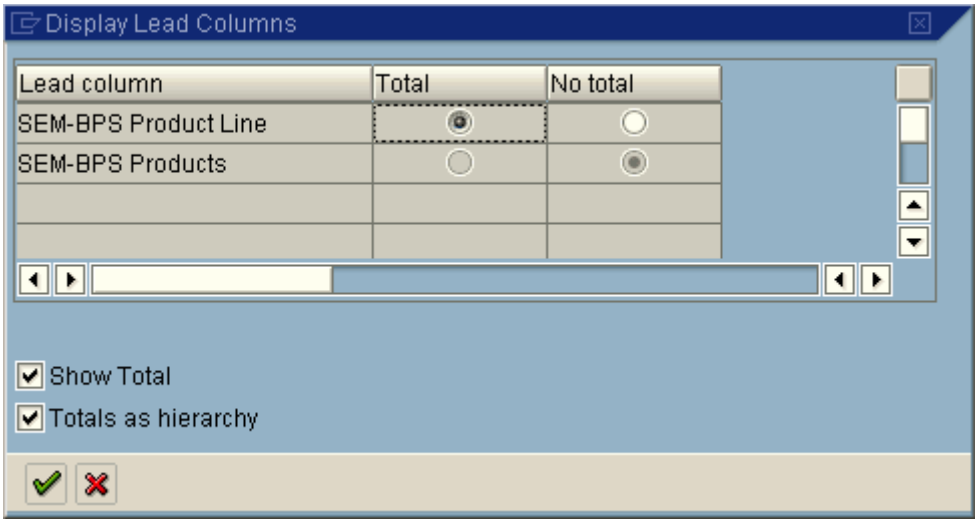


3.4 Hierarchical Display in the Layout

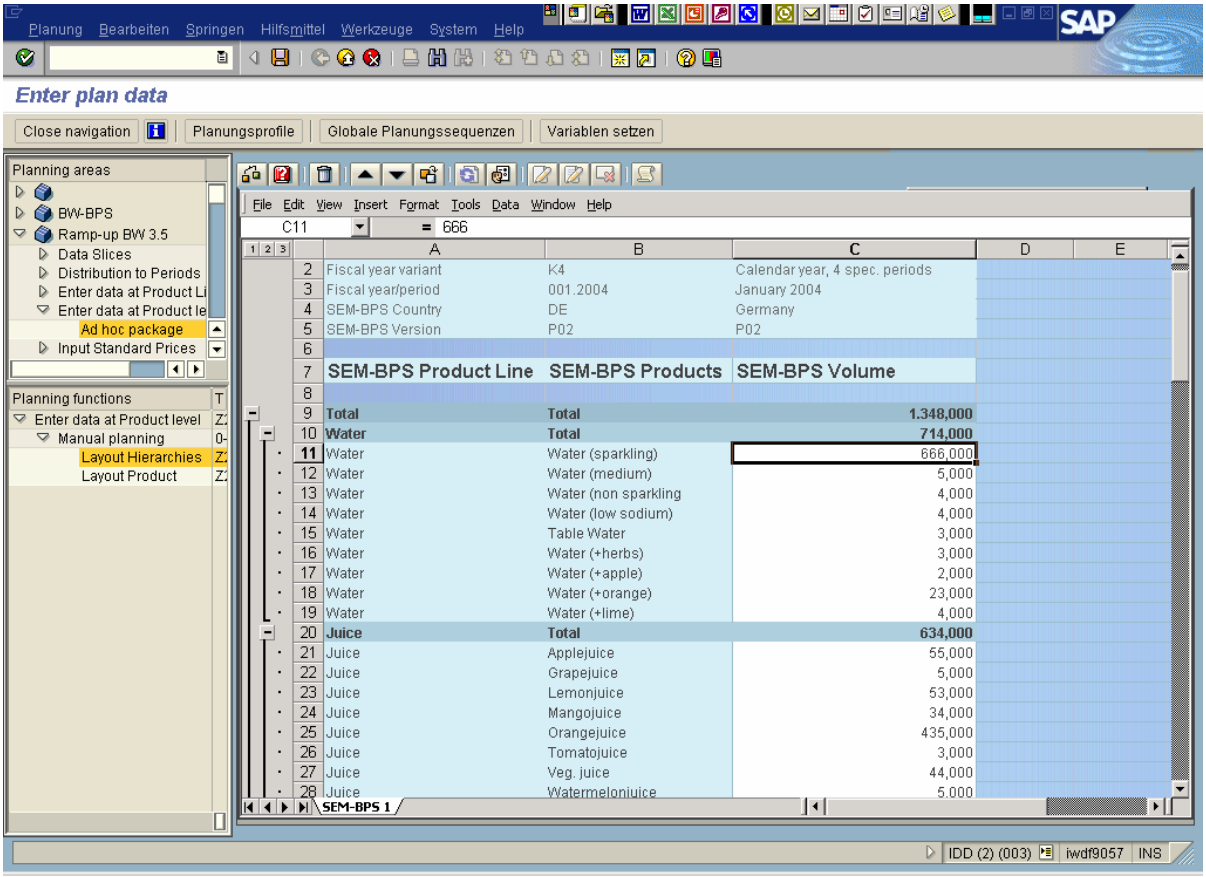
In order to actually see the hierarchical relation between the characteristics in the layout we have two options depending on whether the nodes should be input enabled or not. To see all possible entries we switch on the option “all possible characteristic combinations” in the layout builder.

3.4.1 Nodes Are Not Input Enabled

If the nodes for the product lines are not to be changeable, then we switch on the option “subtotals as hierarchy in the layout”. The popup will appear if you press the button “Lead column settings” in the layout builder (third screen).
If you enter or change data for the products, then the sums (i.e. the values on the nodes) will be calculated by the system. If in this scenario you want to enter data directly on the nodes, you have to define a layout on a separate planning level only containing product line.

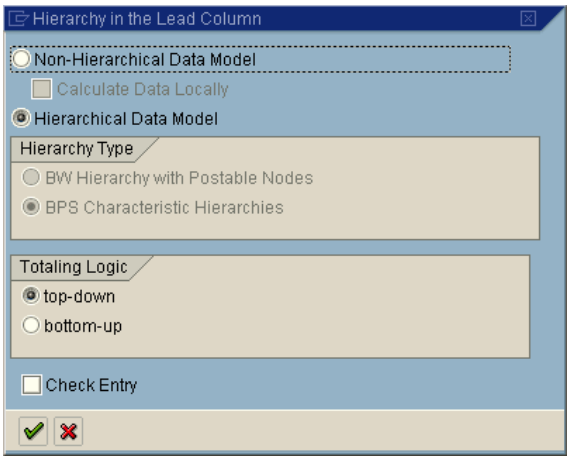


The resulting layout will show the hierarchy as desired:

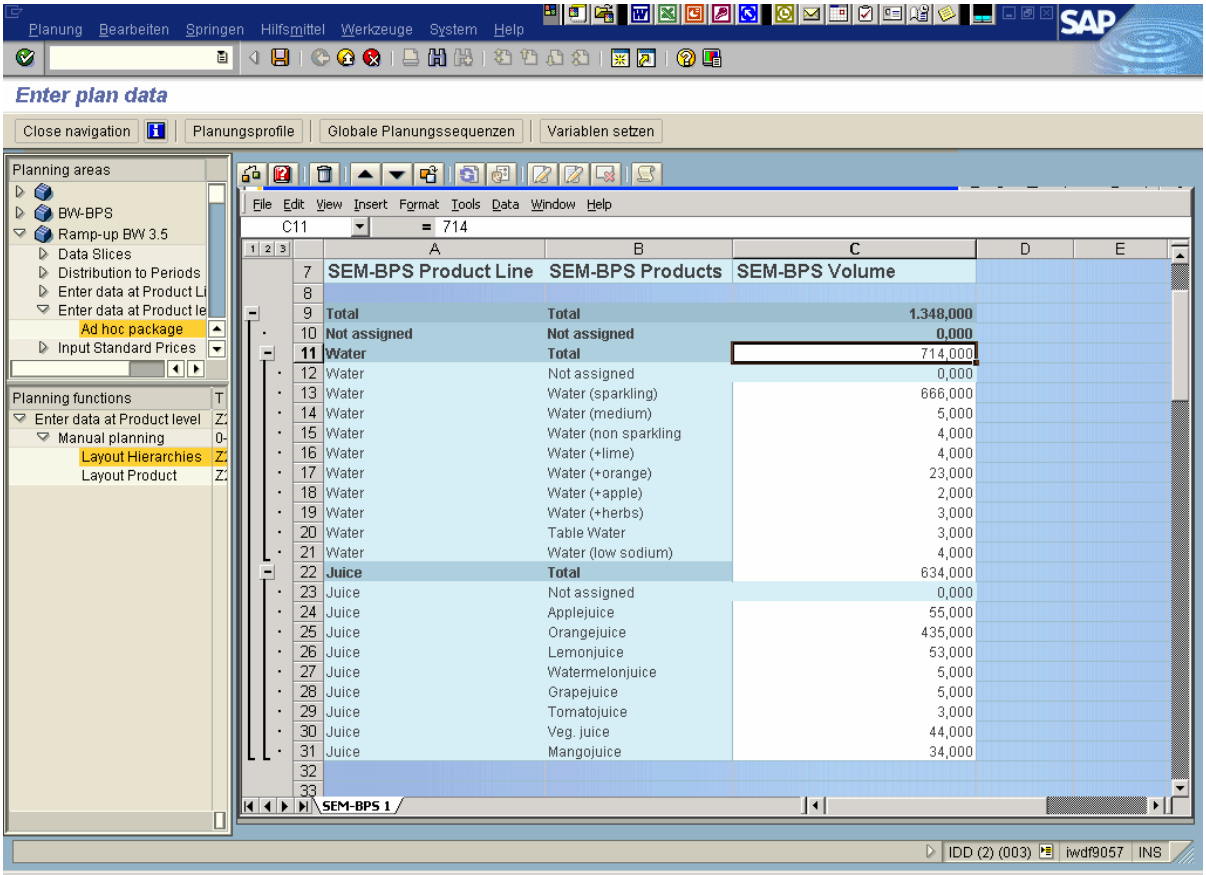


3.4.2 Nodes Are Input Enabled

In this case we use BPS hierarchies (also called “budgeting functionality”). On the first screen of the layout builder you press the button “Hierarchy”. Now you choose the option “hierarchical data model”.



If you use this scenario then the system is using the budgeting mode. As a node (in our case a product line) can hold values that might be different from then ones already "budgeted" to the different products, the system will use the value '#' for the remaining budget. Thus you have to make sure that the value '#' is contained in the selection for both characteristics.
Depending on how you set the radio button for the totaling logic, the system will decide what happens if you enter data for the products: either the sum will be updated (bottom up) or the value '#' will be changed (top down). In both cases you can enter data directly on the node (i.e. product lines) level.
If you also set the checkbox called "check entry", then the systems validates that the user cannot go "over budget", i.e. the residual value on the characteristic value '#' cannot be negative.



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