



Business Information Warehouse

Reporting & Analysis



Course Contents

Course Overview

Unit 1: Introduction to BW Reporting

Unit 2: Navigating in Reports

Unit 3: Business Content

Unit 4: First Steps in the BEx Query Designer

Unit 5: Calculated and Restricted Key Figures

Unit 6: Characteristics

Unit 7: Variables

Unit 8: Query Properties

Unit 9: Exceptions and Conditions

Course Overview

The *Business Explorer (BEx)* is a component of the *SAP Business Information Warehouse (SAP BW)* that provides flexible reporting and analysis tools that you can use for strategic analysis and supporting the decision-making process in your organization. You can use the *BEx* tool to display past and present data in differing levels of detail and from different perspectives, on the Web and in *Microsoft Excel*.

In this course, you learn about the basic functions of *SAP BW* reporting, starting with navigation in existing reports, continuing on to creating your own query definitions in the Query Designer, and taking you through to using analyses on the Web and in mobile reporting.

Target Audience

This course is intended for the following audiences:

- Project team members with a basic knowledge of data warehousing

Course Prerequisites

Required Knowledge

- Basic knowledge of data warehousing

Recommended Knowledge

- Basic knowledge of HTML

Course Goals

This course will prepare you to:

- Use *SAP BW* as a flexible analytical tool and structure reports for decision-making support in your organization.
- Evaluate past and current data to different levels of detail and from different perspectives on the Web and in *Microsoft Excel*
- Use the *BEx Web Application Designer* to create HTML pages with *SAP BW*-specific contents and save the Web applications as URLs

Course Objectives

After completing this course, you will be able to:

- Analyze reports in the *Business Explorer Analyzer (BEx Analyzer)* and on the Web by using the navigation functions
- Outline the architecture and reporting structure in *SAP BW*
- Activate queries from Business Content and use them in reporting
- Evaluate the data set in the Business Information Warehouse by defining queries using the *BEx Query Designer* and executing them in the *BEx Analyzer* and on the Web
- Use the *BEx Web Application Designer* to create HTML page that contain *SAP BW*-specific contents and different tables, charts, or maps

SAP Software Component Information

The information in this course pertains to the following SAP Software Components and releases:

Unit 1

Introduction to BW Reporting

Unit Objectives

After completing this unit, you will be able to:

- Describe the fundamental structures of *SAP BW*
- Explain the reporting functions of *SAP BW*
- Define the most important terminology used in reporting

Lesson: SAP BW Overview

Lesson Overview

This lesson deals with the fundamental structures of the *SAP Business Information Warehouse*.

Lesson Objectives

After completing this lesson, you will be able to:

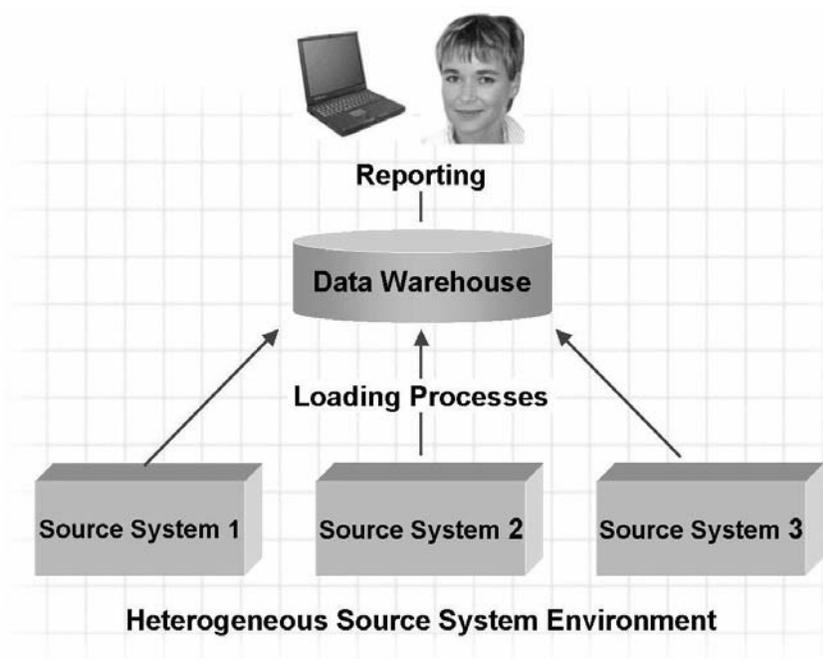
- Describe the fundamental structures of *SAP BW*
- Explain the reporting functions of *SAP BW*
- Define the most important terminology used in reporting

Business Example

You need a good overview of the structures and important terms in *SAP BW* in order to be able to use the available functions. Use this overview to reinforce the BW functions in the following scenarios, and to develop solutions.

Data Warehouse System

A data warehouse system serves primarily to stage information from various data sources. This data and information, and the reports resulting from them, constitute the basis of successful business processes within a company. This type of system can be used by all employees in a company (that is, by managers, departmental heads, and all other employees).



Data Warehouse System

The information is staged in various forms including personalized reports, freely definable queries, and predefined reports. Recipients of information can use these reporting and analysis functions to analyze the data for deviations and significant facts. In the Planning and Campaign Management areas, a data warehouse is used to carry out data analysis. The following issues might arise when using a data warehouse in the Retail Sector area:

- Checking ranges of goods in order to identify slow moving items and big sellers
- Analyzing regional locations to investigate the profitability of different branches
- Investigating the effectiveness of market analyses
- Evaluating customer surveys and complaints
- Analyzing warehouse stock levels
- Analyzing shopping carts using cash register receipts

A concrete query might be:

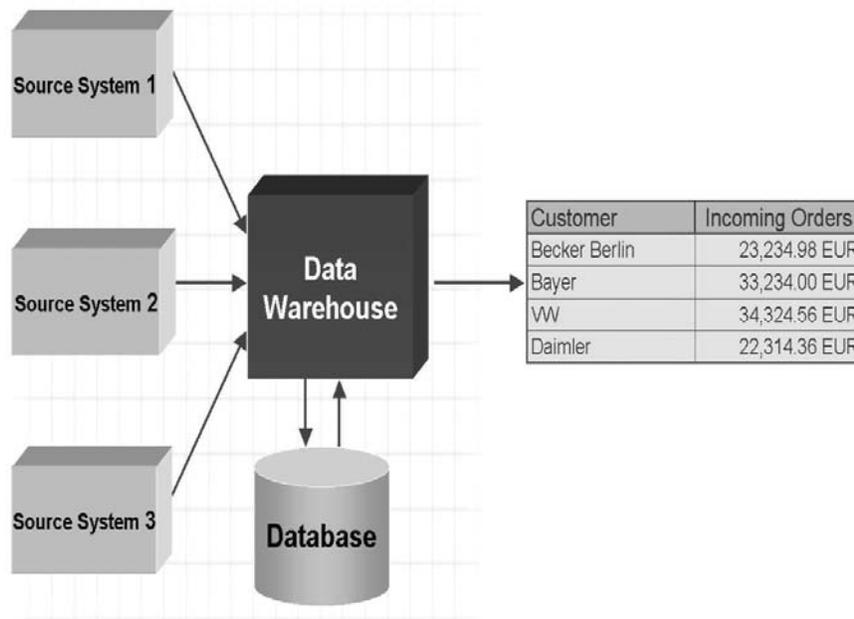
- What were the sales volumes for the Cosmetics, Electrical Goods, and Household Goods departments in the years 2000 and 2001 in New York and Washington DC?

In brief, a data warehouse can:

- Pool data from different, mostly heterogeneous sources
- Overcome this heterogeneity on different levels (system, schema, and data)
- Stage data in the form required by the user

What We Expect from a Data Warehouse

Decision-makers urgently need reliable information from Production, Purchasing, Sales and Distribution, Finance, and Human Resources departments. They require an up-to-date and comprehensive picture of each individual business area and of the business as a whole. This places considerable demands on data staging from the underlying data sources.



What We Expect from a Data Warehouse

The information must be stored in a homogeneous and consistent form at a central location where it can be called up. Therefore, modern data warehouses require a separate database that an independent application environment can use to provide the required services objectively.

Efficient analysis techniques with powerful multi-dimensional visualization are indispensable on the presentation side of the data warehouse. The system must be able to cope with the information needs of the various user groups.

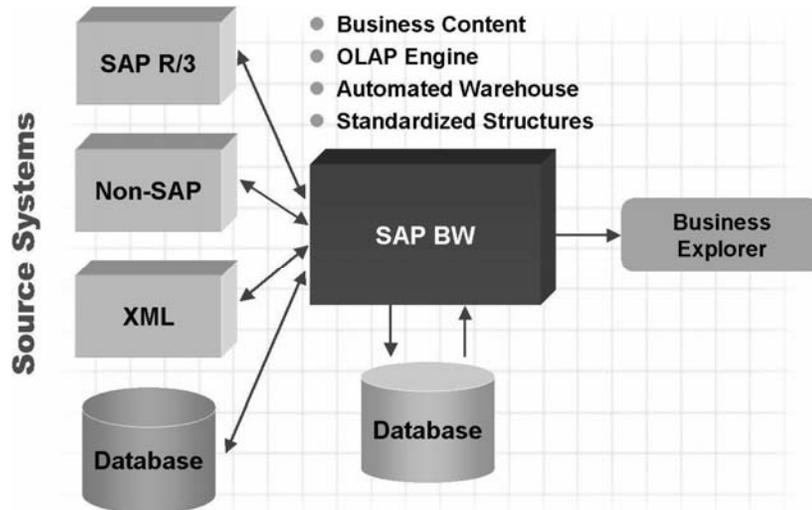
The demands made on the source systems are not so high. What is needed here is an economic and comprehensive preparation of the data that is required by the data warehouse.

The following demands are made on a data warehouse:

- Standardized structuring and presentation of all company information
- An easy-to-use, single-point of access to all company information
- Sophisticated business reporting methods for self-service analysis at all levels
- Fast and cost-effective installation
- A high performance environment
- Data staging from heterogeneous environment
- Release of source systems and IT organization
- Data access independent of the source system
- Analysis of data over a specific period of time, and the storage of historical information (time-dependent master data)

SAP Business Information Warehouse

The *SAP BW* allows you to analyze data from operational *SAP R/3* applications or any other business application. You can also extract and analyze data from external sources such as databases, online services, and the Internet.



SAP Business Information Warehouse

The system (data storage, loading and reporting), which is preconfigured by Business Content for core areas and processes, allows you to examine the relationships in every area of your company.

The realization of *SAP BW* aimed for the following:

- Data warehousing system with optimized data structures for reporting and analysis
- Separate system
- OLAP engine and tools
- Comprehensive data-warehousing architectural base
- Automated data warehouse management
- Preconfiguration using SAP global business know-how

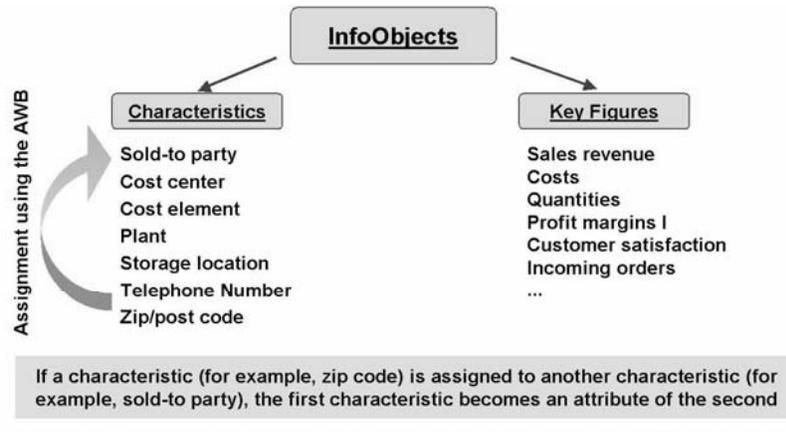
With these goals in mind, SAP has opted for a separate data-warehousing solution that handles reporting activities as an autonomous business component, even providing a separate server with its own database and SAP system: *SAP Business Information Warehouse*.

All of the requirements and objectives mentioned so far have been met in the conception and architecture of *SAP BW*.

Having implemented *SAP BW* and its metadata repository (description of data), the customer has the clear advantage of being able to use the entire SAP know-how built up over the many years of experience in developing business software solutions. *SAP R/3* systems can be configured as source systems, and provide data for all SAP Business Content. This is described later in more detail.

Terminology and Objects in SAP BW

Now, an introduction to the important terms that are used in *SAP BW* will allow you to obtain an overview of terminology. This overview will be consolidated for the individual topical areas in the corresponding units of *SAP BW* courses.



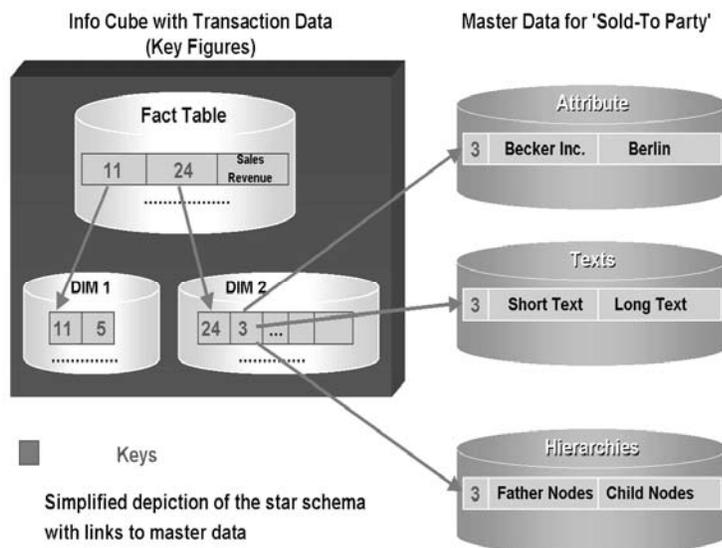
A data record (posting record) is a combination of characteristics and key figures

Controlling Area	Cost Center	Cost Element		Cost
1000	4100	310000	...	1000 EUR

Terminology I

InfoObject

Business analysis-objects (customers, sales volumes, and so on) are called InfoObjects in *SAP BW*. These InfoObjects can be divided into characteristics and key figures. Characteristics can be further divided into units, time characteristics, and technical characteristics (for example, request ID). Key figures are all data fields that are used to store values or quantities (sales volumes, kilowatt-hours, costs, and so on). Characteristics describe the affiliation of key figures. For example, costs belong to a cost center, whereby the cost center is a characteristic.



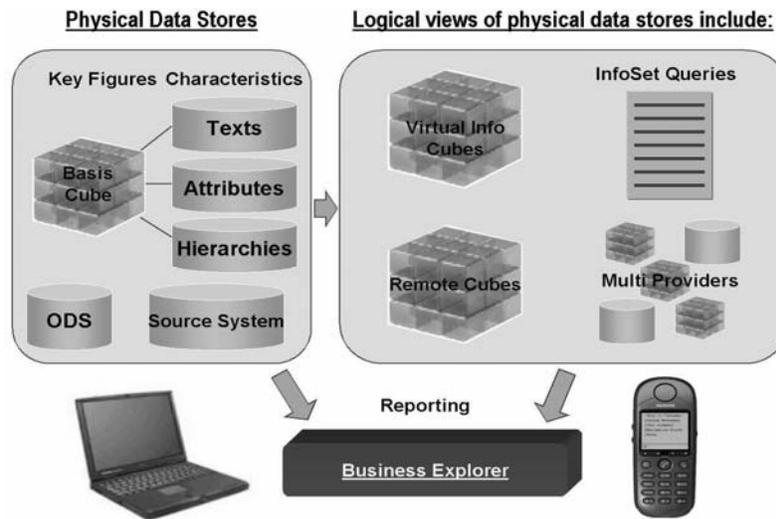
Terminology II

InfoCube

The central data containers that form the basis for reports and analyses in *SAP BW* are called InfoCubes. They contain key figures (sales volumes, incoming orders, actual costs, and so on) and a link to the characteristics (master data of the *SAP BW* system such as cost centers, customers, materials, and so on). Key figures and characteristics are InfoObjects. Each individual InfoCube should contain a self-contained dataset, since queries refer primarily to one InfoCube. Master data in the BW system consists of attributes of a characteristic (for example, the person responsible for a cost center), as well as hierarchies and texts of a characteristic.

An InfoCube consists of several database tables that are linked according to the star schema. They include a fact table that contains the InfoCube key figures, as well as several surrounding dimension tables that store the links to the characteristics.

- Each InfoCube has one fact table and a maximum of 16 dimension tables.
- Each fact table can contain a maximum of 233 key figures.
- A dimension can contain up to 248 freely available characteristics. InfoCubes are stored in structures in the *SAP BW* system. If you want to store an InfoCube, you create a new folder or use an existing one. This is similar to the method used when storing data on your PC: These folders are called InfoAreas in *SAP BW*.



Terminology III

InfoProvider

InfoProvider is the super-ordinate term for an object that you can use to create reports in Business Explorer (BEx). InfoProviders are objects or views that are relevant to reporting.

InfoProviders include various database metaobjects that deliver data for query definitions. The type of data procurement differs depending on the InfoProvider used. However, the type of data procurement has no influence on reporting. InfoProviders deliver data that can be analyzed using a query. There are two types of data stores. Physical stores include:

- InfoCubes
- ODS Objects
- InfoObjects

Logical views of physical data stores include:

- InfoSets
- RemoteCubes
- Virtual InfoCubes
- MultiProviders

The previous figure gives an overview of *SAP BW* reportable objects, divided into data targets that contain physical data, and InfoProviders that only contain logical views. From the BEx view, only InfoProviders are accessed. The way in which the data is modeled is inconsequential to the BEx toolset. **Operational Data Store (ODS)**

An ODS, a data store, stores data at the basic level (document level). It is normally used to resolve and consolidate datasets. These datasets are often from various data sources and/or source systems.

Administrator Workbench (AWB)

Administrator Workbench (AWB) is a workplace for SAP BW administrators. AWB functions are used to configure, control, and administrate SAP BW.

Business Information Warehouse Architecture

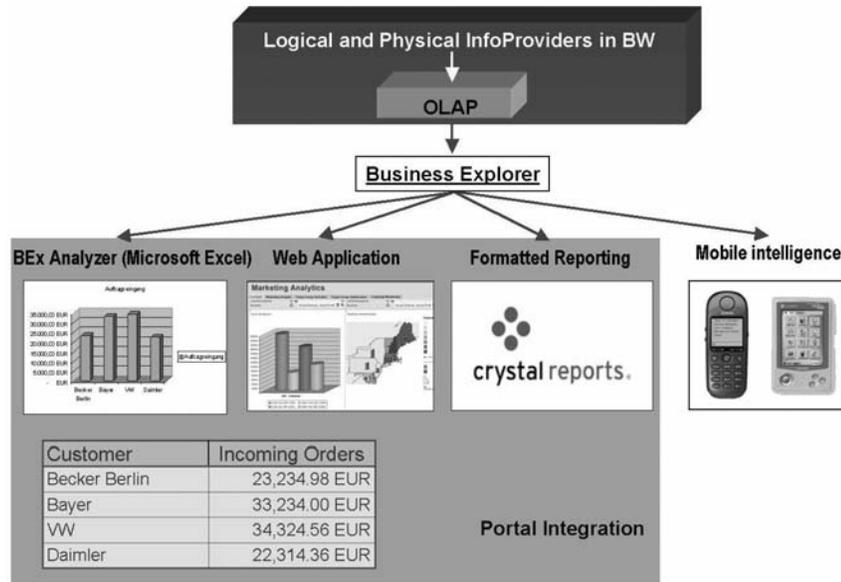
SAP BW enables the analysis of data from operative SAP applications as well as all other business applications and external data sources such as databases, online services, and the Internet.

Business Information Warehouse Architecture

AWB functions allow you to control, monitor, and maintain all data procurement processes.

SAP BW enables Online Analytical Processing (OLAP) for staging information from large amounts of operative and historical data. OLAP technology permits multi-dimensional analyses according to various business perspectives. The BW server, which is preconfigured by Business Content for core areas and processes, allows you to examine the relationships in every area within your company. Business Content provides targeted information to companies, divided into roles. This helps your employees to carry out their tasks. As well as roles, Business Content includes other preconfigured objects such as InfoCubes, queries, key figures, and characteristics. These objects facilitate the implementation of *SAP BW*.

The *Business Explorer (BEx)* component provides users with extensive analysis options.



Reporting in SAP BW

BEx is the SAP BW component that provides flexible reporting and analysis tools that you can use for strategic analysis and supporting the decision-making process in your company. Employees with access authorization can analyze historical and current data at differing levels of detail and from different perspectives. They can use the Web or Microsoft Excel.

BEx allows a wide spectrum of users to access information in SAP BW. This can be done in Enterprise Portal from an iView that you can call alongside the applications where you extract the data, in the Internet or Intranet (Web Application Design), or using a mobile device (for example, WAP-enabled mobile telephones, and personal digital assistants). Web Application Design allows you to implement generic OLAP navigation in Web applications and in Business Intelligence cockpits for both simple and highly-individual scenarios. Highly individual scenarios with customer-defined user interface elements can be realized using standard markup languages (HTML). Web Application Design encompasses a wide spectrum of interactive Web-based Business Intelligence scenarios that you can modify to suit your requirements using standard Web technology.

The following is an overview of BEx functional areas:

Portal Integration

- Single point of entry
- Role-based staging of information
- Personalization
- Integration of unstructured data

Query, Reporting, and Analysis

- Query design using the BEx Analyzer Multi-dimensional (OLAP) analysis
Geographical analysis
- Ad-hoc reporting
- Alert
- Publication of iViews

Web Application Design

- Web Application Design
- Interactive analytical content Information cockpits and dashboards Basis for creating analytical applications Creation of iViews for a portal
- Wizard-based visualization
- APIs for additional, highly individual Web design

Formatted Reporting

- Pixel-precise layouts
- Wizard-based layout definition
- Static, formatted reports
- Form-based reports
- Predefined Crystal reports in Business Content
- Publishing on the Web
- User-friendly printing options

Mobile Intelligence

- Online and offline scenarios Support of WAP devices and PDAs Automatic device recognition
- Publishing using the *Web Application Designer*
- Device-specific tasks
- Alerts and charts
- Integration in the mobile portal

The following explains the individual functional areas of *BEx*:

Query, Reporting, and Analysis

The data basis of *SAP BW* is divided into self-contained business data areas (InfoProviders). The user analyzes the *SAP BW* dataset by defining queries for the InfoProvider. You can determine the way in which the InfoProvider data is analyzed by selecting and combining InfoObjects (characteristics and key figures) or reusable structures in a query. Data analysis based on multi-dimensional data sources (OLAP reporting) allows you to analyze more than one dimension of an InfoProvider (for example, time, place, and product) at the same time. This means that you can make any number of variance analyses (plan/actual comparison and business year comparison). The data, which displays in the form of a pivot table, is a starting point for detailed analysis in order to answer a myriad of questions.

Web Application Design

You can use the *BEx WEB Application Designer* to create HTML pages that contain BW-specific content such as tables, charts, and/or maps. You can save the Web queries as uniform resource locators (URLs) and access them from the Internet, Intranet, or mobile devices.

The *Web Application Designer* contains an assistant that is called the *Web Application Wizard*. This Wizard supports you when creating Web applications by providing an automatic step-by-step process. This simplifies the design process.

Formatted Reporting

The integration of Crystal reports into *SAP BW* enhances the *BEx* functional area by allowing you to create formatted reports. Formatted reports mainly involve pixel-precise layout design and user-friendly printing options.

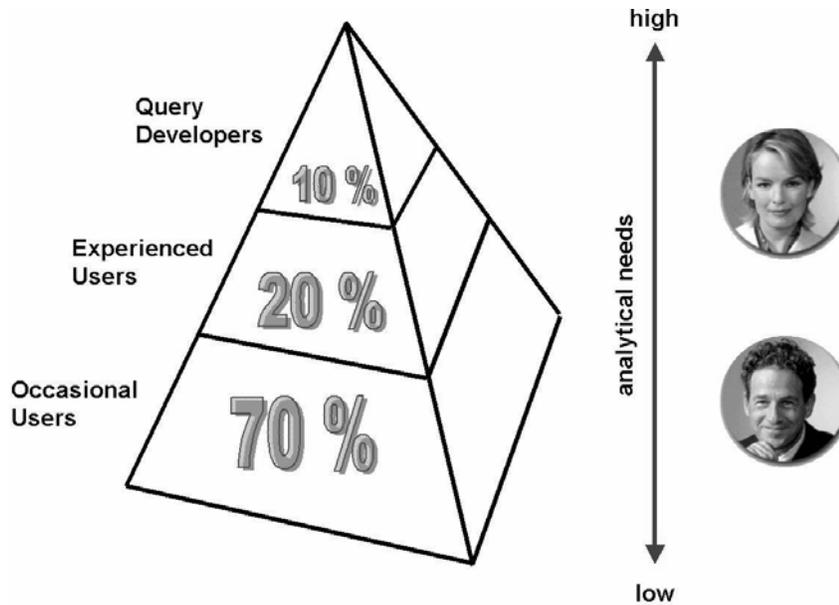
Mobile Intelligence

You can use *BEx Mobile Intelligence* to access Web applications even when on the road. The following devices are supported:

- Personal digital assistant (PDA) with *Windows CE 3.0* and *Pocket Internet Explorer*
- WAP-enabled mobile telephone
- i-Mode-enabled mobile telephone
- Mobile device with EPOC32 operating system (*Nokia Communicator 9210*)

Different User Types in SAP BW

New studies have shown that up to 70 percent of all OLAP system users are basic users. Compared to the advanced users and query developers, basic users only use the system's analytical functions on a very small scale. This is because the basic users usually carry out predefined queries with fixed datasets. Therefore, most of SAP users need a simple user interface.



Different User Types

However, the experienced users and query developers who design and carry out information analyses on several levels must be able to use a comprehensive and effective range of tools for their analyzing options. SAP catered to these various user needs when developing the *Business Information Warehouse*.

Unit Summary

You should now be able to:

- Describe the fundamental structures of *SAP BW*
- Explain the reporting functions of *SAP BW*
- Define the most important terminology used in reporting

Unit 2 - Navigating in Reports

Unit Overview

In this lesson, you use the various navigation options in the *Business Explorer Analyzer (BEx Analyzer)* and in a Web query, and you become familiar with the options of the *Business Explorer Browsers (BEx Browsers)*.

Unit Objectives

After completing this unit, you will be able to:

- Use the navigation options in the *BEx Analyzer* and in a Web query
- Use the functions of the context menu
- Explain the functions of the navigation block
- Use exceptions and conditions
- Navigate with hierarchies
- Call documentation in the query
- Use Drag&Relate in a portal
- Start your reports from the Business Explorer Browser
- Organize your workbooks and links with the BEx Browser and set up access to individual roles
- Outline the functions of the BEx Browser on the Web
- Explain the functions of the Business Document Server (BDS)

Lesson: Navigating in Reports

Lesson Overview

This lesson deals with the different options for navigating in the *BEx Analyzer* and in a Web query.

Lesson Objectives

After completing this lesson, you will be able to:

- Use the navigation options in the *BEx Analyzer* and in a Web query
- Use the functions of the context menu
- Explain the functions of the navigation block
- Use exceptions and conditions
- Navigate with hierarchies
- Call documentation in the query
- Use Drag&Relate in a portal

Business Example

You want to analyze business key figures (for example, sales volumes or costs) within existing BW reports. You use BW reporting options to analyze key figures. There are *BEx Analyzer reports* and Web reports.

Data sources used:

- Role: BW305_Reporting
- InfoCube: T_DALSEGM (MultiCube)
- InfoCube: T_M_CO (MultiCube)

Reports used:

- Query: T_BW305_Q01
- View: T_BW305_Q01_V01
- Template: T_BW305_TPL01 (Sales volume analysis I)
- Query: T_BW305_Q02
- View: T_BW305_Q01_V02
- Template: T_BW305_TPL02 (Graphical sales volume analysis) The initial view of the Web report displays the sales volumes of customers in the USA. The geographical map of the USA is divided into four areas. Customers in these areas are identified by a red triangle. They are also listed in a table. The number of customers is restricted to the fifty best customers (by sales volume). A ticker displays the sales volumes of the four geographical areas.
- Query: T_BW305_Q03
- View: T_BW305_Q01_V03
- Template: T_BW305_TPL03 (Sales volume II)

The initial view of the Web report displays the sales volume and billed amount over two business years on a time axis. The Web report also displays the sales volume for the distribution channels, available product groups, and materials.

- Query: T_M_CO_Q01 (Cost center actual/planned)
- Template:T_BW305_CO_start (CO analysis)

The initial view of the Web report displays a comparison between planned and actual costs for all cost centers, broken down according to cost element. The costs of important cost centers are also displayed as a pointer. This allows you to recognize deviations at a glance.

Caution: The following examples are based partly on BEx Analyzer queries and partly on Web queries. The navigation options can be found in both query types and are sometimes demonstrated on BEx Analyzer queries, and sometimes on Web queries. The queries used have been modified to meet user-specific requirements (layout).

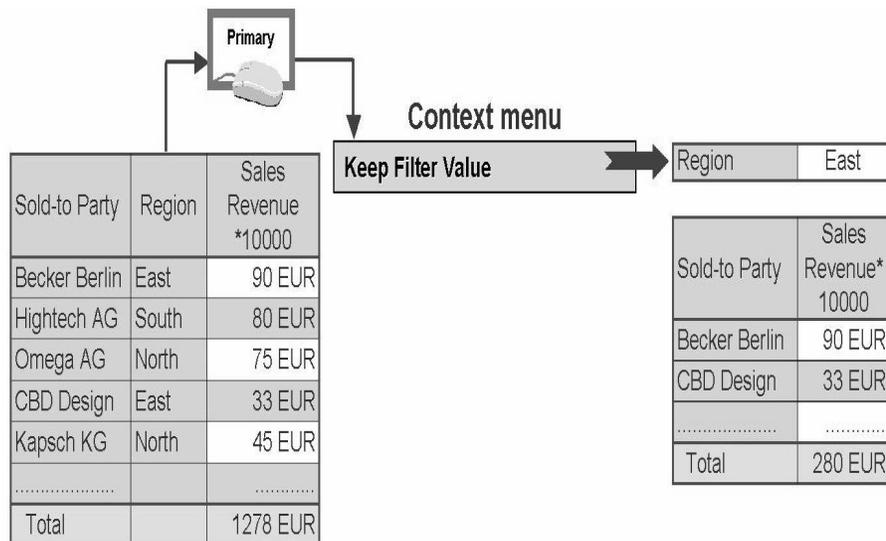
Context Menu

You call the context menu using the right mouse button in the *BEx Analyzer*, and the left mouse button in a Web query. The context menu allows you to navigate in different ways within the report output and offers various functions depending on the cell context. You can also choose to have a simplified context menu with a restricted number of features. If you want the context menu to have more functions, you can add an enhanced menu. You can then use the *Enhanced Menu* and *Basic Menu* menu entries in the context menu itself to toggle between the two versions. The basic menu contains a selection of the functions from the enhanced menu.

For example, the *Region* characteristic appears in the drilldown. Choose the *Keep Filter Value* function for the *East* characteristic value. The data in the table is now filtered by the *East* value, and this characteristic value no longer displays in the drilldown. You can see that the table is filtered by the *East* value in the navigation block or in the filter.

Keep Filter Value

You can select as filter value directly from the results area of an executed report. To do this, position the cursor on the filter value required, and choose *Keep Filter Value* from the context menu. The filter value is then displayed in the report and the report results are restricted to the filter value in question.



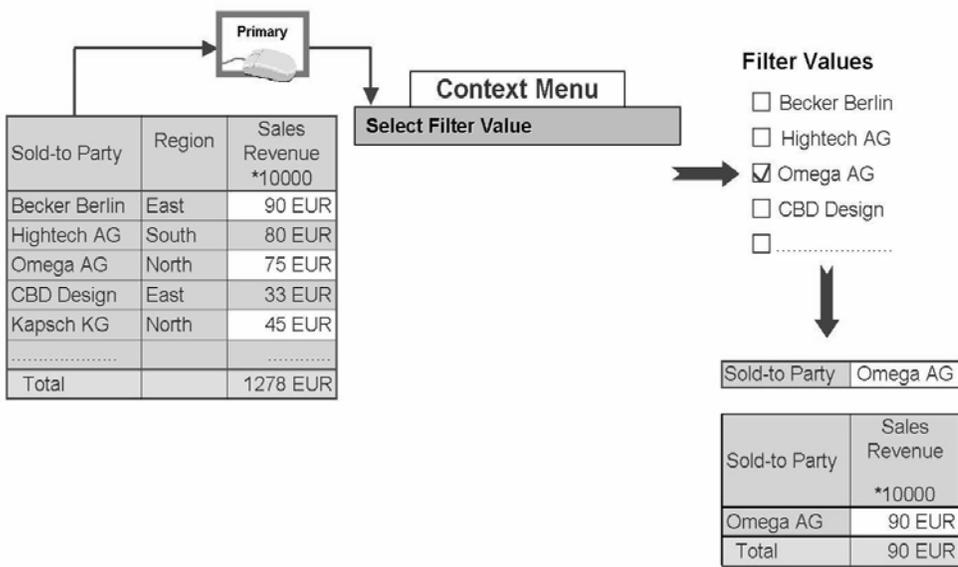
Keep Filter Value

Select Filter Value

The system provides you with all possible values for a particular characteristic or for a particular structure of a query. Depending on the query setting, the values display as keys or as names. You can select one or more values from this value set. You can select filter values for characteristics using value selection in *BEx*. To select an individual value in a Web report, choose the value in question (the hand symbol indicates a hyperlink). This adopts the value with no need for any additional action. To select more than one value, check the checkbox next to the required values, and choose *Transfer*. You can also select a single value in this way.

You can sort the specified values in ascending or descending order. To do this, select the hyperlink that has the name of the characteristic or structure. This link appears above the list of values. The first click sorts the values in ascending order, and the second sorts them in descending order.

As well as selecting filter values, you can also use a search. This search has an effect on the selection list of single values. The values are restricted according to the search criteria.

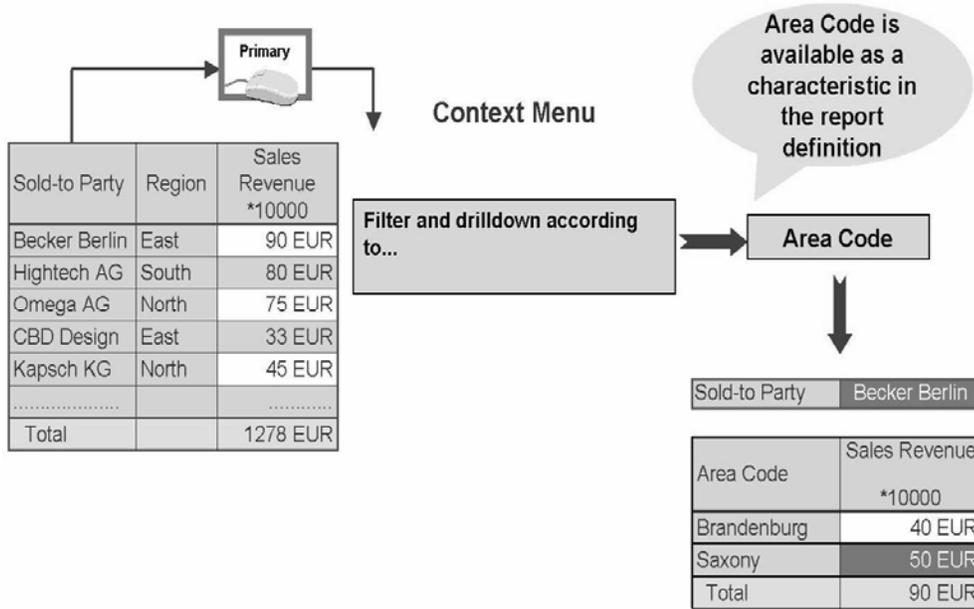


Select Filter Value

Filter and Drilldown according to...

Choose *Filter and Drilldown according to* to set a characteristic at a certain value (filter) and, at the same time, drilldown by a different characteristic on the same axis (row or column).

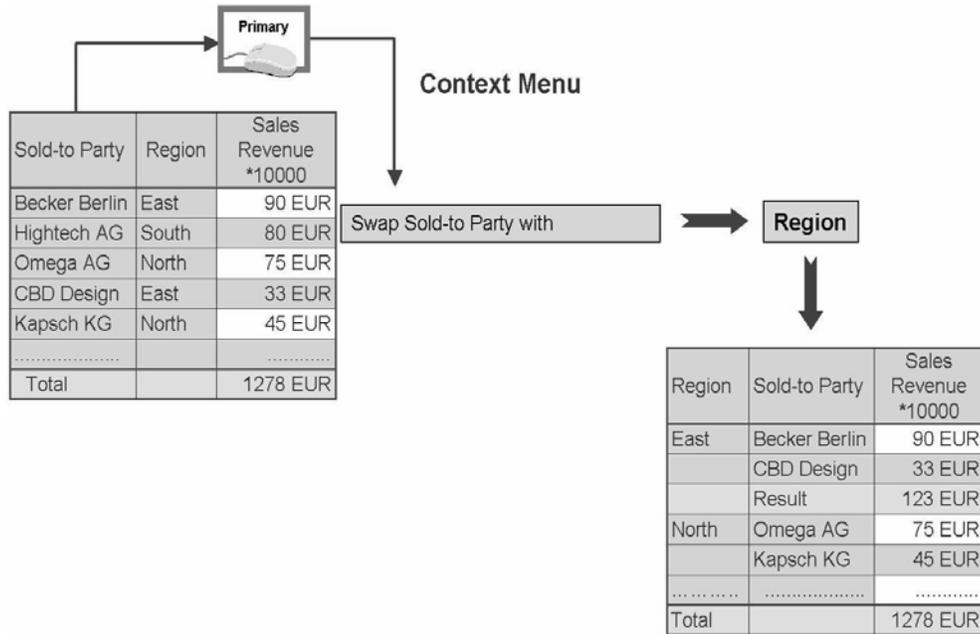
For example, in the *Filter and drilldown according to* menu, choose the *Becker Berlin* characteristic value. The data filter according to *Becker Berlin*. The *Becker Berlin* characteristic value then disappears from the drilldown. At the same time, the Area Code characteristic is drilled down.



Filter and Drilldown According to...

Swap Characteristic with ...

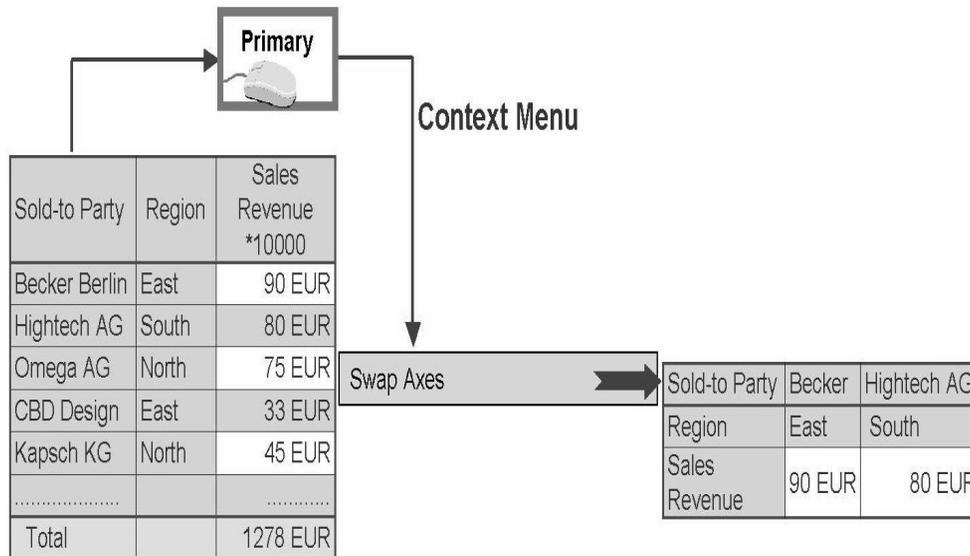
Use the *Swap x with...* function to swap a characteristic or structure for another characteristic or structure.



Swap Characteristic with ...

Swap Axes

Use the *Swap Axes* function to swap the axes of the query. If, for example, the characteristics are in the rows, and the key figures in the columns, you can choose *Swap Axes* to have the key figures display in the rows and the characteristics in the columns.

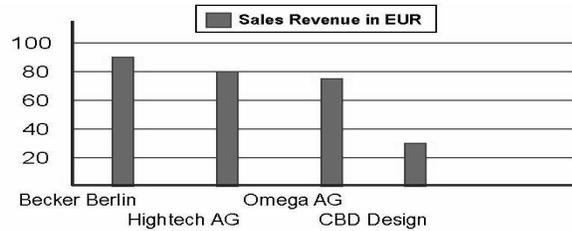


Swap Axes

Fix Filter Value to Axis Choose *Fix Filter Value to Axis* if you only want to see data for one characteristic value and want the characteristic value to continue to appear in the drilldown.

This function is primarily useful for chart and map Web items, as you can see the context of the data (that is, the filter) in the chart and map themselves. It is still possible to interpret the chart and map.

Sold-to Party	Sales Revenue *10000
Becker Berlin	90 EUR
Hightech AG	80 EUR
Omega AG	75 EUR
CBD Design	33 EUR
Kapsch KG	45 EUR
.....
Total	1278 EUR



Fix Filter Value to Axis

Sold-to Party	Sales Revenue *10000
Becker Berlin	90 EUR
Total	90 EUR



Fix Filter Value to Axis

Goto

You can use the *Goto* function to reach documents and other targets using report/report interfaces.

Depending on the cell context in which you call the *Goto* function, the following options are available:

- For reaching cells that contain a key figure, there is the *Goto Display Documents* function: You reach the documents that correspond to the cell selection.
- For reaching cells that contain a characteristic value, the following functions are available:
 - *Goto* → *Display Documents*: You reach documents in the master data area of the characteristic value.
 - *Goto* → *Documents for Navigation Status*: You reach documents that correspond to the selection cell.
- You can start another query on the Web (with the standard Web template) or other Web application, in which the input variables are filled from the selection conditions and element definitions of the selected cell of the sender query.

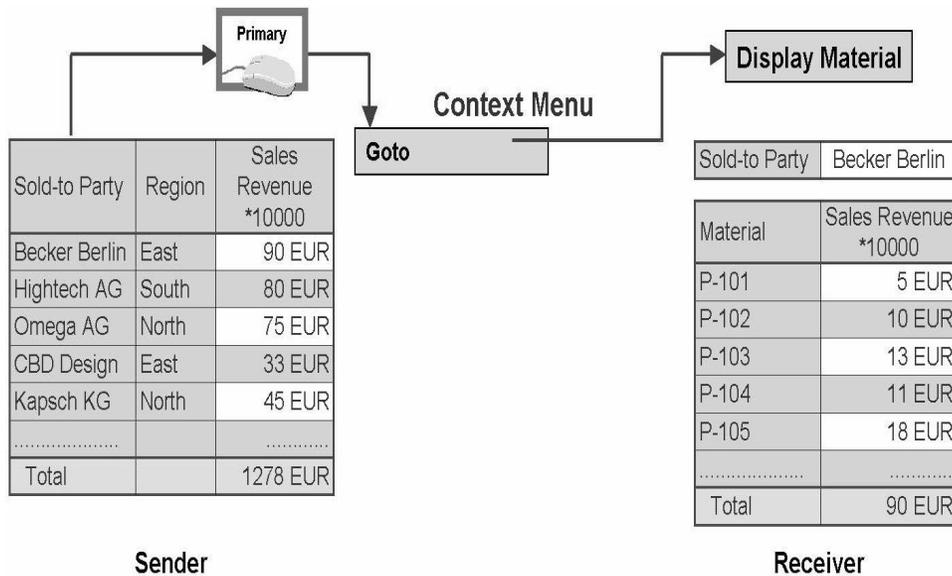
- You can start Web-capable reports, functions, and transactions within and outside of *BW*.

You have the same options when working in *BEx Analyzer* reports.

You have to define the sender/recipient assignment first so that the system offers targets using the report/report interface in the context menu under *Goto*.

The report/report interface (R/RI) allows you to call parameterized programs from other programs, meaning that you are able to jump from one report to another report that contains more information. From *SAP BW*, you can reach targets both within and outside of the *BW* system. You can go to the connected *SAP R/3* system, or to another SAP System (from Service API release 6.10).

You need the SAP Internet Transaction Server (ITS) and the SAP GUI for HTML in all SAP systems in which you wish to call up transactions over the Web. This makes the transactions Web-capable.



Goto

Export as ...

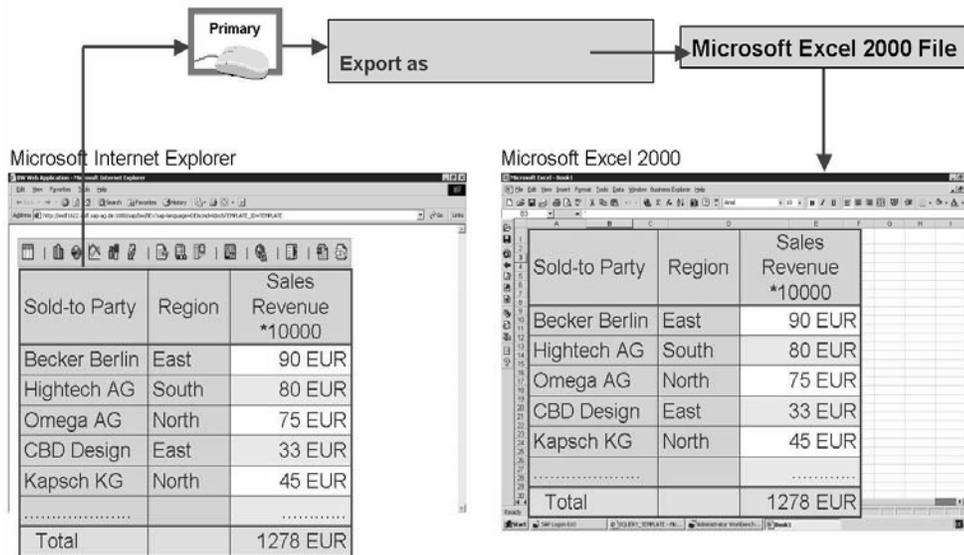
You can export the query data to *Microsoft Excel 2000*. The query data is embedded like queries in the *BEx Analyzer*. The navigation status and formatting remain unchanged. You can see the restrictions of the filters and the data in the table. As on the Web, exceptions are highlighted.

From the context menu (click with left mouse button on the text of a characteristic, characteristic value, structural component, exception description, or condition exception), choose *Export as ...* → *Microsoft Excel 2000 Data*. The system exports the data to a *Microsoft Excel 2000* file.

Caution: The export of data to *Microsoft Excel* is supported from *Microsoft Excel 2000* forward.

You can also export the query data to a CSV (comma separated value) file. Unlike when you export to *Microsoft Excel 2000*, you do not see the context for the figures, nor are the filters specified. The formatting (for instance, the way the exceptions display) is also not available in the CSV file.

Context Menu



Export

Properties

Choose *Properties* from the context menu if you want to make settings for the characteristic or key figure.

Characteristics

The options that are available for changing a characteristic depend on the properties of the characteristic - characteristics with/without attributes, characteristics with/without hierarchies. As well as general settings that can be made for all characteristics, other options display according the properties of the characteristic in question. The dialog box contains up to **three** areas:

1. Show Following Attributes (characteristics with attributes)
2. Display hierarchy (characteristics with hierarchies)
3. Display of Hierarchy Nodes (characteristics with active display hierarchy)

Key Figures

The options for changing key figures are divided into **four** areas:

1. Number Format

You can set the scaling factor from one to one billion, for example. If you set it as 1,000, the value 3,000 is displayed in the report as 3.

2. Sort Order

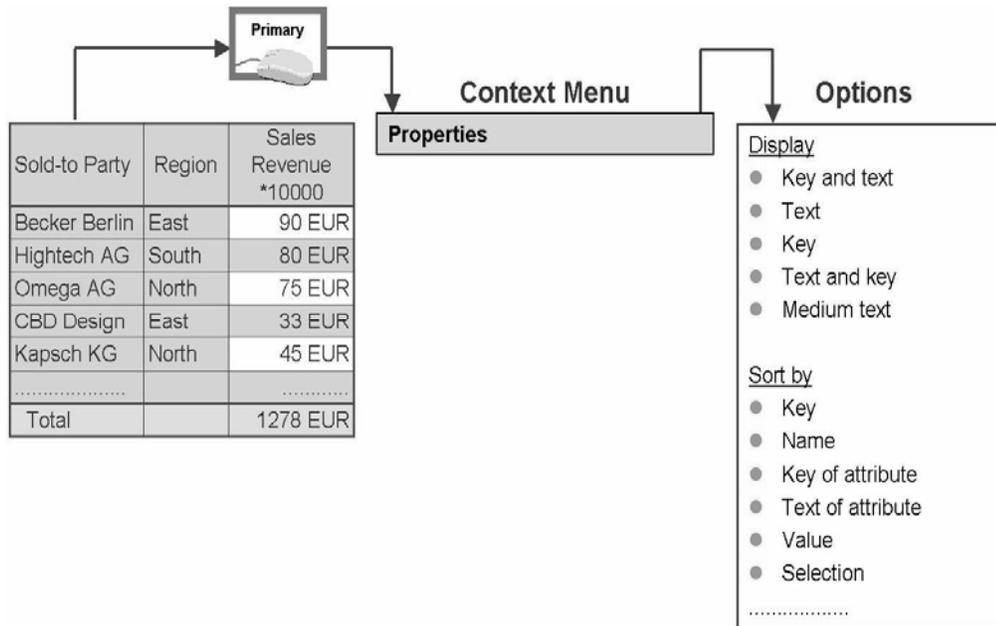
3. Calculations

You can use this function to recalculate result rows and individual values that are displayed in the version according to particular criteria.

4. Calculation Direction

The default direction of the calculation does not always meet your requirements. Therefore, you can use this area to define the direction: along the rows (default) or along the columns.

These functions are explained in more detail later on in the course.

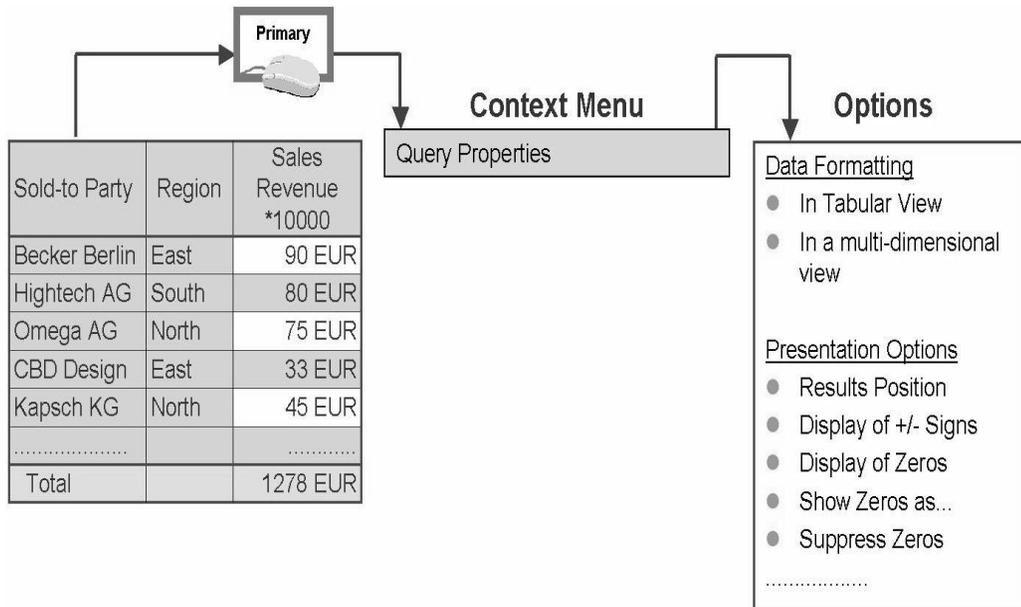


Properties

Query Properties

The options for changing a query are divided into three areas: A fourth area displays information. The areas are:

- Data Formatting
 - In Tabular View
- Presentation Options
 - Results Position
 - Display of +/- Signs
 - Display of Zeros
 - Suppress Zeros
- Display Options
 - Display Scaling Factors
 - Display Document Links
 - Changed On
 - Display Drag and Relate Links
- Last Changed
 - Owner
 - Last Changed By
 - Changed On
 - Changed At



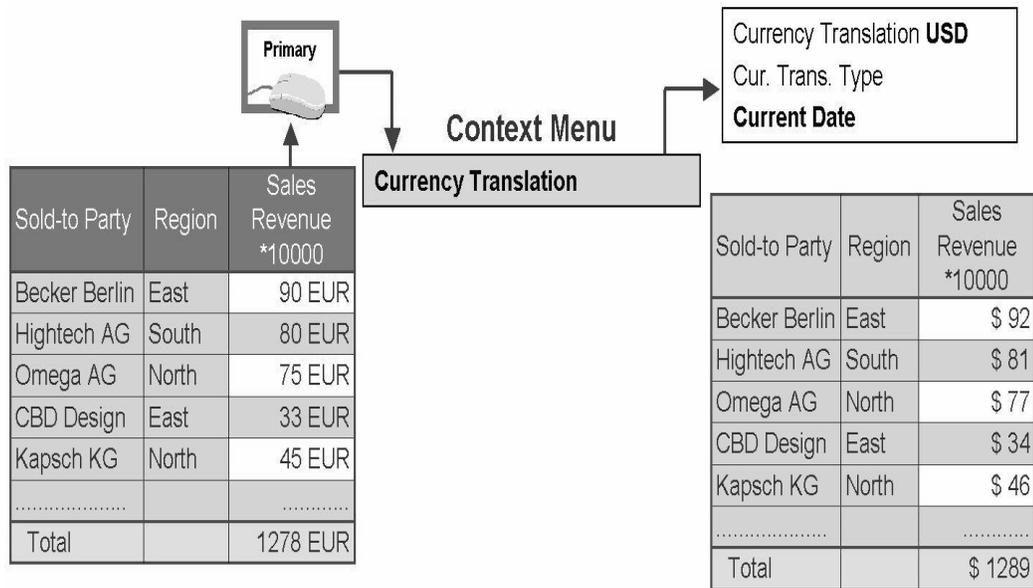
Query Properties

Currency Translation

You can use the *Currency Translation* dialog box to determine the currency into which the key figures or structural components of a query convert.

You have the following options for changing the currency of structures or structural parts:

- Show Original Currency (default settings) You can use this setting to revert to the original currency after a previous conversion.
- To carry out a currency conversion, proceed as follows:
 - Choose a currency from the *Currency Translation* dropdown box.
 - Choose a currency from the *Acc. Trans. Type* dropdown box.
 - To use the conversion type from the query definition, select the *Consider Translation from Query Definition* field.



Currency Translation

Context Menu Summary

There are **three** basic places where you can call up a context menu within the results of a report:

1. On the name of a characteristic (for example, Sold-to Party)
2. On the key value of a characteristics (for example, Sold-to Party *Becker*)
3. On a key figure (for example, *sales volume*)

The next table shows you these three places and the context menu that is called in each place.

The contents of the enhanced context menus are listed in the description of the context menu functions. You can use the *Enhanced Menu* and *Basic Menu* menu entries to toggle between the two versions. The basic menu contains a selection of the functions from the enhanced menu.

Context Menu Functions 1

Name of characteristic	Name of characteristic value	Structural component
<ul style="list-style-type: none"> • Back • Back to Start 	<ul style="list-style-type: none"> • Back • Back to Start 	<ul style="list-style-type: none"> • Back • Back to Start
<ul style="list-style-type: none"> • Select Filter Value 	<ul style="list-style-type: none"> • Keep Filter Value • Fix Filter Value to Axis • Select Filter Value • Filter and drilldown according to → Characteristic 2 	<ul style="list-style-type: none"> • Keep Filter Value • Fix Filter Value to Axis • Select Filter Value • Filter and drilldown according to → Characteristic 2
<ul style="list-style-type: none"> • Drilldown → vertical or horizontal • Swap Characteristic 1 with → Characteristic 2 / structure • Remove Drilldown • Swap Axes 	<ul style="list-style-type: none"> • Expand → Characteristic 2 • Swap Characteristic 1 with → Characteristic 2 / structure • Remove Drilldown • Swap Axes 	<ul style="list-style-type: none"> • Expand → Characteristic 2 • Swap structure with → Characteristic 1 • Swap Axes
<ul style="list-style-type: none"> • Sort Characteristic 1 → Ascending According to Key / Name or Descending According to Key / Name. 	<ul style="list-style-type: none"> • Sort Characteristic 1 → Ascending According to Key / Name or Descending According to Key / Name. 	<ul style="list-style-type: none"> • Sort → Sort Ascending / Sort Descending.

Context Menu Functions 2

Name of characteristic	Name of characteristic value	Structural component
		<ul style="list-style-type: none"> • Calculate Results as → (Nothing Defined) / Summation / Maximum / Minimum / Counting all Values / Counting All Values < 0 / Average of all Values / Average of all Values < 0 / Standard Deviation / Variance / Suppress Result / First Value / Last Value.
		<ul style="list-style-type: none"> • Calculate Single Values as → (Nothing Defined) / Normalization of Result / Normalization of Overall Result / Normalization of Sum / Ranked List / Ranked List (Olympic) • Cumulated
• Goto	• Goto	• Goto
• Currency Translation	• Currency Translation	• Currency Translation
<ul style="list-style-type: none"> • Bookmark • Export as → CSV File / Microsoft Excel 2000 File. 	<ul style="list-style-type: none"> • Bookmark • Export as → CSV File / Microsoft Excel 2000 File. 	<ul style="list-style-type: none"> • Bookmark • Export as → CSV File / Microsoft Excel 2000 File.
<ul style="list-style-type: none"> • Properties (characteristic) • Query Properties 	<ul style="list-style-type: none"> • Properties (characteristic) • Query Properties 	<ul style="list-style-type: none"> • Properties (key figure) • Key Figure Definition • Query Properties

Navigation Block

The navigation block in a Web query depicts the navigation status of a query in the form of a table. The table displays all characteristics and structures of the query and their filter values. You can change the navigation status, and add and remove characteristics and structures to an axis (rows or columns). You can filter according to single values, or remove filters again.

You can use  to drilldown an InfoObject in columns, and  to do so in rows. The InfoObject is then drilled down in the table, and the  symbol displays next to the InfoObject in the navigation block. You can use this symbol to remove the drilldown from the table. You can use  to select a filter value. You can restrict the drilldown by using the selected filter values in the table. The filter values are listed in the navigation block, and you have the option of using  to remove the filter. There is also a context menu in the generic navigation block that refers to the characteristic name (for example, base object).

The screenshot shows a reporting interface with a navigation block at the top containing various icons. Below it is a table of filters:

Fiscal Year/Period	Fiscal Year Variant	Controlling Area
Cost Element	Cost Center	Key Figures

Below the filters is a data table:

Cost Center	Amount Actual	Amount Plan	Variance
2100	2500.00 EUR	5000.00 EUR	- 50 %
3100	120000.00 EUR	10000.00 EUR	20 %
.....

Callouts in the image point to specific features: 'Drilldown in the rows' points to the filter table, 'Drilldown in the columns' points to the data table, and 'Select filter value' points to a filter icon in the data table.

Navigation Block

Exceptions and Conditions

You can formulate conditions for efficient data analysis. The data is restricted in the Web application according to the conditions, so that only the part of the results area that interests you displays.

Caution: Conditions have no influence on results rows. The results row corresponds to the results row in the table without this condition.

Exception reporting means selecting and highlighting deviating and critical objects. The deviations from defined threshold values (exceptions) are highlighted so that you can see deviations from expected results at a glance. Exception reporting allows you to determine critical objects in a query in your Web application.

Sales Revenue < 500,000 EUR		Not active
Sold-to Party	Sales Revenue	
Becker Berlin	2500.00 EUR	
Liskio	1,200,000.00	
.....	

Exception is not active

Sales Revenue < 500,000 EUR		active
Sold-to Party	Sales Revenue	
Becker Berlin	2500.00 EUR	
Liskio	1,200,000.00	
.....	

Exception is active

The exceptions found are highlighted

Exceptions

Sales Revenue < 500,000 EUR		Not active
Sold-to Party	Sales Revenue	
Becker Berlin	2500.00 EUR	
Liskio	1.200.000,00	
.....	

Condition is not active

Sales Revenue < 500,000 EUR		active
Sold-to Party	Sales Revenue	
Becker Berlin	2500.00 EUR	
.....	

Condition is active

The rows for the sold-to party *Liskio* are hidden as a result of the condition.

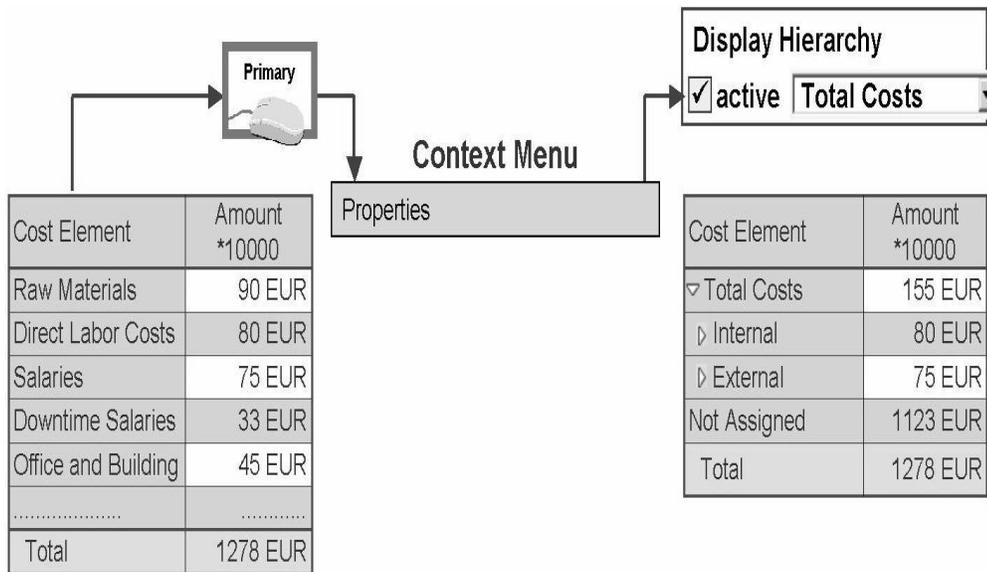
Conditions

Hierarchies

The row display in the results area of a query can also display using a hierarchy. The use of hierarchies has to be activated for the characteristic (for example, cost element). The BW administrator does this in the Administrator Workbench (AWB).

You can activate the hierarchy itself from the properties screen that you call up from the context menu for the characteristic. The hierarchy then displays in the executed query. If you use a hierarchy, the context menu contains the following additional functions:

- Collapse Hierarchy Node
- Deactivate Hierarchy
- Expand Hierarchy (Level 01, Level 02...)



Hierarchies

Documentation

You can use the *Goto* function from the context menu to display documents on various objects that you have created in the Administrator Workbench, in master data maintenance, or in the Web application, and you can create new documents.

If there are documents on the content of a cell, and the *Document Links* function is switched on in the query properties, the system displays a symbol in the cell in question. You can then see at a glance that there is a document for this cell. Choose **OK** . The document displays in a new browser window.

Sold-to Party	Region	Sales Revenue*10000
Becker Berlin <input type="checkbox"/>	East	90 EUR
Hightech AG	South	80 EUR
Omega AG	North	75 EUR
CBD Design	East	33 EUR
Kapsch KG	North	45 EUR
.....	
Total		1278 EUR





You can use the symbol to call documentation

The symbols are shown in the report output.

Documentation

Drag and Relate in a Portal

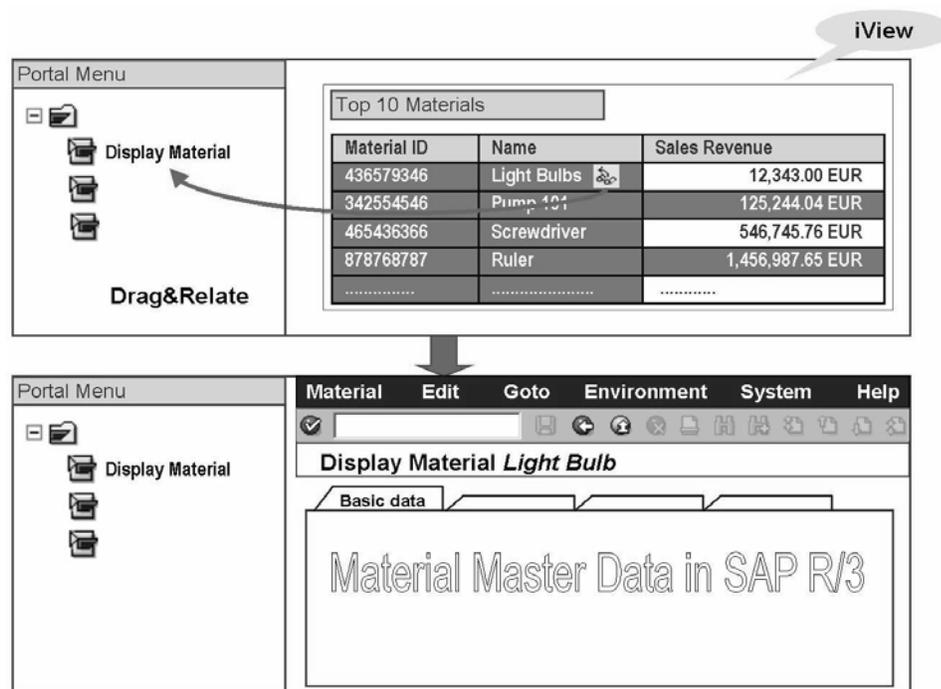
The Enterprise Portal allows you to access applications from other systems and sources, such as the Internet or intranet. You use a single point of access to reach structured and unstructured information, including business data from data analysis, and content from Knowledge Management, the Internet, and the intranet.

A portal facilitates the supply of information. The unification environment enhances this capability by relating the data supplied to other data or Web sites, thereby finding relevant information. Drag&Relate (D&R) with the BW unifier allows you to execute BW applications or other transactions with BW content (as filter values) across system borders by connecting data from one application with data from another application. You merely select a business object (for example, order) and drag it to another object (for example, a link to an external Web site) on the Web iPanel. The system executes the actions (for example, displays the delivery status of the order).

If you want to use Drag&Relate with the BW unifier, you need the following systems:

- *SAP Enterprise Portal 5.0 Support Package 04*
- *SAP BW 3.0B*
- *SAP BW unifier (= part of the SAP Enterprise Portal)*

The next figure displays a BW query in a portal (iView). The *Material* field has been predefined as having the required Drag&Relate functionality (hyper-relational links). If you drag the hyper-relational link *Light Bulb 40Watt Clear* from the *Material* column into the TRANSACTION MM03 DISPLAY MATERIAL in the iPanel, the material master record displays in the SAP R/3 source system.



Drag&Relate

Lesson: BEx Browser

Lesson Overview

This lesson teaches you about the options provided by the Business Explorer Browser (BEx Browser).

Lesson Objectives

After completing this lesson, you will be able to:

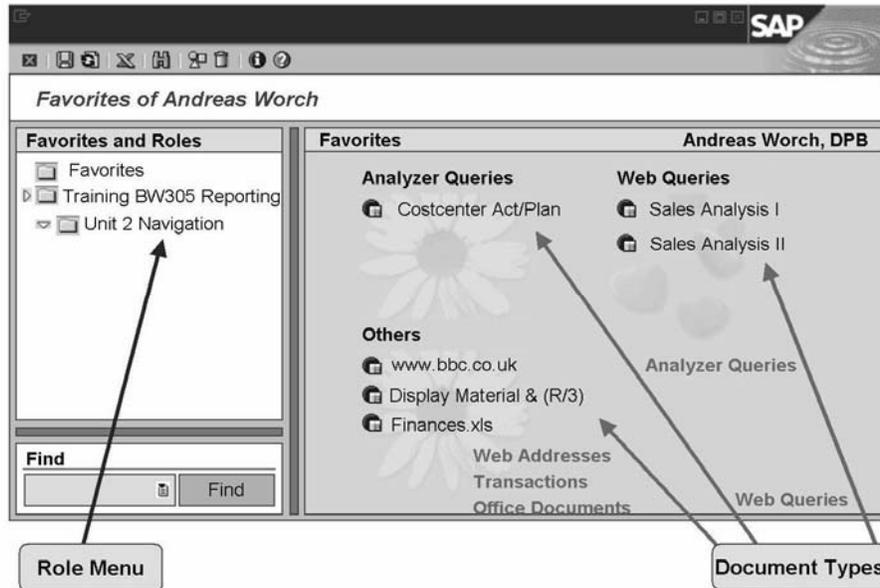
- Start your reports from the Business Explorer Browser
- Organize your workbooks and links with the BEx Browser and set up access to individual roles
- Outline the functions of the BEx Browser on the Web
- Explain the functions of the Business Document Server (BDS)

Business Example

Employees of a company can also start their reports, transactions, and documents from the BEx Browser. They can administer the interface and the content of their BEx Browser display. It is also planned that the BEx Browser will be implemented on the Web in the future. Analyze your options.

BEx Browser: Overview

The BEx Browser allows you to access all documents types of the *BW* that are assigned to your role or stored in your favorites. You can select and open documents assigned to you in the BEx Browser, and you can store and manage new documents there.



BEx Browser: Overview

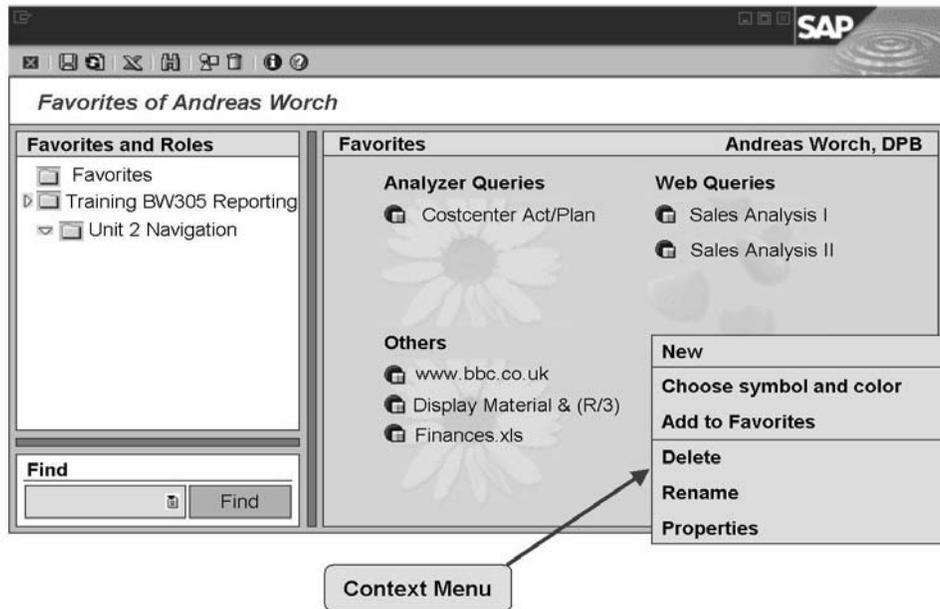
You can work with the following document types in the BEx Browser:

- BW workbooks
- Documents stored in the BDS
- Links (references to the file system, shortcuts)
- Links to Internet pages (URLs)
- SAP transaction calls
- Web applications and Web templates
- Crystal Reports

The BEx Browser displays all of the user's roles and favorites.

Users can maintain their favorites directly in the BEx Browser, or in the SAP Easy Access menu.

Caution: Note that the role display in the SAP Easy Access menu can be switched on and off.



Working with the BEx Browser

You can select and organize documents in the BEx Browser.

You can define the spatial (location on screen) and graphical (color and symbols) display of all folders and their content. You can maintain your favorites and add new folders and objects to them. These favorites also appear in your user-specific access menu (*SAP Easy Access* user menu).

The BEx Browser provides the following functions:

- Add new folders or documents
 - Select the right-hand area of the BEx Browser (storage area), and choose New from the context menu that you call up using the right mouse button. You can then create new objects (folders, workbooks, internet addresses, SAP transactions, documents and links).
- Arrange documents spatially
 - Select a document and use Drag&Drop to move it to the required position. You can also assign a document to a folder using Drag&Drop. The document symbol then adapts itself to match the color of the folder. You can also determine the sequence of documents in the folders using Drag&Drop.
- Assign folders spatially
 - Select a folder and use Drag&Drop to move it to the required position.
- Change the graphical display of folders

- Select a folder, and use the right mouse button to reach the context menu. Then choose *Choose symbol and color*. Choose a folder symbol and/or the color of the object symbols.

You can replace the folder symbols with company-specific images, and you can also use your own logo.

- Copy folders or documents

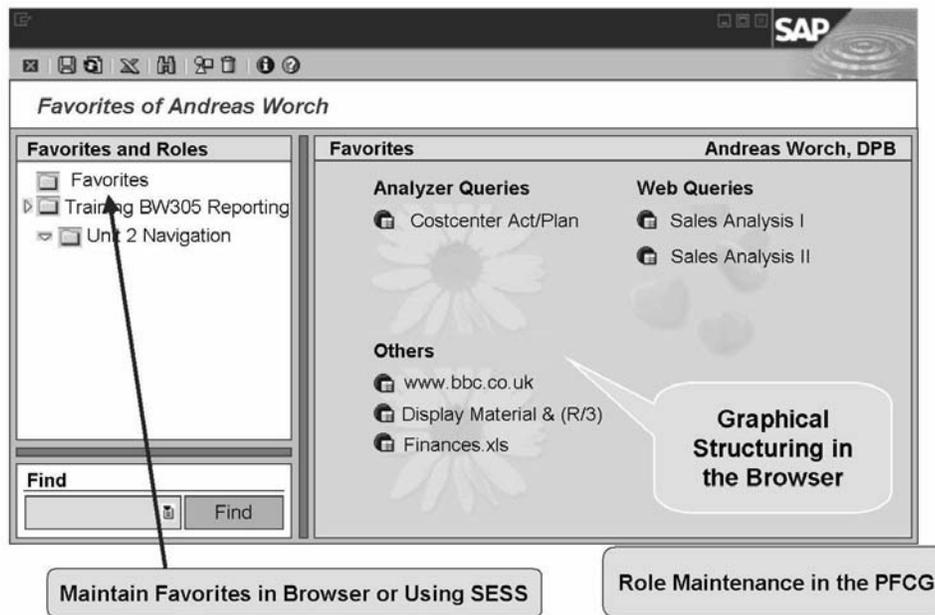
- You can copy individual documents or entire folders with all subordinate documents into other roles, or copy tasks for favorites and roles. Select the folder or document in question and use Drag&Drop to move it to the tree structure in the left-hand side of the BEx Browser. If there are other hierarchy levels, the tree structure automatically opens up at the place where you have moved the folder or object to. If it is not possible to copy a folder or object into one of the folders in the tree structure, this is indicated by a change in the symbol. This can happen if you have no authorization to copy an object to a particular folder.

- Create a link

- You can create links (shortcuts) to any files on your PC. You can also store BEx Browser objects as links on your Windows Desktop (using Drag&Drop):

- Store documents

- You can manage any kind of file in the BEx Browser. These files are then stored in the Business Documents Service. To do this, choose *New* → *Document* after calling up the context menu in the right-hand section of the BEx Browser. Select the required document. The document is then loaded into the BW system and you can access it from the BEx Browser.



BEx Browser Administration

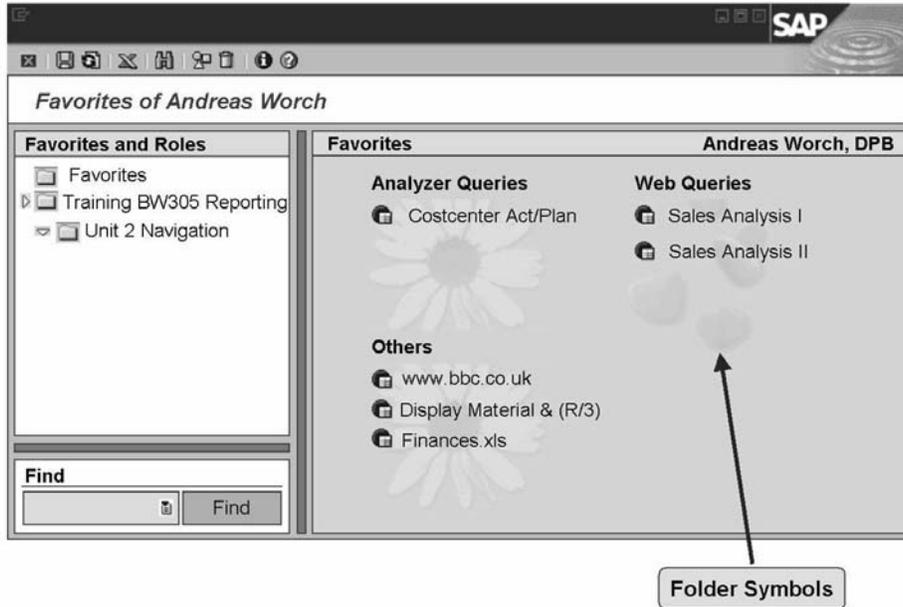
The administration of the BEx Browser has changed completely for Release 2.0. Existing channels and favorites that were maintained in the InfoCatalog before Release 2.0A can be converted to the new technology using the reports provided in BW Customizing.

The following division of tasks is valid for the administration of contents displayed in the BEx Browser from Release 2.0.

- You can select and organize documents in the BEx Browser. You can define the spatial (location on screen) and graphical (color and symbols) display of all folders and their content. You can maintain your favorites and insert new folders of objects into your favorites (similar to the functions of the SAP Easy Access menu).
- Role maintenance (activity group maintenance) is the basis of the administration of roles and tasks displayed in the BEx Browser. You can use role maintenance (TRANSACTION PFCG) to create new roles (activity groups), assign users to these roles, and maintain authorizations. You can also generate links to transactions and Internet pages (URLs) and create new folders. You can only maintain the spatial (position on screen) and graphical (colors and symbols) representation of folders and their content in the BEx Browser.

- All users can maintain their own favorites in the *SAP Easy Access* menu (TRANSACTION SESS). They can insert frequently used transactions or create new folders in their favorites. You can only maintain the spatial (position on screen) and graphical (colors and symbols) representation of folders and their content in the BEx Browser.

If you want to display your roles in the user menu (SAP Easy Access) as in the tree structure of the BEx Browser, make the following setting: in the initial access menu (SAP Easy Access), choose *User Menu*. Choose *Extras* → *Settings* → *Show first level*. The names of the roles to which you are assigned now also display in your user menu.



Folder Symbols in the BEx Browser

Creating Logos and Folder Symbols

You can replace the folder symbols that are already available in the BEx Browser with company-specific images and your own logo. The folder symbols are graphical indicators of folders that are created. They can be found in the right-hand side of the BEx Browser. The logo is depicted in the upper right corner of the white title bar of the BEx Browser. Different systems can have different folder symbols. However, all users of any particular system see the same symbols. There are no user-specific folder symbols.

A maximum of 32 folder symbols can be uploaded. There are two symbols for each folder. One of these is for the normal display of the folder, and the other is used if the folder is selected, for example, if the cursor is positioned over the folder. Only pairs of symbols (normal and selected) with sequential numbering can be uploaded.

There must always be a logo with the name *wdbblogo.bmp*, since this file is used to check the validity of the folder symbols on the local PC. If you do not want a logo to display, you can use a transparent image for the *wdbblogo.bmp* file.

Caution: Note the writing convention: There are spaces between the inverted commas, after *exe.*, and after the forward slash.

Choose *Start* → *Run*. In the BEx Browser itself there is no command for uploading. During the upload process, the folder symbols are taken from the local directory for the system in question (*c:\program files\sapbc\sapgui\themes\bw\<SID>*). The user who uploads the folder symbols into the system needs authorization for TRANSACTION RRMB.

You can not transport folder symbols between BW systems. Upload the folder systems to all BW systems.

BEx Browser on the Web

You can use the BEx Browser on the Web to display the contents of the BEx Browser (roles, tasks, and favorites) in a Web browser. This means that you can still use the BEx Browser on the Web even if **you do not have a frontend installed**.



BEx Browser on the Web

From the BEx Browser on the Web, you can call HTML pages and Web applications that were created using the BEx Web Application Designer and that contain one or more tables, charts, or maps. You can also call other intranet and Internet pages. You can look for objects in the Browser.

You need to release the function module for Web-based reporting in order to use the BEx Browser on the Web. For information on the necessary settings, see TRANSACTION SPRO. Then choose *SAP Reference IMG* → *BW Customizing Implementation Guide* → *Business Information Warehouse* → *Reporting-relevant Settings* → *Web-Based Settings*.

Caution: These settings are only relevant if you have used the BEx Browser on the Web in *BW 2.x* and want to continue to use it in the old form for *BW 3.x*. You have to release the appropriate function modules. In *BW 3.x*, you can include an overview of roles and favorites directly in a Web report as a Web item menu. If you only want to use the new function, you do not need to make these settings. The new function offers the same options as the old version.

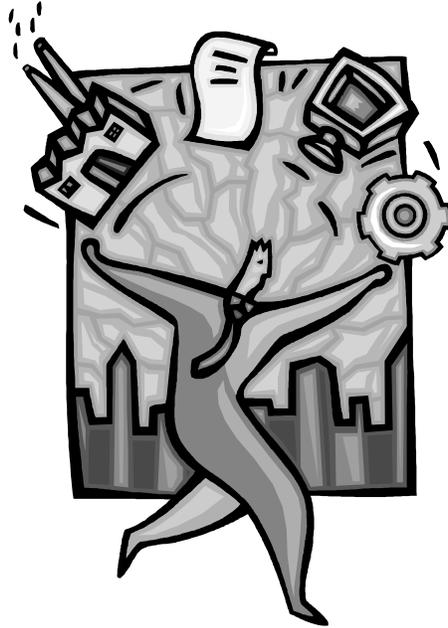
You can not reposition folders and objects using Drag&Drop. You can not maintain your own BW favorites in the BEx Browser on the Web. In contrast to the BEx Browser on the frontend, URLs that are not assigned to a folder are still shown in the tree structure.

Unit Summary

You should now be able to:

- Use the navigation options in the *BEx Analyzer* and in a Web query
- Use the functions of the context menu
- Explain the functions of the navigation block
- Use exceptions and conditions
- Navigate with hierarchies
- Call documentation in the query
- Use Drag&Relate in a portal
- Start your reports from the Business Explorer Browser
- Organize your workbooks and links with the BEx Browser and set up access to individual roles
- Outline the functions of the BEx Browser on the Web
- Explain the functions of the Business Document Server (BDS)

Business Warehouse Reporting



Exercise 1

Unit 2 – Navigation

Task 1

Display the sales revenue data for all regional codes *Average Delivery Time(0D_PU_C01_Q001)* set a filter for material *Logic Monitor Flat 17CN* and then remove the filter again.

Task 2

In the same query swap vendor with material and keep filter value on one of the key figures. Save as a new workbook with the description ***BW305GR## Sales Spirit.***

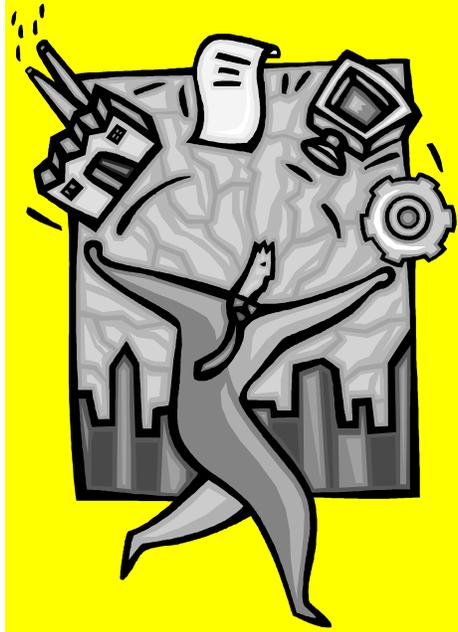
Task 3

In this task by using the same query you want to pick a range from 2/2001 to 12/2001. From the BEx menu, save as a new workbook ***BW305GR## SalesRegion1.***

Task 4

Now you want to know to know actual delivery time to Frankfurt 1612 plant. Save your results as a new workbook ***BW305GR## SalesRegion2.***

Business Warehouse Reporting



Exercise 2

Unit 2 – BEx Browser

Task 1

Please create a folder *My Folder*, internet address www.sap.com
Please, change the color and a picture and add a transaction **RRMX**. Check your shortcuts to make sure they all work.

Task 2

Please, create a Folder in the navigation menu *Web Queries*. Create a path to a query of your choice and place it into *Web Queries* folder. When you are done, check that your shortcut is working.

Unit 3 - Business Content

Unit Overview

This lesson deals with Business Content (BCT) and the metadata repository. The lesson gives you an overview of the role- and task-related information models in *SAP BW*. You can use the HTML-based BW Metadata Repository to access information on metadata, for example, links to other objects, centrally. You can activate a query in BCT and then go on to execute the query in the Query Designer.

Unit Objectives

After completing this unit, you will be able to:

- List the advantages of Business Content
- Use the metadata repository
- Transfer objects from Business Content

Lesson Overview

This lesson deals with the Business Content and the metadata repository. You obtain an overview of the delivered objects and the Business Content information models. In the metadata repository, you can display the definition of all active objects that are delivered in Business Content, as well as links to other objects. You can activate a query in Business Content and then go on to execute it in the Query Designer.

Lesson Objectives

After completing this lesson, you will be able to:

- List the advantages of Business Content
- Use the metadata repository
- Transfer objects from Business Content

Business Example

A large number of reports and key performance indicators (KPIs) are needed in your company. You can use the *SAP BW* system to check whether there are report definitions or InfoObjects delivered by SAP in Business Content that meet, or partially meet, your requirements.

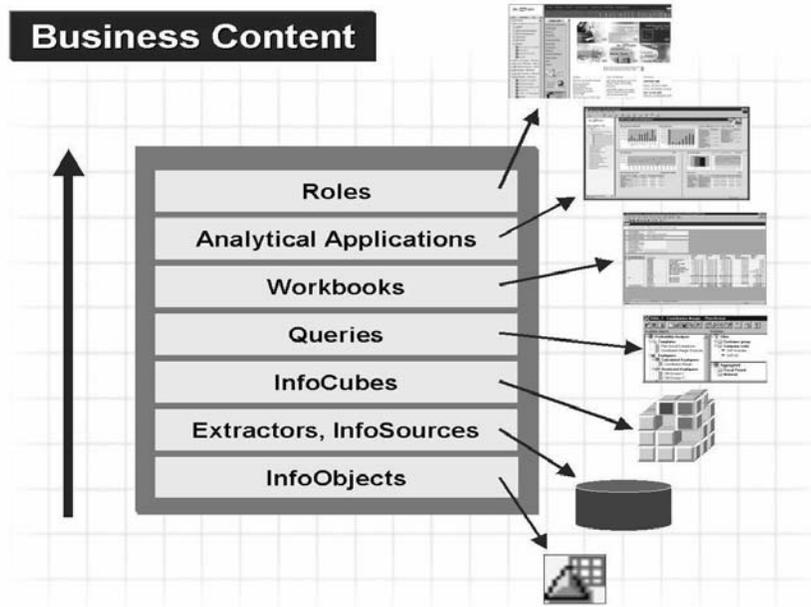
You use the metadata repository as an information source that allows you to obtain an overview of delivered objects. You can display additional information there. You then activate the objects selected in Business Content.

Business Content: Overview

If you need a specific analysis, you should first check whether Business Content contains the query definition you need or a similar query definition. Business Content contains all objects that enable you to structure your reporting quickly, from data extraction from SAP source systems, to roles that supply employees in a company with information they need to complete their work. These information models include:

- Roles
- Queries and workbooks (BW reports, and particular views of them)
- InfoProviders that the reports are based on
- InfoObjects that provide the characteristics and key figures used in your reports
- Update rules and extractors for SAP R/3, mySAP.com business applications, and other selected applications

Business Content has the advantage that all necessary and related objects can be activated at the same time. Afterwards, all relevant data from the SAP source systems can be loaded into the BW system and analyzed immediately with Business Content queries.



Business Content

Roles

The objects are grouped together into **roles** for optimum use. A role corresponds to a specific function in a company, for example, purchasing manager. A role is linked to particular tasks, areas of responsibility, and the information requirements that result from them.

There are roles for the different areas within your company. Targeted reports and applications are available for these roles, according to what employees assigned to the various roles need to do their job.

Industries

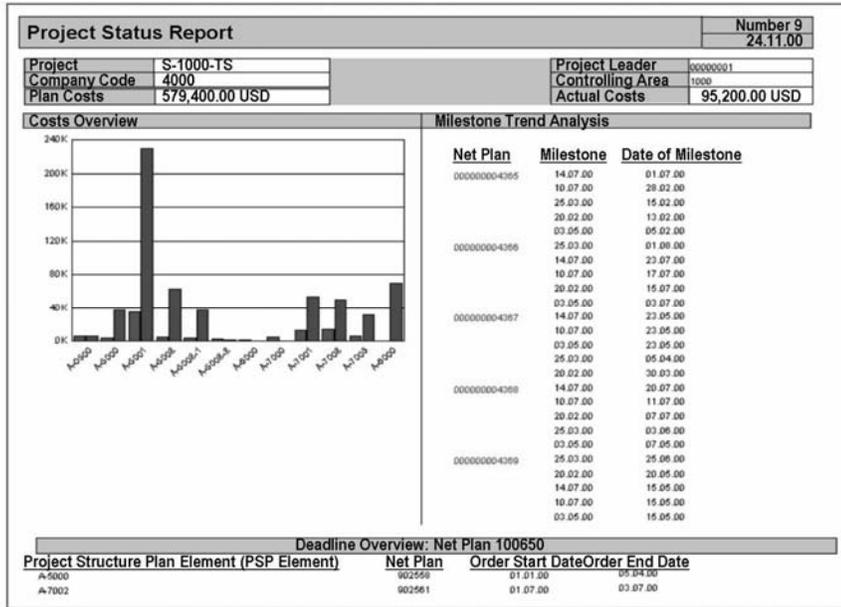
In the case of many **industries**, for example, Retail, Pharmaceuticals, Banking, and so on, roles and the objects that belong to them in Business Content are delivered to meet the needs of the individual areas.

Crystal Reports

Crystal Reports are also delivered with the BW release of Business Content. Crystal Reports are formatted reports whose layout is based on forms prescribed by law or are pixel-oriented. This orientation makes the **pixel-precise arrangement** of report elements possible. Crystal Reports also offer enhanced printing functions. The Crystal Reports delivered in Business Content have been created on the basis of existing BW queries.

You can use the *Crystal Enterprise* server component to publish these reports on the Web and make their applications available.

If you want to create your own formatted reports in addition to the reports delivered by SAP as Business Content, you need the *Crystal Reports Designer*. The option of creating your own reports with the Crystal Reports Designer does not belong to BW standard functions but is part of the *Crystal Enterprise - SAP Edition* solution.



Crystal Report

Analytical Applications

In conjunction with *mySAP Enterprise Portal*, the *BW* release delivers cross-component applications such as **analytical applications** in the form of business packages.

These **business packages** deliver targeted access to information for a process. They enable the analysis of this process, as well as the actions and reactions to it in the systems that deliver the data.

The functions are independent of the operative, transactional systems. However, the analytical application can read the data from the operative systems and write back to them.

The areas for analytical applications include Sales Analysis, Campaign Management, Market Exploration, Procurement Analysis, Production Analysis, Inventory Analysis, Customer Credit Management, and Packages for E-Analytics.

Each business package consists of an overview page, the cockpit, and additional target-oriented user interfaces known as worksets.

SAP DemoContent

You can also use **SAP DemoContent** with delivered examples. The data is stored as flat files during installation on the BW server. This allows demo scenarios from the Purchasing, Sales and Distribution, Financials, Profitability Analysis, Mobile Applications, ACNielsen, and SEM to be activated and displayed.

The corresponding roles are:

- Demo role (SAP_BW_0D_SAPDEMO)
- Demo ACNielsen US (SAP_BW_0D_ACNUS1)
- Mobile Executive (SAP_BW_0D_MOBILE_EXECUTIVE)

In addition, the **Demo Web Applications** are delivered for the following roles:

- Sales Cockpit (SAP_BW_SALES_COCKPIT)
- Demo Role (SAP_BW_0D_SAPDEMO)

Activate the *Demo Role (SAP_BW_0D_SAPDEMO)* in your system. The *Demo Role* contains a Web management InfoCockpit, GIS functions, and a Web application.

Metadata Repository

The **metadata repository** can be found in the Administrator Workbench (AWB) of the BW system. It contains definitions of all active objects delivered in Business Content, as well as their links to other objects. The metadata repository is particularly suited to comparing your reporting requirements with objects and information available in Business Content, and to identifying objects that fully or partially meet your requirements.

You can find the following information on all objects in your BW system in the metadata repository:

Technical data

Technical name, object version, content release, and description

Graphical display

For example, the data flow and star schema (the latter available only for InfoCubes)

Additional objects

For example, required objects, objects to which data is forwarded, and objects that supply data

Object Search in the Metadata Repository

The description of a specific object in the metadata repository can be reached by using the following search options.

1. You can search for the object on which you want more information using the **search function**.

Enter a search term to do this. You can restrict the search to *queries*, *InfoObjects*, *InfoCubes* and *ODS objects*.

2. You can display the **active objects** in the system, **arranged according to object type**.

If you click on an object type, for example Query, all the active objects of that type that are available in the system are listed.

3. You can display all objects in the system that are delivered with Business Content, **arranged according to object type**.

If you click on an object type, for example Query, all queries delivered by SAP in Business Content are listed.



Business Content

Business Content: Initial Access

Business Content can be found in the AWB of the BW system.

You can use the bar on the left (indicated by **A** in the graphic) to choose how objects delivered in Business Content are to be listed in the middle section of the screen (**B**). The objects that you transfer are then listed in the right hand window (**C**).

You can subdivide the objects into *InfoProviders by InfoArea* , for example. Under the *InfoAreas* , the various assigned *InfoProviders*, such as *InfoCubes* , are listed.

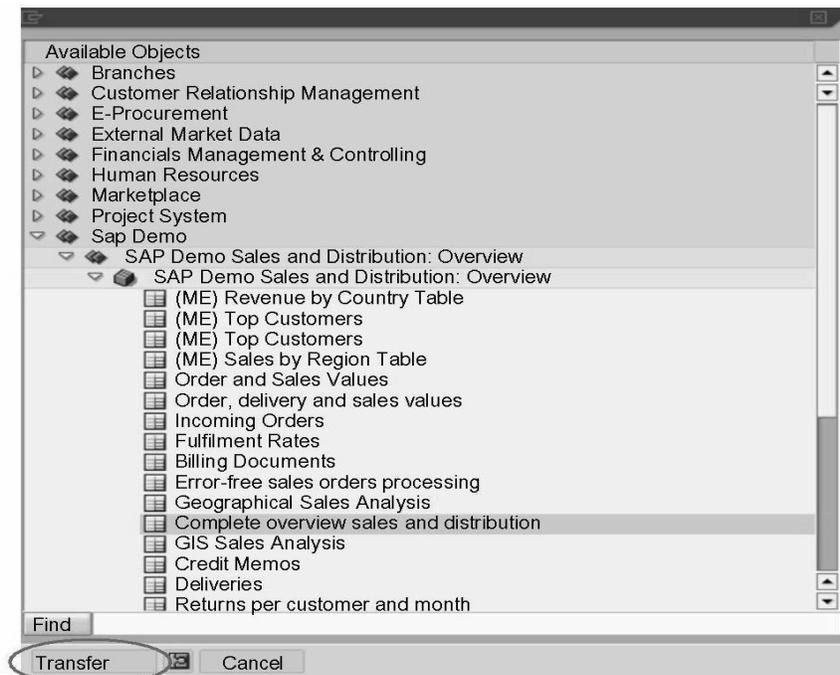
You can also sort by *role*  or *object type* .

The drilldown by **object type** option is especially useful to compare an analysis demand with Business Content content.

The query definitions delivered by SAP can be found in the middle section of the screen in the *BW menu* by object types, with a sub-entry of *query elements* .

- Query Definitions
- Global Structures for Key Figures
- Restricted Key Figures
- Calculated Key Figures
- Variables

You can find the *Select Objects*  option beneath the *Query* sub-node. Clicking on *Select Objects* brings you immediately to a selection menu with all the queries in Business Content. They are listed under the corresponding *InfoAreas* and *InfoProviders*. An integrated search function makes it easier to find queries from specific areas.



Transferring Objects from Business Content

When you have found the query definition you need, select it with the mouse and choose *Transfer*. The system then gathers together all the objects related to the query. This takes place as a background job.

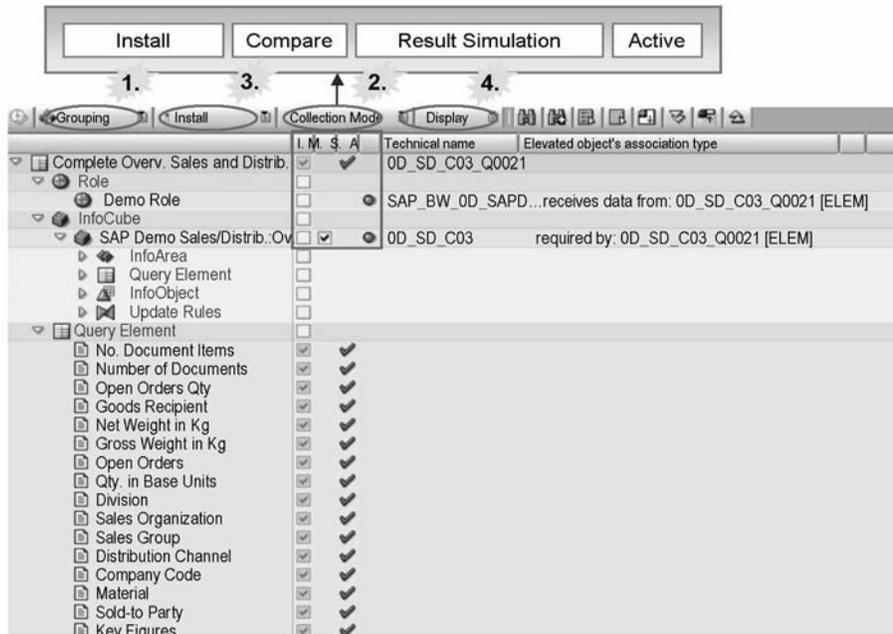
You can also copy several queries at the same time by choosing the control key when you select the definitions.

Transferring Content Objects

After objects have been gathered, the selected query displays in the right-hand window (C). If a green circle appears in the *Active version available* column next to the selected object, the object is already actively available in the system.

If the object is only available in the system as the delivered version, the icon does not appear and the object can be transferred from Business Content in the active version.

If an active version of the transferred object is already available in the system, a check mark appears in the *Comparison* column after the object has been gathered.



Query Gathered for Activation

You can make the following settings in Business Content for gathering and activating objects:

1. Grouping

Under *Grouping*, you can determine what is to be gathered. You can choose between:

- **Only Necessary Objects:**

Only objects that are needed to transfer the selected object from Business Content are gathered. This is the minimal variant of Business Content transfer.

- **In Data Flow Before:**

All objects that give data to the object being activated are gathered.

- **In Data Flow Afterwards:**

All objects that receive data from the object being activated are gathered.

- **In Data Flow Before and Afterwards:**

All objects that give data to, or receive data from the object being activated are gathered. This is the maximal variant of Business Content transfer.

2. Collection Mode

Under *Collection Mode*, you can choose between:

- **Collect Automatically:**

The objects are collected automatically after the object has been selected. This is the default setting.

- **Start Manual Collection:** The objects to be activated are only collected if you choose the *Gather Dependent Objects* function.

3. Type of Transfer

You can choose the type of transfer:

- **Simulate Installation:**

The system tests whether errors would occur if the most important objects were transferred. The simulation serves as orientation help before activation. The result of the activation is shown by a green or red icon beneath the *Simulation result* header.

- **Install:**

The selected objects are activated directly.

- **Install in Background:**

The selected objects are activated in the background as a batch job. This setting is useful if you want to activate a large number of objects.

- **Installation and Transport:**

The selected objects are activated and written to a transport request.

4. Display

Under *Display*, you can choose between:

- **Hierarchy:**

The gathered objects display hierarchically according to their dependencies.

- **List:**

The gathered objects display in a normal list.

In the *Gathered Objects* window (C), there are the following columns:

- In the *Install* column, the following Business Content objects are indicated by default:
 - Objects transferred for the first time
 - Objects that have been redelivered by Business Content in a more recent version
- In the *Match (X) or Copy* column, a checkbox displays if it is possible to compare the SAP delivery version with the active version. This indicator is set by default. If this is the case, your version is matched to the new SAP delivery version and enhanced. If you remove this indicator, the new SAP delivery version is copied in its entirety.

Business Content: Executing an Activated Query in the BEx Analyzer or on the Web

You can call queries activated in Business Content in the BEx Analyzer or on the Web. You can find the query in the Query Designer under the *SAP Demo InfoArea* by choosing *SAP Demo Sales and Distribution: Overview* → *SAP Demo Sales and Distribution: Overview* → *Complete Overview Sales and Distribution*.

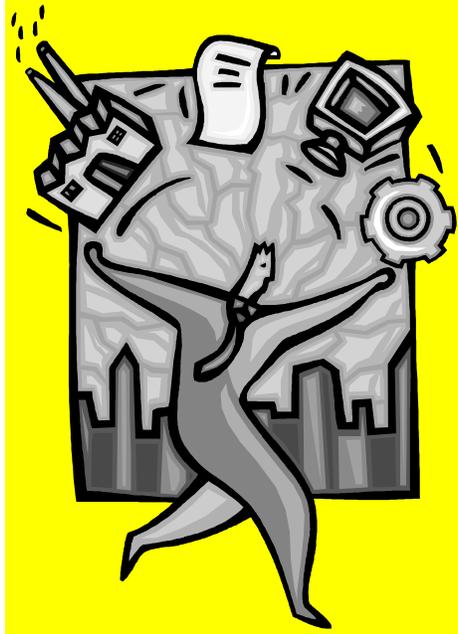
A search function helps you to find the query quickly. You can either enter the descriptive name or the technical name of the query. When you find the query, select it with the mouse and confirm with *OK*. If the corresponding InfoCube contains data, you will obtain the report result.

Unit Summary

You should now be able to:

- List the advantages of Business Content
- Use the metadata repository
- Transfer objects from Business Content

Business Warehouse Reporting



Exercise 3

Unit 3 – Business Content

Task

Obtain an overview of the *SAP Demo Sales and Distribution: Overview (0D_SD_C03)*. Have a look at the list of characteristics and key figures for this InfoCube. Display the network display for the data flow, and obtain an overview of the queries that are structured on this InfoCube.

1. Log on to the *BW server*. Choose *SAP Menu* to reach the SAP menu. Call the *Administrator Workbench* under *BW Administration*. Open the *metadata repository*, and look for the InfoCube *SAP Demo Sales and Distribution: Overview (0D_SD_C03)* in the content objects.
2. Have a look at the list of characteristics and key figures for this InfoCube. Use the network data flow to obtain an overview of the queries that are structured on this InfoCube.
3. Find the *Billing Documents* query (technical name *0D_SD_C03_Q007*), and display the information on this query. Determine which role it is assigned to.
4. Branch to the *activated objects* of the metadata repository and check whether the *Billing Documents* query is actively available in the system.

Unit 4 - First Steps in the BEx Query Designer

Unit Overview

This unit gives an overview of the *BEx Query Designer* tool and the individual objects that you require to create a query definition - the basis of every report.

Unit Objectives

After completing this unit, you will be able to:

- Describe the functions of the *BEx Query Designer*
- Define your own queries and modify these when necessary
- Publish reports for analysis in the *BEx Analyzer* and on the Web
- Describe the differences between the different InfoProviders
- Select the InfoProviders according to their use in creating reports
- Use the different elements of the InfoProvider in the Query Designer

Lesson: Query Designer

Lesson Overview

This lesson presents the *BEx Query Designer* as an independent tool for defining queries in the *SAP Business Information Warehouse*.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the functions of the *BEx Query Designer*
- Define your own queries and modify these when necessary
- Publish reports for analysis in the *BEx Analyzer* and on the Web

Business Example

You use *SAP BW* to define reports that enable standardized navigation functions in analyses, independent of the source operational system.

You want to define simple reports, execute these, and make changes to the report definition.

Calling the *BEx Query Designer*

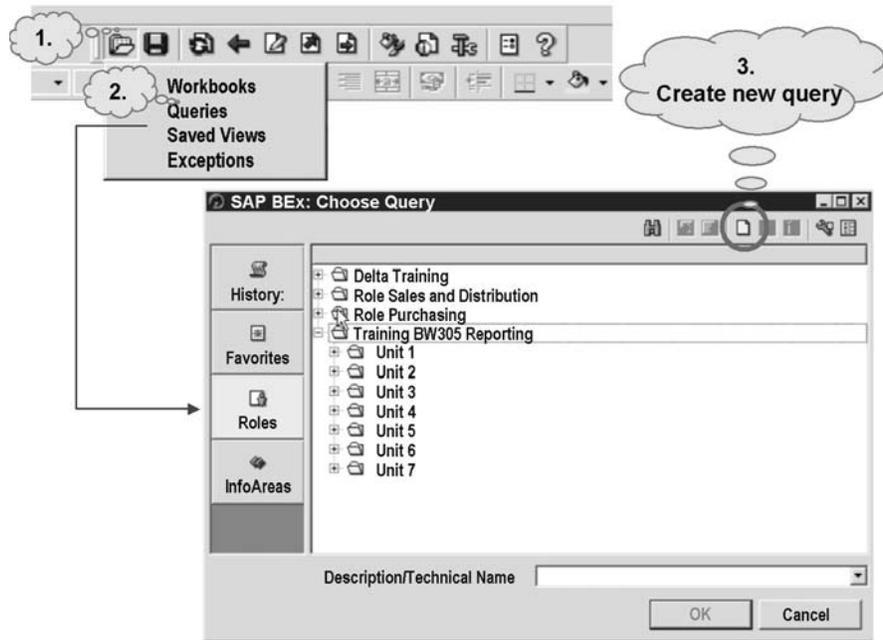
Using the *SAP BW* reporting functions, you can evaluate a dataset from an InfoProvider according to various characteristics and key figures. To do this, you define a query for your chosen InfoProvider in the *BEx Query Designer*. By selecting and combining the InfoObjects in a query, you determine the way in which data from the chosen InfoProvider is evaluated.

You have various options for calling up the Query Designer:

- From the *BEx Analyzer* open dialog box
- As a separate program using *Start* → *Programs* → *Business Explorer* → *Query Designer*
- Using the *Web Application Designer* (see the *BEx Web Application Designer* unit)
- With Crystal Reports (Crystal Reports >=8.5 including CR add-ons for SAP)

The Open Dialog Box

If you choose to access the Query Designer from the *BEx Analyzer*, the *SAP BEx: Choose Query* dialog box is called before the Query Designer opens.



SAP BEx: Choose Query

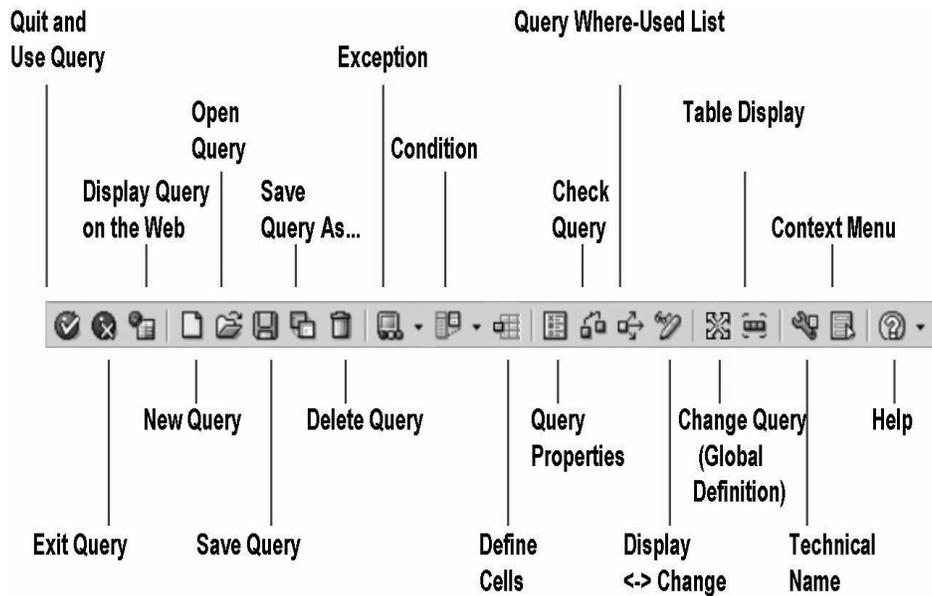
This dialog box is context sensitive, which means that it offers different choices depending on the type of object selected:

Object Type:	Dialog Box Available:
Workbooks:	History, Favorites, Roles
Queries:	History, Favorites, Roles, InfoAreas
Stored Query Views:	History, Favorites, Roles, InfoAreas
Exceptions:	History, InfoAreas

Within the relevant dialog box, you have the option of creating a new query or of finding and selecting an existing query. You can then change or execute the query.

Functions of the *BEx Query Designer*

The following figure gives an overview of the *BEx Query Designer* functions that you can call from the Query Designer toolbar. The functions are described within the context of query definition.



Functions of the Query Designer Toolbar

 **Quit and Use Query.** With this function, you leave the Query Designer and use the query you have defined.

 **Exit Query.** Choose *Exit Query* if you want to leave the Query Designer. Your entries are not saved.

 **Display Query on the Web.** Using this function, you can display the query in a default view on the Web, once you have saved your query definition.

 **New Query.** Choose this function if you want to create a query. The **BEx** Open dialog box appears and you can select the **InfoProvider** here that contains the data that you want to evaluate in the query.

 **Open Query.** This function takes you directly to the **BEx** Open dialog box. You can choose from queries in your *History*, *Favorites*, *Roles*, or from the *InfoAreas*.

 **Save Query.** You use this function to save a modified query under its current name. If the query does not yet have a technical name, the system automatically offers the function *Save Query As...*

 **Save Query As...** You use this function to save a query under a new technical name. You can save the query in your favorites or in a role.

 **Delete Query:** You use this function to delete the query. You can only delete the query if it is not being used in workbooks, Web templates, Crystal Reports, or Reporting Agent settings.

 **Exception:** You use this function to define exceptions for a query.

Exceptions are deviations from normal key figure values, as defined by you, and are highlighted in color in the query view.

Using the small arrow next to the exceptions symbol, you can change or create exceptions. For more information, see the *Exceptions and Conditions* unit.

 **Condition:** You use this function to define conditions for a query. Using the small arrow next to the conditions symbol, you can change or create conditions.

For each characteristic, you can give limit conditions to the key figure values in order to determine, for example, all sales revenues above or below a specified threshold value. The chosen characteristics are displayed in the query with restricted key figures.

 **Define Cells:** This function is only available for queries with two structures. You can define formulas and selection conditions for cells explicitly. In this way, you control the values of cells that appear at the intersections of structural components. This function enables you to access individual cells in queries or to assign special values to these.

 **Query Properties:** Choose this function if you want to change the description of the query or define the settings for the result position, display options, numeric display, zero display and key date of the query.

 **Check Query:** Using this function, you can check a new or saved query for errors before you save it.

 **Query Where-Used List:** Using this function, you can find out in which objects (Workbooks, Web templates, Crystal Reports, or Reporting Agent settings) the query is used.

 **Display <-> Change:** Using this function, you can switch between the display and change modes.

 **Change Query (Global Definition):** You choose this function if you are in the *Local Query Definition* and want to switch to the *Global Definition*.

 **Table Display:** You can create a query for tabular reporting, as well as for Online Analytical Processing (OLAP) reporting, by activating or deactivating the *Table Display* mode in the query definition when defining a query. This function is only available for queries with one structure. You can only have queries with two structures in the multi-dimensional display. They are not suitable for OLAP reporting.

 **Technical Name:** Using this function, you can show/hide the technical names of the query components.

 **Context Menu:** This function enables you to display the current context menu without using the right mouse button (for example, for use with a touch screen).

 **Help:** This function takes you to the *SAP BW* online documentation. The *BEx Query Designer* section automatically displays there in the *BEx* documentation.

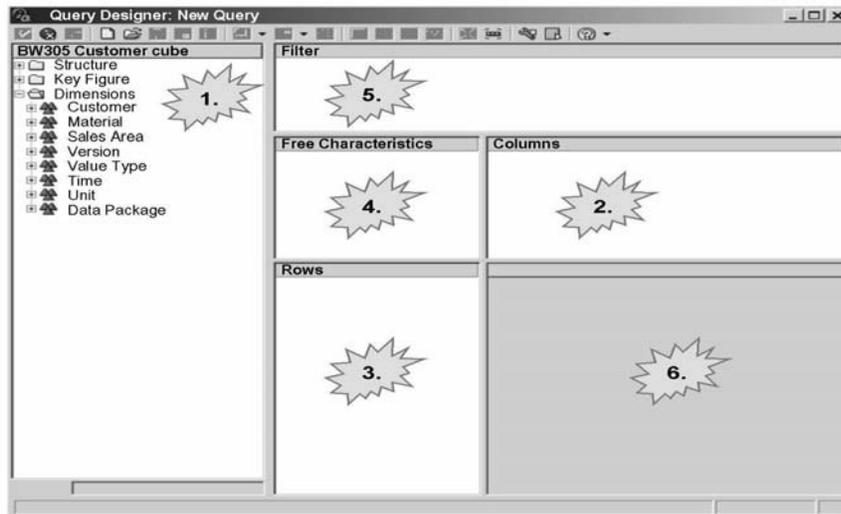
Using the small arrow next to the help symbol, under the *About...* entry, you can see the version of the Query Designer, with the support package number and the revision level.

Creating a Query

This section describes the most important functions required for creating, saving and modifying a query.

To define a new query, start the *Query Designer* and choose *New Query* . In the *New Query: Select InfoProvider* dialog box, select the required InfoProvider. The following example uses the InfoProvider *Customer Cube T_SDDEMO2 (T_SDDEMO2)* under *InfoAreas* → *BW Training* → *BW Customer Training* → *BW305 Reporting*.

Once you have selected the InfoProvider, the Query Designer displays as shown in the following graphic.



Query Designer: New Query

The Query Designer is divided into **six** subareas:

1. Directory tree of the selected InfoProvider.

Once you have selected the required InfoProvider, all available objects (dimensions, key figures, structures) display in the directory tree in the left screen area of the Query Designer.

In this example, you can see the directory tree for the InfoProvider *InfoCube Customer Cube T_SDDEMO2*.

2. Columns

You define the columns of your report in this area.

3. Rows

You define the rows of your report in this area.

4. Free Characteristics

You transfer those characteristics into the free characteristics area that do not display in the initial view of the results when you execute the query in the BEx Analyzer or on the Web. You can then integrate these characteristics into the results through navigation steps. You can also use free characteristics for selecting filter values in the report.

5. Filter

The characteristics displayed in the filter appear neither in the drilldown nor as free characteristics in the query analysis. These characteristics are only used as global filters on the InfoCube data.

6. Preview (displayed in gray on the screen)

This area gives a preview of the query results area.

To create a query, you can expand or collapse the InfoProvider directories by choosing the plus or minus symbol. By expanding the key figure node in the InfoProvider tree, for example, you can display a list of all the key figures for the InfoProvider.

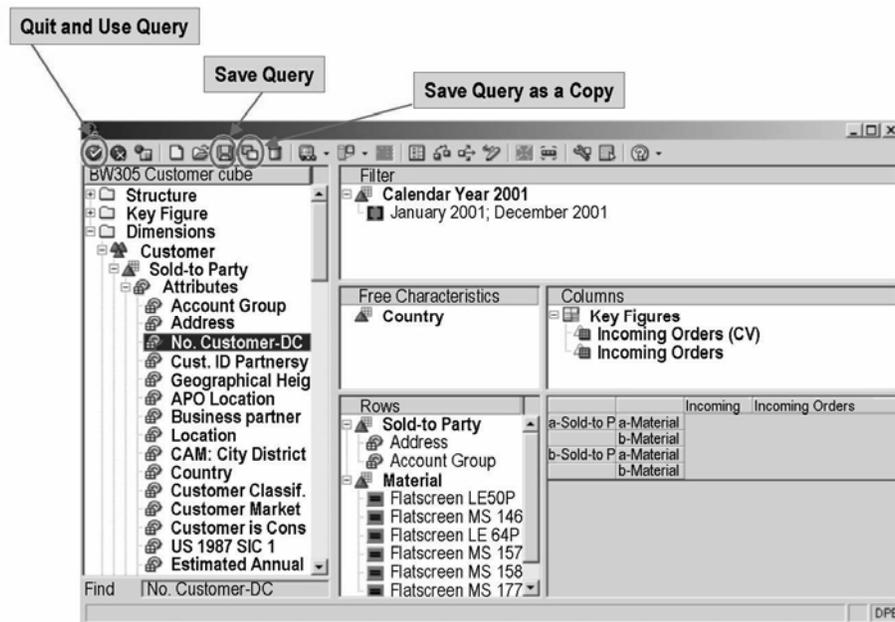
- Use Drag&Drop to transfer the characteristics, key figures, and structures of the InfoProvider into the *Filter*, *Rows*, *Columns*, or *Free Characteristics* areas of the Query Designer.

You can also transfer these characteristics using the keyboard and the clipboard. Choose CTRL+C to copy and CTRL+V to paste.

You can also include characteristic attributes and variables in the query definition in this way.

- You can use the right mouse button to call all of the functions that are in the current context menu. To do this, first select the required query component, then select a menu entry from the context menu.
- By double-clicking on an element in the query designer, you call a dialog box that offers the default function for that element. For example, if you double-click on a characteristic, the dialog box for restricting characteristics appears.

The following graphic shows the Query Designer with a query definition.



Defined Query

The following definitions were made:

- The characteristic *Cal. Year/Month (OCALMONTH)* was chosen as a global filter and restricted to the months *January to April 2001*.
- The characteristic *Country* was selected as a free characteristic.
- The key figures *Incoming Orders Quantity* and *Incoming Orders EUR* were placed in the columns.
- The *Sold-to Party* characteristic, with addresses and account groups, was included in the rows. The material was also included in the rows. This was restricted to a range of materials.
- The preview area shows how the report is structured.

Once you have defined a query, choose *Save Query*  or *Save Query As...* . If you have not yet saved the query, you must enter a query description and a unique technical name. You can also choose where you want to save the query (in your roles or in your favorites folder). You can use *Save Query As...* to save existing queries under a different name.

You can also execute a query immediately. To do this, choose *Quit and Use Query* .

If you have not yet saved the query, you must enter a query description and a technical name.

Once you have saved the query, you have the following options:

- You can execute the query in the BEx Analyzer and include it in a workbook. To

- do this, choose *Quit and Use Query* .
- You can display the query on the Web in a default view. To do this, choose *Display Query on the Web* .
- You can use the query in the Web Application Designer as a data provider for Web items.
- You can use the query in the tabular display in Crystal Reports as a data source for formatted reports.

The individual steps for creating a query and the various options for defining a query are described in more detail in the following section.

Finding a Query

In order to find a query for which you already know a part of the description or other information, choose *Find* .

In the *Search for Queries* dialog box, enter the technical name or description of the query. If necessary, you can restrict the search to additional criteria.

Choose *Find* .

- If you are in the BEx Analyzer and have called the search function from the *Choose Query* dialog box, the query result displays as an Analyzer report.
- If you are using the search function from the Query Designer, the query definition displays.

Search for Queries

Search String: BW305 Getting Started GR-##

Search in: Description Technical Name

Only Queries from InfoProvider

Created or Changed

No User-Specific Restriction
 By Me
 By User

No Time Restriction
 Time Interval: Last 7 Days
 From: 17.07.2002 To: 17.08.2002

Find Cancel

Finding a Query

Changing a Query As a rule, report requirements are not final at the start of the conversion phase. Many new requirements often arise once users have discovered the range of options in the Query Designer. Therefore, reports are often subject to change. Depending on your current position in the Query Designer or Analyzer, you have different options for changing a query:

- If you have called the Query Designer, in the *SAP BEx Query: Choose Query*, select a query. You can either select a query using the technical name or the query description. The queries are also listed under *InfoArea* under the relevant InfoProvider (which you used to define the query).
- You have two options for changing the query definition from a report in the Analyzer:
 - Choose *Change Query (Global Definition)*.

By doing this, you can change the query definition.

- Choose *Change Query (Local View)*.

Changes made to the query here correspond to navigation in the report and are not saved in the query definition.

If you are in the *Change Query (Local View)* mode, you can switch directly to the global definition by choosing *Change Query (Global Definition)*

Filtering Data in the Query Definition

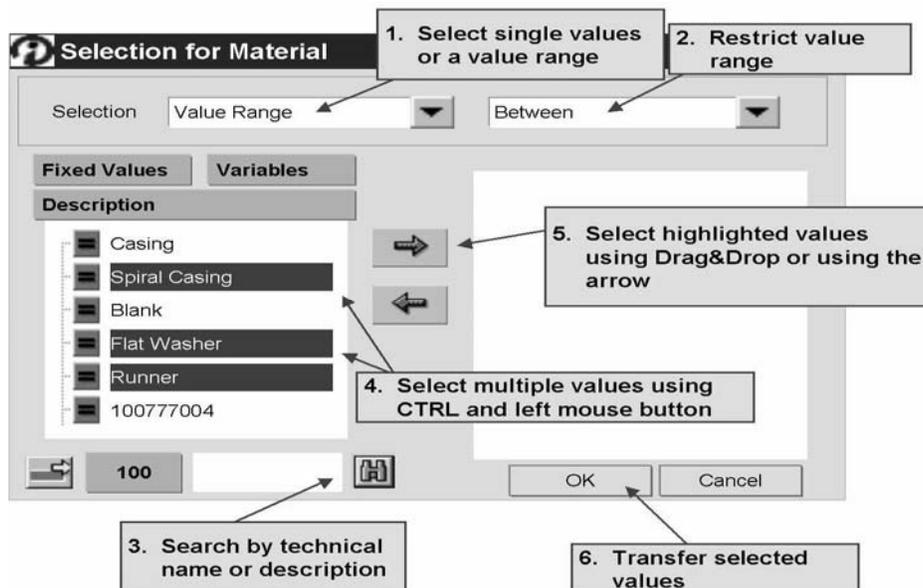
It is often necessary to restrict (filter) characteristics to specific characteristic values in your reports. For example, if you are interested in the sales volume of a particular branch of a worldwide corporate group, but the InfoProvider contains the sales volume for the entire organization, you can restrict the query definition to the relevant branch, so that only the key figure for this branch appear in the report.

You can restrict (filter) the characteristic values of a characteristic in the *Rows*, *Columns*, *Free characteristics*, and *Filter* areas of the Query Designer.

There are **two** ways of restricting characteristics:

1. By selecting a characteristic from the InfoProvider of the characteristic (in the tree structure in the left part of the screen) and double-clicking on the *Values* icon, the selection menu for fixed values displays. You can select single values or values from a value area. The fixed values selected appear in the directory tree under *Values*. You can use Drag&Drop to include these in your query definition.
2. You can also restrict a characteristic that you have already included in the definition. Call the context menu for the characteristic and choose *Restrict*. The *Selection for ...* dialog box appears.

The following figure shows the selection dialog box for the *Material* characteristic.



Selection Dialog Box for Filtering/Restricting a Characteristic

You can find all of the characteristic values available for the chosen characteristic in the left screen area. The right screen area contains the characteristic values that you want to use to restrict the characteristic.

To select a characteristic value, highlight the relevant value in the left screen area. You can select single or multiple characteristic values. Using the *Input* field in the lower left area of the selection dialog box, you can find specific characteristic values by entering their description or technical name. The found values are then automatically highlighted.

You can then use Drag&Drop to move the highlighted values into the right screen area. Alternatively, you can transfer the selected values using the arrow. If you want to remove the restriction, simply reverse the procedure.

Including Text Elements in BEx Analyzer Reports

You have the option of displaying different text elements as additional information in a query (for example, the author, last changed by, InfoProvider, etc.). These text elements are referred to as the header information of the query.

- Choose *Layout*  and *Display Text Elements*.
- You can either display *all* or individual (*General*, *Filters*, *Variables*) text elements.

The text elements are displayed between the filter cells and the results area. You can move or delete individual text elements by moving or deleting the corresponding cells using *Microsoft Excel* menu functions.

Explanation of the Text Elements

Author:

User who defined the query.

Last Changed by:

User who last changed the query definition. Navigation steps are not recorded as changes to the definition.

InfoProvider:

InfoProvider whose data is evaluated in the query.

Query Technical Name:

Technical name that you entered when you saved the query.

Key Date:

Contains the date for which the **time-dependent master data** is selected. You create a key date either in the query definition (in Query Properties) or provide the value using a variable (for more information, see the *Query Properties* unit). If no key date has been defined, the system date is taken as the key date.

Changed At:

Date and time at which the query definition was last changed.

Status of Data:

Time at which the data from the last request was posted to the InfoProvider. This can be evaluated for reporting.

For **MultiProviders**, the current InfoPackages are determined from the individual BasicCubes and from there, the one with the **oldest date** is referred to for the status of the data.

Current User:

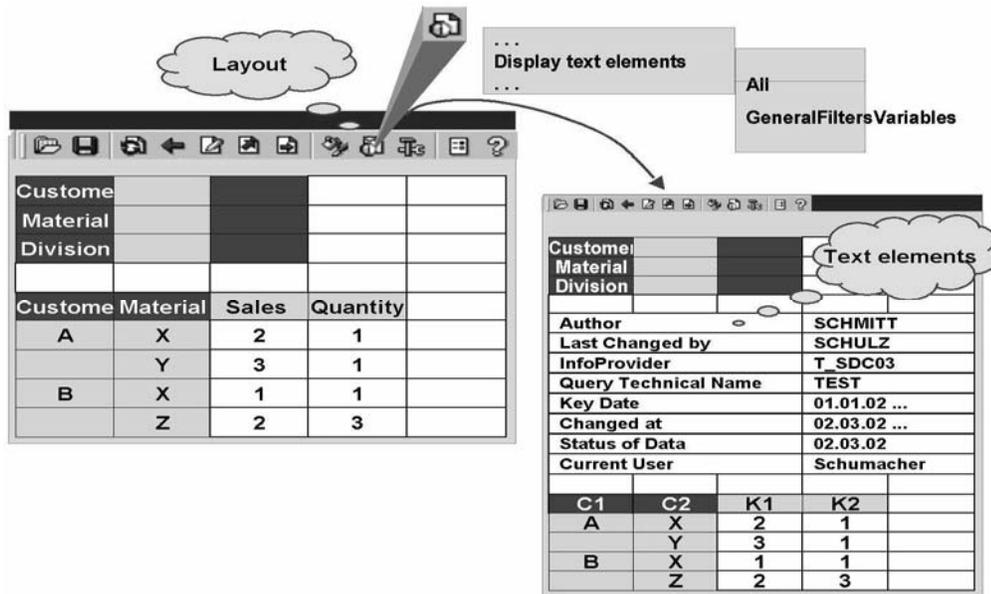
User who currently has the query open or who has inserted it into a workbook.

Last Refreshed:

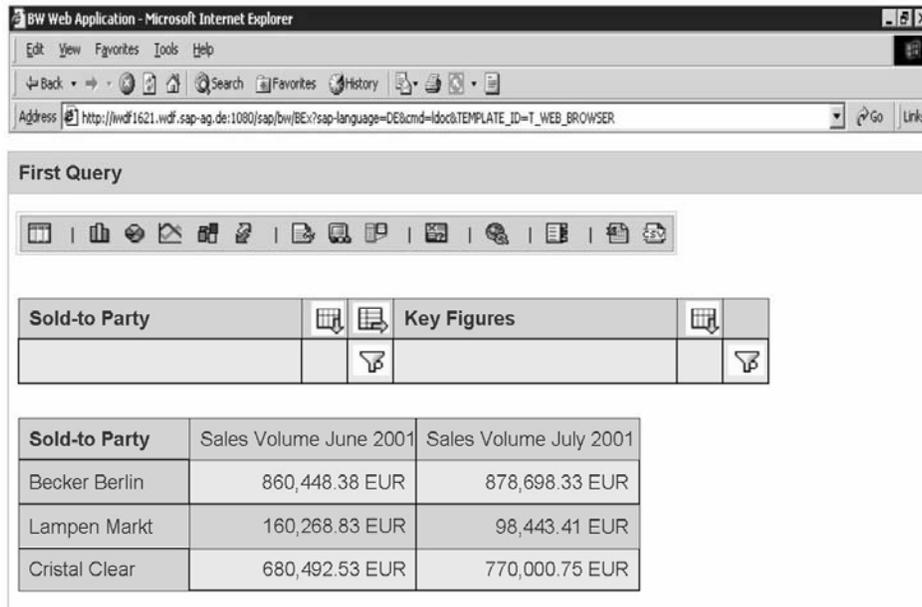
Data and time at which the query data was last refreshed. This is the time when you displayed the text elements (the system has to refresh the query in order to display the text elements).

Variables, Filter Values, Conditions, Exceptions:

Depending on the current query definition, additional text elements (variables, filter values, conditions, and exceptions) may also display.



Inserting Text Elements



Web Query

Publishing the Query on the Web

To publish the query on the Web, save it and choose *Display Query on the Web*. The query displays in a standard Web template. You can change the Web template, if required.

Lesson: InfoProviders and InfoObjects

Lesson Overview

The lessons deals with InfoProviders, which are used in Business Explorer reporting (BEx reporting).

Lesson Objectives

After completing this lesson, you will be able to:

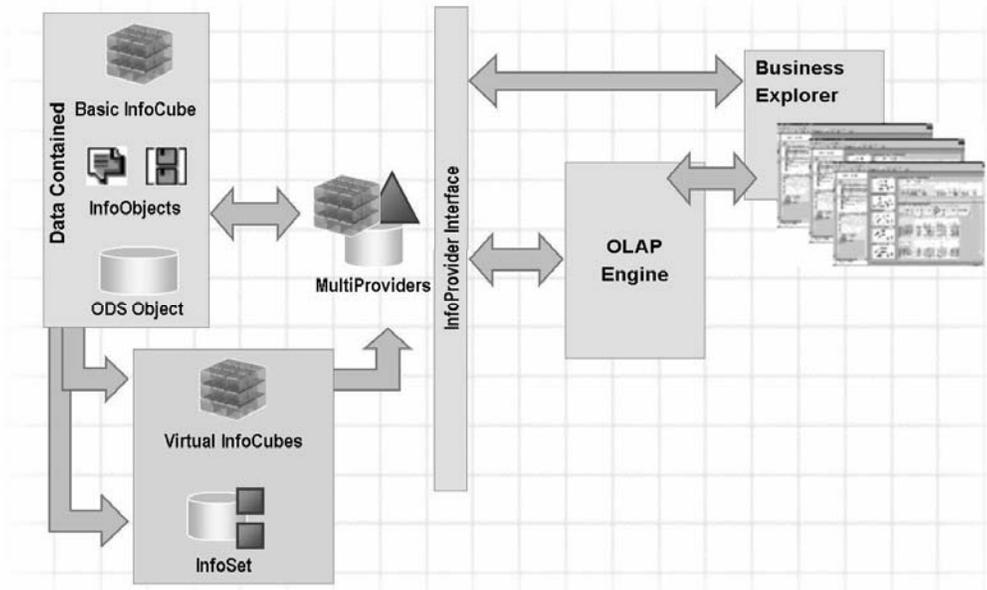
- Describe the differences between the different InfoProviders
- Select the InfoProviders according to their use in creating reports
- Use the different elements of the InfoProvider in the Query Designer

Business Example

Your enterprise uses the *SAP BW* system to create many different reports. Among others, you need to use reports about consolidated data, individual record reporting on document level, and master data reporting.

You also want to find out the options for combining different data sources for reporting, without having to change the data store or the update mechanism.

InfoProviders in SAP BW Reporting InfoProviders are objects for which you can create and execute queries in *SAP BW*. These include objects that physically store data - the data targets, such as InfoCubes, operational data store objects (ODS objects), and InfoObjects (characteristics with attributes or texts). They also include objects that do not contain any actual data, such as InfoSets, RemoteCubes and MultiProviders. InfoProviders are the objects or views relevant to reporting.



InfoProviders: Overview

- **Data Targets**

Data targets are *SAP BW* objects that have their own data store (which physically contains data). These objects include InfoCubes, ODS objects and InfoObjects (characteristics with attributes or texts). The system supplies data targets with data from the source systems using a load process (or by writing directly into the tables for transactional object types). Data targets become InfoProviders if they are used in BEx reporting.

Characteristic InfoObjects have to be included in the InfoProvider tree in the Administrator Workbench to make them available as data targets for flexible updates and as InfoProviders for reporting.

InfoCubes

An InfoCube is the central evaluation object for reports about aggregated (compressed) data. In reporting, an InfoCube is a self-contained dataset (for example, a business area). You can analyze this data in a BEx query. The tables in an InfoCube are structured in a star schema (multi-dimensional data model).

InfoCubes that have a data store in the *SAP BW* system are called BasicCubes (type of InfoCube that distinguishes them from virtual types, see below).

ODS Objects

ODS objects store consolidated and cleansed data on a detailed (atomic) level. In reporting, you use ODS objects for detailed reporting in *SAP BW*, for example, for reporting on individual documents.

An ODS object describes a consolidated data set from one or more data sources. ODS objects are available for **transaction data** and for **master data**. You can analyze this data set in a BEx query.

In contrast to multi-dimensional data stores for InfoCubes, data in ODS objects is stored in flat database tables. An ODS object contains a key (for example, document number, item number), as well as data fields, which can contain key figures or characteristics (for example, customer). You can update ODS object data into connected InfoCubes or into additional ODS objects in the same system or a different system.

Characteristic InfoObjects

Characteristic InfoObjects can have tables into which the master data information (attributes, texts, hierarchies) is loaded from the source system.

Once you have included a characteristic InfoObject in the InfoProvider tree, you can use it as an InfoProvider for BEx reporting.

You use these InfoProviders for master data reporting in *SAP BW*.

- **InfoProviders Without Their Own Data Store** (Virtual InfoProviders):

RemoteCubes

A RemoteCube is an InfoCube whose transaction data is not physically managed in *SAP BW*, but stored externally in the source system.

Only the multi-dimensional structure of the RemoteCube is defined and the master data loaded in the *SAP BW* system. The data for reporting is read online from another system. In reporting, you define queries on RemoteCubes in the same way as you define queries on BasicCubes.

However, since the data is read online from the source system, the performance differs when you execute reports for RemoteCubes and, therefore, we recommend that you only use RemoteCubes in specific scenarios (with small quantities of data, relatively infrequent data requests due to a restricted number of users).

BW InfoSets

BW InfoSets do not have a data store of their own, but instead connect flat tables using joins and, therefore, provide an additional semantic layer (reporting-relevant view) for BEx reporting.

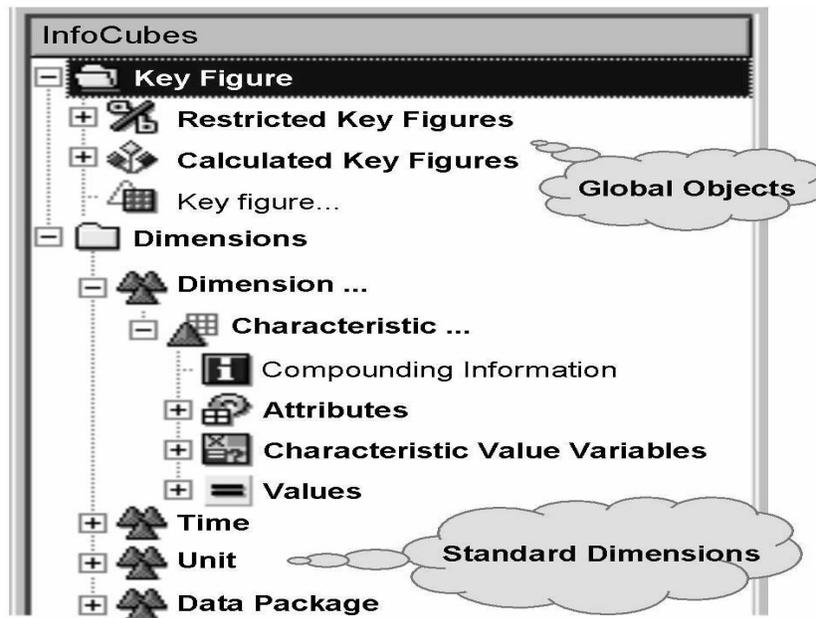
You can create BW InfoSets from ODS objects and characteristic InfoObjects with master data.

BW InfoSets enable temporal joins with which you can create reports depicting changes over time. For example, a link from document data in an ODS object to time-dependent master data (for example, person responsible). In addition to each individual record from the ODS object, you would also be able to report the valid master data values with a determined time characteristic that evaluates the internal fields for the validity interval (DATETO and DATEFROM) of the master data.

MultiProviders

A MultiProvider combines data from several InfoProviders and makes it available for use in reporting. The MultiProvider does not contain any data itself. Its data comes exclusively from the InfoProviders on which it is based. You can create a MultiProvider from any combination of InfoProviders.

MultiProviders are based on a union connection (union), unlike joins in BW InfoSets (intersection).



InfoCube Elements in the Query Designer

Global Objects

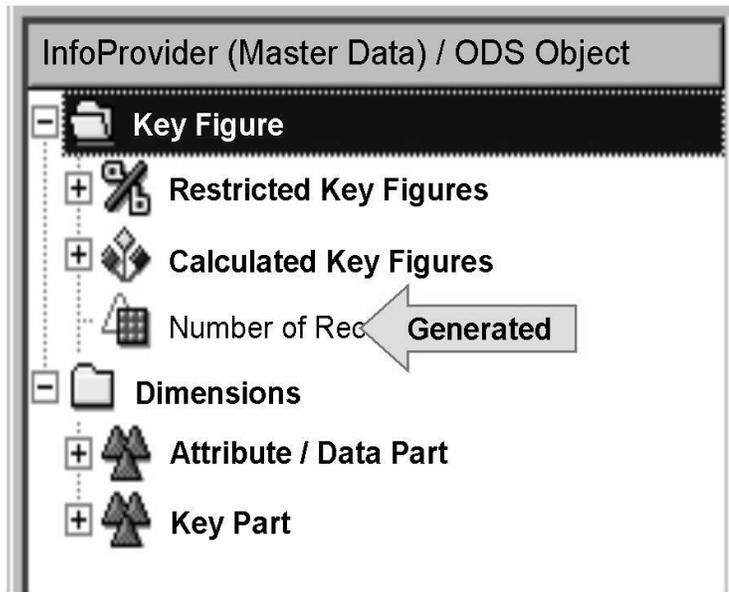
An InfoCube can contain global elements, such as, *Calculated Key Figures* (as can all other InfoProviders) that are available for all query definitions for this InfoProvider. These elements are defined on a global level for the InfoProvider and you can use them in many different reports.

InfoCube Elements

In accordance with its multi-dimensional structure, an InfoCube has *Key Figures* that display in their own folder in the Query Designer. *Characteristics* display in *Dimensions*.

There are additional entries in the selection tree for a characteristic for its *Compounding information* (if the characteristic is compounded with a different characteristic, for example, cost center to controlling area). If you include a characteristic that has compounding information in the query definition, the compounded characteristic is also automatically included in the definition. From the list of entries for *Attributes*, *Characteristic Value Variables*, and *Values*, you can use Drag&Drop to include additional elements in the definition.

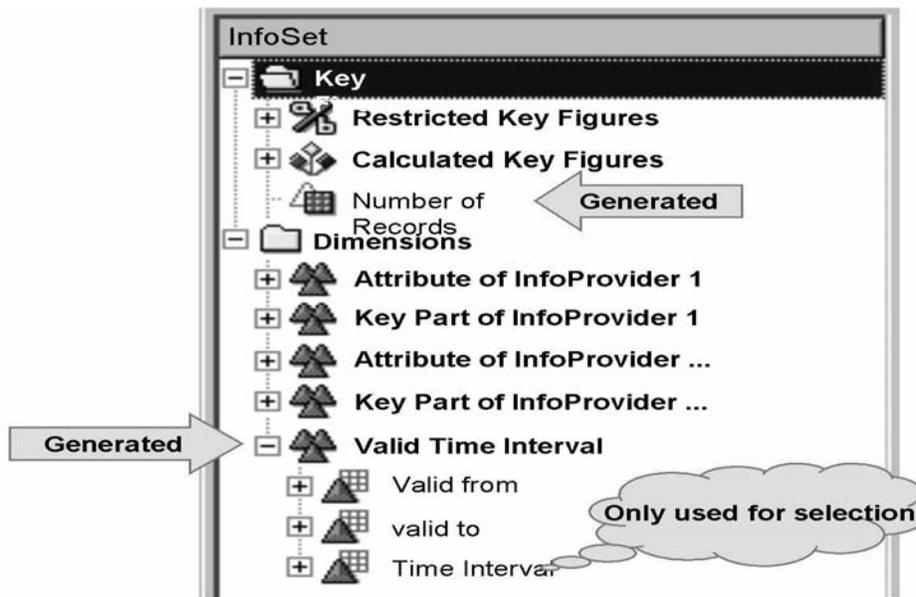
Detailed information about working with attributes and variables is provided in a later lesson.



Elements of InfoProviders and ODS Objects in the Query Designer

The system generates the key figure *Number of Records (1ROWCOUNT)* for characteristic InfoProviders and for ODS objects and places them in the *Key Figures* folder.

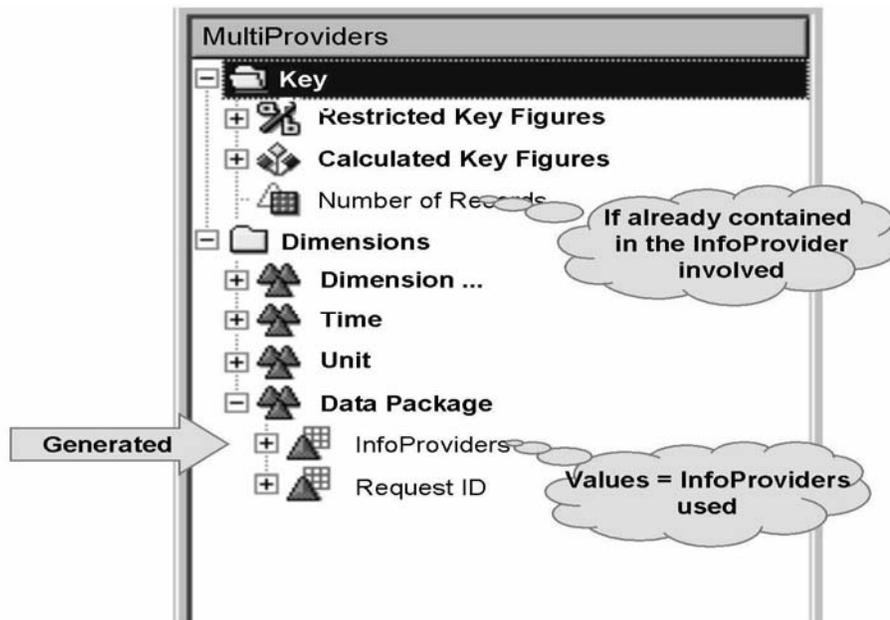
In the *Dimensions* folder, you find two different dimensions for each object type. For characteristic InfoProviders, the dimensions are *Attributes* and *Key Part*, in accordance with the definition of the master data tables. For ODS objects, the dimensions are *Data Part* and *Key Part*.



InfoSets in the Query Designer

The system also automatically generates the key figure *Number of Records* (*1ROWCOUNT*) for InfoSets.

Two dimensions are provided for each InfoProvider in the InfoSet: *Attribute* and *Key Part*. Therefore, for an InfoSet composed of an ODS Object connected to a characteristic, four dimensions display. The respective characteristics are then assigned to the dimensions.



MultiProviders in the Query Designer

In the *Key Figure* folder of a MultiProvider, you can find the generated key figure *Number of Records (1ROWCOUNT)*, if one of the InfoProviders included already contains this key figure, for example, in ODS objects.

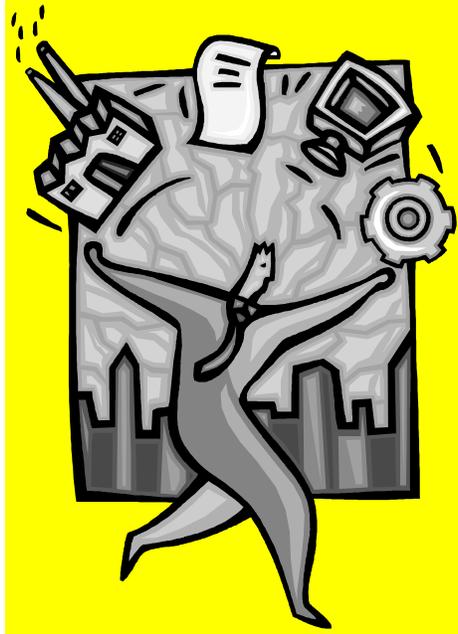
The *Data Package* dimension contains the generated characteristic *InfoProvider (0INFOPROV)*, which enables you to specify a unique InfoProvider in the selection or the display to supply data for the query. The values of this characteristic are formed from the (technical) names of the InfoProviders involved.

Unit Summary

You should now be able to:

- Describe the functions of the *BEx Query Designer*
- Define your own queries and modify these when necessary
- Publish reports for analysis in the *BEx Analyzer* and on the Web
- Describe the differences between the different InfoProviders
- Select the InfoProviders according to their use in creating reports
- Use the different elements of the InfoProvider in the Query Designer

Business Warehouse Reporting



Exercise 4

Unit 4 – Introduction to BW Query Designer

Task1

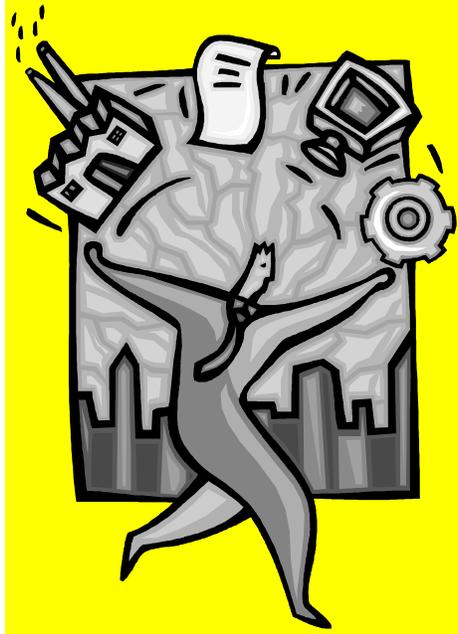
You are interested in finding out the incoming order values and the incoming order quantities of your customers for specific materials between January and April 2002. You want to enable the users of your report to select by specific countries. Create a new query with the following layout:

Task 2

(Optional)

Create a report using the same InfoCube for the time period from May to July 2002 about the sales volumes of your customers from the sales organization Germany Frankfurt (1512), with the option of navigating by division, and a drilldown for the sales volumes on the months May to June.

Business Warehouse Reporting



Exercise 5

Unit 4 – InfoProviders and InfoObjects

Task

InfoProviders in *SAP BI*

1. What type of InfoProvider can you use to create reports?
2. What objects does the term InfoProviders refer to?
3. Which conditions does an InfoObject have to fulfill in order to be used as an InfoProvider?
4. Which InfoProviders are available for master data reporting?
5. Which InfoProviders can contain generated characteristics or key figures?
6. Which InfoProviders can I combine in a BI InfoSet?
7. How many dimensions are displayed for an InfoSet in the Query Designer, if the InfoSet consists of an ODS object and a characteristic InfoObject?

Unit 5 - Calculated and Restricted Key Figures

Unit Overview

This unit deals with how to define restricted key figures on InfoProvider and query levels.

The properties of key figures are also discussed. The lesson shows an example of formula collision and explains the functions of the cell editor that can be used when implementing two structures in a query definition.

Unit Objectives

After completing this unit, you will be able to:

- Explain the objectives and use of restricted key figures in information analyses
- Define restricted key figures at the InfoProvider and query level
- Use the enhanced selection function for selecting restriction values
- Use the *Exclude from Selection* and *Include in Selection* functions
- Explain the use of constant selection
- Define new calculated key figures and explain their usage in reports
- Define a calculated key figure when using a restricted key figure and include it in the analysis
- Identify the various settings that can be made for properties of key figures, and use them in report
- Carry out currency translation in the Business Explorer
- Use the cell editor
- Create global structures so that complex key figure structures can be reused

Lesson: Restricted Key Figures

Lesson Overview

This lesson deals with how to define restricted key figures at the InfoProvider and query level.

Lesson Objectives

After completing this lesson, you will be able to:

- Explain the objectives and use of restricted key figures in information analyses
- Define restricted key figures at the InfoProvider and query level
- Use the enhanced selection function for selecting restriction values
- Use the *Exclude from Selection* and *Include in Selection* functions
- Explain the use of constant selection

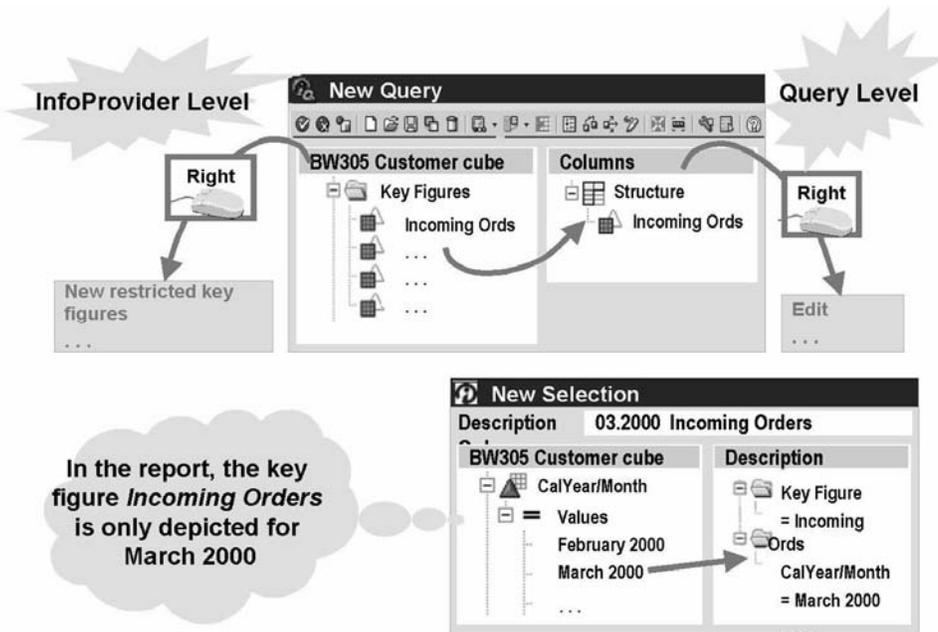
Business Example

You need restricted key figures in order to be able to define detailed reports. For example, you want to list sales volumes for individual time segments next to each other in the report. If you create them at the InfoProvider level, you are then able to reuse the individual key figures in other reports.

Restricted Key Figures

Restricted key figures are (basic) key figures of the InfoProvider that are restricted (filtered) by one or more characteristic selections. The key figure that is restricted by one or more characteristic selections can be a basic key figure, a calculated key figure, or a key figure that is already restricted.

By using restricted key figures, you can focus the query result on certain values. Unlike a filter, whose restrictions are valid for the entire query, for a restricted key figure, only the key figure in question is restricted to its allocated characteristic value or characteristic value interval. Scenarios such as comparing a particular key figure for various time segments, or plan/actual comparison for a key figure if the plan data is stored using a particular characteristic can be realized using restricted key figures.



Defining Restricted Key Figures

Use

You can create restricted key figures at the InfoProvider level, or locally in the query definition. Restricted key figures that are defined at the InfoProvider level are available in every query definition of the InfoProvider in question.

Procedure

1. To define a restricted key figure at the InfoProvider level, from the *Query Designer*, choose *Restricted Key Figure* in the context menu on the left-hand side under *Key Figure*.

To define a restricted key figure at the query level, use Drag&Drop to drag the key figure to be restricted into a Query Designer directory. In the context menu, choose *Edit*, or select the heading of the *Rows* or *Columns* directory and use the right mouse button to choose *New Structure*. Select the structure directory and use the right mouse button to choose *New Selection* from the context menu. The *New Selection* dialog box appears.

2. Enter a description of the restricted key figure into the text field.
3. If you select another key figure, use Drag&Drop to choose the key figure of the InfoProvider and place it on the right-hand side of the *Selection* window.
4. Use Drag&Drop to move the characteristic whose characteristic value you want to use to restrict the key figure to the right-hand side of the *Selection* window.
5. From the context menu of the characteristic, choose *Restrict*.
6. Select the characteristic values you require for the restriction.

7. Confirm your entries by choosing *OK*.
8. For the definition at the InfoProvider level, you enter a technical name in the dialog box, and confirm your entry by choosing *OK*. The newly defined key figure can be found in the *Restricted Key Figures* directory.

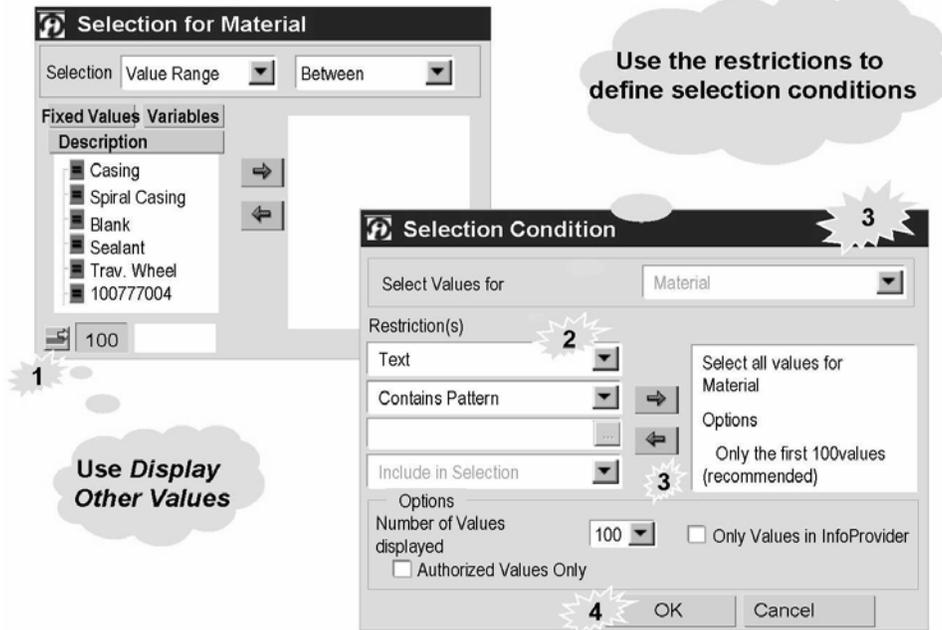
In the case of definition at the query level, the new restricted key figure is already part of the structure.

Selection Conditions for the Selection of Filter Values When defining a restricted key figure, you want to select the restricting characteristics, individual characteristics values, value ranges, hierarchy nodes or characteristic variables. When selecting value ranges, the following operations are available:

- Between
- Greater than or equal to
- Less than or equal to
- Greater than
- Less than

You can **include values in the selection** or **exclude values from the selection** by selecting these options in the context menu of the relevant filter value.

You can also remove the restriction of the characteristic values that appears in the selection dialog box and select displayed values based on their attributes or text by formulating selection conditions. On the basis of this enhanced selection function, the characteristic values targeted by the demands of your report displays in the selection dialog box.



Formulating a Selection Condition

Use

You can select individual values and value ranges from a list or from a selected hierarchy in the selection dialog box. The values available in the left-hand window are restricted to 100 values. You want to remove this restriction, and you want only characteristic values that match your specific criteria to be offered in the selection dialog.

Prerequisites

You have selected the characteristic for which you want to use characteristic values for restriction and chosen *Restrict* in the context menu using the right mouse button.

Procedure

1. Choose the yellow arrow in the bottom left-hand corner (*Display Other Values*) to reach the *Selection Condition* dialog box. You can formulate selection conditions here and deactivate the restriction to 100 values.

If you set the *Number of values displayed* to *All*, and there are a large number of characteristic values, this may cause a long wait when selecting values.

2. In the *Restriction(s)* window on the left-hand side, choose the attribute that you want to use to restrict the selection.

3. Choose the required operator.

You can use the following operators:

- Equal to
- Greater than or equal to
- Less than or equal to
- Less than
- Between
- Contains Pattern

4. Enter a characteristic value. If you want to use the value selection help function, choose the button to the right of the third field labeled with the three periods.

5. To adopt the restrictions, choose the arrow pointing to the right. The dialog box remains open so that you can add further restrictions to your selection condition.

6. Choose *OK*. The list of available values in the left-hand window of the selection dialog box is now restricted according to your formulated selection condition.

The *Text* attribute is offered in the *Restriction(s)* window on the left-hand side if:

1. In the *InfoObject* maintenance for a characteristic, in the *Business Explorer* settings, you set that the characteristic presentation contains text (*Only Text* or *Text and Key*).

2. Text is available for the characteristic.

In this case, the operators *Equal to* and *Contains Pattern* are available. You can formulate the following selection conditions, for example: Display all products with the text **toothpaste**.

Constant Selection

In the *Query Designer*, you use selections when defining a restricted key figure to determine the data that you want to display at runtime. You can use navigation steps to further restrict your selections at runtime. The **Constant Selection** function allows you to mark a defined selection as being constant. As a result of this setting, navigation and filters no longer have an effect on the selection in question.

Determining Constant Selection

Use

Constant selection allows you to easily select reference variables that do not change at the report's runtime.

Procedure

1. In the context menu of the restricted key figure, choose *Edit*, or in the context menu of a structure, choose *New Selection* if you want to make the setting as soon as the selection is created. You reach the *Edit Restricted Key Figure* or *New Selection* dialog box.
2. In the context menu of the characteristic InfoObject that you want to use to restrict the key figure, or that you want to use in the selection, choose *Constant Selection*.

Lesson: Calculated Key Figures

Lesson Overview

This lesson deals with how to define calculated key figures at InfoProvider and query level.

Lesson Objectives

After completing this lesson, you will be able to:

- Define new calculated key figures and explain their usage in reports
- Define a calculated key figure when using a restricted key figure and include it in the analysis

Business Example

The use of complicated calculations for information analysis is the order of the day. This requires various mathematical functions such as percentage functions and totals functions. You need basic key figures and restricted key figures or calculated key figures that you have already defined to define your calculated key figures. For example, you use the restricted key figures for two specific years to calculate the difference between the sales volumes of the years in question.

Functions for Defining Calculated Key Figures

In the Query Designer, you can use a formula to calculate key figures that are not in the InfoProvider by using basic key figures, restricted key figures and existing calculated key figures in the formula definition.

Below are examples and explanations of the functions available as operators when you define a calculated key figure.

Percentage Functions

Percentage Variance (%)

<Operand 1> % <Operand 2>

gives the percentage variance of operand 1 from operand 2. Example: Planned Sales Volume % Actual Sales Volume gives the percentage by which the actual sales volume exceeds the planned sales volume.

Percentage Share (%A)

<Operand 1> %A <Operand 2>

Gives the percentage share of operand 1 of operand 2.

Example: Sales Volume %A Incoming Orders specifies the percentage share of sales volume made up of incoming orders.

Percentage Share of Result (%CT)

%CT<Operand>

Specifies how high the percentage share is in relation to the result. The result means the result of aggregation at the next level (interim result).

%CT Incoming Orders specifies the share of incoming order values of each individual characteristic value (for example of each customer) in relation to the characteristic's result (for example, customer of a division).

Percentage Share of Overall Result (%GT)

%GT <Operand> Specifies how high the percentage share is in relation to the overall result. The overall result means the result of aggregation at the next level in the list. In the calculation of the overall result, the dynamic filters (filters that were not already defined in the Query Designer) are included.

Data Functions

Counts

COUNT(<Expression>)

Delivers the value 1 if the expression named in <Expression> is not equal to 0. Otherwise, delivers the value 0.

NDIV0 (x): Is equal to 0 with division by 0, otherwise x.

NDIV(<Expression>)

Delivers 0 if the expression named in <Expression> gives a division by 0 in the calculation. Otherwise, the result is the value of the expression. Is used to

- Avoid the output of an error message
- Continue calculating with a defined result

Result

SUMCT <Operand>

Delivers the result of the operand in all rows or columns (see Percentage Functions %CT).

Overall Result

SUMGT<Operand>

Delivers the overall result of the operand (see Percentage Functions %GT).

Report Result

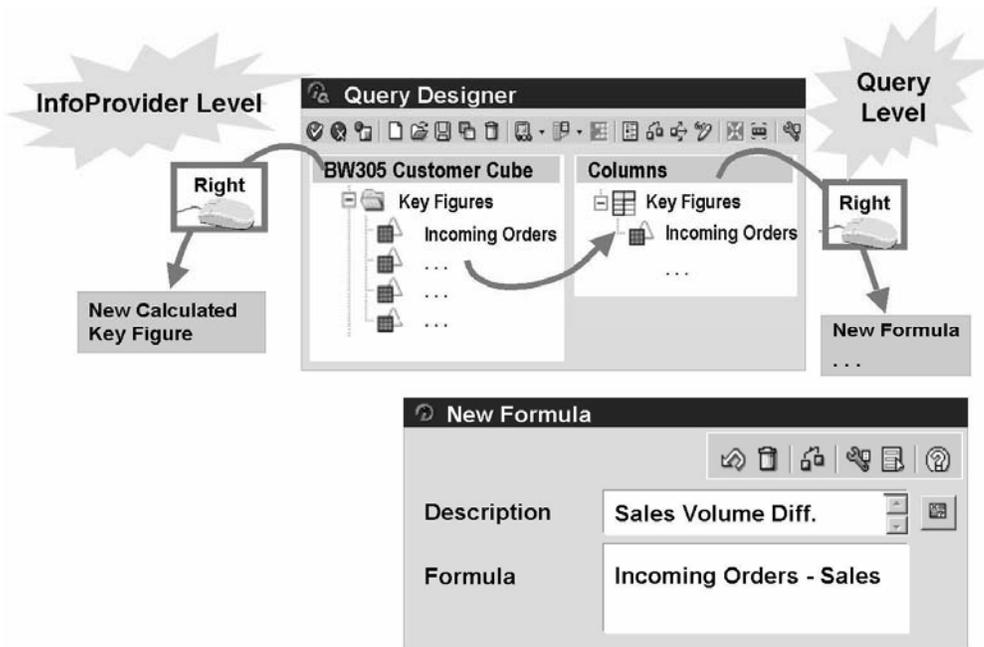
SUMRT<Operand>

Delivers the report result of the operand (to distinguish between the overall and the report result, see also Percentage Functions %GT and %RT).

Mathematical Functions

These include:

- Maximum Minimum Absolute Value
- Smallest integer value larger than operand
- Division (integers)



Calculated Key Figures

Defining Calculated Key Figures

You can use all basic key figures of the InfoProvider in question, as well as the newly defined restricted and calculated key figures of the InfoProvider, to define new calculated key figures. You can define calculated key figures at both the query level and the InfoProvider level. At the query level, the calculated key figure is valid only for the query in question. If you create a calculated key figure at the InfoProvider level, you can use it in all queries that are based on the same InfoProvider.

Defining Calculated Key Figures at the InfoProvider level

1. Select the *Key Figure* directory, and choose *New Calculated Key Figure* from the context menu. You reach the *New Calculated Key Figure* dialog box.
2. Enter a description of the calculated key figure into the *Text* field.
3. Define the required formula using basic key figures, restricted key figures, formula operators, and functions. You can use Drag&Drop to transfer the formula components into the formula field.

Key figures always have the same units when a query is executed. This means that the formula is semantically incorrect if you add a currency unit (for example, EUR) to a unit of weight (for example, kg). If you want to calculate values without using units, you should use the *Value Without Dimension* function. See Data Functions.

4. Check the formula definition and choose *Formula Syntax Check*.

Caution: The *Formula Syntax Check* function only checks the syntax of the formula. It does not check whether the formula is semantically sound, for example, whether the units are compatible.

5. Choose *OK*. In the *Properties of the Calculated Key Figure* dialog box, assign a technical name, and choose *OK*.

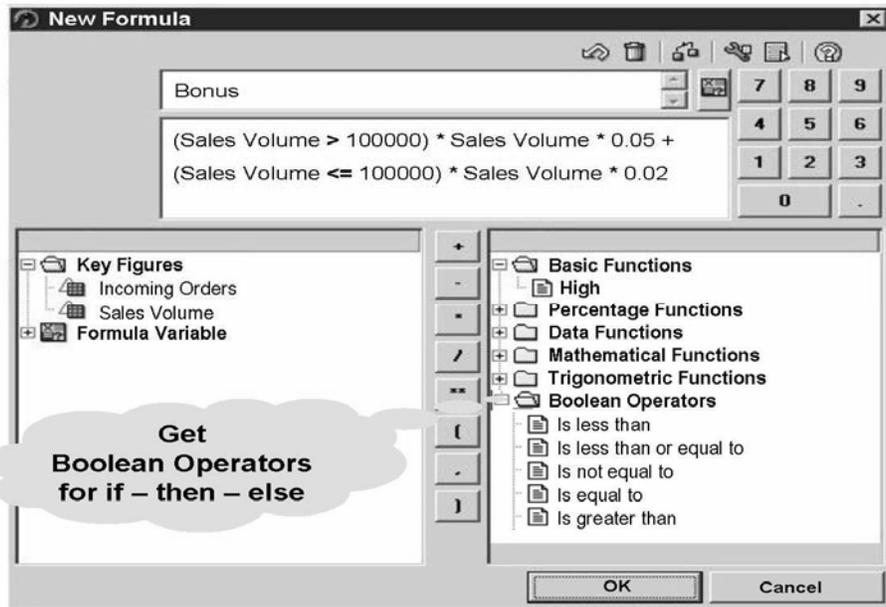
If you choose *Enhance*, the dialog box is enhanced with aggregation behavior or exception aggregation options.

6. The new calculated key figure is available under the *Calculated Key Figures* folder, and can be included in the definition using Drag&Drop.

Defining Calculated Key Figures at the Query Level

To define calculated key figures at the query level, you have to include key figures needed for the calculation in the query definition, and choose *New Formula* from the context menu of the Key Figure structure. These formulas are available only locally in the query definition.

If you are defining calculations in the columns as well as in the rows, a formula collision can occur in the interfaces of the two formulas. You can therefore, define which of the formulas is to be used.



Boolean Operators

Boolean operators constitute a particular example of functions that are available as operators when you define a calculated key figure. With the help of the Boolean operators, you can make comparisons within formulas.

You can use the following operators:

- is less than <
- is not equal to <>
- is greater than >
- is less than or equal to <=
- is equal to =
- is greater than or equal to >=
- logical NOT, AND, OR, and logical exclusive OR XOR

Example: **Costs < Sales Volume**. This expression delivers 1 if the sales volume is larger than costs. It delivers 0 if the costs are larger or the same as the sales volume.

Example: **Costs and Sales Volume**. This expression delivers 1 if the values for costs and sales volume are not equal to 0. Otherwise, it delivers 0.

You formulate if - then - else queries in this way.

Example: IF sales volume > 100,000 THEN sales volume * 5% ELSE sales volume * 2% can be described using the following formula:

$$(\text{Sales volume} > 100000) * \text{sales volume} * 0.05 + (\text{sales volume} \leq 100000) * \text{sales volume} * 0.02$$

This works because at least one side of the calculation will always be multiplied by zero.

Lesson: Properties of Key Figures

Lesson Overview

This lesson deals with the properties of key figures. The lesson provides an example of formula collision and explains the functions of the cell editor that can be used when implementing two structures in a query definition.

Lesson Objectives

After completing this lesson, you will be able to:

- Identify the various settings that can be made for properties of key figures, and use them in report
- Carry out currency translation in the Business Explorer
- Use the cell editor
- Create global structures so that complex key figure structures can be reused

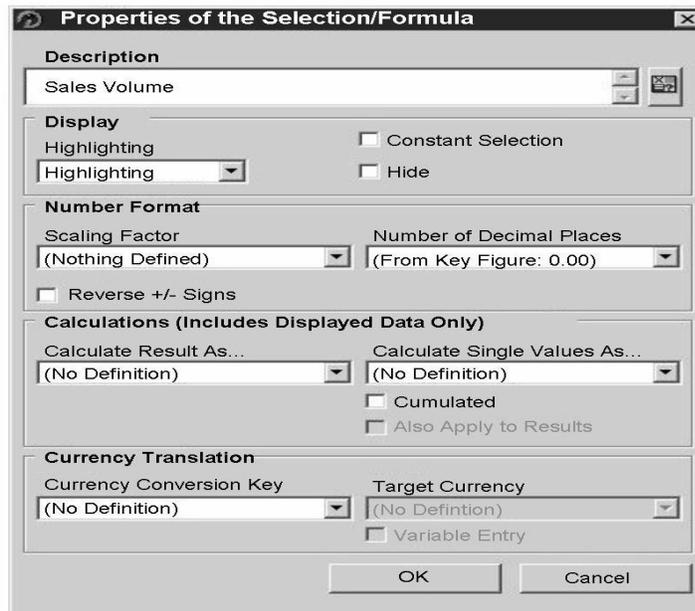
Business Example

Your company has asked you to optimize reports. You are going to make various settings in the properties of the key figures. You also need query definitions with two structures for more complex analyses. You need the option of using the cell editor to address each individual cell of the matrix that is used by both structures.

Properties of Key Figures

The various components of a query have specific properties that reproduce important functions. Call the *Properties* dialog box from the context menu for the key figure for which you want to define properties..

In the *Properties of the Selection/Form* dialog box for a structure part, you can set a range of functions.



Properties of the Selection/Form

Description

Here you can change the automatically determined key figure description (basic key figure, restricted key figure, calculated key figure) here. Structure parts can contain more than one line as a description.

Caution: The total length of all characters in all lines including the line break character is limited to 60 characters.

You can use text variables in the description.

Technical name

You can assign a unique technical name to structure parts such as key figures. This is optional.

When accessing external interfaces (such as Crystal reports, in URLs, or through OLE DB for OLAP), the structure parts must have a technical name so that it can be accessed without error.

Display

You can choose whether the key figure is to be highlighted in the report here. You can hide key figures that you only need for calculating formulas and do not want to display in the analysis.

You can also mark as selection as constant so that this selection can no longer be changed by navigation and filter at runtime.

Number Display

You can set the scaling factor in the *Number Format* area.

Note that scaling factor does not automatically display in the report. You have to set the scaling factor display separately in the query properties.

You can define the number of decimal places here and reverse the +/- signs.

Note: The reverse +/- signs is only a display function. It has no influence on calculation in formulas.

Calculations

You can use this function to recalculate result rows and individual values that display in the version according to particular criteria.

Example: You want to calculate the result on the basis of the average of all displayed sales volumes instead of on the basis of total sales volume. Example: You want to display individual values normalized to the result of overall result.

You can use the Cumulated function to ensure that the cells of a column are presented from top to bottom, and the cells of a row are displayed from left to right.

Currency Translation

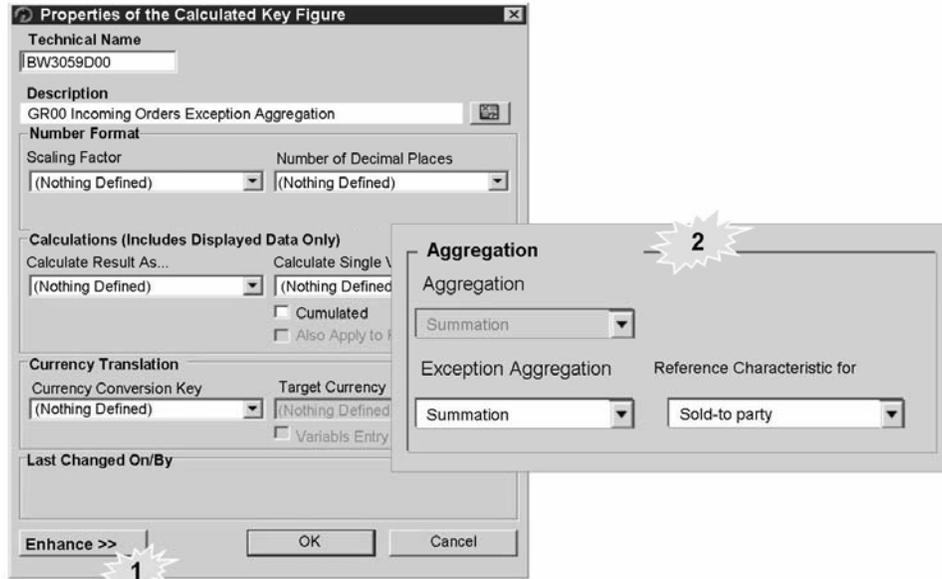
In the Query Designer, you can set a currency conversion key and a target currency in the *Properties* dialog box for a structure part.

Formula Collision

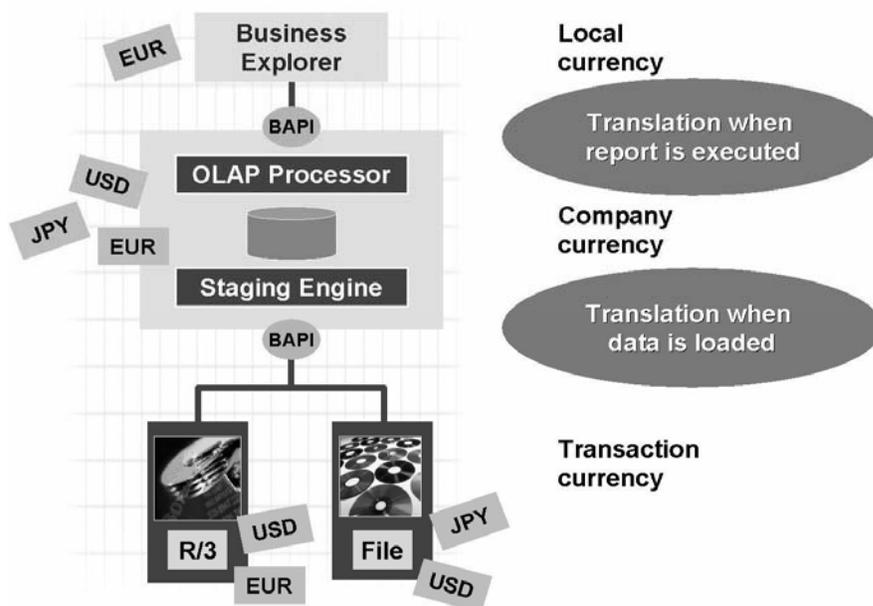
The *Formula Collision* function only displays in the *Properties* dialog box if two structures are used in the query definition and both contain formulas. In places where the two formulas collide, it is not clear how the system should calculate. You can therefore choose the formula you want to use to calculate the value.

Enhance

In the *Properties of the Calculated Key Figure* dialog box, you can also select an exception aggregation for a special characteristic for the calculated key figure.



Properties of the Calculated Key Figure



Currency Translation

A currency translation in the *Business Information Warehouse* can take place at two points.

When the data is updated in the InfoProvider, a currency can be determined for use with each key figure. When analyzing data in the Business Explorer, you can determine the currency conversion key and target currency for each structure part separately. You choose a currency conversion key that has been created in the *Administrator Workbench*. If necessary, enter the required target currency into the *TargetCurrency* dropdown box.

If you want the target currency to be flexibly determined at the runtime of the report, you can include a currency variable. Choose *Variable Entry* to do this. A default menu appears when you start the report, where you can select the target currency you want.

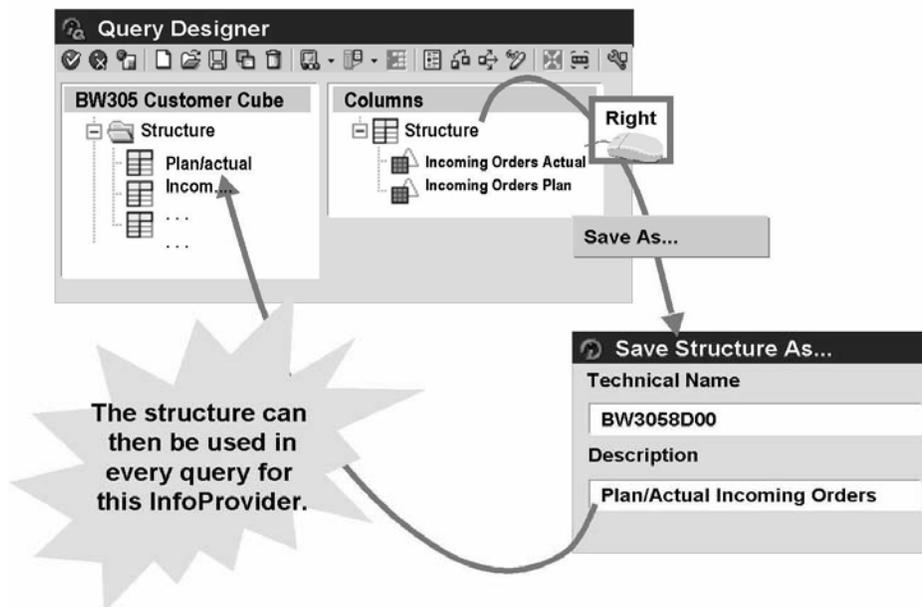
All value key figures of the query can be translated into one common target currency with a currency translation key in the report.

Reusable Structures in Queries

Structures are combinations of characteristics and key figures (of basic key figures, calculated key figures, or restricted key figures) of the InfoProvider. A structure can be used in a planned/actual comparison or in a contribution margin scheme.

Structures can also be used in several queries for the same InfoProvider. In order for this to be possible, you need to save them as **reusable structures**. In order to make a distinction, we call structures that are not stored as reusable structure **local structures**. Local structures are only used in one query.

1. Call up the context menu in the heading of the *Rows* or *Columns* directory. Choose *New Structure*.
2. In the context menu of the new structure, choose *New Selection*. In the *New Selection* dialog box, use drag and drop to choose characteristics and key figures of the InfoProvider that you want to use in the new structure. Restrict one characteristic or key figure. Define a new formula for calculations.



Creating Reusable Structures

1. Select the structure that you want to reuse. Choose *Save as...* from the context menu (right mouse-click) and enter a technical name and a description.
2. The saved structure is now available in the structure directory of the InfoProvider tree. You can use the structure for the definition of new queries for this InfoProvider.

Changes made later to global structures affect all queries in which they were used. If you only want to make local changes in a particular query, you can choose *Remove Reference* in the context menu for the structure, and thereby, change the reusable structure into a local structure.

Changes made later do not affect the definition of the reusable structure, nor the queries that you made with this reusable structure.

Cell Editor

- Cell editor allows direct definition of specific **cells** in a query.
- Cells are the intersection of two structures in a query definition.
- The Cell Editor can only be used in query definitions where there are two structures.

Note: One structure will hold only characteristics while the other structure holds only key figures.

- Cells can be formulas, selections, references or auxiliary cells.

The Cell Editor is a function of the BEx Query Designer. You can select the editor if the query definition contains two structures. You can define a maximum of two structures in a query definition. One of these structures can contain key figures. You use characteristic values in one structure, and key figures in the other.

Defining Exception Cells

Use

Cell-specific definitions allow you, in addition to the implicit cell definitions resulting from the formulas created, to explicitly define formulas and selection conditions for cells, thereby overwriting the implicitly generated values. This function allows you to create more detailed queries.

You can also define cells that have no direct relationship to the corresponding structure parts. These cells do not display; they do serve as containers for auxiliary selections or formulas.

Caution: A cell is the intersection of two structure elements. The term **Cell** in the function of *Defining Exception Cells* should not be confused with cells in MS-Excel.

The formulas or selection conditions that you define for a cell are always effective at the intersection of two structure elements. If a drilldown characteristic has various characteristic values, the cell definition is always effective at the intersection of the characteristic value with the key figure.

Procedure

1. In the Query Designer, choose *Define Cells*  to reach the Cell Editor functions.
2. You can now use four different functions.

New Selection

- Select a cell in the *Cell Definition* dialog box, and use the right mouse button to choose *New Selection*.
- Define the required selection.
- Enter a description for the selection and choose *OK*.

New Formula

- Select a cell in the *Cell Definition* dialog box, and use the right mouse button to choose *New Formula*.
- Define the required formula. Enter a description for the formula and choose *OK*.

New Cell Reference

Each cell that you define can be reused in formulas. If you want to reuse the value of the implicit generic cell definition that automatically occurs at the intersection of two structure parts of a query, select this cell in the *Cell Definition* dialog box, and choose *New Cell Reference* using the right mouse button. The description arising from the two structure parts automatically appears in the cell. You can now refer to this cell.

Additional cells

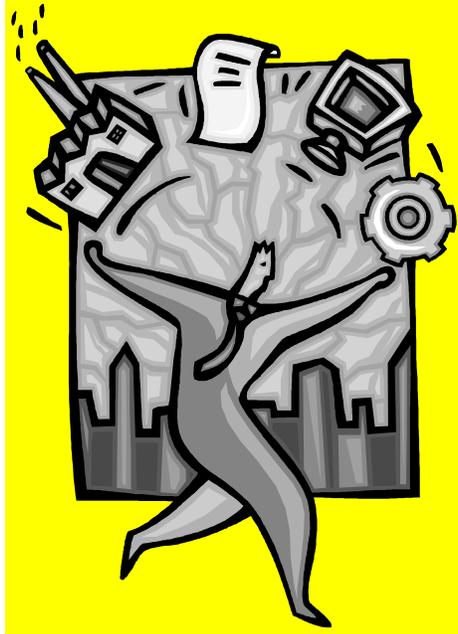
Choose *Additional Cells* if you need additional cells for auxiliary selections or formulas.

Unit Summary

You should now be able to:

- Explain the objectives and use of restricted key figures in information analyses
- Define restricted key figures at the InfoProvider and query level
- Use the enhanced selection function for selecting restriction values
- Use the *Exclude from Selection* and *Include in Selection* functions
- Explain the use of constant selection
- Define new calculated key figures and explain their usage in reports
- Define a calculated key figure when using a restricted key figure and include it in the analysis
- Identify the various settings that can be made for properties of key figures, and use them in report
- Carry out currency translation in the Business Explorer
- Use the cell editor
- Create global structures so that complex key figure structures can be reused

Business Warehouse Reporting



Exercise 6

Unit 5 – Restricted Key Figures

Task 1

Define two restricted key figures that depict the sales volume for the period leading up to 2002 and for the year 2002 itself. For the definition of two further key figures, you use the enhanced selection conditions to restrict the sales volume for each sold-to party to the selected materials.

Create a new query using

1. **InfoProvider:** *SAP Demo Sales and Distribution overview Cube (0D_SD_C03)* in the *BW305 Reporting* InfoArea with the characteristic *Sold-to party (0D_SOLD_TO)* in the rows.
As global filter user *Division (0D_DIV)* restricted to *High Tech*, and
Sales Organization (*0D_SALE_ORG*) restricted to Sales Organization 1616
Define a new restricted key figure at InfoProvider level. We will limit the basic key figure *Sales Volume* to a *January 2002*.
Description: **GR01 OpenNetValue2002**
Technical name: **BW3057A01**.
2. In the same query, define restricted key figures at **query level**. This key figure is to display *Net Value in stat.Cur* for period of January 2002 to December 2002. **Description: GR##Net Value in stat.Cur 2002**. Define another restricted key figure *Net Value in stat.cur*. restricted to all the materials that contain *Flat Screen* in their description.



Caution: You must distinguish between upper and lower case when searching.

- a) Description: **OpenNetValue2002MonitorFlat**.
Choose OK.
- b) Save the query by clicking 
- c) Description: **GR##BW305RestrictedKeyFigures**.
Technical name: **BW3057B##**.
Now execute the query

Task 2

You use selections when defining the restricted key figure to determine the data that you want to display at runtime. Use the *Constant Selection* function to easily select reference sizes that can not change at runtime.

1. Create a new query based on the InfoProvider *Cube (OD_SD_C03)*. Place the characteristic *Material (OD_MATERIAL)* into the rows. Use the characteristics *Sales Organization (OD_SALE_ORG)* as the global filter, restricted to the sales organization *Germany Frankfurt (1512)*. Place the InfoObject *Cal. year / month (OCALMONTH)* into the free characteristics, and restrict it to the single values *03/2002*. Create a restricted key figure open orders and restrict it to period *6/2002*. Make a copy of the 1st key figure and make sure that the second one has only values that are coming from the InfoProvider. Put constant selection on both of them. What happened to the query when you did that?

Define two new key figures.

Description: **SalesCurrentQuarter.**

Description: **SalesValueCurrentQuarter.**

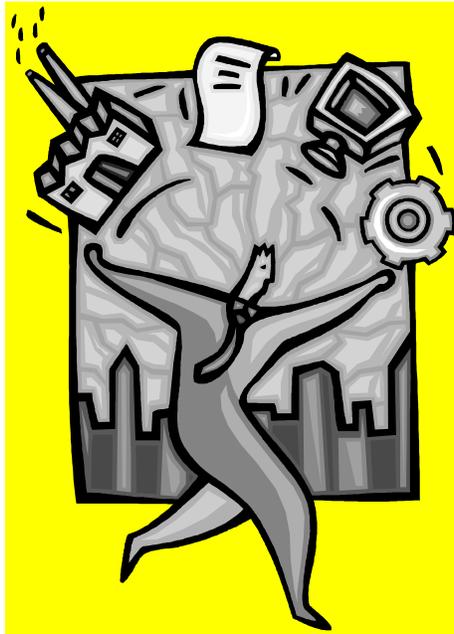
Save the query

Description: **GR##BW305SelectionofConstants.**

Technical name: **BW3057C##.**

Now execute the query.

Business Warehouse Reporting



Exercise 7

Unit 5 – Calculated Key Figures

Task 1

Generate a report that represents the sales volumes and Net Value of the first two quarters of 2002 as well as the first half-year with percentage changes.

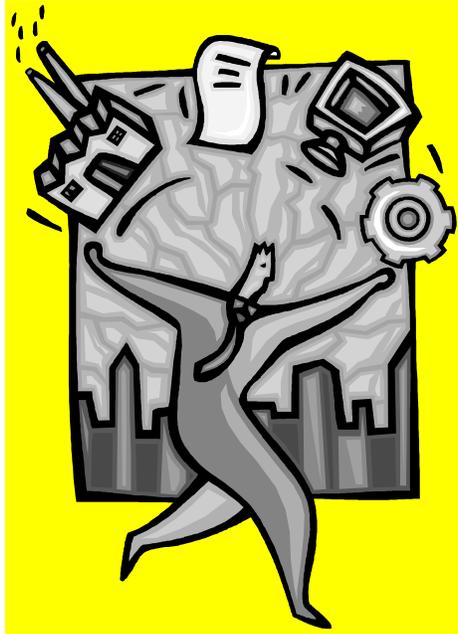
1. Create a new query based on the InfoProvider *SAP Demo Sales and Distribution overview Cube* in the *SAP Demo* InfoArea. In the rows, create a structure with the following name: Description:
GR## Quarterly Comparison
Technical name: **BW3059A##**.
This query contains the first and second quarters of 2002. The structure should also include the first half-year as a sum of the first two quarters.
2. In the columns, include the basic key figures *Open Order net value* and *Net value in statistic currency*. Define a new calculated key figure that calculates the percentage share of the Open Order in relation to net value of Net Value. Description: **%Share Open Order of Net Value**
3. Save the query
Description: **GR##BW305FormulaCollision**.
Technical name: **BW3059C##**.
Now execute the query. If necessary, carry out a currency translation. At the point where the *1st half 2002* and *% share open orders of net value* calculations cross, there is a formula collision. Decide which of the formulas you want to be valid for the calculation of the values at the point of collision, and make the appropriate setting in the properties of the key figure or calculated formula.

Task 2

You need information on the share of the sales volume for the individual quarters in relation to the first half -year. You define a new calculated key figure that uses the value from a particular cell for calculation.

1. In the query definition **GR## BW305 Formula Collision (BW3059C##)**, define a new formula that calculates the share of the sales volumes for the individual quarters in relation to the sales volume for the first half-year. Use the cell editor to do this. Select the sales volume for the first half year there as a reference cell.

Business Warehouse Reporting



Exercise 8

Unit 5 – Properties of Key Figures

Task 1

Generate a report that represents the sales volumes and Net Value of the first two quarters of 2002 as well as the first half-year with percentage changes.

1. Create a new query based on the InfoProvider *SAP Demo Sales and Distribution overview Cube* in the *SAP Demo* InfoArea.

In the rows, create a structure with the following name:

Description: **GR## Quarterly ComparisonB**

Technical name: **BW3059B##**.

This query contains the first and second quarters of 2002. The structure should also include the first half-year as a sum of the first two quarters.

2. In the columns, include the basic key figures *Open Order* and *Net value in stat cur*. Define a new calculated key figure that calculates the percentage share of the Open Order in relation to net value of Net Value. Description: **%Share Open Order of Net Value. Make sure only formula is visible in the query.**

3. Save the query

Description: **GR##BW305FormulaCollisionB**.

Technical name: **BW3059CB##**.

Now execute the query. If necessary, carry out a currency translation. At the point where the *Half Year 1* and *Percentage Variance of Quarters* calculations cross, there is a formula collision with the calculated key figure *% Share Open Order of Net Value*. Decide which of the formulas you want to be valid for the calculation of the values at the point of collision, and make the appropriate setting in the properties of the key figure or calculated formula. In the *currency conversion key* dropdown, select *Average rate – current rate*. In the *target currency* dropdown, select *US Dollars (5 dec)*. Click OK, save the query, and execute it. You may get some warnings.

Task 2

You need information on the share of the sales volume for the individual quarters in relation to the first half -year. You define a new calculated key figure that uses the value from a particular cell for calculation.

1. In the query definition **GR## BW305 Formula CollisionB (BW3059CB##)**, define a new formula that calculates the share of the sales volumes for the individual quarters in relation to the sales volume for the first half-year. Use the cell editor to do this. Select the sales volume for the first half year there as a reference cell.

Description: Share of Open Order of Overall Open Order forHalfYear1.

Save the key figure structure you defined as a reusable structure.

Description: **GR## OpenNetValue AnalysisB**

Technical name: **BW3059HB##**.

Save the query and then execute it. Take a look at your report.

Unit 6 - Characteristics

Unit Overview

With *SAP BW* your managers are better informed on all levels in order to make decisions and react quickly, which is necessary in today's dynamic markets. In addition, the use of hierarchies and structures in combination with hierarchies is discussed in this unit.

You can create your own hierarchies in *SAP BW*. To do this, you use time-dependent hierarchy structures and linked nodes.

Unit Objectives

After completing this unit, you will be able to:

- Describe the various properties of characteristics and their use in adjusting reports to your requirements
- Demonstrate the benefit of using display attributes to describe characteristics in more detail
- Describe the difference between using display attributes and navigation Display characteristics and key figures in a hierarchy
- Define how the hierarchy is displayed in the report
- Combine hierarchies and structures
- Restrict characteristics to hierarchy nodes
- Define your own hierarchies in *BW*
- Create time-dependent hierarchy structures
- Use link nodes in the hierarchy definition

Lesson: Properties and Attributes of Characteristics

Lesson Overview

This lesson deals with the properties of characteristics and the various options for enhancing reports with additional information in the form of attributes.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe the various properties of characteristics and their use in adjusting reports to your requirements
- Demonstrate the benefit of using display attributes to describe characteristics in more detail
- Describe the difference between using display attributes and navigation attributes

Business Example

Reports are often used as the basis for decision-making. In order to implement measures resulting from these reports without losing time, it is often necessary to collect additional information quickly, such as a contact person and the telephone number of a sold-to party or the person responsible for a cost center. Including this information in your reports in the form of attributes saves valuable time.

Properties of Characteristics

The various components of a query have specific properties that reproduce important functions. You call the properties dialog box from the context menu for the characteristic for which you want to define properties, by selecting *Properties*.

In the *Characteristic Properties* dialog box, you can make settings for a range of functions that affect the key figures for this characteristic in the query drilldown.

Hierarchy Properties	U	Value
Expand to Level	<input checked="" type="checkbox"/>	3
Position of Lower-level Nodes	<input checked="" type="checkbox"/>	Down
Values of Posted Nodes	<input type="checkbox"/>	Display
Nodes with Only One Lower-lev	<input type="checkbox"/>	Display

Characteristic Properties for Characteristic ... You can define the following properties for characteristics:

Description

The text provided in the InfoObject maintenance appears here. You can change the text and display it in the query.

Display As

This is where you determine how characteristic values display, as long as they values were created in the InfoObject maintenance for the characteristic:

- No Display Key and Name
- Name and Key Name
- Key Long or Medium Name

Display of Results

- *Suppress Results Rows*

You can structure the appearance of your report by using this function to determine whether the results rows are displayed *Always*, *Never* or *With Only One Value*.

- *Normalized to* You can use this function to normalize key figure values to a specific characteristic. When values are normalized, the key figures display as a percentage of the chosen result.

You can select the *Query Result*, *Overall Result*, and *Result* (interim result) as the reference value.

The characteristic is normalized only if it is in the drilldown.

- *Cumulative*

This function aggregates the values of the characteristic values (the nth value is aggregated with the n+1 value).

Sorting

You can make settings for sorting within the characteristic. You can use the following:

The characteristic itself, sorted by key or name

All attributes of the characteristic sorted by *Key* or *Name*
The sort sequence is either *Ascending* or *Descending*.

You cannot use the attribute that you have selected for sorting in the display.

Display Hierarchy

You can display and make the necessary settings for the characteristic hierarchically.

Attributes

Characteristics can be described in more detail through attributes. For example, you can assign the attribute *Telephone Number* to the characteristic *Sold-to Party* to display the telephone number of the sold-to party.

You assign attributes to characteristics in the InfoCube maintenance. You can maintain them as purely **Display Attributes** or as **Navigation Attributes**. You can show **Display Attributes** in a report in the drilldown. However, navigation steps are not possible. (For example, you cannot choose values from a display attribute as a filter.)

To include a display attribute in the drilldown, open the index for the characteristic. Once in the *Attributes* index, drag the required attribute into the query definition.

To select a display attribute of a characteristic that is already in the query definition, from the context menu of the characteristic, choose *Attributes*.

In the *Attribute Properties* for a specific attribute for a characteristic, you can set the display functions as key, name, and so on.

You can use **Navigation Attributes** for defining queries in reporting in the same way as characteristics. They display in the dimension of the characteristic to which they belong.

In order to use an attribute as a navigation attribute, note the following:

1. You have to flag the attribute as a navigation attribute in the InfoObject maintenance of the characteristic.
2. You have to select that attribute from the list of possible navigation attributes in InfoCube maintenance.

Note the following when using navigation attributes:

- Time-dependency of the navigation attribute.

Navigational attributes enable you to view current data with characteristic values from the past or view past data with current characteristic values.

- Navigation attributes used as characteristics in query design.
- Slight loss in query performance when compared to characteristics.

Lesson: Integrating Hierarchies into Reports

Lesson Overview

This lesson deals with using hierarchies and using structures in conjunction with hierarchies.

Lesson Objectives

After completing this lesson, you will be able to:

- Display characteristics and key figures in a hierarchy
- Include external hierarchies in your reports
- Define how the hierarchy is displayed in the report
- Combine hierarchies and structures
- Restrict characteristics to hierarchy nodes

Business Example

You can increase the clarity of your reports by arranging several characteristics and key figures hierarchically in your reports. In order to analyze the characteristics values of, for example, a cost center or a material, external hierarchies are often used. It may also be necessary to combine structures with hierarchies for presentation in the report.

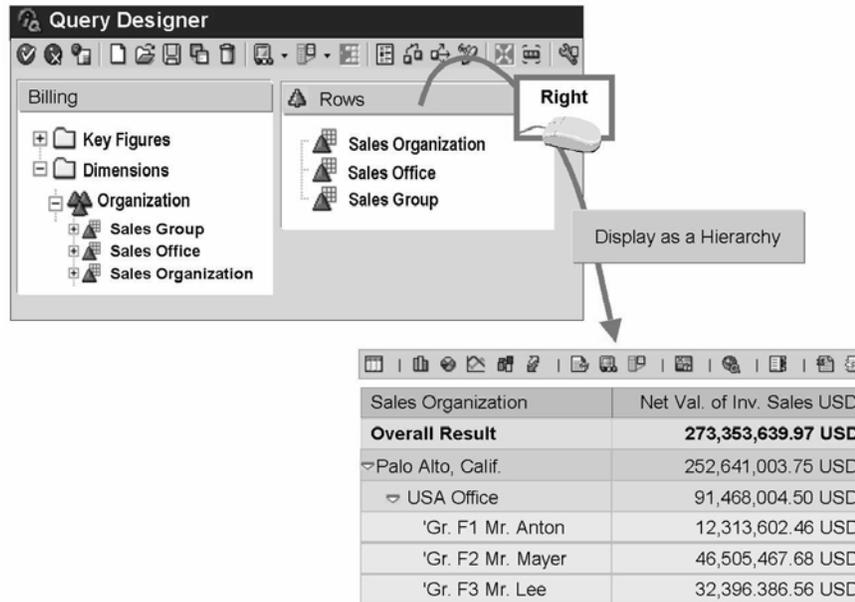
Hierarchical Display in Reports

You have **two** options for hierarchical displays in reports:

1. You can display the characteristics included in the query definition as a hierarchy.
2. You can select an external hierarchy as a display hierarchy for a characteristic in the query definition.

Hierarchical Positioning of Characteristics and Key Figures

You can display characteristics and key figures in the rows and in the columns as hierarchies by selecting *Display As Hierarchy* from the context menu of the row or column header.



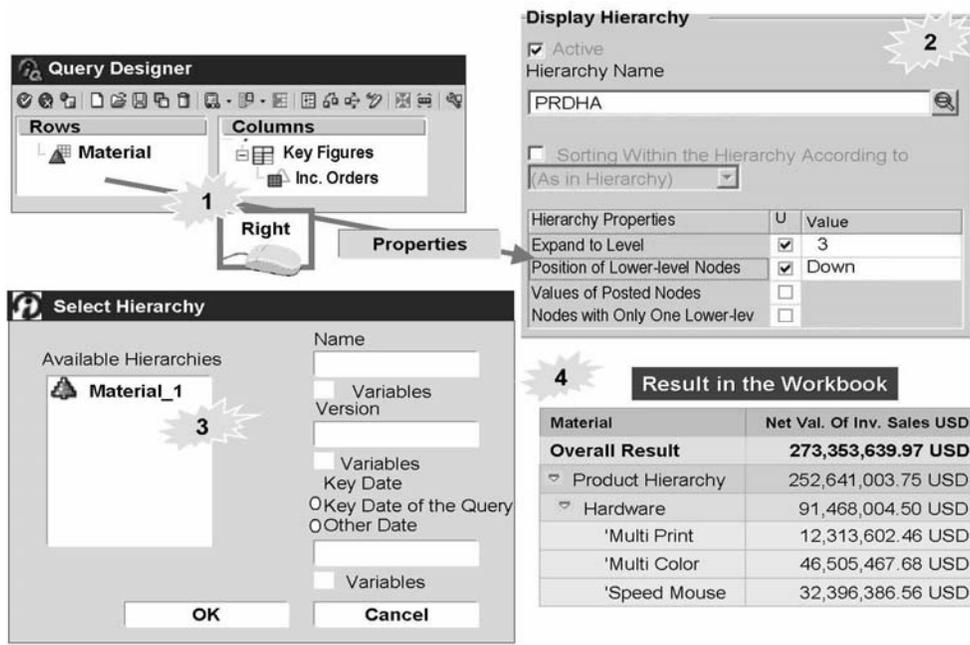
Hierarchical Positioning of Characteristics

Selecting External Hierarchies

- You create hierarchies for basic characteristics, for example, *Cost Center (OCOSTCENTER)*.
- External hierarchies are saved in special master data tables. They behave like master data and therefore, you can use and modify them in all InfoCubes.
- You can define several hierarchies for a characteristic. You then select the display hierarchy from these hierarchies.

In order to make hierarchies available for a characteristic in BW, you can load characteristic hierarchies from a source system or create them in the Business Information Warehouse.

You determine whether a characteristic can have a hierarchy in the InfoObject maintenance. This is also where you define the properties of the permitted hierarchies (for example, hierarchy versions, time-dependent hierarchy structures).



Hierarchies in Reports

Including Hierarchies in Reports

1. Choose *Properties* from the context menu of the characteristic that you want to present in a hierarchy.
2. In the *Properties* dialog box, choose values from the *Display Hierarchy* area. 
3. In the list of *Available Hierarchies*, select the required fixed hierarchy and choose *OK*.

Properties of the Display Hierarchy

Each hierarchy has the properties that were determined in the hierarchy definition. You can override the following hierarchy properties in the query definition for a hierarchy.

Sorting

Within the hierarchy, you can sort in *Descending* or *Ascending* order by *Key* or *Name*.

Expand to Level

To determine the hierarchy level to which the hierarchy is expanded in the report, in the **U** column (*User Settings*), put a check in the checkbox and enter the required numerical value.

Position of Lower Level Nodes

In the **U** column, put a mark in the checkbox and choose whether the subordinate nodes are positioned above (*Up*) or below (*Down*) a superior node.

Values of Posted Nodes

In the **U** column, put a check in the checkbox and choose whether you want to *Display* or *Suppress* the values of posted nodes.

Nodes with Only One Lower-Level Node

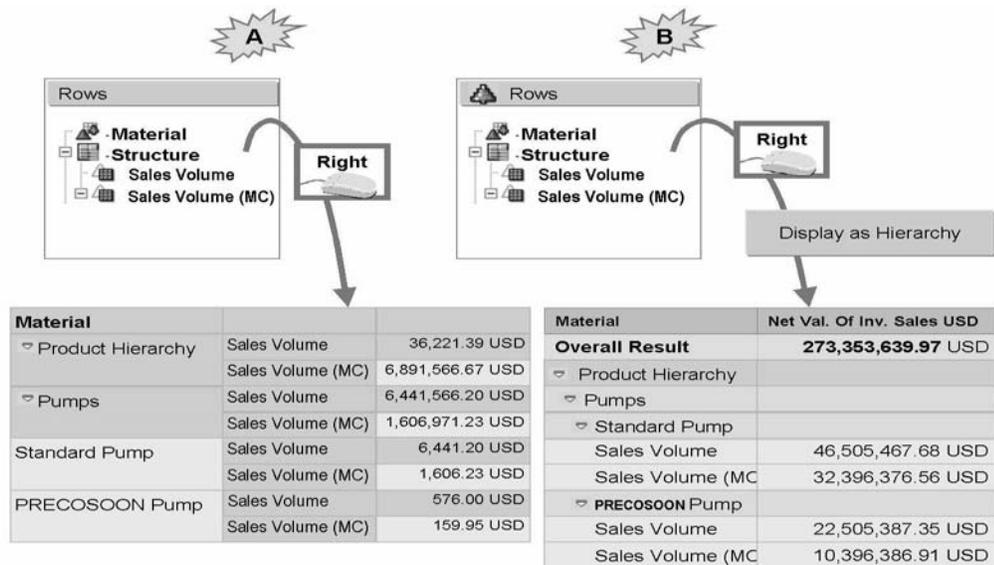
In the **U** column, put a check in the checkbox and choose whether you want to *Display* or *Suppress* nodes with only one lower level node.

Using Hierarchies to Make Restrictions

You can use hierarchies to select filter values for characteristics by selecting individual hierarchy nodes.

If you restrict the characteristic to one hierarchy node, the node hierarchy is automatically taken as the display hierarchy. However, you can switch the display hierarchy to not active.

In order to restrict a characteristic to a hierarchy node, from the dialog box, select *Restrict* and then the hierarchy. Select the required hierarchy node and confirm with *OK*.



Combinations of Hierarchies and Structures

You can combine hierarchies and structures in the display so that you can choose to display the characteristics in non-hierarchical form (example A) and hierarchical form (example B).

A:

If you combine a hierarchy with a structure but do not choose *Display as Hierarchy*, a column and a row are used for both the hierarchy and the structure.

B:

With the hierarchy display, the hierarchy appears with the structure in a column or a row.

Lesson: Creating User-defined Hierarchies

Lesson Overview

This lesson covers creating user-defined hierarchies in *SAP BW*. It also deals with time-dependent hierarchy structures and linked nodes for use in creating hierarchies.

Lesson Objectives

After completing this lesson, you will be able to:

- Define your own hierarchies in BW
- Create time-dependent hierarchy structures
- Use link nodes in the hierarchy definition

Business Example

Along with external hierarchies that are loaded from the source systems, you may also need to include user-defined hierarchies in your reports. The hierarchy structures that you require are time-dependent so that they can portray restructuring in reports.

Hierarchy Components

A hierarchy gives an overview and the structure of a characteristic according to specific evaluation criteria.

Nodes

A hierarchy is made up of nodes. The relationship between the nodes is defined as follows:

- The uppermost node is the root.
- There can be several roots.
- Each node (except for the uppermost node) is assigned to one super-ordinate node.
- There is a distinction between postable and non-postable nodes.

Hierarchy Levels

All nodes that are on the same level in a hierarchy (nodes that are the same distance away from the root) form a hierarchy level. The root of a hierarchy forms the first level. The level of a node denotes the distance of the node from the root.

Leaves

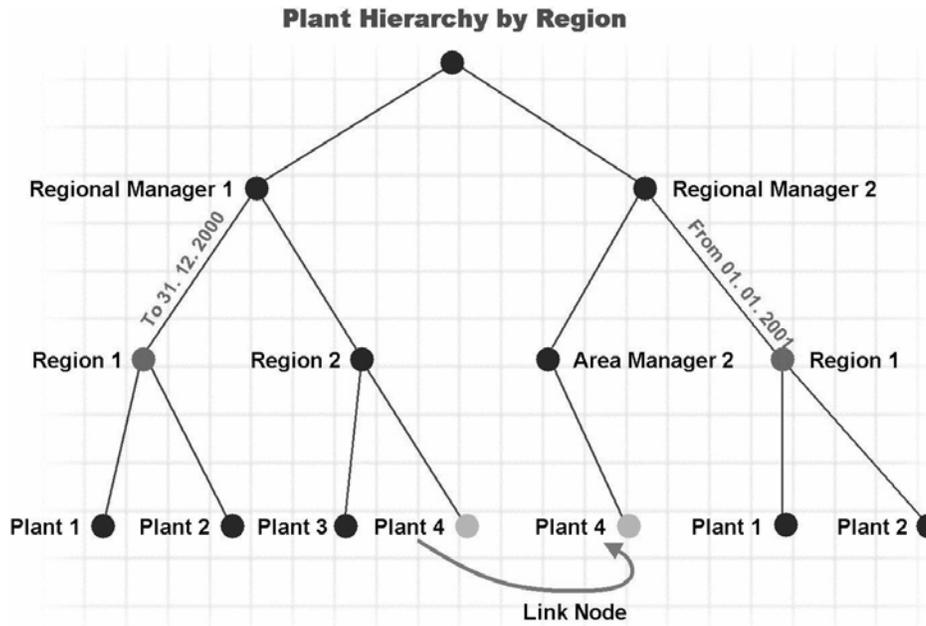
Hierarchy leaves contain the characteristic values for the basic characteristic and can therefore have entries in the fact table. In contrast to postable nodes, a leaf cannot have any subordinate nodes.

Intervals

Intervals contain a number of leaves that belong together, described by their upper and lower limits. You can create them for a node that has more than one leaf. By defining intervals, new characteristic values that are added to the master data automatically become assigned to the interval if the characteristic value is included in the interval range.

Basic Characteristic

You can create hierarchies only for those characteristics that do not relate to another characteristic.



Creating User-defined Hierarchies

As a prerequisite for creating hierarchies, in the InfoObject maintenance for the characteristic concerned, you have to set the *With Hierarchies* indicator, which states that the characteristic can have hierarchies. You also have to determine whether the hierarchy or hierarchy structure can be time-dependent, or whether versions can be created for it.

GR00 Customer Hierarchy by Region	Link Indicator	Valid From	Valid To
Customer Hierarchy by Region	<input type="checkbox"/>	01.01.2000	31.12.9999
Regional Manager 1	<input type="checkbox"/>	01.01.2000	31.12.9999
Greater London	<input type="checkbox"/>	01.01.2000	31.12.9999
Bavaria	<input type="checkbox"/>	01.01.2000	31.12.2000
Regional Manager 2	<input type="checkbox"/>	01.01.2000	31.12.9999
Area Manager	<input type="checkbox"/>	01.01.2000	31.12.9999
GM Store M313	<input checked="" type="checkbox"/>	01.01.2000	31.12.9999
GM Store M312	<input checked="" type="checkbox"/>	01.01.2000	31.12.9999
California	<input type="checkbox"/>	01.01.2000	31.12.9999
GM Store M313	<input type="checkbox"/>	01.01.2000	31.12.9999
GM Store M312	<input type="checkbox"/>	01.01.2000	31.12.9999
Regional Manager 3	<input type="checkbox"/>	01.01.2000	31.12.9999
Bavaria	<input type="checkbox"/>	01.01.2001	31.12.9999

Creating User-defined Hierarchies 2

Hierarchy nodes appear twice in the hierarchy when nodes that have the same technical key and that appear more than once are leaves (postable nodes without lower-level nodes), and when they are not attached to the same super-ordinate node.

You can then either set the nodes as **link nodes** or make the **hierarchy structure time-dependent** and specify that the time intervals of all duplicate nodes with the same technical key do not overlap.

Link Nodes

You use link nodes to include a sub-tree in a hierarchy more than once. The name, the InfoObject and, if necessary, the from/to date fields of the nodes are identical. However, the link node is only a link to the original node that you cannot change independently. Link nodes cannot have their own lower-level nodes. They take on the lower-level nodes of the original node. These lower-level nodes do not display in the hierarchy maintenance.

Creating User-defined Hierarchies

1. Call the *Administrator Workbench* and, under *Modeling*, choose the *InfoObject* tree.
2. Highlight the characteristic for which you want to create a hierarchy and, from the context menu, choose *Create Hierarchy*.
3. In the dialog box, enter the technical name of the hierarchy, the hierarchy version (if necessary), the time base, and at least a short description for the hierarchy. Once you have confirmed your entries, the *Maintain Hierarchy* screen appears.
4. To create nodes and leaves, choose the relevant pushbutton for the node that you want to create. You can choose from text nodes, characteristic nodes of external characteristics, leaves of the basic characteristic of the hierarchy, or intervals.

Postable nodes (characteristic nodes of the basic characteristic in the hierarchy, intervals) are symbolized by the green *InfoObject* icon. Non-postable nodes (text nodes, external characteristic nodes) are symbolized by the yellow *InfoObject* icon or by the file folder icon.

You can arrange the nodes as you wish beneath one another as far as interval level. You cannot attach any additional nodes under intervals.

5. Repeat this step until you have determined the final hierarchy structure.
6. Save and activate your hierarchy.

Reporting-relevant Settings in the Hierarchy Maintenance

You have various options for hierarchy settings in the hierarchy maintenance.

Level Maintenance

A level encompasses all nodes in a hierarchy that are at the same stage in the drilldown. You can use *Level Maintenance* to determine names for the different levels of a hierarchy. These names are then used in the context menu of the query during navigation.

Hierarchy Attributes

You can set the presentation parameters for the hierarchy display in the query using *Hierarchy Attributes*.

Level Maintenance | Hierarchy Attribute **1**

Do Not Display Leaves for Inner Nodes

Display Leaves for Inner Nodes

Material	Sales Volume in EUR	Material	Sales Volume in EUR
▽ T_COMPHIERKNOTEN_NO	1.697.115,88 EUR	▽ T_COMPHIERKNOTEN_YES	1.697.115,88 EUR
▽ T_PCS	1.697.115,88 EUR	▽ T_PCS	1.697.115,88 EUR
▽ R-1001	1.697.115,88 EUR	▽ R-1001	1.697.115,88 EUR
R-1111	396,30 EUR	R-1001	833.074,93 EUR
R-1140	846.837,15 EUR	R-1111	396,30 EUR
R-1180	16.807,50 EUR	R-1140	846.837,15 EUR
		R-1180	16.807,50 EUR

Showing/Hiding the Values of Posted Nodes

Do Not Display Inner Nodes in the Query

There are various display options for an inner, postable node, that is, an inner node that has subordinate postable nodes (lower-level nodes). You can either create a leaf for each inner node and insert it directly underneath the inner node, or choose not to display the additional nodes.

Changeable Display for Leaves of Inner Nodes

You can determine whether the user is able to change the display for the runtime of the query. The following values are possible:

' ': The display cannot be changed in the query.

'X': The display can be changed in the query.

Suppress Unassigned Node

Here you can specify whether to suppress the node under which all postable characteristic values that do not appear in the hierarchy display.

Root/Totals Item

You can determine whether the root and therefore, the totals item display at the end or start of the query and whether the leaves appear above or below.

Start Drilldown Level

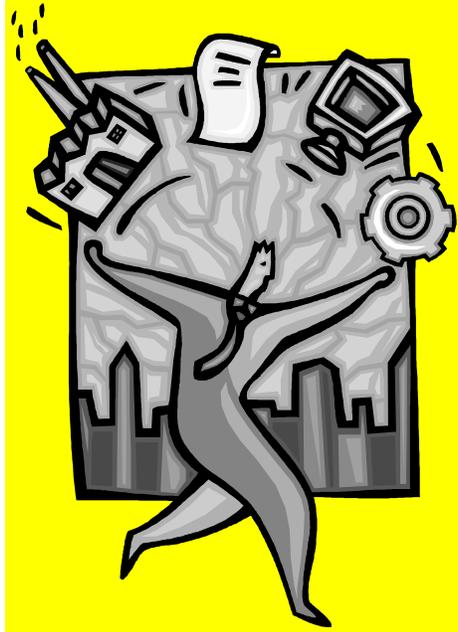
You can set the default level to which the hierarchy is drilled down when you first call up the query. You can overwrite this setting in the query definition.

Unit Summary

You should now be able to:

- Describe the various properties of characteristics and their use in adjusting reports to your requirements
- Demonstrate the benefit of using display attributes to describe characteristics in more detail
- Describe the difference between using display attributes and navigation attributes
- Display characteristics and key figures in a hierarchy
- Include external hierarchies in your reports
- Define how the hierarchy is displayed in the report
- Combine hierarchies and structures
- Restrict characteristics to hierarchy nodes
- Define your own hierarchies in BW
- Create time-dependent hierarchy structures
- Use link nodes in the hierarchy definition

Business Warehouse Reporting



Exercise 9

Unit 6 – Properties and Attributes of Characteristics

Task

Define a report that displays the sold-to parties, their materials, the relevant net value of stat.cur for the period January 2002 to June 2002

Display the location, region and telephone number for the sold-to parties as additional information. Make the necessary settings so that you can select data based on country and postal code later.

1. Create a new query based on the SAP *Demo Sales and Distribution overview Cube (0D_SD_C03)*

In the columns, include the basic key figure *Net Value Stat.Cur.*

In the rows, include the characteristics *Sold-to Party* and *Material*.

2. As additional information for the sold-to party, include the attributes location, region and telephone number in your report. For the region, define that only the name is to be displayed.

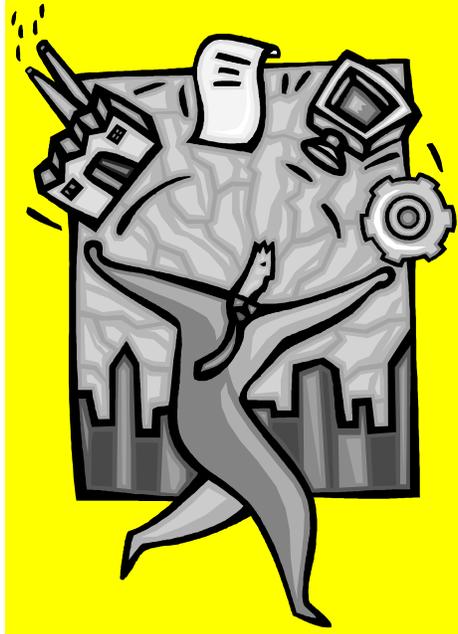
Alternate:

- a) You can also expand the folder for *sold-to party* and then expand the *attributes* folder. From here, you can drag&drop the attributes you want into the report. Note that you must place the attributes under the characteristic they belong to in the query definition.

3. Display only the name of the sold-to party. In order to structure the report clearly, specify that the results rows are not displayed for Cal. Year/Month (0CALMONTH)

4. Save the query and execute it.
Description: **GR##BW305Characteristics**
Technical name: **BW30510B##**

Business Warehouse Reporting



Exercise 10

Unit 6 – Integration of Hierarchies

Task 1

You want to display an overview of sales groups for the sales organizations in your report by a company code. To structure the report clearly, display the characteristics *Sales Organization* as a hierarchy.

1. Create a new query based on the SAP Demo Sales and Distribution overview Cube (OD_SD_C03) In the rows, include the characteristic Company Code (OD_CO_CODE) and characteristic *Sales Group* (OD_SALE_GRP)
2. Display the characteristics in the rows as a hierarchy.
3. Save the query:
Description: **GR##BW305Hierarchy1**
Technical name: **BW30511A##**.
4. Now execute the query.

Task 2

In another report, you want to display Sales Organization as a hierarchy. Include *open orders*, Create a new query based on the *SAP Demo Sales and Distribution overview Cube* (OD_SD_C03). Put the characteristic *Sales Organization* (OD_SALE_ORG) into the rows. Expand the hierarchy to 3 levels, position of lower nodes----down; display values of posted notes and hide nodes with only one lower level node.

Save the query.

Description: **GR##BW305Hierarchy2**

Technical name: **BW30511B##**.

Note that the hierarchy is expanded down three levels, as you specified in the properties of the hierarchy.

Unit 7 - Variables

Unit Overview

This lesson identifies the different types of variables and their various processing types. The lesson also describes how to create variables using the variable Wizard. Examples of variables that are delivered with Business Content are presented.

Unit Objectives

After completing this unit, you will be able to:

- Describe how variables can be used for defining more flexible reports
- Describe the different types of variables
- Create different types of variables using the Variable Wizard
- Use variables that are delivered with Business Content in your query definition

Lesson: The Variable Wizard

Lesson Overview

This lesson deals with the different types of variables and their various processing types.

It describes how to create variables using the Variable Wizard.

Lesson Objectives

After completing this lesson, you will be able to:

- Describe how variables can be used for defining more flexible reports
- Describe the different types of variables
- Create different types of variables using the Variable Wizard
- Use variables that are delivered with Business Content in your query definition

Business Example

You want to use flexible reports in your company with free selection of characteristic values. In order to do this, you have to define variables using the Variable Wizard. By including text variables that are filled using the replacement path, you receive detailed information in your reports.

Using Variables

Variables are query parameters that you define in the Query Designer and that are filled with values only when you execute the query or Web application.

Variables for Ad-hoc Report

Month 1 GR-00  June 2001

Month 2 GR-00  July 2001

How can I structure my reports more flexibly?
By using variables

Customer	Sales Vol. June 2001	Sales Vol. July 2001
Becker Berlin	860,448.38 EUR	878,698.33 EUR
Lampen Markt	160,268.83 EUR	98,443.41 EUR
Cristal Clear	680,492.53 EUR	770,000.75 EUR



Creating Queries with Variables

Variables act as placeholders for:

- Characteristic values
- Hierarchies
- Hierarchy node
- Texts
- Formula elements

Variables are **reusable objects**.

The variables defined in the Query Designer are available in all InfoProviders for use in query definition. Variables do not depend on the InfoProvider, but rather on the InfoObject for which they were created.

Variables enable you to set queries more flexibly (query parameterization). When using variables in the Query Designer, you do not choose fixed characteristic values, hierarchies, hierarchy nodes, texts, or formula elements, but rather you set variables as placeholders. These placeholders are then filled with values at query runtime (when you insert the query into a workbook, when you refresh a workbook or when you launch the query on the Web). If you use variables, a query definition can then serve as the basis for many different queries.

Processing Type:	Variable Type:				
	Characteristic Value Variables	Hierarchy Node Variables	Text Variables	Formula Variables	Hierarchy Variables
Manual Entry / Default Value	X	X	X	X	X
Replacement Path	(X)*		X	X	
Customer Exit	X	X	X	X	X
SAP Exit	X	X	X	X	X
Authorization	X	X			

* Only in conjunction with the replacement path 'Query Result'

Processing Types for the Different Types of Variables

There are different variable types, depending on the object (for example, characteristic, formula) for which the variable is defined as a placeholder.

Characteristic Value Variables

When selecting characteristic values in the query definition, you can select variables instead of fixed values. These variables, which act as placeholders, are filled with values when you execute the query. You can use variables to select single values and value ranges.

Selection for Cal. Year/Month

Selection: Value Range, Between

Fixed Values: Description

- Month 1 GR-00
- Month 2 GR-00
- Curr. Fiscal Year
- Curr. Quarter
- Curr. Month

Selection: Month 1; Month 2

Variables for Ad-hoc Report

Month 1 GR-00: 6.2001

Month 2 GR-00: 7.2001

Execute, Check

Customer	Sales Vol. June 2001 to July 2001
Becker Berlin	860,448.38 EUR
Lampen Markt	160,268.83 EUR
Cristal Clear	680,492.53 EUR

Characteristic Value Variables

1. Selecting Single Value Variables

From the context menu of the characteristic, choose *Restrict*. The dialog box for selecting characteristic values appears.

Select the *Variables* tab page and transfer the required variables using Drag&Drop or the *Arrow* button.

2. Selecting Single Value Variables as Variable Value Range Limits

In the dialog box for selecting characteristic values, in the *Selection* field, choose *Value Range* and set the required operator (Between, Less than, Greater than, ...). Select the *Variables* tab page. When using the *Between* operator, you can restrict both limits using single value variables or choose a single value variable for one of the interval limits and transfer a fixed value for the other interval limit on the *Fixed Values* tab page.

When using the operators *Greater than or equal to*, *Less than or equal to*, *Greater than*, or *Less than* from the list of available variables in the left window, highlight a variable and move this using Drag&Drop or the *Arrow* button into the right *Selection* window.

Hint: Swapping Interval Limits

If you are using variables when making interval selections, you can swap the limits by highlighting the relevant variable in the right *Selection* window, and choosing *Swap Interval Limits* from the context menu.

3. Selecting Variables with Several Single Values or Value Ranges Depending on how they have been defined, you can not only select single values for variables, but also several single values, intervals, or selection options. Under *Single Values*, select the relevant variable from the variables window and specify the values or interval limits when you execute the query.

Text Variables

Text variables represent a text. You can use text variables in query descriptions, calculated key figures, and structural components.

To include an existing text variable, choose the 'Select Text Variable' icon

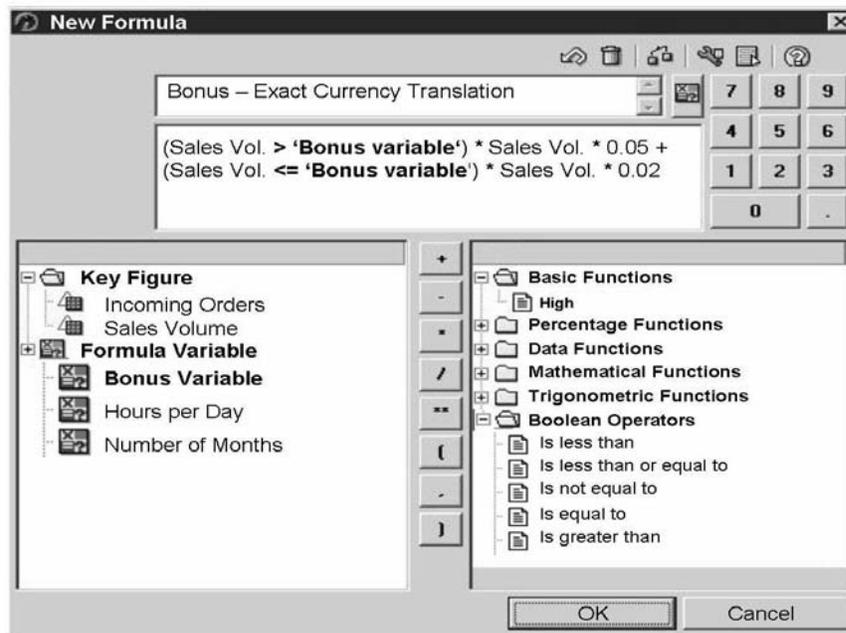


and search for the required text variable in the list of existing text variables. This appears with its technical name, enclosed by ampersands (&), in the description.

Formula Variables

Formula variables represent numerical values. You can use formula variables in formulas.

Numerical values are also used for calculating exceptions and conditions. You can also use formula variables here.



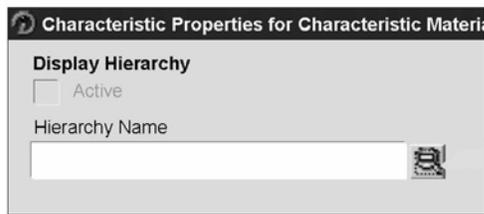
Variables for Formulas

Example:

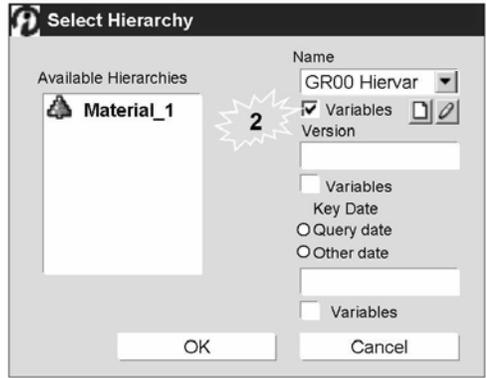
To calculate bonuses, use a formula variable with the currency unit to process the current threshold value for bonus calculation when you execute the query.

Hierarchy Variables

Hierarchy variables represent hierarchies. You can use them wherever hierarchies can be selected.



1. Using the value selection in the dialog box: Select hierarchy



Hierarchy Variables

To select a hierarchy as a variable, in the *Select Hierarchy* dialog box, set the flag for variables. (To reach the *Select Hierarchy* dialog box, from the context menu of the characteristic, select *Properties* and then the *Value Selection* icon .)

You then have the option in the *Name* field of selecting the required variable from the existing hierarchy variables.

Note that the *Version* and *Key Date* are only input-enabled if the characteristic can contain version or time-dependent hierarchies.

Hierarchy Node Variables

Hierarchy node variables represent a node in a hierarchy. You can use them as an alternative to hierarchy nodes as fixed values for restricting a characteristic. If you use a hierarchy node variable, you can make selections by hierarchy node when you use the query.

There are two possible combinations of hierarchies and nodes:

Variable hierarchy node with a fixed hierarchy

For example, a report about any department (variable hierarchy node) for the hierarchy valid for 2002 (fixed hierarchy).

1. To restrict a characteristic to a variable hierarchy node, use the context menu of the characteristic to call the dialog box for restricting characteristic values.
2. In the *Single Values* selection field and the *From Hierarchy* field, select the required hierarchy.

3. On the *Variables* tab page, from the list of variables in the left window, select the required variable. Use Drag&Drop (or the arrow pointing to the right) to move these into the right *Selection* window.

Variable hierarchy node with a variable hierarchy

For example, a report about any department (variable hierarchy node) for the hierarchy valid for the current calendar year (variable hierarchy).

1. To restrict a characteristic with a variable hierarchy to a variable hierarchy node, use the context menu of the characteristic to call the dialog box for restricting characteristic values.

In the *Single Values* selection field and the *From Hierarchy* field, select a hierarchy that contains the required hierarchy node.

2. On the *Variables* tab page, from the list of variables in the left window, select the required hierarchy node variable and transfer this into the *Selection* field.

Highlight the hierarchy node variable in the right window, and from the context menu for hierarchy node variables, choose *Select Variable Hierarchy*.

3. The *Selecting Variables for Hierarchies* dialog box appears. You can select a variable for hierarchy selection here.

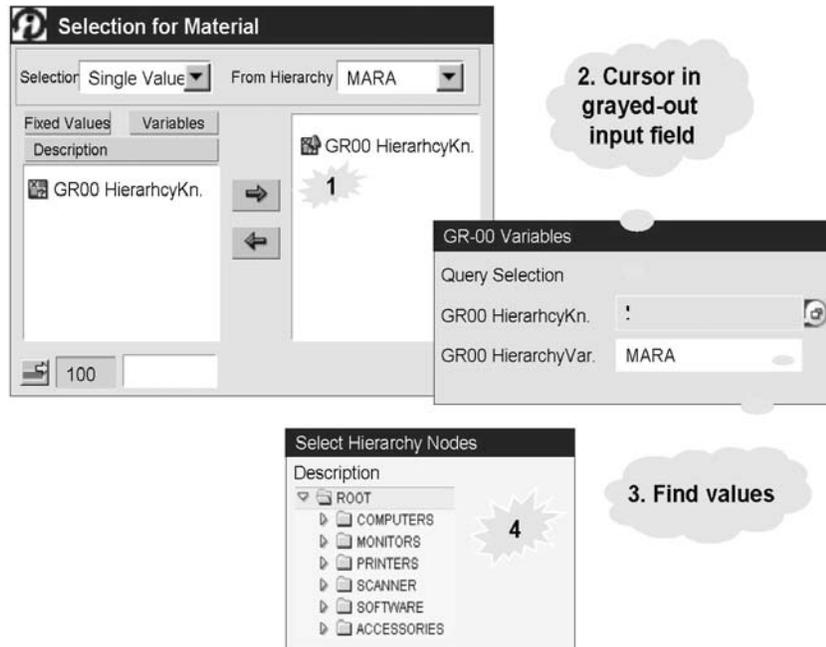


Figure 70: Variables for Hierarchy Nodes



To be able to enter a value for the hierarchy node variable at runtime, set the cursor on the greyed-out input field and, using input help or the corresponding icon, select the required hierarchy node.

If you are using a hierarchy variable at the same time, you first have to select the hierarchy.

Variable Processing Types

The following processing types are available:

- *User Entry/Default Value*
- *Replacement Path*
- *Authorization*
- *Customer Exit*
- *SAP Exit*

User Entry / Default Value

If you choose *User Entry/Default Value* as the processing type for a variable, you can manually enter the required value for the variable in a dialog box when you execute the query.

You enter a default value when you create the variable. This default value is then displayed for input-enabled variables in the input field of the variable screen. For fields that are not input-enabled, the default value is used as the variable value.

Replacement Path

The processing type *Replacement Path* enables you to specify the value that automatically replaces the variable when the query or Web application is executed.

For example, when you enter a variable as a characteristic value, you do not need to determine the text for the characteristic value straight away, but can let it be filled dynamically to match the characteristic that is used when the query is executed for the variable.

1. Text variables and formula variables with the replacement path processing type are replaced by the corresponding characteristic value. The Variable Wizard automatically takes you through the *Characteristic* dialog step. This is where you select the reference for the replacement value.
2. Characteristic value variables with the replacement path processing type are replaced by a query result.

In the *Replacement Path* dialog box, you select the query containing the results that you want to use as a variable. You can now use the data result of the selected query as a variable in a different query.

Authorization

The *Authorization* processing type enables you to fill the variables automatically with the values from the authorization of a user.

If you choose the *Authorization* processing type when you create a variable, the variable fills automatically with the values in the user's authorization.

When the user opens a query, the data selection is automatically carried out according to his or her authorizations.

Customer exit

If necessary, you have the option of using a customer exit to set up a processing type for variables that is tailored specifically to your needs.

The *Customer Exit* processing type for variables enables you to determine values for variables by means of a function module exit. The function module used is **EXIT_SAPLRRS0_001**.

You create a project in transaction *CMOD* by selecting the SAP enhancement *RSR00001* and assigning this to the enhancement project. Activate the project.

For more information about working with the SAP enhancement for global variables in reporting, see the SAP enhancement help. Call the transaction *SMOD*. Enter the name of the enhancement (*RSR00001*), choose *Documentation* and then *Edit/Display/Change*. For general information about working with *Customer Exits*, see

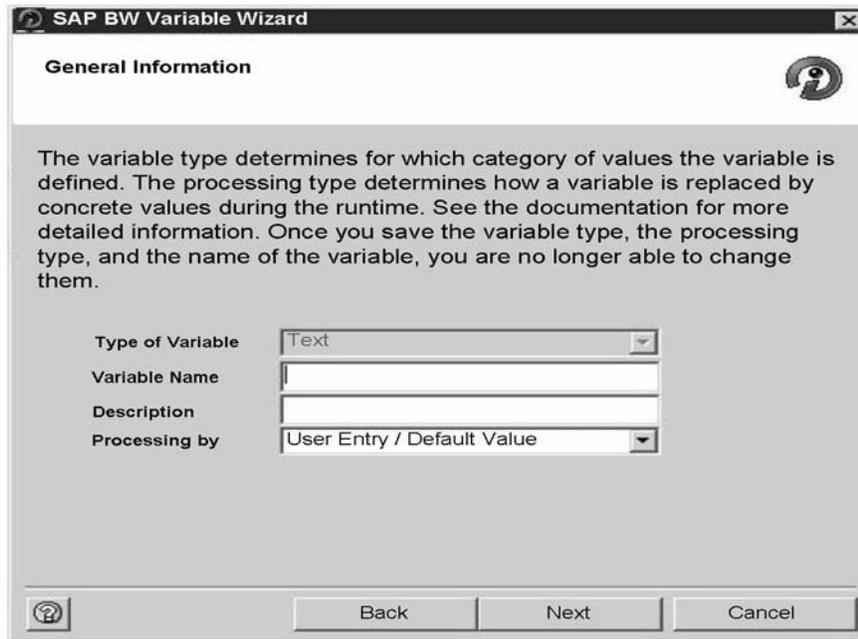
the *Application Help* in transaction *CMOD*.

SAP Exit

The SAP exit processing type is contained in variables that are delivered with SAP BW Business Content.

Overview of the Variable Types and Processing Types

Variable Type/Processing Type	User Entry / Default Value	Replacement Path	Customer Exit	Authorization
Characteristic Variable	x	x	x	x
Text Variable	x	x	x	
Hierarchy Variable	x		x	
Hierarchy Node Variable	x		x	x
Formula Variable	x	x	x	



Variable Wizard: General Information

Introduction

The Variable Wizard takes you through a step-by-step process for defining a new variable.

The first dialog step in the Variable Wizard explains that instead of defining fixed values for your query, you can define variables as placeholders that are then filled with values at runtime. If you do not want to display this step in the future, put a check in the *Do not display this step in future* box.

General Information

The type of variable is shown in the second dialog step. You determine the variable type by calling up the Variable Wizard in a specific context.

Context-Sensitive Entries

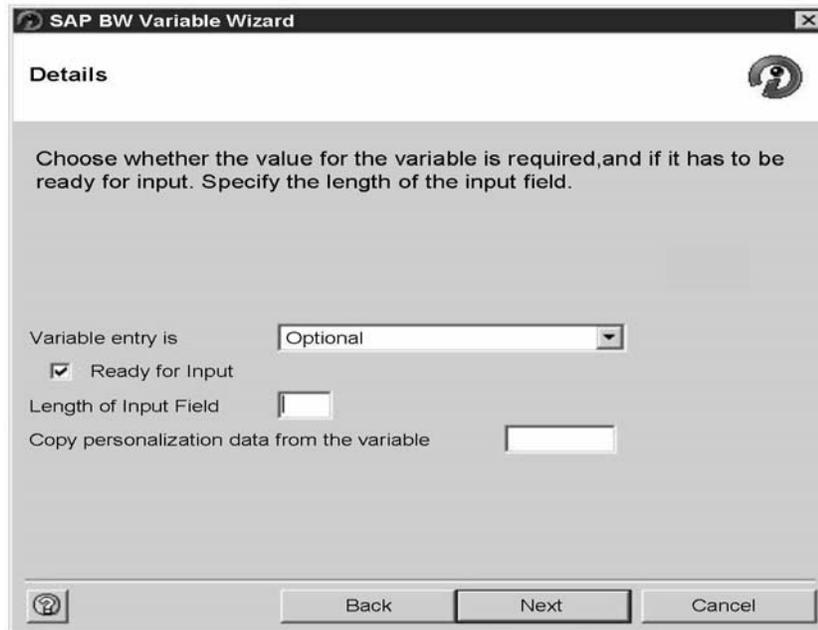
The following appear differently, according to context:

- Details
- Default Values
- Replacement Path
- Characteristic
- Currencies and Units

Details

Details is a dialog step in the Variable Wizard in which all types of variables appear except for variables with the replacement path processing type.

The Variable Wizard automatically offers you only those options that are possible and useful.



Variable Wizard: Details

1. Under *Variable Represents*, select the display area that the variable is to represent. You can choose from:
 - *Single Value*
The variable represents one value only.
 - *Multiple Single Values*
The variable represents a range of single values.

You can use this setting with hierarchy nodes, for example, to enable the user to enter several single nodes.
 - *Interval*
The variable represents a from-value and a to-value.
 - *Selection Option* The variable represents a combination of single values and intervals of your choice.
 - *Precalculated Value Set*
The variable represents a number of values that are stored in a database table by the Reporting Agent.
2. Under *Variable Entry is*, specify whether the variable input is *Optional*, *Mandatory*, or *Mandatory, Initial Value not Allowed*.

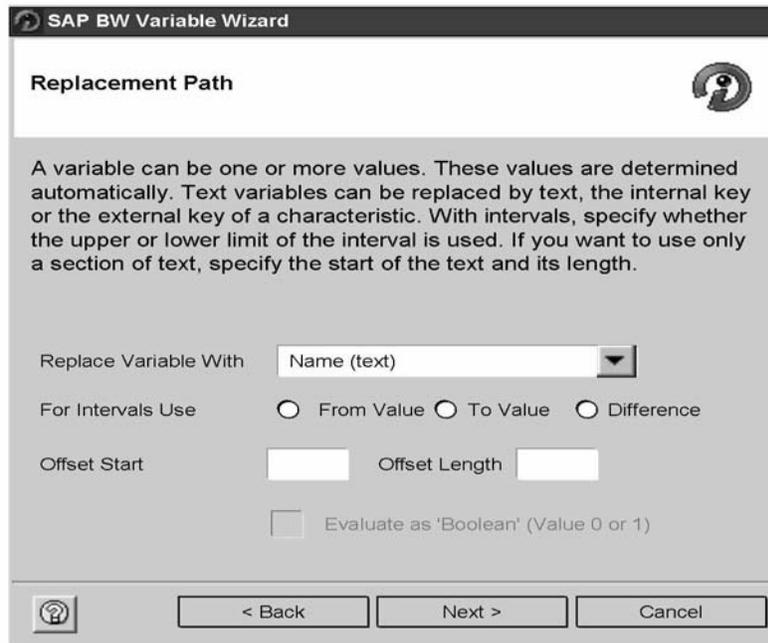
3. Under *Ready for input* you can determine whether the variable is input-enabled when the query or Web application is executed. If the ready-for-input option is active (= default setting), the variables screen is offered when you execute the query or Web application. You can then enter the required values, confirm the default values, or change the default values.
4. The option *Can be changed in query navigation* enables you not only to select from values that you entered in the variables screen after you have executed the query, but also use other values as dynamic filters in the query.
5. *Copy personalization data from variable*: You can personalize variable values for input-enabled variables for each user. These personal values are saved for each variable and each user.

Default Values

When you define a variable, you enter one or more default values. These then appear in the variables screen when you execute the query or Web application.

Replacement Path

A dialog step of the Variable Wizard that appears for characteristic value variables, formula variables, and text variables with the replacement path processing type.



Variable Wizard: Replacement Path

There are different options for the replacement path, according to the type of variable used:

Text variables and formula variables with the *Replacement Path* processing type are replaced by the corresponding characteristic value. The value for a formula variable has to be a number. The value for a text variable has to be a text.

1. Under *Replace Variable With*, you have the following options:

Key

- *External Characteristic Value of the Key*
 - *Name (Text) Attribute Value Hierarchy Attribute*
2. Using the setting *With Interval Take*, you determine whether the *From-Value*, the *To-Value*, or the *Difference* is used as the value when the value to be replaced is an interval.
 3. The setting *Offset Start and Offset Length* enables you to determine the start and the length of the text output. For example, if the only the first 10 characters of the text are to be used, the *Offset Start* value would be 0 and the *Offset Length* value would be 10.

4. The *Evaluate as Boolean* function (value 0 or 1)

This function is only available for formula variables.

If you select this setting, the formula variable is not replaced by a value (for example, key value), but rather it specifies whether a non-zero or non-blank value exists.

- The value of the variable is 0 if the value to be replaced is a string with only blank characters or a zero.
- The value of the variable is 1 if the value to be replaced is a string with characters that are not blank or a number that is not zero.
- **Characteristic value variables with the *Replacement Path* processing type** are replaced by a query result.

You can now use the data result of the selected query in a different query using the variable.

Example: You want to insert the result of the query *Top 5 Products* into another query *Sales Volume - Calendar Year/Month* variably.

1. Highlight the characteristic, for example, *Product*, and from the context menu, choose *New Variable*. The Variable Wizard appears.
2. Enter a name and a description for the variable and choose the *Replacement Path* processing type.
3. You reach the *Replacement Path* dialog step. Enter the name of the query (for example, **Top 5 Products**)
4. You reach the *Save Variable* dialog step.
5. You can now insert the variable into the query (*Sales Volume - Calendar Year/Month*) to determine how the sales volume of the 5 products with the highest sales volumes has developed on a month-by-month basis.

Each time that the query *Sales Volume - Calendar Year/Month* is executed, the pre-query (*Top 5 Products*) is executed beforehand. This can lead to long runtimes. If you do not absolutely need to execute a pre-query (for example, you do not have to calculate the top 5 products every time since these change only monthly), SAP recommends that you use a variable that represents a precalculated value set.

Characteristic

A dialog step of the Variable Wizard that appears for text and formula variables with the *Replacement Path* processing type.

In text and formula variables with the *Replacement Path* processing type, the characteristic reference is not clear in the system. Therefore, select the characteristic to which the variable refers.

Currencies and Units

A dialog step of the Variable Wizard for formula variables. You can select from the following dimensions:

Amount

Quantity

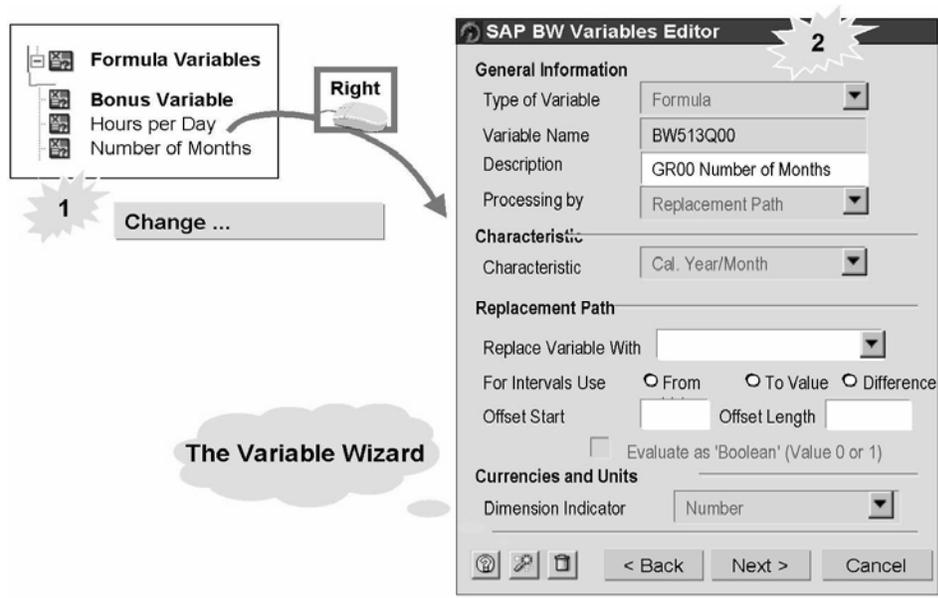
Price (= currency/unit) Number (= default setting) Date

Saving Variables

In the final dialog step, you get an overview of the settings you have made for the variable. Choose *Finish*. The variable is saved and the Variable Wizard closes.

Changing Variables in the Variable Editor

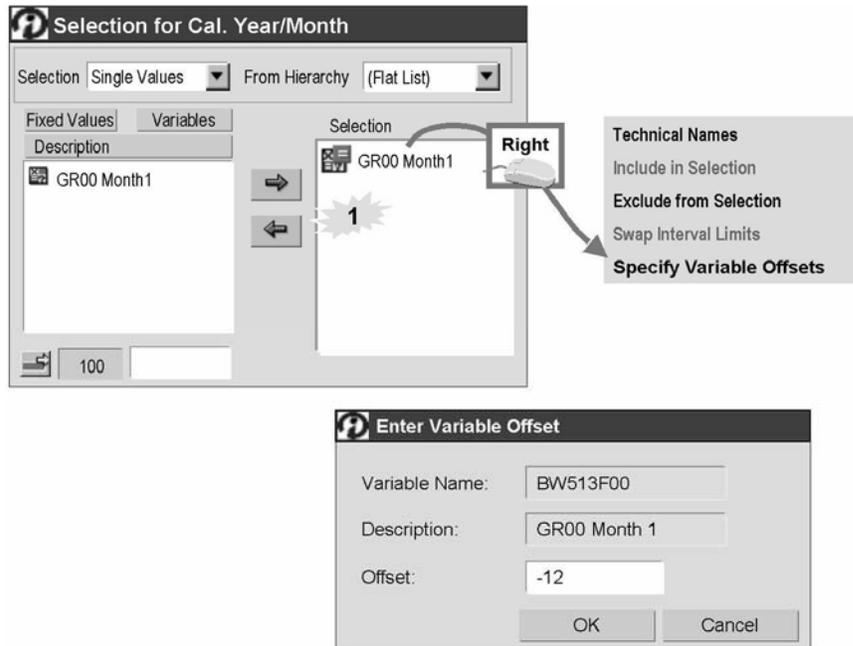
The Variable Editor uses a dialog box to give all of the selection options available for changing an existing variable.



Variable Editor

The individual fields of the dialog box reflect the dialog steps in the Variable Wizard and show the current settings of the variable. The dialog box is context sensitive, which means that only the fields and options that are relevant for the variable display, depending on the type of variable and the processing type.

If you would rather make your changes using a step-by-step processes with explanatory text, you can go to the Variable Wizard.



Using the Variable Offset

To analyze key figures that have a fixed time- relationship to one another, you can use the variable offset. For example, you want to compare the sales volume from the current time period with that of the same time period in the previous year. In your report definition, you can use the same variable several times to restrict the key figures and determine a difference from the input value.

You can also use the variable offset to select an interval as a restriction with upper and lower limits that refer to the same variable.

1. To do this, in the upper-left *Selection* field, choose *Value Range* and *Between* as the operator.
2. On the *Variables* tab page, select the required variable and move this using Drag&Drop (or using the arrow key pointing to the right) into the right selection window.
3. Now specify variable offsets for the upper and lower limits.

Selecting Variable Offsets

This function is only available for characteristic value variables of the type single value or interval.

1. Select the relevant variable from the right *Selection* window.
2. Using the right mouse button, call the context menu and choose *Specify Variable Offsets*.

3. In the *Variable Offset* dialog box, enter the required variable offset. When using value ranges, specify the variable offset for the upper and lower limits.

Content Variables

Business Content variables are delivered for all types of variables. You have to activate the variables delivered before you can use them.

Variables that are delivered with **Business Content** from *SAP BW* often have the SAP exit processing type. This enables you to create complex queries quickly and easily.

For time characteristics, a range of variables are delivered that replace frequently-used time periods or specific times, for example, the current month or the comparable month of the previous year.

Additional Objects

Specify Additional Data:		
Object Type:	Name	Technical Name
Variables	Current calendar month	OCMONTH
	Current month from previous year	OCMCMLY
	Last 12 months excluding the current month	OCML12LM
	Last 12 months including the current month	OCML12CM
	Last month	OCMLMON
	Current quarter from previous year	OCMAQULY
	Current quarter	OCMCQUAR
	Last month posted (current year)	OCYMONTH
	Cal. year/month (single value, mandatory entry)	OPCALMON
	Text variable for month	OT_CMONT
	Cal. year/month time period 1	OI_CALZ1

Content Variables for *Cal. Year/Month (OCALMONTH)*.

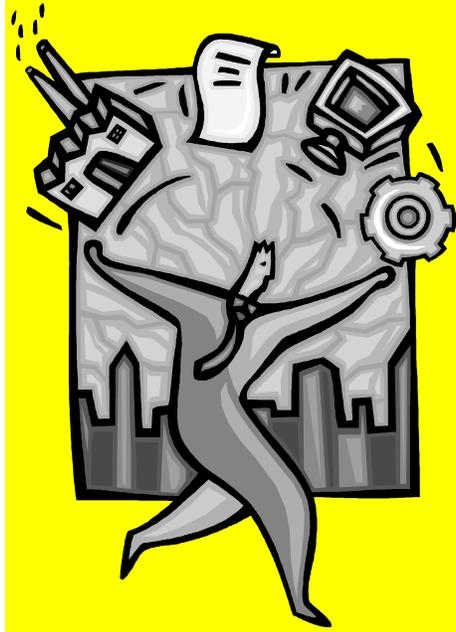
In the Metadata Repository, you find the variables that were created for the InfoObjects used. You also find information about whether the variable in question is actively available in the system.

Unit Summary

You should now be able to:

- Describe how variables can be used for defining more flexible reports
- Describe the different types of variables
- Create different types of variables using the Variable Wizard
- Use variables that are delivered with Business Content in your query definition

Business Warehouse Reporting



Exercise 11

Unit 7 – Variables

Task 1

In order to structure your reports flexibly, you want to use variables instead of fixed values to restrict your key figures. You want to list the *Net Value Stat.Cur* for each of your materials for a particular month and for a time interval. You want to display the chosen time or time period in the column header of the sales volumes.

1. Create a new query based on the *OD_SD_C03*

Place the characteristic *Material (OD_MATERIAL)* into the rows.

Include the basic key figure *Net Value Stat.Cur* in the columns, restricted to the characteristic *Cal. Year/Month (OCALMONTH)*. Restrict *Cal. Year/month* using a variable that you define with the help of the variable wizard. Specify that a single month has to be entered at runtime.

Use the following description for the variable:

Variable name: **BW305F##**

Description: **GR##Month1**

2. Define a new text variable that you include in the description of the key figure so that you can list the month, to which the *Net Value Stat.Cur* is restricted at runtime, as a text (for example, *Net Value Stat.Cur September 2002*). Ensure that the text variable relates to the from-value of the characteristic variable.

Use the following description for the text variable:

Variable name: **BW305G##**

Description: **GR##TextVar.Month(from)**

3. Drag the *Net Value Stat.Cur* key figure into the columns again and restrict this using a variable so that the user has to select a month interval at runtime to which the *Net Value Stat.Cur* is restricted. Use the following description for the variable:

Variable technical name: **BW305K##**

Description: **GR##MonthInterval**

4. In order to specify the selected interval in the column header, you need a to-value text variable in addition to the from-value text variable. Create the to-value text variable and use both variables in the key figure description.

Enter the following as the text variable description:

Variable name: **BW305L##**

Description: **GR##TextVar.Month(to)**

5. Save the query Description: **GR##BW305Variables1**.
Technical name: **BW30513M##**.
Execute the query.
Keep the query open for the next task.

Task 2

You now want to display the sales organization as a hierarchy in your report and select the hierarchy at runtime.

By using a hierarchy node variable, you can select individual hierarchy nodes flexibly.

1. In the query definition of **GR## BW305 Variables1**, restrict the sales organization to a hierarchy node variable, which you create as new. Define the hierarchy node variable to allow the entry of multiple single values and to also allow changes to be made during query navigation.

Enter the following description:

Description: **GR## Hierarchy Node Var.**

Technical name: **BW305N##**

Once you have created the hierarchy node variables, stay in the selection dialog box for sales organization to define the hierarchy variable in the second step.

1. Open the global query definition for *GR## BW305 Variables1 (BW30512M##)*. From the context menu for *sales organization* choose *Restrict* → *Variables* tab page. You see the characteristic value variables in the selection list. You have to select a hierarchy in order to switch to the hierarchy node variables. Select a hierarchy, for example *PM sales organization*: Choose *From Hierarchy*. From the context menu in the left selection window, choose *New Variable*.
2. You also want to be able to select the hierarchy flexibly at runtime. To do this, define a hierarchy variable and include this in the query.
Description: *GR## Hierarchy Var.* Technical name: **BW305P##a**) In the *Selection for Sales organization* dialog box, transfer your hierarchy node variable into the selection window using Drag&Drop, call the context menu for the hierarchy node variables that you transferred and choose *Select Variable Hierarchy*. Set the flag for variables and choose *New Variable*.
3. Save the query and then execute it. Select a hierarchy and two hierarchy nodes. Set another hierarchy node in the query as a filter for the material.
4. Which hierarchy nodes can you select?
5. Which hierarchy nodes would you be able to select if you had created the hierarchy node variable so that the variable cannot be changed during navigation?

Task 3

You want to display the Net Value Stat.Cur of your customers for a time period that is selected by the user. You also want to display the number of selected months in the interval and the average Net Value Stat.Cur per month.

1. Create a new query based on the *0D_SD_C03*

Transfer the characteristic *Sold-to Party* into the rows.

Include the basic key figure *Net Value Stat.Cur* in the columns, restricted to the characteristic *Cal. Year/Month (OCALMONTH)*. Restrict *Cal. Year/Month* by the characteristic variable that you created (*GR## Month Interval (BW305K##)*).

In order to list the number of months in the interval in the report, define a new formula variable as a new calculated key figure on query level with the following description:

Variable name: **BW305Q##**

Description: **GR## Number of Months**

This uses the replacement path to calculate the difference between the interval limits of the variable **GR## Month Interval (BW305K##)** for Cal. Year/Month.

2. Use the formula variable **GR## Number of Months** to create a new formula that calculates the average Net Value Stat.Cur per month in the selected time period. Save the query Description: **GR##BW305Variables2**.
Technical name: **BW30513R##**.
Now execute the query.

Unit 8 - Query Properties

Unit Overview

This unit deals with the display of reports, and query definition and documents for meta, master, and InfoProvider data in the backend and frontend. The Unit also deals with where queries are used, and with deleting queries and copying queries between InfoCubes.

Unit Objectives

- After completing this unit, you will be able to:
- Show and describe the various settings possible in a query definition
- Influence the structure of and access to reports in a query definition
- Display the workbooks or views in which a query definition is stored
- Explain how to delete query objects
- Explain how to copy queries between InfoCubes
- Describe the different document classes for metadata, master data, and transaction data
- Define documents for these document classes

Lesson: Query Properties

Lesson Overview

This lesson deals with the options that a user has in a query definition for influencing the presentation of reports.

Lesson Objectives

After completing this lesson, you will be able to:

- Show and describe the various settings possible in a query definition
- Influence the structure of and access to reports in a query definition
- Display the workbooks or views in which a query definition is stored
- Explain how to delete query objects
- Explain how to copy queries between InfoCubes

Business Example

You have been given the task in your company of creating queries with certain default settings that will form the basis for future reports. Therefore, you not only have to structure the reports clearly, but also consider access to additional documents for individual objects in order to create a real picture.

Query Properties

You can define default properties in the query definition. To reach the properties dialog box provided for this, go to the toolbar in the BEx Query Designer and choose the *Query Properties* symbol.

The following section gives a few examples of the available features .

Features

In the *Query Properties* dialog box, the modification options are divided into the areas *General*, *Display*, *Specific* and the *Documents* button with which you can jump to document definition.



Query Properties: General

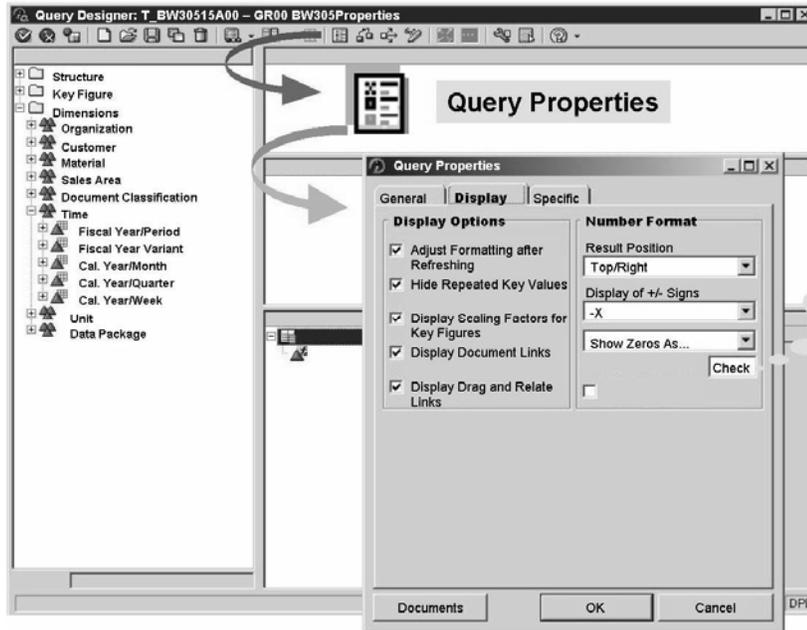
General

This tab page gives information about the technical name of the query definition, the InfoProvider used as the basis, the owner, and the person who last changed the query.

You can change the description of the query definition here and give it text variables (in order to keep the variable restriction in the description at runtime, for example).

A key date, which can be required by time-dependent characteristics, attributes, and hierarchies and their nodes for the report display, can be fixed or defined with a variable request at runtime.

You can change the sequence of entry variables to ensure a logical order for the user.



Query Properties: Display

Display

This tab page is divided into **two** areas: One is for the display options and the other for the number format.

The display options include the following:

- *Adjust Formatting after Refreshing*

The query format is used to identify the type of data contained in the cell and therefore emphasize the structure of the results. The *Refresh formatting after Refreshing* function ensures that the format is adapted to the updated query data when the query is refreshed. This function activates by default. If you want to deactivate this function (this helps to improve performance when calling a report), or use your own format templates, remove the check from the box.

- *Suppress Repeated Key Values*

This function also activates by default, which means that when the query is executed only the first key or description displays for each characteristic and any additional identical keys or descriptions are suppressed.

- *Display Scaling Factors for Key Figures*

This function enables you to include any scaling factors defined in the row or column header (for example, *100 EUR).

- *Display Document Links*

If you activate this function, you have access to document links using the extra symbol that displays in the relevant object within the report. As a prerequisite, a document has to already exist for an object in the Administrator Workbench. The information displays in a separate browser window.

- *Display Drag and Relate Links*

The Drag&Relate function enables you to execute transactions from an SAP R/3 system or an external system from within the Enterprise Portal. Field information is used to display additional data in a source system (for example, from CRM or the HR area). You have to save a BEx Web application as a iView in a role and also integrate it into a role in the Enterprise Portal in order to use Drag&Relate with it. If you activate this function in the *Query Properties* on the *Display* tab page, an additional symbol displays for the characteristics in your report. You can then drag this symbol, for example for sold-to party, by holding down the left mouse button, from the iView into an R/3 transaction (for example, to the iPanel). The relevant R/3 system transaction is called with the required information for this characteristic.

The number format area includes the following:

- *Results Position*

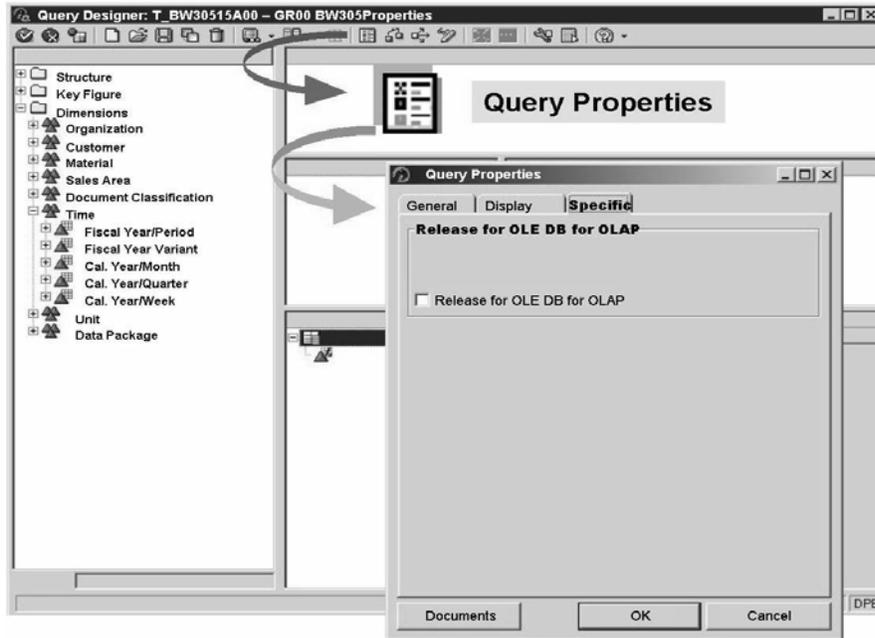
You use this function to define the position in which the results area displays: *Bottom/Right*, *Top/Left*, *Bottom/Left*, or *Top/Right*.

- *Display of +/- Signs*

This is where you determine how negative values display: With the minus sign before the value *-<number>* after the value *<number>-*, or with the value in parentheses (*<number>*).

- *Display or Suppression of Zero Rows and Columns.*

You have the following options with regard to the display of zero values: *Display Zeros*, *Zeros Without Currency/Unit*, *Suppress Zeros* or *Show Zeros as*. With the option *Show Zeros as*, you can enter your own value or text that displays in place of zeros. Alternatively, you can suppress zero rows and columns altogether.

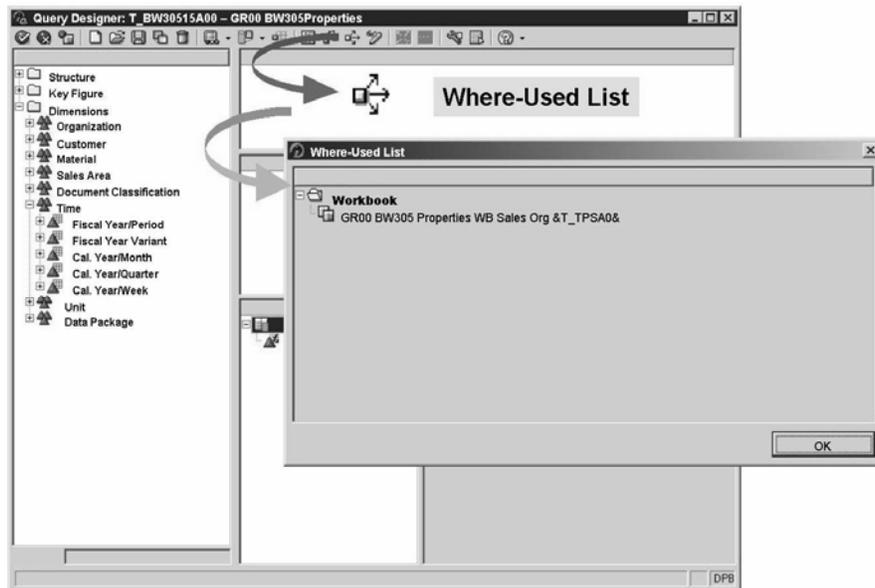


Query Properties: Specific

You can release the query results to the OLE DB for OLAP interface here by setting the flag, if you want to evaluate data from the Business Information Warehouse using third-party tools. All characteristics and key figures in the query are then transferred since the release of this interface offers a normalized method for accessing BW data using a relevant front-end presentation tool.

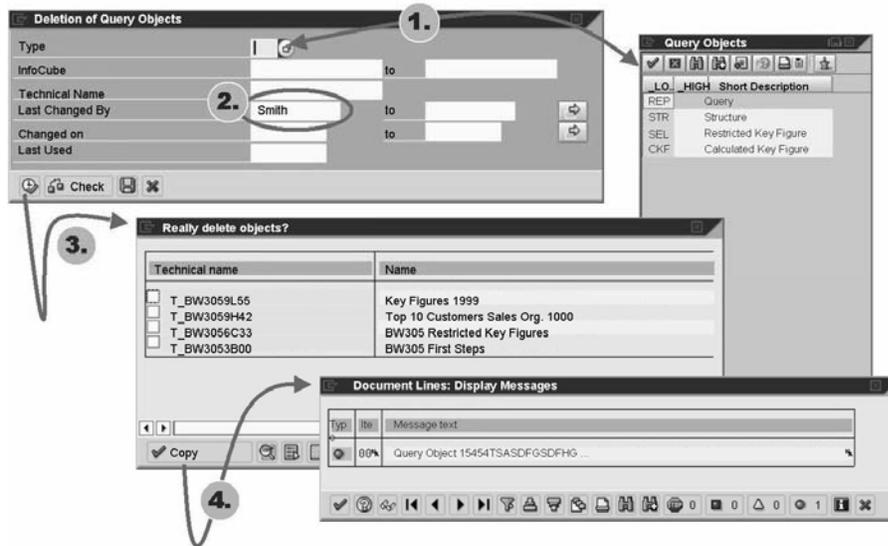
Documents button

Use this button to jump to the *Documents Query Element...* dialog box, from where you can display an existing document, or create or import a new document (from Microsoft Word, Microsoft Excel, and so on). You can find these documents in the metadata repository of the Administrator Workbench. They display there provided that they were created with an editor and marked as being online documentation.



Query Where-Used List

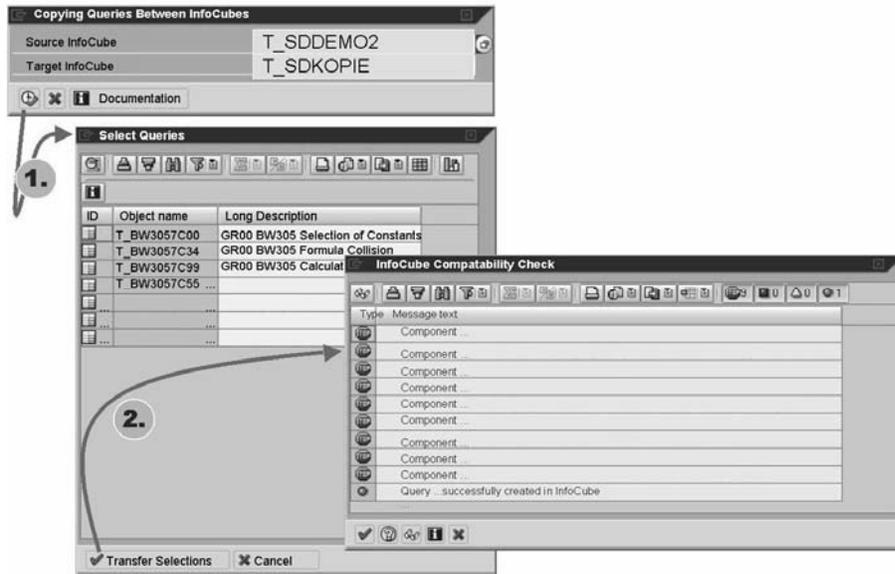
You have the option in the *Query Designer* of displaying a where-used list for the query definition in workbooks and views. To do this, choose the *Query Where-Used List* symbol from the Query Designer toolbar.



Deleting Query Objects

By choosing *Delete* , you can remove the query definition from SAP BEx, the BEx Query Designer, and also from the *SAP* menu, which has additional selection functions, using the path *Business Explorer* → *Query* → *Delete Objects*.

Caution: In order to delete a query object, there must be at least one query, structure, restricted key figure, or calculated key figure.



Copying Queries Between InfoCubes

In the *SAP* menu under *Business Explorer*, you find a *Copy* function that enables you to copy queries and their subobjects (structures, calculated key figures, restricted key figures) between different InfoCubes.

Caution: The target InfoCube must contain all of the InfoObjects in the source InfoCube.

Lesson: Document Integration

Lesson Overview

This lesson deals with defining documents for metadata, master data and InfoProvider data.

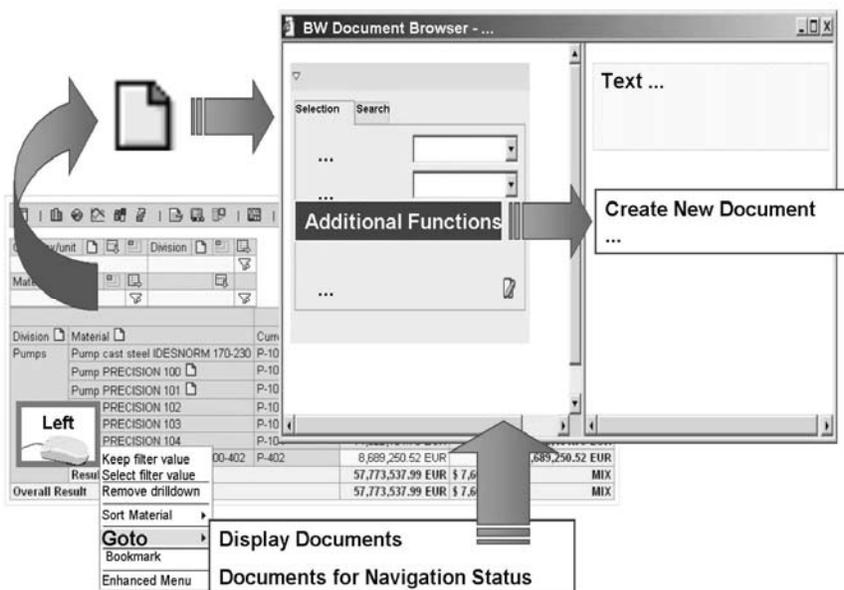
Lesson Objectives

After completing this lesson, you will be able to:

- Describe the different document classes for metadata, master data, and transaction data
- Define documents for these document classes

Business Example

In view of the meaningful value of analytical reports, it is of an enormous advantage to be able to access additional documentation within a report. Additional information about the query, individual characteristic values, as well as combinations of characteristic values is extremely useful in answering a large number of questions. When defining characteristic values, it is often desirable to link technical drawings or detailed pictures as documentation.



Document Access

Document Integration

For metadata, master data and transaction data, you can define and even link one or more documents in various formats, versions and languages.

SAP distinguishes between logical documents, which are linked to BW objects using attributes (for example, object type and object name), and physical documents which belong to a specific logical document as individual characteristic values (versions) and which present meta-descriptions for individual files using their attributes (for example, language and format). You can store the individual files either on an SAP database or on an external content server using an HTTP interface.

In the *Administrator Workbench*, you choose *Documents* to reach the navigation window for the three document classes *Metadata*, *Master Data*, and *InfoProvider Data*.

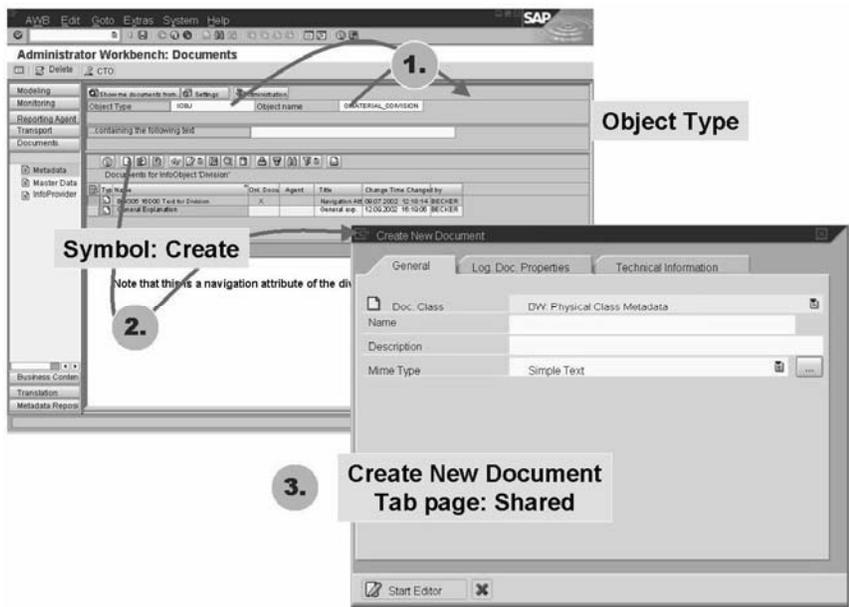
To link one document from any document class to another document, without actually linking to this document physically, you have to save both documents in a format that supports hyperlinks: such as HTML, Microsoft WORD or Microsoft EXCEL.

Metadata Document Class

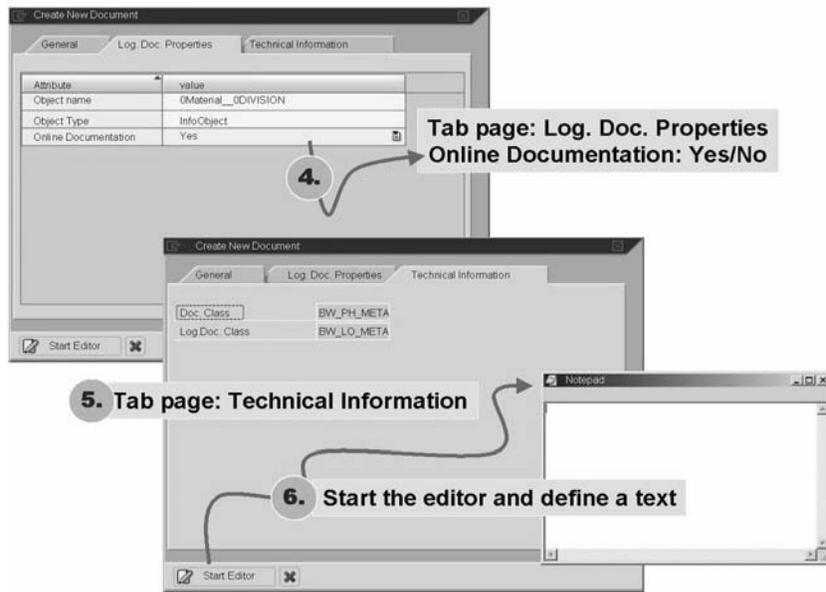
You can define documents for metadata for the following BW objects:

- InfoObject
- InfoCube
- InfoSet
- ODS Object
- Query

You can define additional explanations for individual structural components, for changes that have been made and the reasons for the changes, for historical developments and so on here.



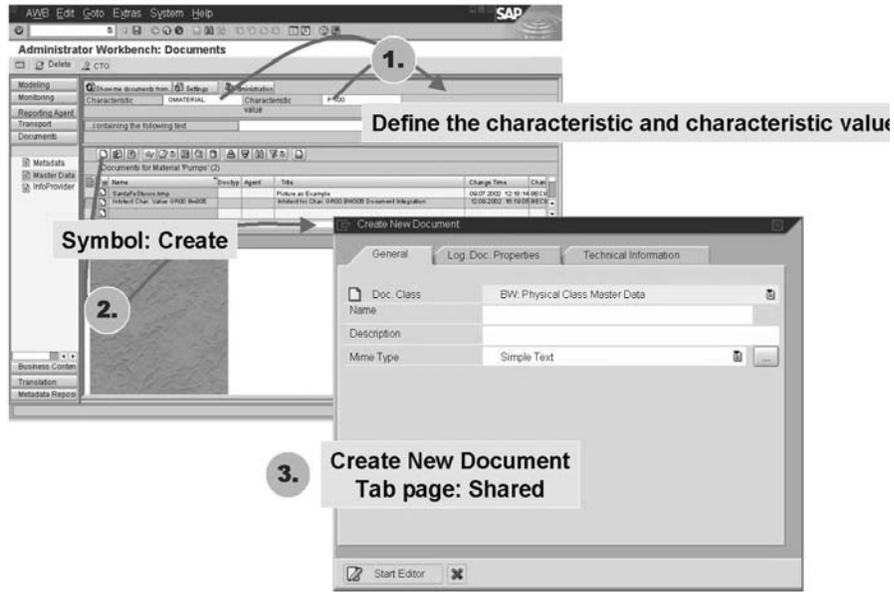
Metadata Document Integration I



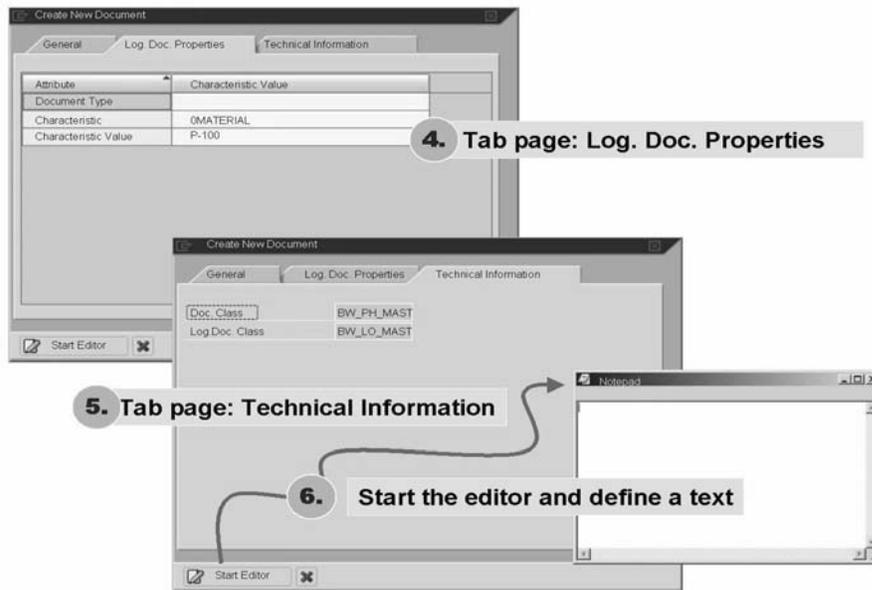
Metadata Document Integration II

Master Data Document Class

You can define documents for single characteristic values for master data. Here, you can define pictures for personnel numbers, descriptions, and technical specifications of materials, original documents and so on.



Master Data Document Integration I



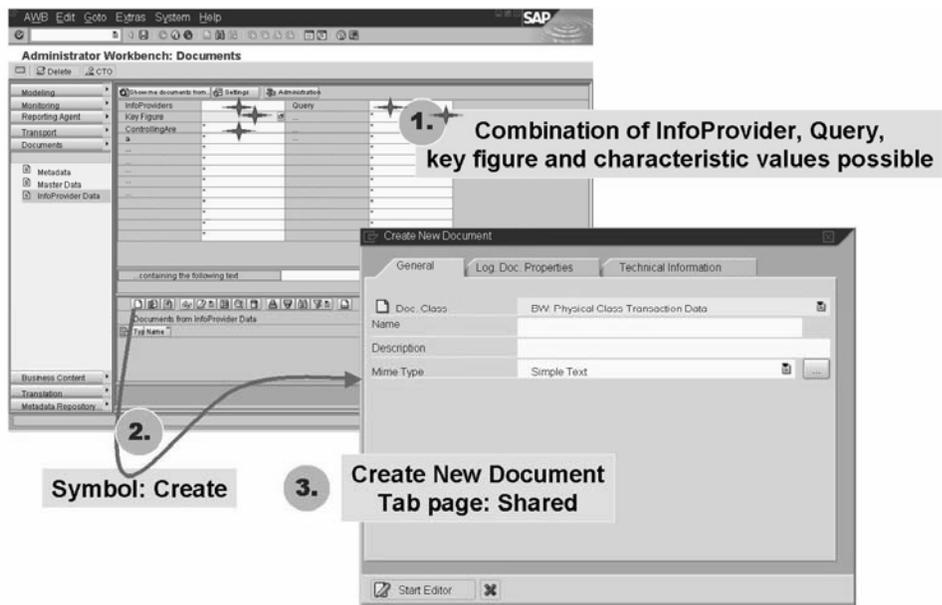
Master Data Document Integration II

InfoProvider Data Document Class

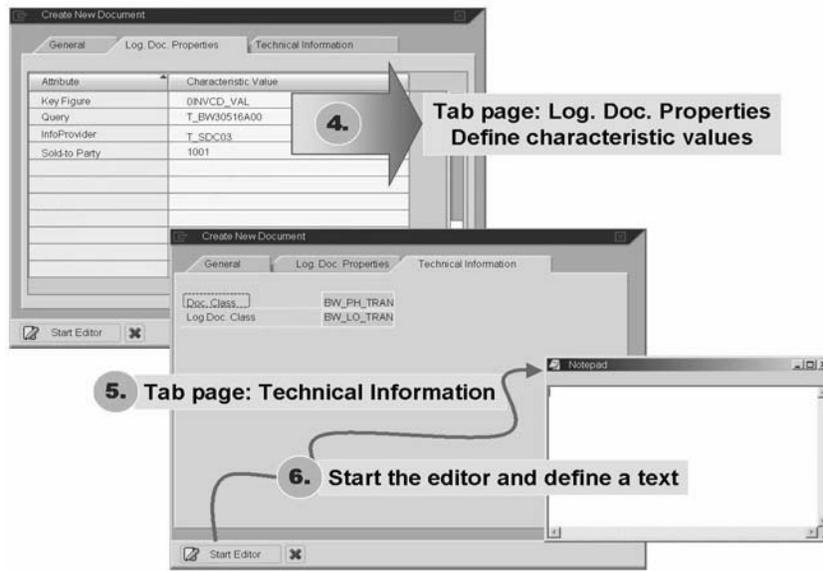
You can assign one or more documents to the transaction data of an InfoProvider (a query, for example). You also have the option of assigning any number of documents to a combination of characteristic values and key figures. The documents are then displayed in the report in a context-sensitive fashion, which means that access to the documents adjusts according to the navigational state of the report.

Hint: Characteristic is permitted as an attribute of documents.

In characteristic InfoObject maintenance on the *Shared* tab page, you determine whether the characteristic is permitted as a property of documents. You can annotate transaction data with relation to a characteristic in *SAP BW* in this way. Example: You define the following as a text document for the sales key figure, the month January 2002 and the country US: **The sales for the US in January 2002 were extremely low due to a weak exchange rate.** The characteristics month and country must have these properties activated.



InfoProvider Data Document Integration I



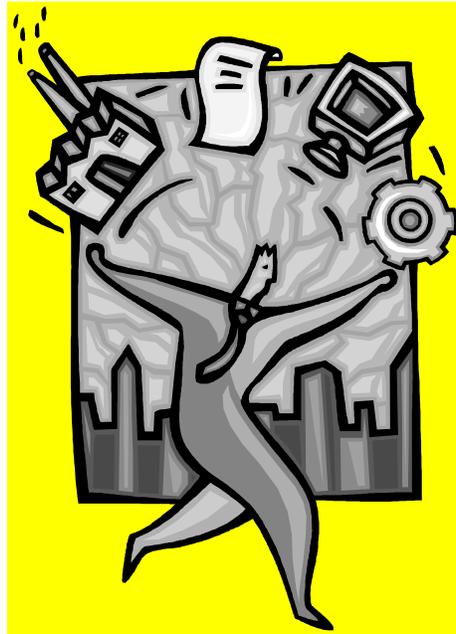
InfoProvider Data Document Integration II

Unit Summary

You should now be able to:

- Show and describe the various settings possible in a query definition
- Influence the structure of and access to reports in a query definition
- Display the workbooks or views in which a query definition is stored
- Explain how to delete query objects
- Explain how to copy queries between InfoCubes
- Describe the different document classes for metadata, master data, and transaction data
- Define documents for these document classes

Business Warehouse Reporting



Exercise 12

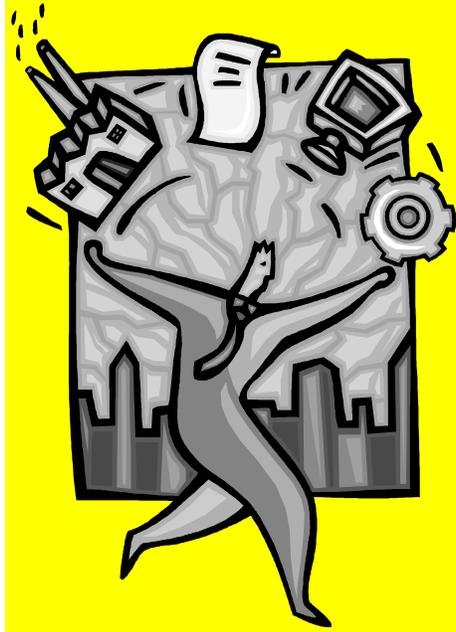
Unit 8 – Query Properties

Task

You want to create a query that contains the sales organization as a variable in the filter area, with a variable request for a specific month and the material in the free characteristics. You want to display the selected sales organization in the query header. You want to enable the user of the report to define a key date variably to display changes to the revenue class of individual customers. In the report drilldown, you want to include customers with the revenue class attribute and the sales volume and Open Order net value key figure evaluations. You do not want to display the currency in the rows, but rather in the column header of each key figure. You want to give zero values the message *Check!* And give the user the option of accessing documents for individual objects. You want to display the overall result in the top-right of the report to give an immediate overview.

1. Create a new query based on the *OD_SD_C03* cube with the *sales organization* characteristic as the filter with a variable request (Sales Organization). Use *material* and *calendar year/month* as free characteristics and give the *calendar year/month* a variable request (use a variable that you created in previous exercise). Include the *sold-to party* characteristic in the rows and give it the *country* attribute. Select *Open Orders* key figures and drop it into columns.
2. Use the query properties function to define a text variable (Text Sales Organization) in the query description which will display the name of the sales organization selected. Write the description as follows and place the text variable after the abbreviation of the sales organization (SLORG):
Description: **GR##BW305PropertiesSLORG**
3. Since the key date is to be variable in the query, find the relevant variable for this *Key Date*.
4. Now set the scaling factors, document links and Drag&Relate links and change the results position to the top-right. Also specify the type of zero display in the query properties and define the text "Check!" for this.
5. Now save the query definition
Description: **GR##BW305PropertiesSLORG &0T_CMONT&**
Technical name: **BW30515A##** where ## corresponds to your group number. Execute the query on the web.

Business Warehouse Reporting



Exercise 13

Unit 8 – Document Integration

Task 1

As the basis for your task, you need to create a query definition that contains the navigational attribute *Division* in the rows, restricted to *High Tech* with a drilldown by material. Display the *Division* by **Name** and the *Material* by **Key**. In the rows, list the *Sold to Party* with an additional breakdown by *customer*. Display the *Sold to Party* characteristic required here by **Name**. To enable users to access documents in the executed report without the need for additional settings, you have to define this in the query definition.

1. Create a new query using the *SAP Demo Sales and Distribution InfoCube* (OD_DECU). Include the characteristics *Division* and the *Material* dimension in the rows. Restrict *Division* to *High Tech*. Select *Sold to party* for the rows area.
2. Now save the query definition

Description: **GR##BW305DocumentIntegration**

Technical name: **BW30516A##**,

Unit 9 – Exceptions and Conditions

Unit Overview

This unit deals with including exceptions and conditions to further analyze a report. Exceptions allow you to highlight deviations. Conditions allow you to reduce report options to what is really necessary.

Unit Objectives

After completing this unit, you will be able to:

- Explain the purpose of exceptions
- Use exceptions in a query definition
- Structure a variable exception
- Activate and deactivate exceptions within a report
- Change, enhance, and delete exceptions
- Explain the purpose of conditions
- Use conditions in a query definition
- Focus reports on fundamental data using conditions
- Activate and deactivate conditions within a report
- Change, enhance, and delete conditions

Lesson: Exceptions

Lesson Overview

This lesson deals with exception reporting and the definition of exceptions in the *Query Designer*.

Lesson Objectives

After completing this lesson, you will be able to:

- Explain the purpose of exceptions
- Use exceptions in a query definition
- Structure a variable exception
- Activate and deactivate exceptions within a report
- Change, enhance, and delete exceptions

Business Example

In order to make quick, responsible decisions, a company's data must be prepared and presented so that values that deviate from expected values are noticed by users at a glance. The management of your organization wants to use a warning system within a report and has therefore asked you to define threshold values with different colors in an *Exception* on a query level.

GR00 BW305 Exceptions

Cal_Year/Month Customer Country

Material Key Figures

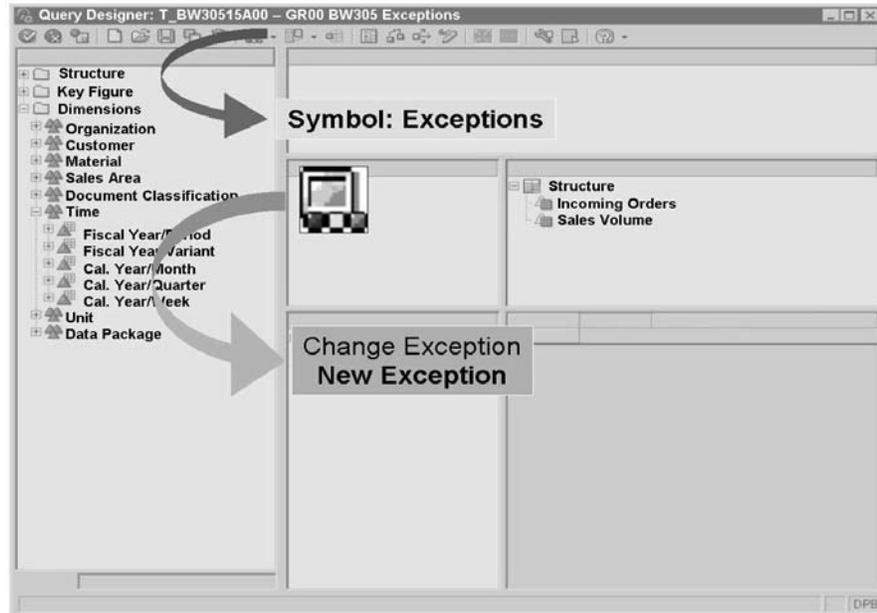
Threshold values displayed in color

Customer	Material	CalYear/Month	Incoming Orders			Overall Result
			07.2001	08.2001	09.2001	
1001 Lampen-Markt GmbH	Light bulb 40 Watt, Clear, 220/235V		214,480.00 EUR	210,267.00 EUR	225,269.00 EUR	648,036.00 EUR
	Light Bulb 40 Watt, Red, 220/235V		59,444.00 EUR		1,760.00 EUR	121,204.00 EUR
	Light bulb 60 Watt, Clear, 220/235V		26,322.00 EUR	110,605.58 EUR	117,587.98 EUR	228,419.94 EUR
	Light Bulb 60 Watt, Red, 220/235V		54,194.00 EUR	53,032.70 EUR		107,226.70 EUR
	Light bulb 80 Watt, Clear, 220/235V		133,688.00 EUR		139,192.80 EUR	272,880.80 EUR
	Light Bulb 80 Watt, Red, 220/235V			47,176.40 EUR		47,176.40 EUR
	Result		461,832.38 EUR	421,281.68 EUR	541,829.78 EUR	1,424,943.84 EUR
1002 Omega SoftHardware Markt	Light bulb 80 Watt, Clear, 220/235V		31.46 EUR	31.46 EUR	31.46 EUR	94.38 EUR
	Result		31.46 EUR	31.46 EUR	31.46 EUR	94.38 EUR
1032 Institut für Umweltforschung	Pump PRECISION 102				86,075.90 EUR	86,075.90 EUR
	Pump PRECISION 103				116,319.00 EUR	116,319.00 EUR
	Pump PRECISION 104				102,462.00 EUR	102,462.00 EUR
	Pump Standard IDESNORM 100-402				248,461.30 EUR	248,461.30 EUR
	Result				555,318.10 EUR	555,318.10 EUR
1033 Karsson High Tech Markt	Light bulb 60 Watt, Clear, 220/235V		33,921.60 EUR	33,921.60 EUR	33,921.60 EUR	100,764.80 EUR
	Sunny Sunny 01		32,502.60 EUR	35,002.80 EUR	40,836.60 EUR	108,342.00 EUR
	Sunny Tetral3		45,994.00 EUR			45,994.00 EUR
	Flatscreen LE 50 P		26,994.00 EUR	15,325.40 EUR	18,224.80 EUR	62,544.20 EUR
	Flatscreen MS 1575P			36,648.50 EUR		36,648.50 EUR
	Flatscreen MS 1585		99,020.40 EUR	52,964.40 EUR		151,984.80 EUR
	Flatscreen MS 1785P				82,139.40 EUR	82,139.40 EUR
	MAG DX 15FFe			32,142.50 EUR		32,142.50 EUR
	MAG DX 17F		68,393.60 EUR		43,523.20 EUR	111,916.80 EUR
	SEC Multisync XV 17			56,189.00 EUR		56,189.00 EUR

Web Application with an Active Exception

Exceptions

The functions in exception reporting enable you to select and highlight unusual deviations of key figure values in a query. You can see deviations from predefined threshold values or intervals in the query result displayed in different colors if the exception is active. Early spotting of these deviations provides the basis for timely and effective reactions.



Defining Exceptions in the Query Designer

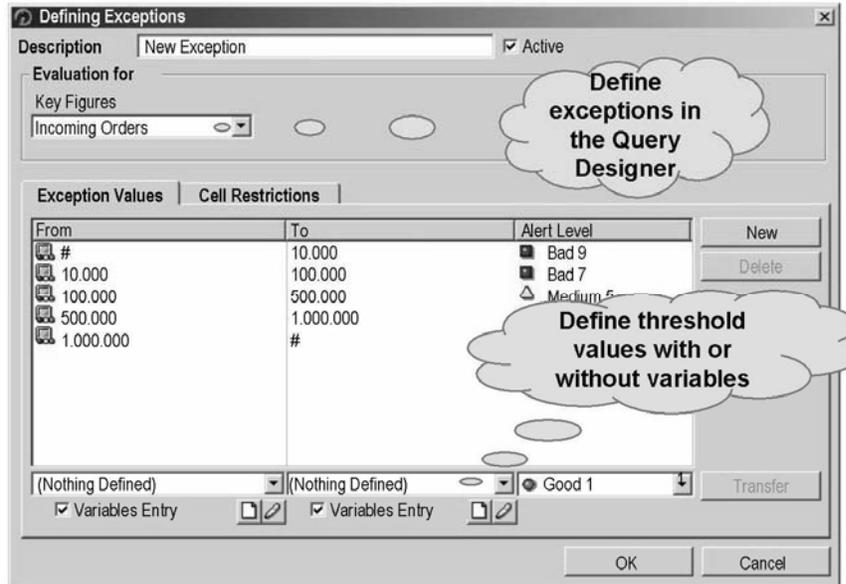
Creating Exceptions

You create an exception in the *Query Designer* using the  symbol *Exception* → *New Exception*.

In the dialog box that appears, you can specify a meaningful *Description* and set the exception to *Active*. The exception is applied as soon as you execute the query. If you do not set the active flag, you can activate the exception in the report itself.

In the BEx Analyzer, from the BW toolbar,  *Layout* → *Display Exceptions*, you also have the option of adding an additional line between the filter and results areas for each exception and activating or deactivating the exception from there. There is an item for Web applications that you can integrate into your template for the same purpose.

You can use exceptions to evaluate one or all key figures in your query definition. If you want to use exceptions selectively on specific key figures in your query definition, you have to define an exception for each key figure accordingly.



Exception Values

On the *Exception Values* tab page, you enter your values by first choosing *New*. An alert level Row always consists of a *From* field, a *To* field and an *Alert Level* field. If you leave the *From* or the *To* Value empty, this gives an infinite value definition. You choose *Transfer* to add your entries to the list of threshold values.

You can proceed as follows to make entering large values with many zeros easier:

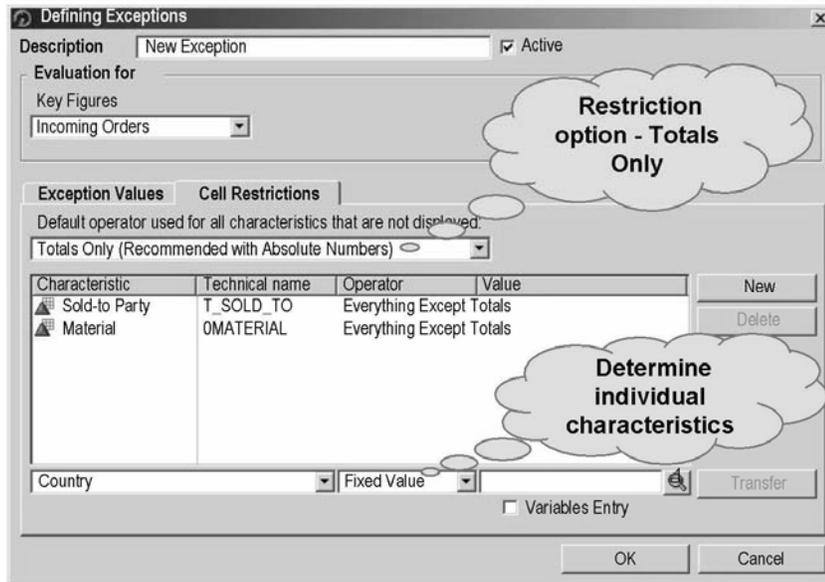
An apostrophe after the value means multiply by a thousand, two apostrophes means multiply by a million and three apostrophes means multiply by a billion (for example: 1' = 1,000, 1.5'' = 1,500,000).

By defining variables as threshold values, you can influence defined exceptions flexibly. You can allocate the available alert levels as you wish. You can set the alert colors red, yellow, and green, each in three shades, as required. The colors relate to the color characteristic values of the format templates delivered by SAP and symbolize traffic light colors.

If you want to assign your own symbol colors, in the BW toolbar in the *BEx Analyzer* choose *Format* → *Patterns*. So that these changes are kept in the query, you have to save them in a workbook. For Web applications, the formats are stored in the *MIME Repository* under *BWReports.css*. You can modify them there.

Ensure that the character of a warning remains even if the color is altered.

You can include all values or specific intervals (for example, only those falling below the threshold value in the red area) in the threshold value catalog. You can enter fixed point or floating point numbers for the values you are defining. With key figures that exceed the threshold value and are on the border between two intervals, the worst alert level is always shown (for example with interval 0 to 1000 alert level 9 and 1000 to 5000 alert level 8, with the sales volume key figure equal to 1000, then the alert level 9 is used as the basis for identification).



Cell Restrictions

On the *Cell Restrictions* tag page, you can specify whether a restriction with regard to the use of the exception applies *Only* to the *Totals* (default setting) or to *All* values (therefore, not a restriction).

You can choose *New* to define an operator for each characteristic in the query definition, and a value for each operator. You also choose *Transfer* to add your restrictions to the list.

You have the following selection options for the operators:

Everything

The cell context is not restricted. The exception applies for every drilldown state of the characteristic.

Totals Only

The exception affects only the aggregated values of the characteristic.

Everything Except Totals

The exception affects all values except for the aggregated values of the characteristic.

Fixed Value

The exception applies only to a specific characteristic value of the characteristic, which you can determine in the search help in the *Value* field. You can also use a characteristic value variable here. To do this, select *Variables Entry*. You are then given the option of using or changing an existing characteristic value variable, or of creating a new one.

Level

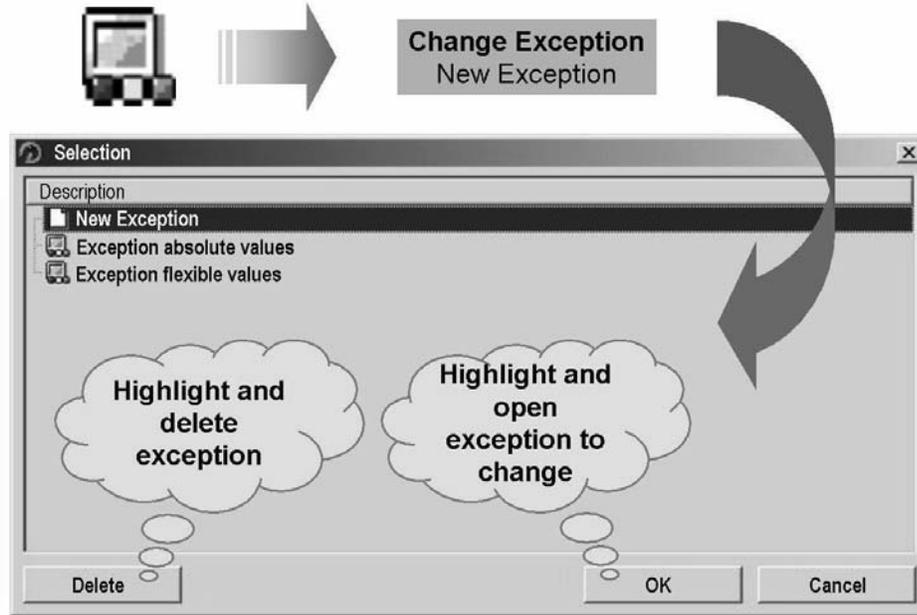
The exception applies only to specific hierarchy levels of the characteristic. You enter the required hierarchy level in the *Value* field here.

You have to list all characteristics that you defined in the *Cell Restrictions* in the drilldown of the report because the exception takes effect only then. If there is a characteristic in the drilldown that is not recorded in the cell restrictions, the effect that the exception has depends on whether you selected *Totals Only* or *All* on the *Cell Restrictions* tab page. If you selected *All*, it does not matter where you integrate the characteristic in the drilldown, the exception is applied accordingly. However, if you selected *Totals Only*, you have to place this characteristic at the end of the drilldown, otherwise the exception does not take effect.

Changing Exceptions

You can change exceptions in the *Query Designer* using the symbol  *Exception* → *Change Exception*.

If you want to delete or change a list entry, highlight the entry using your cursor and choose *Delete*, or *OK* if you want to make changes.



Changing and Deleting Exceptions

Deleting Exceptions

You can change exceptions in the *Query Designer* using the symbol  *Exception* → *Change Exception*. Use the cursor to highlight the exception that you want to delete and choose *Delete* to confirm.

If you execute your report on the Web, you can create, change, activate, and deactivate exceptions using the *List of Exceptions* Webitem. You can delete an exception using the context menu only if you created the exception in the Web application itself.

Lesson: Conditions

Lesson Overview

This lesson deals with defining threshold values and ranked lists in the Query Designer.

Lesson Objectives

After completing this lesson, you will be able to:

- Explain the purpose of conditions
- Use conditions in a query definition
- Focus reports on fundamental data using conditions
- Activate and deactivate conditions within a report
- Change, enhance, and delete conditions

Business Example

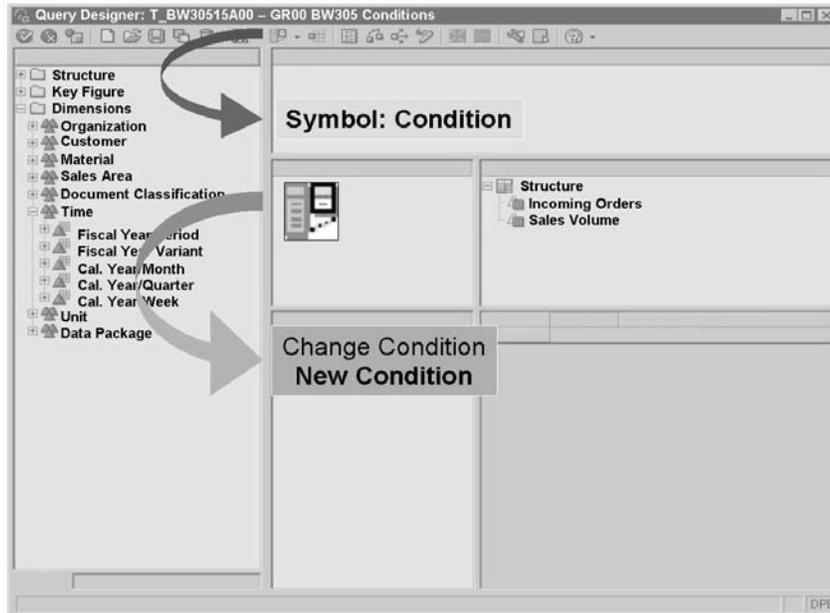
The sales department wants the flexibility to restrict a report so that only the most important information displays. This should enable a more efficient analysis of data when large amounts of data are analyzed. You now have the task of using conditions within a query definition in order to meet the aims of the sales department.

Sold-to Party		Sales Volume EUR
3500	Royal Brit. Rail	28,456,900.00 EUR
2500	Electro Engines	15,760,300.00 EUR
3010	Hever Industrial Inc.	11,009,567.00 EUR
2120	COMPU Tech	8,780,300.00 EUR
1660	Booktree Inc.	6,430,780.00 EUR
2000	Becker Berlin	2,670,987.00 EUR
3390	Nobil North Ltd.	800,587.00 EUR
5510		798,971.00 EUR
		234,400.00 EUR
		202,650.00 EUR

By defining a condition, you can restrict your query to a specific ranked list, for example.

Focusing Data Using Conditions

By defining a condition, you have the option of analyzing the query results in more detail. You can analyze combinations of characteristics using ranked lists, thereby displaying your ten best customers by sales revenue, for example. By defining value limits, you can display all key figure values above or below a certain value. The data is restricted accordingly in the results area of the query so that you only see the area that interests you. You can define multiple conditions for a query, and then activate or deactivate them in the report itself to create different views of the data.



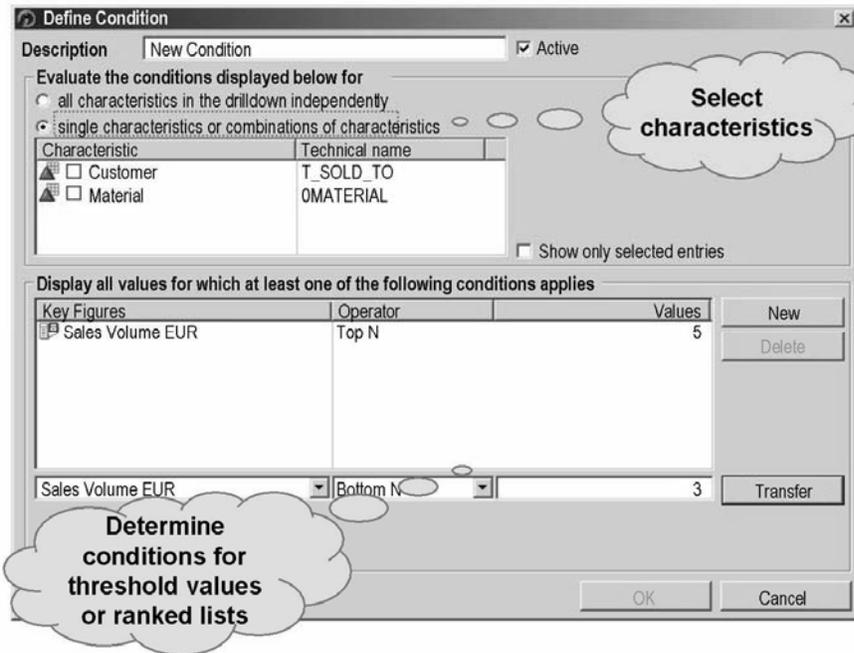
Defining Exceptions in the Query Designer

You can make restrictions in the Query Designer, using *Condition* . As a prerequisite, you have to have created a query definition for which one or more conditions can be defined.

In the dialog box that appears, you specify a meaningful *Description* and set the condition to *Active*. If the condition has the status *Active*, that condition is used in the report as soon as you execute the query. If you do not set the active flag, you can activate the condition in the report itself. In the BEx Analyzer, from the BW toolbar *Layout* → *Display Conditions*, you also have the option of adding an additional line between the filter and results areas for each condition and activating or deactivating the condition from there. There is an item for Web applications that you can integrate into your template for the same purpose.

You can set conditions for all characteristics, single characteristics, and characteristic combinations in the report drilldown, that is, in the results area in the BEx Analyzer or in the table item.

If you restrict conditions for a report to *Single Characteristic or Combinations of Characteristics*, you have to ensure that the characteristic or the combination of characteristics is integrated into the report drilldown for the restrictions defined to take effect.



Defining a Condition

Features

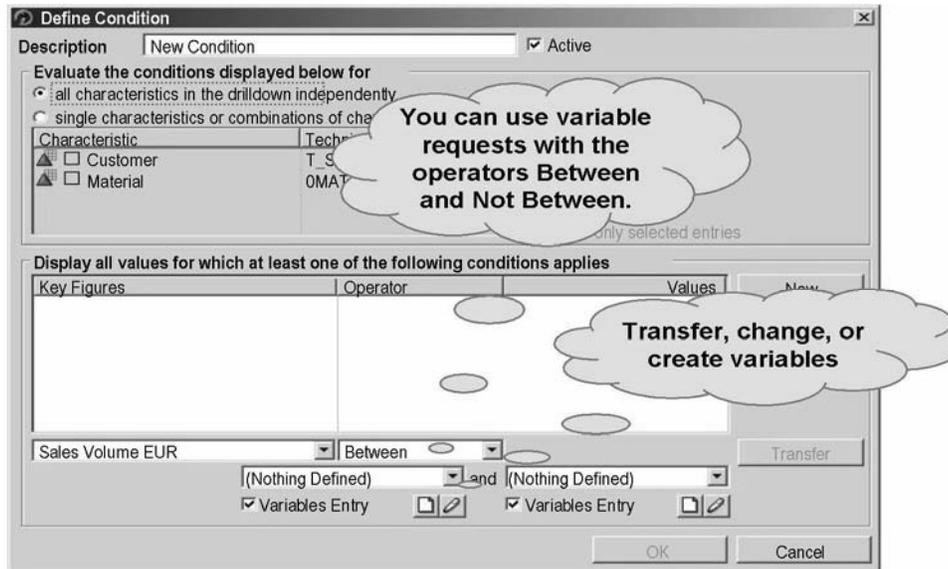
In *Display all values for which at least one of the following conditions applies*, choose *New* to select a *Key Figure* for which a condition is to be used. In the second field, you can see the operators for specifying value definitions. You choose *Transfer* to add your entries to the list of conditions and choose *New* to define more conditions. You save your conditions by choosing *OK*; you can then display your report in the BEx Analyzer or in the browser.

A condition row consists of a key figure, an operator, and a value for the operator. In query definitions that contain two structures, there is an additional field for defining a structural component.

You can use the following operators for threshold value conditions:

- *Equal to*
Example: Invoiced quantity equals 1000
- *Not Equal to*
Example: Line item not equal to 5
- *Less than*
Example: Sales revenue less than 100,000 EUR
- *Greater than*
Example: Incoming orders greater than 1,000,000 EUR
- *Less than or equal to*
Example: Sales revenue less than or equal to 100,000 EUR
- *Greater than or equal to*
Example: Incoming orders greater than or equal to 1,000,000 EUR
- *Between*
Example: Sales from/to, with the option of defining these values using a variable request
- *Not Between*
Example: Sales from/to excluded from display, with the option of defining these values flexibly at runtime.

In the variable definition, select *Variable Entry*. You are then given the option of choosing an existing variable from the drop-down list, changing the variable or creating a *New Variable*.



Defining Variable Threshold Values

You can use the following operators for ranked list functions:

- *Top N*

Example: Display the sales revenue of the top 5 customers

- *Bottom N*

Example: Display the bottom 3 (lowest) incoming orders

- *Top %*

Example: Restriction to 20% of the best revenue, in order

- *Bottom %*

Example: List of 15% of the customers with the lowest sales revenue, in order

- *Top Sum*

Example: You get a list of the products with the highest sales revenues where the total sales revenue makes up 20,000 EUR. All sales revenues are sorted in descending order and then the sum is calculated until the threshold value of 20,000 EUR is exceeded. All products, including the product that takes the sales volume over the 20,000 EUR mark, are listed.

- *Bottom Sum*

Example: Same as the *Top Sum* but here, a ranked list is sorted in ascending order of products with the weakest sales revenue until a sum greater than or equal to 20,000 EUR is reached. All products, including the product that takes the sum over the 20,000 EUR mark are also listed here.

Caution: When you execute a report with an active condition, you always see the query result in the *Overall Result* row (overall result without filter). If you do not want to see the query result, from the context menu in the BEx Analyzer, you can choose *Calculate* → *Result As* → *Summation*. If you are using the browser, you can call the context menu and then choose *Properties* → *Local Properties* → *Calculate Result As* → *Summation* .

Using Several Conditions in a Report

If you are using several conditions in one report, conflicts can arise that lead to automatic deactivation. The following status descriptions appear in the display:

Variant

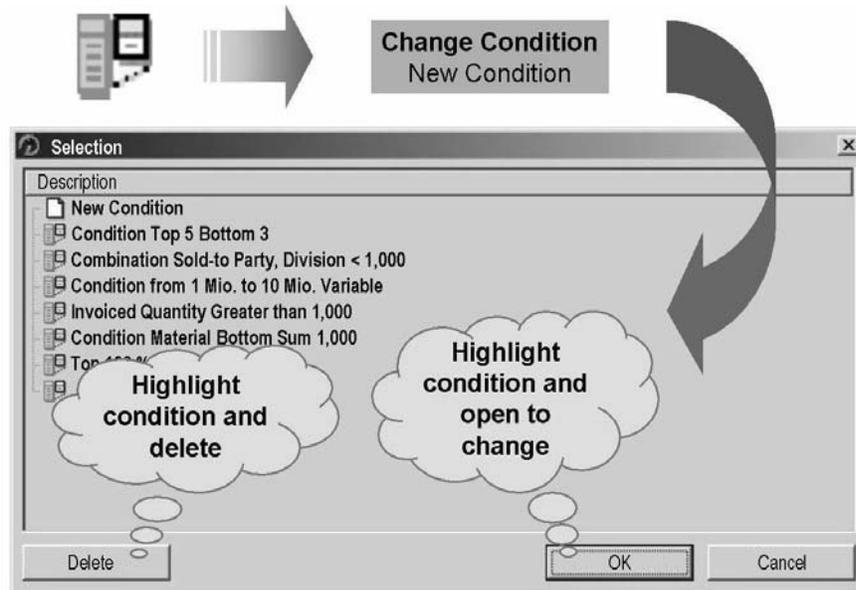
Reason: The condition relates to a characteristic or characteristic combination that is not included in the drilldown.

Not Used

Reason: The condition relates to a characteristic that is drilled down using an active display hierarchy.

The condition relates to a characteristic that is included through the activation of another condition, leading to a collision, and is therefore deactivated (however, you can reactivate this condition and automatically deactivate the last condition activated).

Caution: If you activate a condition for a combination of characteristics, the results row no longer displays.



Changing and Deleting Conditions

To change existing conditions, in the Query Designer, choose *Condition*  → *Change Condition*. The *Selection* dialog box appears. Highlight the required condition and confirm with *OK*. In the *Define Condition* dialog box, you can add new conditions to the list, or highlight existing conditions to change or delete them.

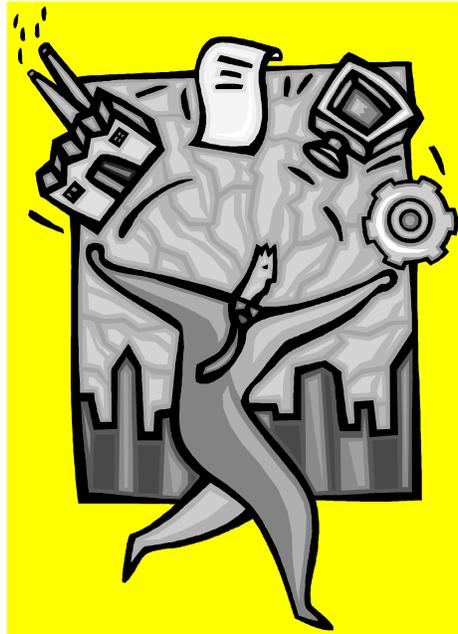
You can also delete conditions from the *Selection* dialog box by highlighting the relevant conditions and choosing *Delete* to remove it from the list.

If you execute your report on the Web, you can create, change, activate, and deactivate conditions using the *List of Conditions* Webitem. You can delete a condition using the context menu only if you created the condition in the Web application itself.

Unit Summary

- You should now be able to:
- Explain the purpose of exceptions
- Use exceptions in a query definition
- Structure a variable exception
- Activate and deactivate exceptions within a report
- Change, enhance, and delete exceptions
- Explain the purpose of conditions
- Use conditions in a query definition
- Focus reports on fundamental data using conditions
- Activate and deactivate conditions within a report
- Change, enhance, and delete conditions

Business Warehouse Reporting



Exercise 14 Unit 9 – Exceptions

Task 1

You need to create a query to track your purchasing habits with various vendors and set warnings for your management.

You need to create two exceptions for this query definition.

1. Create a new query using the *SAP Demo Purchasing Data (0D_PU_CO1)* cube. Please include material group and vendor from the characteristics. Set free characteristic for country.
2. In the *BEx Query Designer*, using *Exception*, create a *New Exception*. Define the description **Exception Absolute Values** and put a check in the *Active* checkbox. For *Evaluation for* → *Key Figures* choose *Order Values* and on the *Exception Values* tab, define the following absolute values:

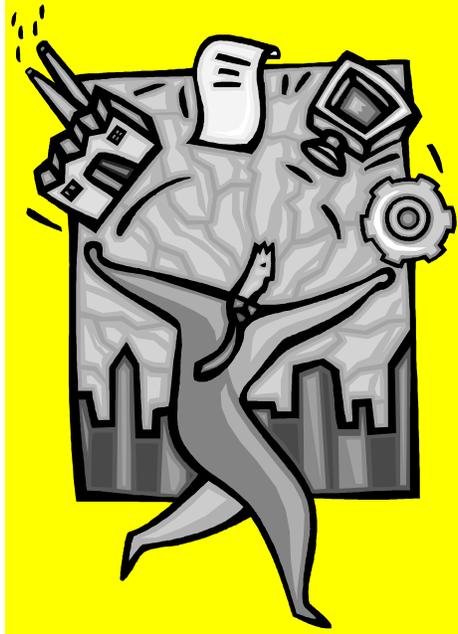
From	To	Alert Level
(Leave field empty)	10000	<i>Bad 9</i>
10000	100000	<i>Bad 7</i>
100000	500000	<i>Medium 5</i>
500000	1000000	<i>Good 3</i>
1000000	(Leave field empty)	<i>Good 1</i>

Confirm your exception by choosing *OK*.

3. Now save the query definition
Description: **GR##BW305Exceptions**
Technical name: **BW30517A##**,
4. You now see that only the overall result of your key figure *Order Value* is in color. To include other results in your exception, return to the query definition and to your exception and from the *Cell Restrictions* tab page, select *All (Recommended with Relative numbers)*
5. Now your report shows all the entries shaded for the exception. Create a new selection **Half Year** for the period January 1999 to June 1999 in the key figure context menu. Include the *Order Value* key figure in the selection. Save and execute the query, now you see results only for that half a year.

Save the query. View it in BEx.

Business Warehouse Reporting



Exercise 15

Unit 9 – Exceptions (optional)

Task

You require a query showing the sales for June 2002 for all customers. You want to use an exception to report on the key figure Open order net value. In the query, different levels of sales should receive a different color.

1. Create a query using Info cube **SAP Demo Sales and Distribution overview Cube** (0D_SD_C03). Put the key figure *Net Value in stat.Cur* (0D_NETVAL_S) in the columns and the characteristics *Sold- to Party* and *Calendar Year/Month* in the rows. Restrict the characteristic *Calendar Year/Month* to June 2002.
2. Assign different colors to the key figure values to highlight the different levels of sales volume. Create an exception called **GR##Sales** for the key figure **Net Value in Stat. Cur**. Test for the exceptional characteristic levels. Specify the following alert levels:

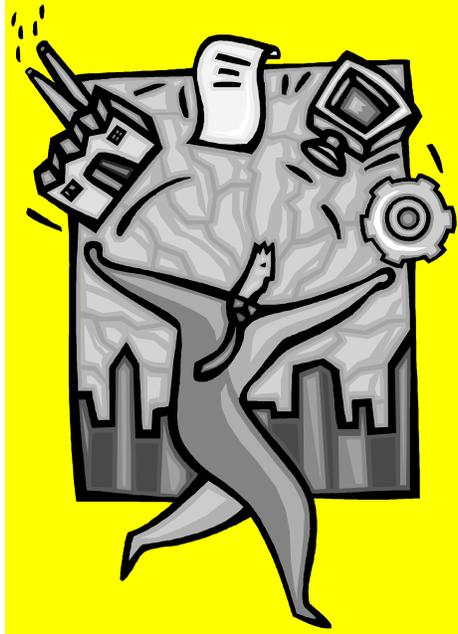
From	To	Alert Level
0	10,000	Bad9
10,000	100,000	Bad8
100,000	300,000	Bad7
300,000	500,000	Medium6
500,000	600,000	Medium5
600,000	800,000	Medium4
800,000	1,000,000	Good3
1,000,000	2,000,000	Good 2
2,000,000	10,000,000	Good 1

3. To standardize the basis of the exceptions, translate the currency into US Dollars (5 Dec) (USDN) for the key figure Sales Volume using the mean exchange rate based on today's date.
4. For the characteristic *Calendar Year/Month*, suppress the totals rows to avoid the same information being displayed repeatedly.
5. Save and execute the query using the values below:

Technical Name: **GR##09**
Description: **BW305GR## Exceptions**

Note that when you run the query you might get warnings saying conversion rates are not available. This is why some of the data is not converted to US dollars.
6. Sort the results of the *Net Value in stat.Cur* (0D_NETVAL_S) column in descending orders so as to get a better overview.
7. Save the query in your Favorites folder as a new work book named **BR505GR## Exceptions**. After saving the work book, close the BEx Analyzer.

Business Warehouse Reporting



Exercise 16

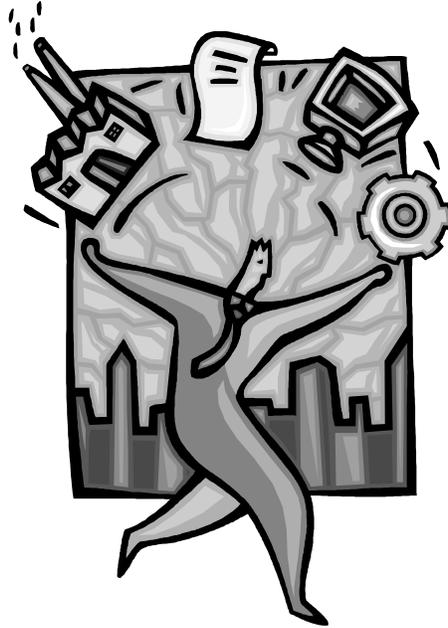
Unit 9 – Conditions

Task

In this exercise, you will create a condition to select only the top ten customers that placed the largest orders with you for June 2002.

1. Begin by creating a new query using the Info Cube *Demo Sales and Distribution overview Cube (OD_SD_C03)* found in the SAP Demo Info Area.
Create the query to show the top ten customers based on *Net Value in stat.Cur* in the month of June 2002.
2. Hide the totals rows in your local query view.
3. Save the query in your Favorites folder as a new work book named **GR## Conditions**.

Business Warehouse Reporting SOLUTIONS



Solution 1

Unit 2 – Navigation

Task 1

Display the sales revenue data for all regional codes *Average Delivery Time(0D_PU_C01_Q001)* set a filter for material *Logic Monitor Flat 17CN* and then remove the filter again.

Steps to Carry out

1. Open the query *Average Delivery Time (0D_PU_C01_Q001)*. Right click on *Material-----Filter Value -----Drag and Drop Logic Monitor Flat 17CN*

Task 2

In the same query swap vendor with material and keep filter value on one of the key figures. Save as a new workbook with the description ***BW305GR## Sales Spirit.***

Steps to carry out

1. Use the same query
2. From the context menu for *Vendor*, choose *Swap with Material*
3. From the context menu choose *Keep Filter Value*
4. Save as a new workbook by clicking *Save as Workbook* with description ***BW305GR##SalesSpirit***

Task 3

In this task by using the same query you want to pick a range from 2/2001 to 12/2001. From the BEx menu, save as a new workbook ***BW305GR## SalesRegion1.***

Steps to carry out

1. Use the same query
2. From Free characteristic menu right click on *Cal.year/month-----select Filter Value*
3. From Tab Selection-pick *Value range---*(the next window automatically chose display)
4. Pick by Drag and Drop or by double click 2/2001 and 12/2001
5. Save as a new workbook ***BW305GR##SalesRegion1***

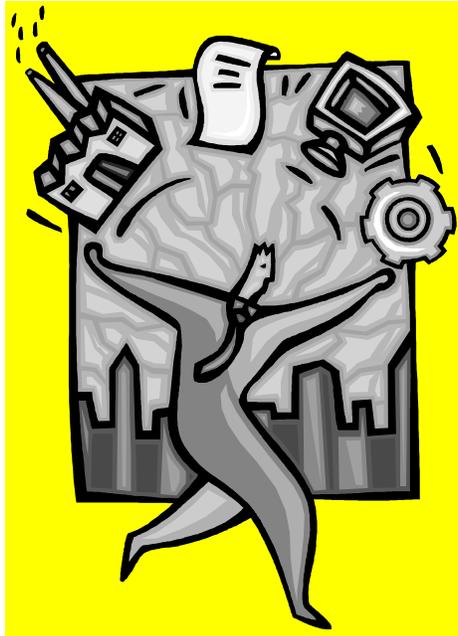
Task 4

Now you want to know to know actual delivery time to Frankfurt 1612 plant. Save your results as a new workbook ***BW305GR## SalesRegion2.***

Steps to carry out

1. From the Free characteristic region select the filter value for Plat
2. Please pick Frankfurt 1612
3. Click ok and save as ***BW305GR##Sales Region2***

Business Warehouse Reporting



Solution 2

Unit 2 – BEx Browser

Task 1

Please create a folder, internet address, change the color and a picture and add a transaction

Steps to carry out

- a) Go to Start-----Programs-----Business Explorer-----BEx Browser
- b) Log in
- c) Right click anywhere-----New Folder-----call it *My Folder*-----when you done click *anywhere*
- d) Right click gray picture-----choose symbol or color-----pick picture and color-OK
- e) Right click -----New-----Internet Address that you would like (an example you can use would be <http://cygnet.schwans.net>)
- f) Right click-----New-----SAP Transaction-----Name *BEx*-----Transaction *RRMX*

When you are done creating everything, please go to all your shortcuts to be sure they work correctly.

Task 2

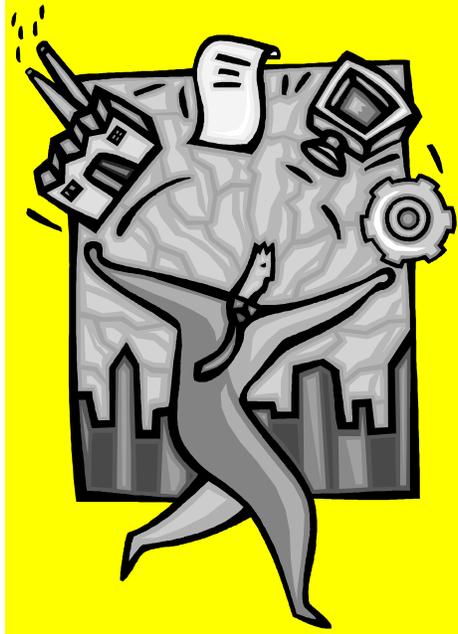
Please, create a Folder in the navigation menu *Web Queries*. Create a path to a query of your choice and place it into *Web Queries* folder

Steps to carry out

- a) Right click on the Favorites-----New Folder-----Name it *My Queries*
- b) Display any query on the web by publishing it from a Query Designer.
 - a. Open Query designer from the Business Explorer program group.
 - b. Open any query.
 - c. Publish it to the web using the button -  .
- c) Copy paste the web address of the Query
- d) Right click anywhere in BEx Browser-----New-----Internet Address-----paste Query address into Internet Address Space-----Name the Query
- e) Drag and Drop newly created shortcut into you're my *Queries* folder

When you are done, check that your shortcut is working.

Business Warehouse Reporting



Solution 3

Unit 3 – Business Content

Task

Obtain an overview of the *SAP Demo Sales and Distribution: Overview (0D_SD_C03)*. Have a look at the list of characteristics and key figures for this InfoCube. Display the network display for the data flow, and obtain an overview of the queries that are structured on this InfoCube.

Determine which roles the *Complete Overview Sales and Distribution (0D_SD_C03_Q007)* query is assigned to. Go to the *Activated Objects* folder in the metadata repository, and check whether the *Billing Documents (0D_SD_C03_Q007)* query is already actively available in the system.

1. Log on to the *BW server*. Choose *SAP Menu* to reach the SAP menu. Call the *Administrator Workbench* under *BW Administration*. Open the *metadata repository*, and look for the InfoCube *SAP Demo Sales and Distribution: Overview (0D_SD_C03)* in the content objects.

Steps to carry out

- a) Log on to the BW system and take the following path in the SAP Easy Access menu: *SAP Business Information Warehouse-> Modeling-> RSA1 - Administrator Workbench: Modeling*, or transaction *rsa1*.
Once you are in the Administrator workbench click on the metadata repository button to go to the **metadata repository**.
 - b) When you reach the metadata repository, under the **Business Content** heading, choose **Local Objects**.
 - c) You obtain a list of object types. Select the object type **InfoCube**.
 - d) All InfoCubes delivered in Business Content are listed alphabetically. Scroll down, and find the InfoCube **SAP Demo Sales and Distribution: Overview (technical name:0D_SD_C03)**. Select it.
2. Have a look at the list of characteristics and key figures for this InfoCube. Use the network data flow to obtain an overview of the queries that are structured on this InfoCube.

Steps to carry out

- a) Scroll down using the mouse. The characteristics and key figures of the InfoCube are listed in tabular form, as are the objects that receive data from the InfoCube, and the objects that pass data to it.
 - b) Under the **Graphical display** choose *Network display of data flow*.
 - c) Scroll to the right. The queries that draw data from the InfoCube *SAP Demo Sales and Distribution: Overview* are indicated with arrows.
3. Find the *Billing Documents* query (technical name 0D_SD_C03_Q007), and display the information on this query. Determine which role it is assigned to.

Steps to carry out

- a) From the network display of the data flow, choose the *Billing Documents* query (technical name: 0D_SD_C03_Q007) by clicking on it.

The tabular overview gives you information on the role that this query is assigned to, and the InfoCube that feeds it with data.

The *query preview* link gives you a preview that shows you the characteristics of the query.

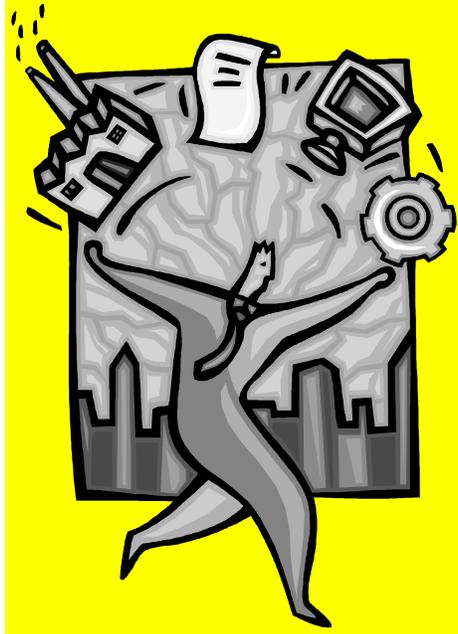
Hint: You can use the context menu (secondary mouse button) to return to the previous view by choosing *Back*.

4. Branch to the *activated objects* of the metadata repository and check whether the *Billing Documents* query is actively available in the system.

Steps to carry out

- a) From the metadata repository, choose *Activated Objects Local Objects*.
- b) You obtain a list of object types. Select the object type *Query*.
- c) All queries that are available in the active version in the system are displayed.

Business Warehouse Reporting



Solution 4

Unit 4 – Introduction to BW Query Designer

Task1

You are interested in finding out the incoming order values and the incoming order quantities of your customers for specific materials between January and April 2002. You want to enable the users of your report to select by specific countries. Create a new query with the following layout:

1. Create a new query using the InfoProvider *SAP Demo Sales and Distribution Cube Overview Cube* in the SAP Demo InfoArea with the characteristic *Sold-to party (OD_SOLD_TO)* in the rows.
Use the basic key figures *Net value in statistic currency (OD_NETVAL_S)* and *Open Order quantity (OD_OORQTYBM)* in the columns.

Steps to carry out

a) To open the BEx Analyzer, choose *SAP Menu* → *SAP business information warehouse* → *Business Explorer* → *Analyzer*.

In BEx Analyzer, choose open, and choose Queries.

Choose InfoArea *SAP Demo* → *SAP Demo Sales and Distribution overview* → *SAP Demo Sales and Distribution overview Cube*.

Choose *New*.

From the *Customer* dimension, transfer the *Sold-to Party (ODSOLD_TO)* into the *Rows* using Drag & Drop.

From the *Key Figures* folder, transfer *Net val. in statCur (OD_NETVAL_S)* and *Open Order qty (OD_OORQTYBM)* into the *Columns* using Drag & Drop.

2. Save the query Description: **GR##BW305CustomerQuery1**.

Technical name: **BW3054F##**

Execute the query and close your application.

Steps to carry out

- a) Save the query Description: **GR##BW305CustomerQuery1**.

Technical name: **BW3054F##**.

Choose *Save*.

Execute the query as a report in the BEx Analyzer. Then close the report without saving it.

3. In the next step, you want to change the query definition. Find the query you created (*GR## BW305 Customer Query1*) using the search function. Try out the various criteria for restricting the search. (For example, search for all queries created by your user ID or all query definitions defined today.)

4. Include the material in the report in order to display the incoming orders for each material for the customers. You also want to filter the data globally to the months 01.2002 to 04.2002.

Steps to carry out

- a) Choose  

Test the various search restrictions. For example, search for:

The queries that you defined. Choose *Created:* → *By User*.

Enter your user: **BSC-##**

Queries that fall within a specific time interval. Choose *Time Interval:* → *Today*.

The technical name of your query. As the *Search String:*, enter **BW3054F**

Select the query *GR## BW305 Customer Query1* from the selection list and choose *Change*

- b) In the Query Designer, move *Material (OD_MATERIAL)* (from the Product dimension) into the rows, under the sold-to party.
- c) Choose *Cal. year / month (OCALMONTH)* characteristic (from the *Time (OD_SD_C03T)* dimension), and place it into the *Filter* using Drag & Drop.

From the context menu for *Cal year / month*, choose *Restrict*. In the selection screen, choose *Value Range*. Choose *Between*. Select *01.2002* and *04.2002*, and transfer the selection using the arrow button. Choose *OK*.

4. Enable the users of your report to select data related to specific countries. Execute the query.

Use the local definition to remove the material from the drilldown and to include the country in the drilldown to list the sold-to parties by country.

Then use the global definition to restrict the country in the free characteristics to *Germany*, for example. Execute the report and make a note of which sold-to parties are listed in your report.

Steps to carry out

- a) From the *Country Key* dimension, transfer the *Country (OD_COUNTRY)* into the *Free Characteristics* using Drag & Drop.

Save the query and then execute it.

- b) Choose *Change Query*  Choose *Change Query (Local View)*.

Use Drag&Drop to transfer *Material* into the *Free Characteristics* and *Country* from the free characteristics into the *Rows*.

Place the *Sold-to Party* below the *Country*.

- c) Click the *change global query definition* button. 

From the context menu for *Country*, choose *Restrict*.

In the selection screen choose *Single Values*.

Select *Germany* and adopt the selection using the arrow button.

Choose *OK*.
Save and execute the query.

5. Now view your query on the Web.

Steps to carry out

- a) From the query results screen Choose  tools-> Launch in Web Browser-> Query (default view)

Task 2

(Optional)

Create a report using the same InfoCube for the time period from May to July 2002 about the sales volumes of your customers from the sales organization Germany Frankfurt, with the option of navigating by division, and a drilldown for the sales volumes on the months May to June.

1. Define a new query using the SAP Demo Sales and Distribution: Overview Cube (0D_SD_C03) and Include the *Sold-to Party (0SOLD_TO)* and the key figure *Open Order (0D_OORVALSC)* in your query definition. Choose *Sales Organization (0D_SALE_ORG)* as the global filter, restricted to *Germany Frankfurt (1512)*. Use *Division* and the time characteristic *Cal. Year/Month* as free characteristics. You are only interested in the months May to July.

Steps to carry out

- a) Open the Query Designer.

From the *Sales Area* dimension, place the *Sales Organization (0D_SALE_ORG)* characteristic into the *Filter* section using Drag&Drop.

In the context menu for *Sales Organization*, choose *Restrict*.

In the selection screen, choose *Single Values*.

Select *Germany Frankfurt (1512)* And transfer it into the *selection* window.

Choose *OK*.

From the *Sales Area* dimension, transfer the *Division (0D_DIV)* characteristic into the *Free Characteristics* section using Drag&Drop.

From the *Time* dimension, transfer the *Cal. year / month (0CALMONTH)* characteristic into the *Filter* using Drag&Drop.

From the context menu for *Cal year / month*, choose *Restrict* .

In the selection screen, choose *Value Range*.

Choose *Between*.

Select *05.2002* Hold down the CTRL key and select *07.2002*

Adopt the selection using the arrow button .

Choose *OK*.

Transfer the key figure *Open Orders (0D_OORVALSC)* into the *Columns* using Drag&Drop.

From the *Customer* dimension, place the *Sold-to-party(0D_SOLD_TO)* characteristic into the *Rows* section using Drag&Drop.

2. Save the query in your favorites:
Description: **GR##BW305CustomerQuery2.**
Technical name: **BW3054G##.**

Now execute the query.

Steps to carry out

- a) To save the query, choose Save As and save into your favorites..

Choose Roles → Unit: G

Description: **GR##BW305CustomerQuery2.**

Technical name: **BW3054G##.**

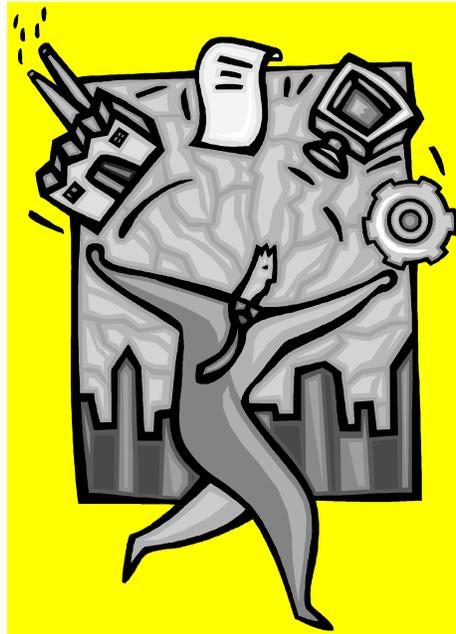
Choose *Save*.

Execute the query. In order to list the sales volumes for the individual months in your report, include *Cal. Year/Month* in the horizontal drilldown.

- 3 Now display your query on the Web.

- a) From the query results screen Choose  tools-> Launch in Web Browser-> Query (default view)

Business Warehouse Reporting



Solution 5

Unit 4 – InfoProviders and InfoObjects

Task

InfoProviders in SAP BI

1. What type of infoprovider can you use to create reports?

Answer: You can define reports based on the following InfoProviders:

- InfoCubes
- ODS Objects
- InfoObjects (characteristic InfoObjects with master data)
- InfoSets
- Remote Cubes
- MultiProviders

2. What objects does the term Infoproviders refer to?

Answer: The term InfoProvider can describe objects in which data is physically present. These objects are called data targets:

- InfoCubes
- ODS Objects
- InfoObjects

InfoProviders can also be objects that do not store data physically, but that display a logical view:

- InfoSets
- Remote Cubes
- MultiProviders

3. Which conditions does an InfoObject have to fulfill in order to be used as an InfoProvider?

Answer: A characteristic InfoObject needs to have master data (attributes and/or texts) and be assigned to an InfoArea in order to be an InfoProvider.

4. Which InfoProviders are available for master data reporting?

Answer: InfoSet, characteristics with master data

Complete master data reporting is not possible using InfoCubes. Master data reporting is possible with InfoSets if the InfoSet refers to characteristic InfoObjects with master data.

5. Which InfoProviders can contain generated characteristics or key figures?

Answer: ODS Objects, Infoproviders for characteristics objects, infosets, multiproviders. MultiProviders contain generated characteristics or key figures, if at least one InfoProvider in it contains these.

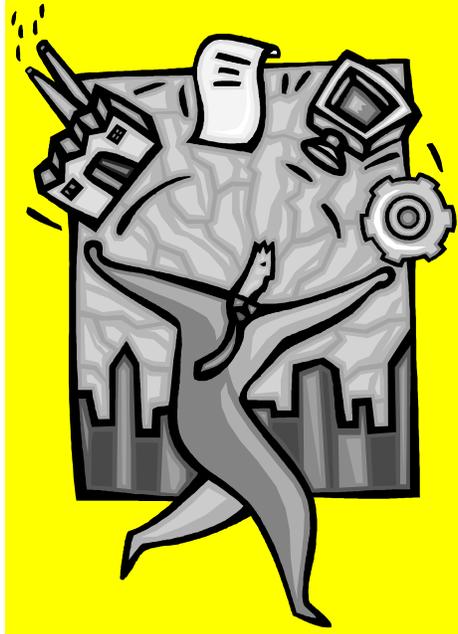
6. Which InfoProviders can I combine in a BI InfoSet?

Answer: You can structure BI InfoSets only from ODS objects and/or characteristic InfoObjects.

8. How many dimensions are displayed for an InfoSet in the Query Designer, if the InfoSet consists of an ODS object and a characteristic InfoObject?

Answer: Two dimensions are created for each ODS Object and characteristic InfoObject.

Business Warehouse Reporting



Solution 6

Unit 5 – Restricted Key Figures

Task 1

Define two restricted key figures that depict the sales volume for the period leading up to 2002 and for the year 2002 itself. For the definition of two further key figures, you use the enhanced selection conditions to restrict the sales volume for each sold-to party to the selected materials.

2. Create a new query using
3. **InfoProvider:** *SAP Demo Sales and Distribution overview Cube (0D_SD_C03)* in the *BW305 Reporting InfoArea* with the characteristic *Sold-to party (0D_SOLD_TO)* in the rows.
As global filter user *Division (0D_DIV)* restricted to *High Tech*, and
Sales Organization (0D_SALE_ORG) restricted to *Sales Organization 1616*
Define a new restricted key figure at InfoProvider level. We will limit the basic key figure *Sales Volume* to a certain period.
Description: **GR01 OpenNetValue2002**
Technical name: **BW3057A01**.

Steps to carry out

- a) Click  and choose Queries.
- b) Choose *New*  Query.
- c) Choose *Cube SAP Demo Sales and Distribution: Overview (0D_SD_C03)* → OK. It is found under *SAP Demo* → *SAP Demo Sales and Distribution: Overview*.
- d) Place the *Sold-to party (0D_SOLD_TO)* characteristic under the *Customer* dimension into the *Rows* section using Drag & Drop.
- e) Drill down into *Sales Organization (0D_SALE_ORG)* characteristic under *Sales Area* dimension and into *Values*, choose *1616* (show technical names to find this number) and drop it into the *Filter* section using Drag & Drop.
- f) To define the first restricted key figure at **InfoProvider level**, choose *New Restricted Key Figure* in the context menu of the *Key Figure* folder. (Right click on *Key Figure* and choose *New Restricted Key Figure*).
- g) Description: **GR## OpenNetValueBefore2002**
- h) Use Drag & Drop to place *Net Value in stat. Cur* under Key Figures into the description area on the right.
- i) Choose the *Cal. year / month (0CALMONTH)* characteristic under the *Time (0D_SD_C03T)* dimension, and place it into the description area using Drag & Drop.
- j) In the context menu (right click) for *Cal year / month*, choose *Restrict*. In the selection screen, choose *Value Range*. Choose *Less than*. Select *January 2002* and adopt the selection using the right arrow button. Choose OK.
- k) Click OK again to bring up the properties screen. In the *Properties of the Restricted Key Figure* dialog box, enter:
Technical name: **BW3057A##**.
Confirm with OK.

3. In the same query, define another restricted key figure **Sales2002** at **query level**. This key figure is to display *Net Value in stat.Cur* for the year 2002.

Steps to carry out

- d) To define the second restricted key figure at **query level**, choose *Net Value in stat.Cur* from the Key Figure folder, and place it into the *Columns* section using Drag & Drop.
- e) In the context menu for *Net Value in stat.Cur*, choose *Edit*.
- f) Choose the *Cal. year / month* (OCALMONTH) characteristic under the *Time* (0D_SD_C03T) dimension, and place it into the description field using Drag & Drop.
- g) In the context menu for *Cal year / month*, choose *Restrict*.
- h) In the selection screen, choose *Value Range*.
- i) Choose *Between* and select January 2002 and adopt the selection using the arrow button.
- j) Select December 2002 and adopt the selection using the arrow button. Choose OK.
- k) **Description: GR##Net Value in stat.Cur 2002.**
Confirm with OK.
- l) You need the additional key figure for the sales volume before 2002 for FlatScreen. To define this restricted key figure at query level, select *GR## OpenNetValueBefore2002*. Drag and Drop into Columns.
- m) Choose *Edit* in its context menu.
- n) Choose the characteristic *Material* from the *Product* (0D_SD_C033) dimension and place it into the Description field using Drag & Drop.
- o) In the context menu (right click) for *Material*, choose *Restrict*.
- p) The characteristic values needed for the restriction are not offered in the first 100 values. Click arrow button (Display other values) at the bottom of the screen next to number "100".
- q) In the *Restrictions* area, choose *Text* from the drop down.
- r) Choose *Contains Pattern*.
- s) Enter **Monitor flat** as the search string. Click *OK*.
- t) You are presented with a screen of *Fixed Values*. Select all of them and click the right arrow to move them to the *Selection* area. Click *OK*.



Caution: You must distinguish between upper and lower case when searching.

- u) **Description:** OpenNetValue2002MonitorFlat.
Choose OK.
- v) Save the query by clicking 
- w) **Description:** GR##BW305RestrictedKeyFigures.
Technical name: BW3057B##.
Now execute the query

Task 2

You use selections when defining the restricted key figure to determine the data that you want to display at runtime. Use the *Constant Selection* function to easily select reference sizes that can not change at runtime.

1. Create a new query based on the InfoProvider *Cube (0D_SD_C03)*. Place the characteristic *Material (0D_MATERIAL)* into the rows. Use the characteristics *Sales Organization (0D_SALE_ORG)* as the global filter, restricted to the sales organization *Germany Frankfurt (1512)*. Place the InfoObject *Cal. year / month (0CALMONTH)* into the free characteristics, and restrict it to the single values *06/2002*.

Define two new key figures.

Description: **SalesCurrentQuarter**.

Description: **SalesValueCurrentQuarter**.

For the second key figure, use the *Constant Selection* function.

Steps to carry out

- a) To define a new query for the same InfoProvider, open the *Query Designer*, and choose *Queries* → *New* → *History* → *SAP Demo Sales and Distribution overview Cube (0D_SD_C03)* → *New*.
- b) Place the *Sales Organization (0D_SALE_ORG)* characteristic under the *Sales area* dimension into the *Filter* section using *Drag & Drop*.
- c) In the context menu for *Sales Organization*, choose *Restrict*.
- d) In the selection screen, choose *Single Values*. Select *Germany Frankfurt (1512)* and adopt the selection using the arrow button. Choose *OK*.
- e) Choose the *Cal. year / month (0CALMONTH)* characteristic under the *Time* dimension, and place it into the *Free Characteristics* field using *Drag & Drop*.
- f) In the context menu for *Cal year / month*, choose *Restrict*.
- g) In the selection screen, choose *Single Values*.
- h) Select *03/2002* and adopt the selection using the arrow button. Choose *OK*.
- i) Use *Drag & Drop* to place *Material (0D_MATERIAL)* Under *Product* from the *Material* dimension into the rows.
- j) To define the restricted key figures, place the key figure *Open Order* in the *Columns* section using *Drag & Drop*.
- k) In the context menu for *Open Order*, choose *Edit*.
- l) Choose the *Cal. year/month (0CALMONTH)* characteristic under the *Time* dimension, and place it into the description field using *Drag & Drop*.
- m) In the context menu for *Cal year / month*, choose *Restrict*.
- n) In the selection screen, choose *Single Values*.
- o) Choose *06/2002*, and adopt the selection using the arrow button.
- p) Change the Description to: **SalesValueCurrentQuarter**.
Choose *OK*.
- q) You create the second key figure as a copy of the one you just defined. Choose the

SalesValueCurrentQuarter, click copy and then paste.

- r) Edit the copied key figure.
- s) Choose Cal year/Month, choose restrict.
- t) Making sure to be on tab Fixed Values, go to *Display Other Values*  and make sure *Only Values in InfoProvider* is checked. Confirm OK.
- u) Right click on *Calendar* and choose *Constant Selection* for both of the key figures
Description: **SalesValueCurrentQuarterSelectionofConstants**.

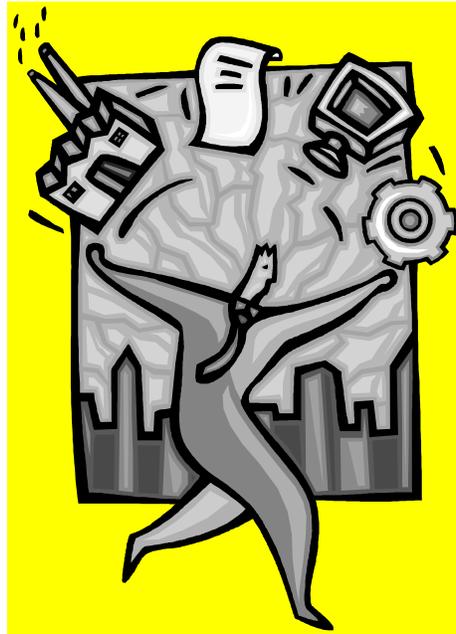
Save the query

Description: **GR##BW305SelectionofConstants**.

Technical name: **BW3057C##**.

- v) Now execute the query.

Business Warehouse Reporting



Solution 7

Unit 5 – Calculated Key Figures

Task 1

Generate a report that represents the sales volumes and Net Value of the first two quarters of 2002 as well as the first half-year with percentage changes.

1. Create a new query based on the InfoProvider *SAP Demo Sales and Distribution overview Cube* in the *SAP Demo* InfoArea. In the rows, create a structure with the following name: Description:

GR## Quarterly Comparison

Technical name: **BW3059A##**.

This query contains the first and second quarters of 2002. The structure should also include the first half-year as a sum of the first two quarters. You define the fourth part as a formula for calculating the percentage variance of the two quarters contained in the structure.

Steps to carry out

- a) To define a new query, open the Query Designer from the Analyzer. Choose *Open* → *New*  → and choose *SAP Demo Sales and Distribution overview Cube from History (0D_SD_C03)* → *OK*.
- b) Call up the context menu in the heading of the *Rows* directory by right clicking the heading "Rows".
- c) Choose *New Structure*.
- d) Choose *Properties* from the context menu of the *New* structure.
Description: **GR## Quarterly Comparison**
Technical name: **BW3059A##**.
Choose *OK*.
- b) To define the first quarter as part of the structure, go to the context menu of the *GR## Quarterly Comparison* structure, and choose *New Selection*.
- c) Under the *Time* dimension, choose the *Cal. year / month* characteristic, and place it in the selection screen using *Drag&Drop*.
- d) In the context menu for *Cal. year / month*, choose *Restrict*.
- e) *Selection: Value Range, Between*.
- f) Use *Drag & Drop* to pull dates between *January 2002* and *March 2002*. Choose *OK*.
- g) Enter **Quarter1/2002** as the description.
- h) For the definition of the second quarter, right click with the mouse on the quarter that you already created and click *copy*.
- i) Then highlight the structure, right click and choose *Paste*. Identical Quarter

appeared.

- j) Now right click -> Edit and change date ranges for *April 2002* and *June 2002*.
- k) Change the name. Description: **Quarter2/2002**.
- l) Choose *OK*.
- e) For the definition of the two new formulas in the structure, choose *New Formula* in the context menu for the *Quarterly Comparison*. Description: **HalfYear1/2002**.
- f) Use Drag&Drop to place *Quarter 1/2002* into the formula field.
- g) Choose *Plus* (the button ).
The image shows a small square button with a plus sign (+) inside, next to a vertical line.
- h) and place *Quarter 2/2002* into the formula field.

- 2. In the columns, include the basic key figures *Open Order net value* and *Net value in statistic currency*. Define a new calculated key figure that calculates the percentage share of the Open Order in relation to net value of Net Value. Description: **%Share Open Order of Net Value**

Steps to carry out

- A) Use Drag&Drop to place the basic key figures *Open Order* and *Net value in statcur* into the columns.
 - b) From the context menu for the *key figures* entry in the columns, select *New formula*.
 - c) Use drag & drop to place *Open Orders* into the formula field.
 - d) Under the *percentage functions* folder, find *Percentage share*. Place it into the formula.
 - e) Place *Net val in statCur* into the formula.
 - f) Name your formula **%Share Open Order s of net value**.
- 3. Save the query

Description: **GR##BW305FormulaCollision**.

Technical name: **BW3059C##**.

Now execute the query. If necessary, carry out a currency translation. At the point where the *1st half 2002* and *% share open orders of net value* calculations cross, there is a formula collision. Decide which of the formulas you want to be valid for the calculation of the values at the point of collision, and make the appropriate setting in the properties of the key figure or calculated formula.

- a) To save the query, choose *Save Query* 
Description: **GR##BW305FormulaCollision**.
Technical name: **BW3059C##**.
Execute the query.

B) The currency translation takes place in the properties dialog of the key figure you want to convert.

- 1) Right click on the key figure *Open orders*. Select *properties*
- 2) Find the *currency translation* drop down.
- 3) Choose *Average rate, current date*.
- 4) Select *US dollars (5 dec)* from the target currency drop down.

Target currency: **US Dollars** Choose **OK**. Repeat steps for key figure **net value**.

Conversion type: MEANTODAY Fixed target currency, **Current date**.

C) To fix the formula collision do the following

- 1) Right click on the calculated key figure *%Share Open Order s of net value* and choose *properties*.
- 2) In the *formula collision* drop down, choose *results from this formula*.

Note how this causes the calculation to do the percentage calculation defined for the column instead of summing the first and second quarters together to create the “half year” entry.

Task 2

You need information on the share of the sales volume for the individual quarters in relation to the first half -year. You define a new calculated key figure that uses the value from a particular cell for calculation.

1. In the query definition **GR## BW305 Formula Collision (BW3059C##)**, define a new formula that calculates the share of the sales volumes for the individual quarters in relation to the sales volume for the first half-year. Use the cell editor to do this. Select the sales volume for the first half year there as a reference cell.

Description: Share of Open Order of Overall Open Order forHalfYear1.

Steps to carry out

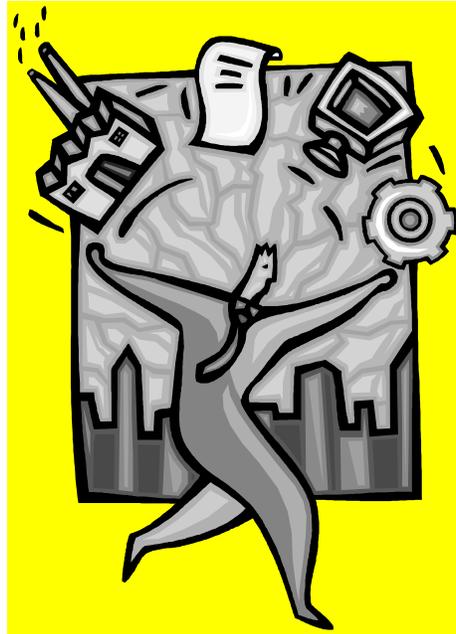
- a) Open the global query definition for **GR## BW305 Formula Collision (BW3059C##)**.

1. Use the *Define Cells* icon  to call up the Cell Editor.
2. At the place where the *Half Year 1* and *Open Order* calculations cross, choose *New Cell Reference* in the context menu.
3. Choose *OK*.
4. Choose *New Formula* in the context menu for the key figure structure.

Description: Share of Open Order of Overall Sales Volume for Half Year 1.

5. Use Drag&Drop to place *Open Order net value* into the formula field. 6. Choose / (*divided by*).
7. Place *Net val. in statCur / OpenOrders/HalfYear* from the *Cells* section into the formula field
8. Choose *OK*.
9. Call up the Cell Editor again.
10. At the intersection of *Share of Open Order of Overall Sales Volume for Half Year 1* and *first half*, choose *New Selection* in the context menu.
11. Enter **No Entry** as the description, and choose *OK*.
12. In the context menu for *No Entry*, choose *Properties*.
13. Select the *Hide* checkbox.
14. Choose *OK*.
15. In the Cell Editor, choose *OK*.

Business Warehouse Reporting



Solution 8

Unit 5 – Properties of Key Figures

Task 1

Generate a report that represents the sales volumes and Net Value of the first two quarters of 2002 as well as the first half-year with percentage changes.

1. Create a new query based on the InfoProvider *SAP Demo Sales and Distribution overview Cube* in the *SAP Demo* InfoArea.

In the rows, create a structure with the following name:

Description: **GR## Quarterly ComparisonB**

Technical name: **BW3059B##**.

This query contains the first and second quarters of 2002. The structure should also include the first half-year as a sum of the first two quarters. You define the fourth part as a formula for calculating the percentage variance of the two quarters contained in the structure.

Steps to carry out

- a) To define a new query, open the Query Designer from the Analyzer. Choose *Open* → *SAP Demo Sales and Distribution overview Cube (0D_SD_C03)* → *OK*. Call up the context menu in the heading of the *Rows* directory. Choose *New Structure* and then choose *Properties* from the context menu of the structure. To define the first quarter as part of the structure, go to the context menu of the *GR## Quarterly Comparison* structure, and chose *New Selection*.
- b) Under the *Time* dimension, choose the *Cal. year / month* characteristic, and place it in the selection screen using Drag&Drop. In the context menu for *Cal. year / month*, choose *Restrict* For the selection: *Value Range, Between*. Use Drag & Drop to adopt *January 2002* and *March 2002*. Choose *OK*.

Enter **Quarter1/2002** as the description.
- c) For the definition of the second quarter, right click with the mouse on the quarter that you already created and click copy. Then highlight the structure, right click and choose Paste. Identical Quarter appeared. Now right click Edit and change date ranges for *April 2002* and *June 2002*. Don't forget to choose *value* range and *between* for the selection

Change the name. Description: **Quarter2/2002**.

Choose *OK*.
- d) For the definition of the two new formulas in the structure, choose *New Formula* in the context menu for the *Quarterly Comparison*.
Description: **HalfYear1/2002**.
Use Drag&Drop to place *Quarter 1/2002* into the formula field.
Choose Plus (the button with the '+' sign) and place *Quarter 2/2002* into the formula field.
Click 'OK' to save the formula.

In the context menu for the *Quarterly Comparison* structure, choose *New Formula*.

Description: **PercentageVarianceofQuarters1and2/2002**

Use Drag&Drop to place *Quarter 2/2002* into the formula field.

Choose the *Percentage Variance* from the *Percentage functions* folder.

Use Drag&Drop to place *Quarter 1/2002* into the formula field.

Choose *OK*.

2. In the columns, include the basic key figures *Open Order* and *Net value in stat cur*. Define a new calculated key figure that calculates the percentage share of the Open Order in relation to net value of Net Value. Description: **%Share Open Order of Net Value. Make sure only formula is visible**

Steps to carry out

- a) Use Drag&Drop to place the basic key figures *Open Order* and *Net value in stat cur* into the columns.

For the calculation of the key figure *percentage share of the sales volume in relation to incoming orders*, choose *New Formula* in the context menu for the key figure structure.

Description: **%Share Open Order s of net value.**

Use Drag&Drop to place *Open Order* from the structure elements folder into the formula field.

Under *Percentage Functions* choose *Percentage Share* and use Drag&Drop to place it into the formula field.

Use Drag&Drop to place *Net Value in stat cur* into the formula field.

Choose *OK*.

- b) Right click on *Open Order* and *Net Value in stat.cur* go to *Properties* and check *Hide*.

3. Save the query

Description: **GR##BW305FormulaCollisionB.**

Technical name: **BW3059CB##.**

Now execute the query. If necessary, carry out a currency translation. At the point where the *Half Year 1* and *Percentage Variance of Quarters* calculations cross, there is a formula collision with the calculated key figure *% Share Open Order of Net Value*. Decide which of the formulas you want to be valid for the calculation of the values at the point of collision, and make the appropriate setting in the properties of the key figure or calculated formula.

- b) To save the query, choose *Save Query* 

Description: **GR##BW305FormulaCollisionB.**

Technical name: **BW3059CB##.**

Execute the query.

To perform the currency translation, go back into the global definition of the query.

Right click on the *Net val. in statCur* key figure and go to its properties.

In the *currency conversion key* dropdown, select *Average rate – current rate*.

In the *target currency* dropdown, select *US Dollars (5 dec)*.

Click OK, save the query, and execute it. You may get some warnings saying a particular exchange rate can not be found. This is due to the exchange rate not being loaded into the IDES training system.

- c) Go back to the global query definition.
In the context menu for *% Share Open Order of Net Value*, choose *Properties* → *Formula Collision*.
Result from this Formula. Choose *OK*.

Task 2

You need information on the share of the sales volume for the individual quarters in relation to the first half -year. You define a new calculated key figure that uses the value from a particular cell for calculation.

1. In the query definition **GR## BW305 Formula CollisionB (BW3059CB##)**, define a new formula that calculates the share of the sales volumes for the individual quarters in relation to the sales volume for the first half-year. Use the cell editor to do this. Select the sales volume for the first half year there as a reference cell.

Description: Share of Open Order of Overall Open Order forHalfYear1.

Steps to carry out

- a) Open the global query definition **GR## BW305 Formula CollisionB (BW3059CB##)**. **Note:** You may already have this query open from the last exercise.

Use the *Define Cells* icon  to call up the Cell Editor. At the place where the *Half Year 1* and *Open Order* calculations cross, choose *New Cell Reference* in the context menu. Choose *OK*.

For the definition of the share of the sales volume in relation to the sales volume of the first half year, choose *New Formula* in the context menu for the *key figure structure*.

Description: Share of Open Order of Overall Sales

Volume for Half Year 1.

Use Drag&Drop to place *Open Order* into the formula field.

Choose */ (divided by)*.

Place *Open net value/Half Year 1/2000* from the *Cells* section into the formula field.

Choose *OK*.

2. Save the key figure structure you defined as a reusable structure. Description: **GR##**

OpenNetValue AnalysisB Technical name: **BW3059HB##**.

Save the query and then execute it. Take a look at your report.

Steps to carry out

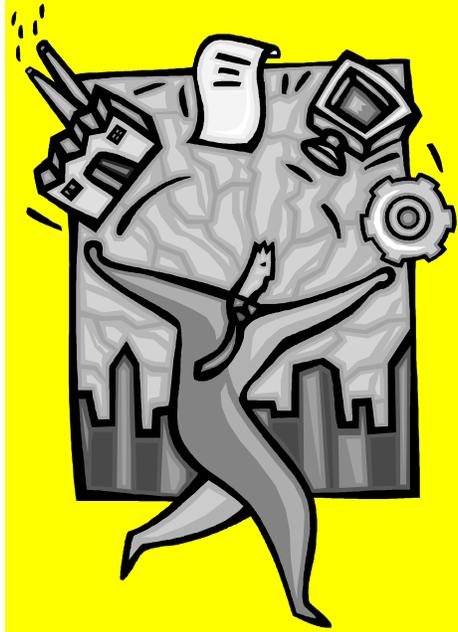
- a) To save the structure you created as a reusable structure, choose *Save as* in the context menu for the *GR## quarterly comparison* structure.

Description: **GR## OpenNetValue AnalysisB**

Technical name: **BW3059HB##**.

Save the query and then execute it.

Business Warehouse Reporting



Solution 9

Unit 6 – Properties and Attributes of Characteristics

Task

Define a report that displays the sold-to parties, their materials, the relevant sales revenues, and the costs for the first two quarters of the year 2002.

Display the location, region and telephone number for the sold-to parties as additional information. Make the necessary settings so that you can select data based on country and postal code later.

1. Create a new query based on the SAP *Demo Sales and Distribution overview Cube (0D_SD_C03)*

In the columns, include the basic key figure *Net Value Stat.Cur*.

In the rows, include the characteristics *Sold-to Party* and *Material*.

Restrict the data to the first six months two quarters of the year 2002 and enable navigation using both of these quarters.

Steps to carry out

- 1) Open the Query Designer
- 2) Use Drag&Drop to transfer the basic key figure *Net Value Stat.Cur* into the columns.
 - a) For the characteristics, choose:
 - b) Use Drag&Drop to transfer *Dimensions* → *Customer* → *Sold-to Party* to the Rows.
 - c) Use Drag&Drop to transfer *Dimensions* → *Material* → *Material (0D_MATERIAL)* to the rows.
 - d) Use Drag&Drop to transfer *Dimensions* → *Time* → *Cal. Year/Month (0CALMONTH)* into the Free Characteristics.
 - e) Restrict *Cal. Year/Month (0CALMONTH)* to January 2002 and June 2002.
 - a. Right click on *Cal. Year/Month (0CALMONTH)* and select *Restrict*.
 - b. Choose *Value Range* and *between*.
 - c. Ctrl+click *January 2002* and *June 2002*.
 - d. Transfer your selection using the right arrow button.
 - e. Choose *OK*.
2. As additional information for the sold-to party, include the attributes location, region and telephone number in your report. For the region, define that only the name is to be displayed.

Steps to carry out

- a) To include display attributes in the query definition, from the context menu for the *sold-to party*, choose *Attributes* and then select the required attributes *Region* and *Telephone 1*.

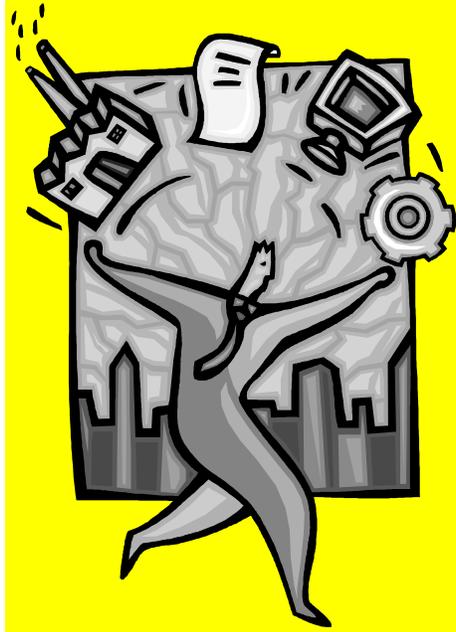
Alternate:

- a) You can also expand the folder for *sold-to party* and then expand the *attributes* folder. From here, you can drag&drop the attributes you want into the report. Note that you must place the attributes under the characteristic they belong to in the query definition.
3. Display only the name of the sold-to party. In order to structure the report clearly, specify that the results rows are not displayed for *Cal. Year/Month (0CALMONTH)*

Steps to carry out

- a) Right click on the characteristic *Sold-to Party* and select *properties*.
 - b) Under *Display As* choose *Name*.
 - c) Click OK to accept your changes.
 - d) To hide the results rows for the characteristic *Cal. Year/Month*, Right Click on *Cal. Year/Month* and choose *Properties*.
 - e) In the *Display of Results* section, change *Suppress Results Rows* to *Always*.
 - f) Click OK to accept your changes.
4. Save the query and execute it.
Description: **GR##BW305Characteristics**
Technical name: **BW30510B##**

Business Warehouse Reporting



Solution 10

Unit 6 – Integration of Hierarchies

Task 1

You want to display an overview of specific sales volumes for the sales organizations in your report. To structure the report clearly, display the characteristics *Sales Organization* as a hierarchy.

5. Create a new query based on the SAP Demo Sales and Distribution overview Cube (OD_SD_C03) In the rows, include the characteristic Company Code (OD_CO_CODE) and characteristic *Sales Group* (OD_SALE_GRP)

Steps to carry out

- a) Open query OD_SD_C03
- b) Use Drag & Drop to transfer characteristic *Company Code* (OD_CO_CODE) and *Sales Group* (OD_SALE_GRP) into the rows.
6. Display the characteristics in the rows as a hierarchy.
 - a) In the header row of the rows window (the gray part, above the actual listing of characteristics), call the context menu and choose *Display as a Hierarchy*.
7. Save the query:
 - a) Description: **GR##BW305Hierarchy1**
Technical name: **BW30511A##**.
8. Now execute the query.

Steps to carry out

- a) In the header row of the rows window, call the context menu and choose *Display as a Hierarchy*.

Description: **GR##BW305Hierarchy1**
Technical name: **BW305911A##**.

Execute the query. 

Task 2

In another report, you want to display Sales Organization as a hierarchy. Create a new query based on the *SAP Demo Sales and Distribution overview Cube* (OD_SD_C03). Put the characteristic *Sales Organization* (OD_SALE_ORG) into the rows.

Steps to carry out

- a) Create a new query based on the *SAP Demo Sales and Distribution Overview* (OD_SD_C03) cube.
- b) Use Drag&Drop to transfer characteristic *Sales Organization* (OD_SALE_ORG) into the rows. This characteristic is in the *Sales Area* dimension.
- c) Drag&drop *Open Orders* into the columns.
- d) Display the sales organization as a hierarchy.
 - a. Right click on *Sales Organization* and select *properties*.
 - b. Under the *display Hierarchy* heading, click the *values* button ().
 - c. This will bring up a new window showing available hierarchies for the characteristic. Choose the only available hierarchy – *PM Sales organization* (PM_SALES_ORGANIZATION).
 - d. Click OK to confirm using this hierarchy. Ensure that the *Active* checkbox is filled in so that your hierarchy will be displayed in your report.
 - e. Specify that the hierarchy is sorted by name and in descending order. These settings are

- directly below the *Hierarchy Name* dialog box.
- f. In the *Hierarchy Properties* area, there are four settings you can change.
 - i. *Expand to level* – This setting tells the query how many levels to expand the hierarchy to when it is initially displayed. Click the checkbox to turn this option on and specify 3 for the number of levels to display.
 - ii. *Position of lower level nodes* – This option tells BEx to either display the children of nodes below or above the parent. We want our hierarchy to expand downward. The default is down, so you can leave this option alone, or fill in the checkbox and select *down* from the dropdown.
 - iii. *Values of Posted nodes* – This option tells BEx to display a parent node as a child of itself if it has a value assigned to it for the key figure being displayed. Fill in this checkbox and select *display* from the dropdown.
 - iv. *Nodes with only one lower level node* – This tells BEx how to display nodes that have only one child. Setting this to *Hide* will display the lower level child in place of the parent when you expand the hierarchy. Fill in this checkbox and select *Hide*.
 - g. Save the query.
 - i. Description: **GR##BW305Hierarchy2**
 - ii. Technical name: **BW30511B##**.
 - iii. Now execute the query.
 - h. Execute the query.

Note that the hierarchy is expanded down three levels, as you specified in the properties of the hierarchy.

Note that the hierarchy expands downwards. You can change the properties of the *Sales Organization*, specifically *position of lower level nodes* to see how the hierarchy can expand upwards as well as down.

Unfortunately, there are no examples of a posted node in this data. If Canada had a value for *Open Orders*, it would be displayed along with Toronto and Vancouver when you expand its hierarchy.

To see the effects of the Hide Lower Level Nodes option we selected, expand Switzerland.

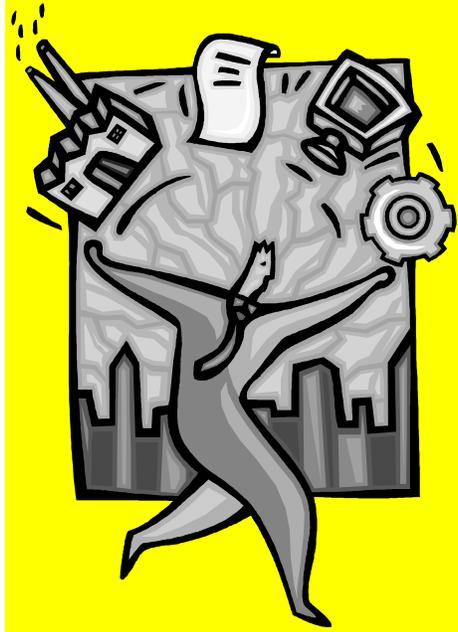
Return to Query Designer.

Steps to carry out

Note that we have a hierarchy called “Not assigned nodes”. These are nodes that do not have a rollup defined in the hierarchy. We do not want to display these in our results.

- a) Return to the query definition.
- b) Right click on the *Sales Organization* and select *Restrict*.
- c) Transfer all the entries, except “Not assigned sales organizations” in the selection.
- d) Click ok.
- e) Save and execute the query.
 - Description: **GR##BW305Hierarchy2**
 - Technical name: **BW305911B##**.
 - Execute the query.

Business Warehouse Reporting



Solution 11

Unit 7 – Variables

Task 1

In order to structure your reports flexibly, you want to use variables instead of fixed values to restrict your key figures. You want to list the *Net Value Stat.Cur* for each of your materials for a particular month and for a time interval. You want to display the chosen time or time period in the column header of the sales volumes.

1. Create a new query based on the *OD_SD_C03*

Place the characteristic *Material (OD_MATERIAL)* into the rows.

Include the basic key figure *Net Value Stat.Cur* in the columns, restricted to the characteristic *Cal. Year/Month (OCALMONTH)*. Restrict *Cal. Year/month* using a variable that you define with the help of the variable wizard. Specify that a single month has to be entered at runtime.

Use the following description for the variable:

Variable name: **BI505F##**

Description: **GR##Month1**

Steps to carry out

- a) To define a new query, open the Query Designer. *New*.
- b) Use Drag&Drop to transfer *Material* from the *Product* dimension into the *rows*.
- c) Use Drag&Drop to include the basic key figure *Net Value Stat.Cur* in the columns.
- d) From the context menu for *Net Value Stat.Cur* choose *Edit*.
- e) From *Dimensions*→ *Time*, transfer *Cal. Year/Month* from the *Time* dimension into the right window using Drag&Drop.
- f) From the context menu for *Cal. Year/Month* choose *Restrict* and go to the *Variables* tab page.
- g) In the left window, call the context menu and choose *New Variable*.
- h) On the *General Information* page, enter:
 - a. Variable name: **BI505F##**
Description: **GR##Month1**
Processing by: *User Entry/Default Value*
Choose *Next*.
- i) On the *Details* page, choose the following settings:
Variable Represents: *Single Value*
Variable Entry: *Mandatory*
Ready for Input: *Set the flag to active*
Can be changed in query navigation: *Not active*
Choose *Next*.
- j) On the *Default Values* page, enter:
Default Value: *6/2002*
Choose *Next*.

- k) On the *Save Variable* page, you get an overview of the settings you have made. Choose *Finish*.
 - l) Transfer the variable that you have defined into the selection window and choose *OK*. The window is closed and you return to the *Edit Selection* dialog box.
2. Define a new text variable that you include in the description of the key figure so that you can list the month, to which the Net Value Stat.Cur is restricted at runtime, as a text (for example, *Net Value Stat.Cur September 2002*). Ensure that the text variable relates to the from-value of the characteristic variable.

Use the following description for the text variable:

Variable name: **BI505G##**

Description: **GR##TextVar.Month(from)**

Steps to carry out

- a) In the *Edit Selection* dialog box, position the cursor at the end of the key figure description. Choose the *Select Text Variables* icon In the selection box . Select *New* (first entry in the list) and choose *OK*. On the *General Information* page, enter: Variable name: **BI505G##**
Description: **GR##TextVar.Month(from)**
Processing by: *Replacement Path* Choose *Next*.
 - b) On the *Characteristic* page, choose the following settings:
Characteristic *Cal. Year/Month (0CALMONTH)*
Choose *Next*.
 - c) On the *Replacement Path* page, enter:
Replace Variable With: *Name (Text)*
For Intervals Use: *From Value*
Choose *Next*.
 - d) On the *Save Variable* page, you get an overview of the settings you have made. Choose *Finish*. The text variable that you have defined appears in the description with its technical name enclosed in *&*.
3. Drag the *Net Value Stat.Cur* key figure into the columns again and restrict this using a variable so that the user has to select a month interval at runtime to which the Net Value Stat.Cur is restricted. Use the following description for the variable:

Variable technical name: **BI505K##**

Description: **GR##MonthInterval**

Steps to carry out

- a) Use Drag&Drop to include the basic key figure *Net Value Stat.Cur* in the columns.
- b) From the context menu for *Net Value Stat.Cur* choose Edit .
- c) From the Time dimension, transfer the *Cal. Year/Month* into the right window using Drag&Drop.
- d) In the context menu for *Cal year / month*, choose *Restrict* .
- e) Select the Variables tab page.
- f) In the left window, call the context menu and choose New Variable.
- g) On the General Information page, enter:
 - Variable name: BI505K##
 - Description: GR## Month Interval
 - Processing by: User Entry/Default Value
- h) Choose Next.
- i) On the Details page, choose the following settings:
 - Variable Represents: Interval
 - Variable Entry: Mandatory
 - Ready for Input: Set the flag to active
 - Can be changed in query navigation: Not active
- j) Choose Next.
- k) On the Default Values page, enter (for example):
 - Default Value: 1/2002
 - To Default Value: 12/2002
- l) Choose Next.
- m) On the Save Variable page, you get an overview of the settings you have made.
- n) Choose Finish.
- o) Transfer the variable that you have defined into the selection window and choose OK.

The window is closed and you return to the Edit Selection dialog box.

4. In order to specify the selected interval in the column header, you need a to-value text variable in addition to the from-value text variable. Create the to-value text variable and use both variables in the key figure description.

Enter the following as the text variable description:

Variable name: **BI505L##**

Description: **GR##TextVar.Month(to)**

Steps to carry out

- a) In the *Edit Selection* dialog box, position the cursor at the end of the description *Net Value Stat.Cur* and choose  .
- b) Then select the text variable that you created *GR## Text Var. Month(from) (BI505L##)*.
- c) After the text variable, add the word *to*. In the description window, enter the following: **&.From**. From the context menu, choose *New Variable*.

- d) In the selection box, select *New* from the start of the list and choose *OK*. On the *General Information* page, enter:
 - Variable name: **BI505L##**
 - Description: **GR##TextVar.Month(to)**
 - Processing by: *Replacement Path*
 - Choose *Next*.

 - e) On the *Characteristic* page, choose the following settings:
 - Characteristic *Cal. Year/Month (OCALMONTH)*
 - f) Choose *Next*.

 - g) On the *Replacement Path* page, enter:
 - Replace Variable With: *Name (Text)*
 - For Intervals Use: *To Value*

 - h) Choose *Next*.
 - i) On the *Save Variable* page, you get an overview of the settings you have made. Choose *Finish*. The text variable that you have defined appears in the description with its technical name enclosed in *&*.
5. Save the query Description: **GR##BI505Variables1**.
Technical name: **BI50513M##**.
Execute the query.
Keep the query open for the next task.

Task 2

You now want to display the sales organization as a hierarchy in your report and select the hierarchy at runtime.

By using a hierarchy node variable, you can select individual hierarchy nodes flexibly.

1. In the query definition of *GR## BI505 Variables1*, restrict the sales organization to a hierarchy node variable, which you create as new. Define the hierarchy node variable to allow the entry of multiple single values and to also allow changes to be made during query navigation.

Enter the following description:

Description: **GR## Hierarchy Node Var.**

Technical name: **BI505N##**

Once you have created the hierarchy node variables, stay in the selection dialog box for sales organization to define the hierarchy variable in the second step.

2. Open the global query definition for *GR## BI505 Variables1 (BI50512M##)*. From the context menu for *sales organization* choose *Restrict* → *Variables* tab page. You see the characteristic value variables in the selection list. You have to select a hierarchy in order to switch to the hierarchy node variables. Select a hierarchy, for example *PM sales organization*: Choose *From Hierarchy*. From the context menu in the left selection window, choose *New Variable*.

Steps to carry out

- a) Add the *sales organization* characteristic of the *sales area* dimension to the rows.
- b) From the *sales organization* context menu, select *Restrict*.
- c) Click on the variables tab and create a new variable.
- d) On the *General Information* page, enter:
Variable name: **BI505N##**
Description: **GR## Hierarchy Node Var.**
Processing by: *User Entry/Default Value*
Choose *Next*.
- e) On the *Details* page, choose the following settings:
Variable represents: *Multiple Single Values*
Variable Entry: *Mandatory*
Ready for Input: *Set the flag to active*
Can be changed in query navigation: *Set the flag to active*
Choose *Next*.
On the *Default Values* page, choose *Next*.
- f) On the *Save Variable* page, you get an overview of the settings you have made.
Choose *Finish*. Do not leave the *Selection for sales organization* dialog box.

2. You also want to be able to select the hierarchy flexibly at runtime. To do this, define a hierarchy variable and include this in the query.

Description: GR## Hierarchy Var. Technical name: **BI505P##**a) In the *Selection for Sales organization* dialog box, transfer your hierarchy node variable into the selection window using Drag&Drop, call the context menu for the hierarchy node variables that you transferred and choose *Select Variable Hierarchy*. Set the flag for variables and choose *New Variable*.

Steps to carry out

a)

Create a New variable.

On the *General Information* page, enter:

Variable name: **BI505P##**

Description: **GR## Hierarchy Var.**

Processing by: *User Entry/Default Value*

Choose *Next*.

- c) On the *Details* page, choose the following settings:

Variable represents: Multiple single values

Variable entry is: *Optional*

Ready for Input: *Set the flag to active*

Choose *Next*.

On the *Default Values* page, choose *Next*:

- d) On the *Save Variable* page, you get an overview of the settings you have made. Choose *Finish*.
- e) From the list in the *Name* field, select the hierarchy variable that you defined. Choose *OK*. Close the *Selection for Sales Organization* dialog box by choosing *OK*.

3. Save the query and then execute it. Select a hierarchy and two hierarchy nodes. Set another hierarchy node in the query as a filter for the material.

Steps to carry out

- a) Save the query and then execute it. Using the context menu, set another hierarchy node in the query as a filter for the sales organization.

4. Which hierarchy nodes can you select?

Answer: All hierarchy nodes in the selected hierarchy can be used as filter values.

5. Which hierarchy nodes would you be able to select if you had created the hierarchy node variable so that the variable cannot be changed during navigation?

Answer: If the variable cannot be changed during navigation, you can also choose the nodes beneath the selected node.

Task 3

You want to display the Net Value Stat.Cur of your customers for a time period that is selected by the user. You also want to display the number of selected months in the interval and the average Net Value Stat.Cur per month.

1. Create a new query based on the *OD_SD_C03*

Transfer the characteristic *Sold-to Party* into the rows.

Include the basic key figure *Net Value Stat.Cur* in the columns, restricted to the characteristic *Cal. Year/Month (0CALMONTH)*. Restrict *Cal. Year/Month* by the characteristic variable that you created (*GR## Month Interval (BI505K##)*).

In order to list the number of months in the interval in the report, define a new formula variable as a new calculated key figure on query level with the following description:

Variable name: **BI505Q##**

Description: **GR## Number of Months**

This uses the replacement path to calculate the difference between the interval limits of the variable *GR## Month Interval (BI505K##)* for *Cal. Year/Month*.

Steps to carry out

- a) Use Drag&Drop to transfer *Sold-to Party* from the *Customer* dimension into the *Rows*.

Use Drag&Drop to include the basic key figure *Net Value Stat.Cur* in the columns.

From the context menu for *Net Value Stat.Cur* choose Edit → Dimensions → Time.
Transfer *Cal. Year/Month* to the right window using Drag&Drop.
From the context menu for *Cal year / month*, choose Restrict .
Choose the Variables tab page and transfer the variable *GR## Month Interval (BI505K##)* using Drag&Drop.
- c) From the context menu for the Key Figure structure, choose New Formula.
In the Operands field, from the context menu for Formula Variables, choose New Variable.
- d) On the General Information page, enter:
Variable name: BI505Q##
Description: GR## NumberOf Months
Processing by: Replacement Path
Choose Next.
- e) On the Characteristic page, choose the following settings:
Characteristic *Cal. Year/Month (0CALMONTH)*
Choose Next.
- f) Replace variable with: Name(Text)
On the Replacement Path page, enter:
For Intervals Use: Difference

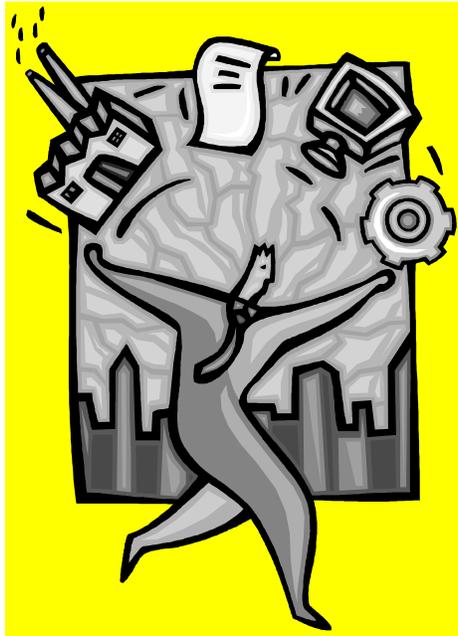
On the Currencies and Units tab page, the dimension ID is set as
A number.
Choose Next.

- g) On the Save Variable page, you get an overview of the settings you have made.
Choose Finish.
 - h) Open the formula variables directory and use Drag&Drop to transfer the formula variable that you defined (GR## Number of Months). Enter Number Of Months as the description. Choose OK.
2. Use the formula variable *GR## Number of Months* to create a new formula that calculates the average Net Value Stat.Cur per month in the selected time period. Save the query Description: **GR##BI505Variables2**.
Technical name: **BI50513R##**.
Now execute the query.

Steps to carry out

- a) To create the new formula, choose *New Formula* from the context menu for the key figure structure.
Name it **Ratio of net value to number of months**.
Use Drag&Drop to transfer *Net Value Stat.Cur* into the formula field.
Choose *Divided by"/"*
Choose *Formula Variable: GR## Number of Months*.
Choose *OK*.
Save the query, Description: **GR##BI505Variables2**.
Technical name: **BI50513R##**.
Execute the query.

Business Warehouse Reporting



Solution 12

Unit 8 – Query Properties

Task

You want to create a query that contains the sales organization as a variable in the filter area, with a variable request for a specific month and the material in the free characteristics. You want to display the selected sales organization in the query header. You want to enable the user of the report to define a key date variably to display changes to the revenue class of individual customers. In the report drilldown, you want to include customers with the revenue class attribute and the sales volume and Open Order net value key figure evaluations. You do not want to display the currency in the rows, but rather in the column header of each key figure. You want to give zero values the message *Check!* And give the user the option of accessing documents for individual objects. You want to display the overall result in the top-right of the report to give an immediate overview.

1. Create a new query based on the *0D_SD_C03* cube with the *sales organization* characteristic as the filter with a variable request (Sales Organization). Use *material* and *calendar year/month* as free characteristics and give the *calendar year/month* a variable request (use a variable that you created in previous exercise). Include the *sold-to party* characteristic in the rows and give it the *country* attribute. Select *Open Orders* key figures and drop it into columns.

Steps to carry out

- a) In the *Query Designer: New Query* dialog box, make the following definition:
 - a. Use Drag&Drop to include *Dimensions* → *Sales Area* → *Sales Organization* in the *Filter* area.
 - b. Click with the right mouse button on *Sales Organization* → *Restrict*.
 - c. On the variables tab, choose the existing variable *Sales Organization (0D_SA_OR)*.
 - d. Add this to your selection and choose *OK*.
 - e. Use Drag& Drop to include *Dimensions* → *product* → *Material* in the *Free Characteristics* area.
 - f. Use Drag& Drop to include *Dimensions* → *Time* → *Cal. Year/Month*→ in the *Free Characteristics* area
 - g. Click with the right mouse button on *Cal. Year/Month* → *Restrict*.
 - h. Go to the *Variables* tab and choose a time variable you created in a previous exercise. Add this to the selection and choose *OK*.
 - i. Use Drag&Drop to include *Dimensions* → *Customer* → *Sold-to Party* in the *Rows*
 - j. With the right mouse button, select *Sold-to Party* → *Attributes* → *Country*.
 - k. Use Drag& Drop to include *Key Figure* → *Open order* in the *Columns*.
2. Use the query properties function to define a text variable (Text Sales Organization) in the query description which will display the name of the sales organization selected. Write the description as follows and place the text variable after the abbreviation of the sales organization (SLORG):
Description: **GR##BW305BW305BW305BW305PropertiesSLORG**

Steps to carry out

- a) From the *Query Designer* toolbar, choose *Query Properties*  and make the following settings:
General tab → *Description*: **GR##BW305BW305BW305BW305PropertiesSLORG**,
select the *Select Text Variables* symbol ().
highlight the variable *Text Variable Month* (from) and confirm with *OK*.
3. Since the key date is to be variable in the query, find the relevant variable for this *Key Date*.

Steps to carry out

- a) On the same tab page, go to *Key Date* using the *Values* button ().
- b) On the *Variables* tab, select *Key Date* (technical name *zkey_date*).
4. Now set the scaling factors, document links and Drag&Relate links and change the results position to the top-right. Also specify the type of zero display in the query properties and define the text "Check!" for this.

Steps to carry out

- a. Still in the query properties, go to the *Display* tab.
- b. In *Display Options* put a check in the boxes for:
 - a. *Display Scaling Factors for Key Figures*
 - b. *Display Document Links*
 - c. *Display Drag&Relate Links*
- c. Under *Number Format* → *Results Position* select *Top/Right*
- d. In the dropdown that currently says "display zeros", choose "Show Zeros as"
- e. In the *Show zeros as* entry box, put the text "**Check!**".
5. Now save the query definition

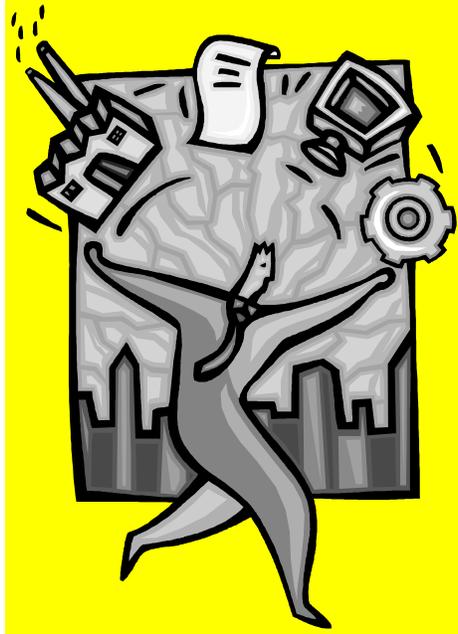
Description: **GR##BW305BW305BW305BW305PropertiesSLORG &0T_CMONT&**

Technical name: **BW305BW305BW305BW30515A##** where ## corresponds to your group number.
Execute the query on the web.

Steps to carry out

- a. You have already defined the description for the query under *Query Properties*. The query name defaults to this. Therefore, you only have to enter the technical name when you save the query.

Business Warehouse Reporting



Solution 13

Unit 8 – Document Integration

Task 1

As the basis for your task, you need to create a query definition that contains the navigational attribute *Division* in the rows, restricted to *High Tech* with a drilldown by material. Display the *Division* by **Name** and the *Material* by **Key**. In the rows, list the *Sold to Party* with an additional breakdown by *customer*. Display the *Sold to Party* characteristic required here by **Name**. To enable users to access documents in the executed report without the need for additional settings, you have to define this in the query definition.

1. Create a new query using the *SAP Demo Sales and Distribution InfoCube* (0D_DECU). Include the characteristics *Division* and the *Material* dimension in the rows. Restrict *Division* to *High Tech*. Select *Sold to party* for the rows area.

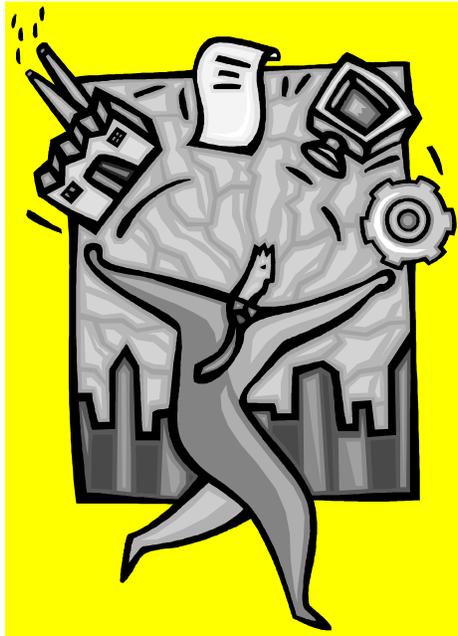
Steps to carry out

- a) Select *SAP Menu* → choose *New*. Base your query off of *SAP Demo Sales and Distribution* -> *SAP DemoCube*.
 - b) In the *Query Designer*, make the following definition:
 - i. Transfer *Division* (from the *organization* dimension) and *Material* (from the *product* dimension) characteristics to the *Rows* using Drag&Drop.
 - ii. Right click on *Division*, choose *Restrict*.
 - iii. Choose *High Tech* for the restriction and click OK.
 - iv. Transfer *Sold to Party* (from the *customer* dimension) into the rows.
 - v. Transfer from Key Figures Net Value and Billed Quantity into the columns.
 - C) From the context menu for *material*, choose → *Properties*
 - D) Under *Display As*, choose *Key*
 - E) Use the same process for *Division* and *Sold to Party*, but change the *display as* to be *name*.
 - F) Under *Query Properties*, set the flag for *Display Document Links* on the *Display* tab.
2. Now save the query definition
Description: **GR##BW305DocumentIntegration**
Technical name: **BW30516A##**,

Steps to carry out

- a) In the *Query Designer*, click the *Save Query* button.
- b) Make the entries described above, *Quit and Use Query* or *Display Query on Web*.

Business Warehouse Reporting



Solution 14

Unit 9 – Exceptions

Task 1

You need to create a query to track your purchasing habits with various vendors within the first half of 1999 and set warnings for your management.

You need to create two exceptions for this query definition.

1. Create a new query using the *SAP Demo Purchasing Data (0D_PU_CO1)* cube. Please include material group and vendor from the characteristics. Set free characteristic for country.

Steps to carry out

Select *SAP Menu* → *SAP Demo Purchasing Cube (0D_PU_CO1)* and choose *New*.

- In the *Query Designer*, use Drag&Drop to include the characteristics *Material Group* (From the *Material Group* dimension) and *Vendor* (from the *Vendor Group* dimension) in the rows.
- Drop *Country* (from the *Country Key* dimension) into free characteristic.
- Drop Key figure *Order Value* and characteristic *Ca.Year/Month* into columns.

2. In the *BEx Query Designer*, using *Exception*, create a *New Exception*. Define the description **Exception Absolute Values** and put a check in the *Active* checkbox. For *Evaluation for* → *Key Figures* choose *Order Values* and on the *Exception Values* tab, define the following absolute values:

From	To	Alert Level
(Leave field empty)	10000	Bad 9
10000	100000	Bad 7
100000	500000	Medium 5
500000	1000000	Good 3
1000000	(Leave field empty)	Good 1

Confirm your exception by choosing *OK*.

Steps to carry out

- From the main screen of the *BEx Query Designer*, click the *Exception*  button.
- If you don't have any exceptions created yet (which we don't) you are automatically brought to the *New Exception* definition.
 - For the *Description* put **Exception Absolute Values**
 - Make sure the *Active* check box is filled in
 - In the *Evaluation for* → *Key Figures* drop down, select *Order Value*.
 - Go down to the *Exception Values* tab
 - Click *New*
 - Enter the first from and to values and the corresponding alert level listed above, then confirm with *Transfer* to place your entries in the list. To define an open value, leave the field empty. Enter the rest of the entries in the table above.
 - Save your exception by choosing *OK*.

3. Now save the query definition
Description: **GR##BW305Exceptions**
Technical name: **BW30517A##**,
4. You now see that only the overall result of your key figure *Order Value* is in color. To include other results in your exception, return to the query definition and to your exception and from the *Cell Restrictions* tab page, select All (Recommended with Relative numbers)

Steps to carry out

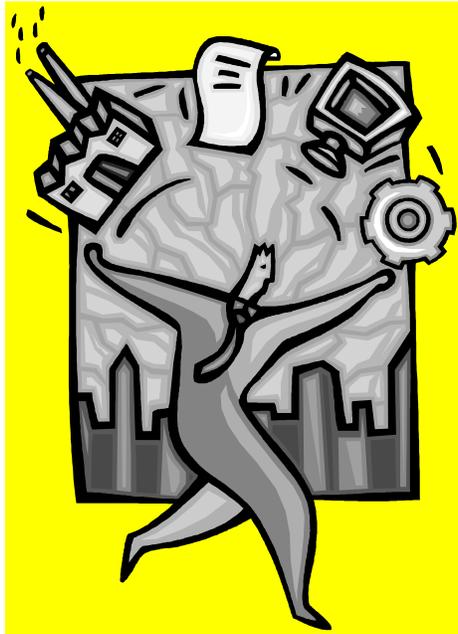
- a. From the main *Query Designer* screen click the *Exceptions* button.
 - b. You can either click the little arrow on the exceptions button and select *Change Exception* or you can click the main part of the button and select **Exception Absolute Values** then click *OK*.
 - c. Go to the *Cell Restrictions* tab and find the *default operator used for all characteristics that are not displayed*.
 - d. Select *All (Recommended with Relative Numbers)* from the drop down and confirm the exception with *OK*.
5. Now your report shows all the entries shaded for the exception. Create a new selection **Half Year** for the period January 1999 to June 1999 in the key figure context menu. Include the *Order Value* key figure in the selection. Save and execute the query, now you see results only for that half a year.

Steps to carry out

- a. From the context menu of Key Figures, select *New Selection*.
- b. For the Description type *Half Year*.
- c. Drag&drop the key figure *Order Value* into the *description* window.
- d. Drag&Drop *Cal. Year/Month* into Description
- e. Right click on *Cal. Year/Month* and choose *Restrict*.
- f. Select *Value Range* and *Between*
- g. Cntl+click January 1999 and June 1999 and add them to the selection.
- h. Click *OK*.
- i. Click *OK* again to save your selection.

Save the query. View it in BEx.

Business Warehouse Reporting



Solution 15

Unit 9 – Exceptions (optional)

Task

You require a query showing the sales for June 2002 for all customers. You want to use an exception to report on the key figure Open order net value. In the query, different levels of sales should receive a different color.

1. Create a query using Info cube **SAP Demo Sales and Distribution overview Cube (0D_SD_C03)**. Put the key figure *Net Value in stat.Cur* (0D_NETVAL_S) in the columns and the characteristics *Sold-to Party* and *Calendar Year/Month* in the rows. Restrict the characteristic *Calendar Year/Month* to June 2002.

2. Assign different colors to the key figure values to highlight the different levels of sales volume. Create an exception called **GR##Sales** for the key figure **Net Value in Stat. Cur**. Test for the exceptional characteristic levels. Specify the following alert levels:

From	To	Alert Level
0	10,000	Bad9
10,000	100,000	Bad8
100,000	300,000	Bad7
300,000	500,000	Medium6
500,000	600,000	Medium5
600,000	800,000	Medium4
800,000	1,000,000	Good3
1,000,000	2,000,000	Good 2
2,000,000	10,000,000	Good 1

Steps to Carry out

- a) In the query definition screen, choose exception -> New exception.

Enter the following values:

Field	Value
Description	Sales
Active	checked
Evaluation for Key Figures	Net Value in stat.Cur (0D_NETVAL_S)

- b) On the *Exception values* tab strip, select the *New* button and enter the specified values in the columns. Confirm your entries each time you complete arrow using the *Transfer button*. Use the drop-down arrow to assign the Alert Level.
 - c) On the *Cell Restrictions* tabs trip, in the field *Default operator used for all*, choose *All (recommended with relative numbers)*.
 - d) Confirm your entries with **OK**.

3. To standardize the basis of the exceptions, translate the currency into US Dollars (5 Dec) (USDN) for the key figure Sales Volume using the mean exchange rate based on today's date.

Steps to carry out

- a) In the BEx Query Analyzer on the context menu of Net value in stat.Cur select *properties*.
- b) Find the currency translation section of the window that pops up and enter the data below.

Field	Value
Target Currency	US Dollars (5 Dec) (USDN)
Conversion Type	Average Rate – Current date

Confirm your entries with **OK**.

- 4. For the characteristic *Calendar Year/Month*, suppress the totals rows to avoid the same information being displayed repeatedly.

Steps to carry out

- a) In the query definition, right-click *Cal. Year/Month* and select *Properties*
 - b) In the *Result display* section, change *Suppress results rows* to *Always*
 - c) click **OK**.
- 5. Save and execute the query using the values below:

Technical Name: **GR##09**

Description: **BW305GR## Exceptions**

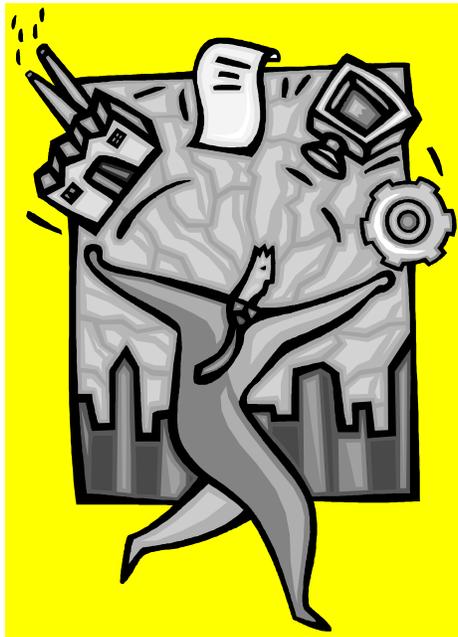
Note that when you run the query you might get warnings saying conversion rates are not available. This is why some of the data is not converted to US dollars.

- 6. Sort the results of the *Net Value in stat.Cur (0D_NETVAL_S)* column in descending orders so as to get a better overview.

Steps to carry out

- a) Place the cursor in any cell in the *Net Value in stat.Cur (0D_NETVAL_S)* column, right-click and select *Sort*→ *Descending*.
- 7. Save the query in your Favorites folder as a new workbook named **BR505GR## Exceptions**. After saving the workbook, close the BEx Analyzer.

Business Warehouse Reporting



Solution 16

Unit 9 – Conditions

Task

In this exercise, you will create a condition to select only the top ten customers that placed the largest orders with you for June 2002.

1. Begin by creating a new query using the Info Cube *Demo Sales and Distribution overview Cube (0D_SD_C03)* found in the SAP Demo Info Area.
Create the query to show the top ten customers based on *Net Value in stat.Cur* in the month of June 2002.

Rows	Sold-to party
Columns	Net value in statistic currency
Free Characteristics	Cal. Year/Month
Filter	None

Steps to carry out

- a) From the BI Easy Access Menu, choose *Business Explorer* → *Query Designer*
- b) Open → *Queries* → *0D_SD_CO3* → *New*
- c) Take *Sold-to Party* from the *Customer Dimension* and drag it to *Rows*.
- d) Drag the key figure *Net value in stat. cur* to *Columns*.
- e) Drag the *cal. Year/month* characteristic from the *Time Dimensions to Free Characteristics*.
- f) Right-click *Cal. Year/Month* and choose *Restrict*
- g) Select *Single values selection* and select *June 2002*. Confirm your entries with **OK**.
- h) On the query definition screen, select *Condition* → *New condition*. 
- i) Enter the following values:

Field Name	Value
Description	GR## June 2002
Active	checked
Evaluate the conditions...for	all characteristics in the drilldown independently
Key figures	Click 'New' button then select Net Value Stat.Cur
Operator	Top N
Values	10

Confirm your entries with **Transfer**, then **OK**.

2. Save and execute the query using the following names:

Field Name	Value
Technical name	GR##Q10
Description	GR## Conditions

- a) From the query definition, choose  *Save*.
 - b) Enter the Technical name and Description as specified.
 - c) Execute the query.
3. Hide the totals rows in your local query view.

Steps to carry out

- a) Right-click one of the Sold-to party values and choose *Sold-to party*→ *Suppress results row*→ *Always*.
4. Save the query in your Favorites folder as a new work book named **GR## Conditions**.

Steps to carry out

- a) On the BEx tool bar, choose  *Save*→ *Save as new work book....*
- b) Select the *Favorites folder*.
- c) Enter **GR## Conditions** in the *Description* field.
- d) Confirm your entries with **OK**.