

BEx Map (incl. Geocoding)



ADDON.NDBWRE

Release 20B



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BEx Map

Purpose

Many characteristics in the Business Information Warehouse, for example, customer, sales region, and country, contain important geographical information. You evaluate geographical information in the BEx Map, along with key figures that are relevant to business. The BEx Map is BW's Geographical Information System (GIS). It is integrated into the Business Explorer.

Integration

The BEx Map is part of the **Business Explorer**. It is used for reporting on geo-relevant data.

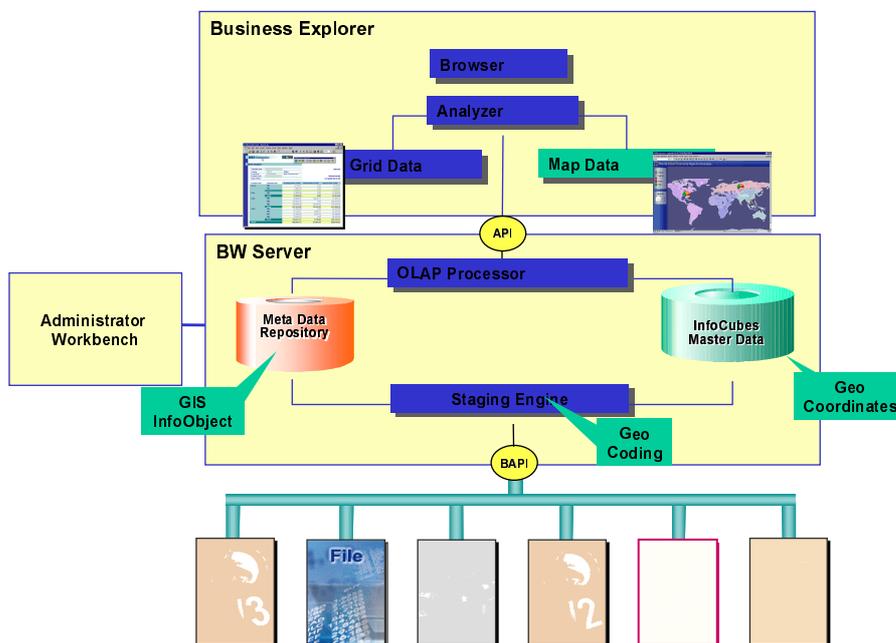
Geo-relevant InfoObjects are stored and maintained in the **Metadata Repository**. The master data for geo-InfoObjects is equipped with geo-attributes. InfoObjects are geocoded using the external tool ArcView from ESRI (Environmental Systems Research Institute).

Features

With the BEx Map, you prepare and evaluate data of a geographical nature (characteristics such as customer, sales region, and country, for example). The geo-relevant data is displayed graphically on a map. Using enhanced navigation options ("geographical drilldown"), regional information can be evaluated more easily at different levels of detail. A map shows the spatial proximity of places and regions, allowing geographical connections to be more clearly represented.

Process Flow

The following graphic illustrates how geographical data is evaluated using the BEx Map:



1. In the InfoObject maintenance, flag the geo-relevant characteristics (country, for example) that you want to use as geo-characteristics.
2. You load the corresponding [shapefiles \[Seite 10\]](#) into the BW system. You maintain the assignment of shapefile and master data (mapping between geo-characteristic and shape file). See [SAPBWKEY Maintaining Static Geo-characteristics \[Seite 13\]](#)

If you want to use the BEx Map to report on geo-characteristics that show information in point form (customer, plant, sales office, for example) you have to geocode these characteristics. See [SAPBWKEY Maintaining Dynamic Geo-characteristics \[Seite 19\]](#)

3. You define a query with geo-characteristics, and insert the query into a workbook. Choose *Layout* → *Attach Map*. Query data of geographical relevance is displayed on the map in the Business Explorer, or on the Web. You navigate around the map to report further on the geo-relevant data.

See:

[Geographical Data Analysis with BEx Map \[Seite 27\]](#)

[Publishing Maps on the Web \[Extern\]](#)

Geocoding

Definition

To display BW data geographically, the system has to connect the data with geographic places and areas (for example, states).

Structure

The geographical information about geographical boundaries of areas that are displayed using static geo-characteristics is stored in [shape files \[Seite 10\]](#). In the shape file, a BW-specific attribute called the SAPBWKEY is responsible for connecting an area on the map with the corresponding characteristic value in BW. This attribute adjusts the object key in the corresponding BW master data table. This process is called the **SAPBWKEY maintenance**. See [SAPBWKEY Maintenance for Static Geo-Characteristics \[Seite 13\]](#)



You can use *ArcView GIS* or other software that has functions for editing dBase files to carry out the SAPBWKEY maintenance (MS Excel, for example).

With data in point form that is displayed using dynamic geo-characteristics, geographical coordinates are added to BW master data. The process of finding geographical coordinates for entries in the master data table is called **geocoding**. See [SAPBWKEY Maintenance for Dynamic Geo-Characteristics - Geocoding \[Seite 19\]](#)



The software *ArcView GIS* from ESRI (Environmental Systems Research Institute) geocodes the InfoObjects.

Integration

You need the software *ArcView GIS* from ESRI. You redeem the voucher that you received with the installation packet from SAP BW to get this software.

The installation packet also contains a CD developed specially by SAP and ESRI. The CD contains a range of maps covering the whole world in various levels of detail.



You can apply directly to ESRI for additional detailed maps in ESRI shape file format (<http://gis.esri.com/intldist/contactint.cfm>).

Static and Dynamic Geo-Characteristics

Definition

Static and dynamic geo-characteristics describe data that refers to geographical information (for example, characteristics such as customer, sales region, and country). You use the **BEx Map** (Business Explorer Map) to display and evaluate this geo-relevant data on a geographical map.

Structure

There are four different types of geo-characteristic:

1. Static geo-characteristics

A static geo-characteristic is a characteristic that describes an area (polygon) for which the geographical coordinates do not often change. Countries or regions are examples of static geo-characteristics.

Data from areas or polygons are stored in [shape files \[Seite 10\]](#) that define the geometry and the attributes of the geo-characteristics.

2. Dynamic geo-characteristics

A dynamic geo-characteristic is a characteristic that describes a place (a specific geographical location, or point on a map) for which the geographical information changes more often. Customers or plants are examples of dynamic geo-characteristics, because they are associated with a geographical point on a map as described by an address, and this information is quite likely to change at some point.

BW adds a range of standard attributes to this geo-characteristic. These standard attributes store the geographical coordinates of the corresponding object for each row in the master data table. There are the following geo-attributes:

Technical Name	Description	Data Type	Length
LONGITUDE	longitude of the location	DEC	15
LATITUDE	latitude of the location	DEC	15
ALTITUDE	altitude of the location (height above sea level)	DEC	17
PRECISID	identifies how precise the data is	NUMC	4
SRCID	ID for the data source	CHAR	4



At present only the LONGITUDE and LATITUDE attributes are used. ALTITUDE, PRECISID and SRCID are reserved for future use.

If you reset the geographical type of a characteristic to *Not a Geo-Characteristic*, these attributes are deleted in the InfoObject maintenance.

3. Dynamic geo-characteristics with values from attributes

To save you having to geocode each dynamic geo-characteristic individually, a dynamic geo-characteristic can get its geo-attributes (longitude, latitude, altitude) from another dynamic characteristic that has been geocoded already (postal code, for example). Customers and plants are examples of this type of *dynamic geo-characteristics with values from attributes* (type 3).

In the BEx Map, this kind of geo-characteristic is displayed as a regular dynamic geo-characteristic that describes a location (geographical information as a point on map). The geo-attributes described above are not added to the master data table on the database level.

Instead, the geo-coordinates are stored in the master data table of a regular attribute of the characteristic.



You want to define a dynamic geo-characteristic for *Plant* with the postal code as an attribute. The geo-coordinates are generated from the postal code master data table during the runtime.



This method avoids redundant entries appearing in the master data table.

4. Static geo-characteristics with geo-attributes

A static geo-characteristic that includes geo-attributes (longitude, latitude, altitude) which geo-characteristics of type 3 are able to refer to. The postal code, for example, can be used as a *static geo-characteristic with geo-attributes*.



OPOSTCD_GIS (postal code) is used as an attribute in the dynamic geo-characteristic OBPARTNER (business partner) that gets its geo-coordinates from this attribute. In this way, the locational information for the business partner is stored on the level of detail of the postal code areas.

See also:

[Delivered Geo-Characteristics \[Seite 12\]](#)

Shape Files

Definition

ArcView GIS software files from ESRI that contain digital map material of areas or polygons (that is, shapes). Shape files define the geometry and attributes of static geo-characteristics.

Use

Shape files form the basis for displaying BW data on the BEx Map, as well as on maps on the Web.

Structure

Format

The format of ArcView shape files uses the following files with special file enhancements:

.dbf – dBase file that saves the attributes or values of the characteristic

.shp – saves the current geometry of the characteristic

.shx – saves an index for the geometry

These three files are saved for each static geo-characteristic in the Business Document Service (BDS) and loaded to the local computer from BDS when you use BEx Map.

Shape file Data from the ESRI BW Mapping Data CD

The map data from the ESRI BW mapping data CD was selected as the basic reference data level to provide you with a detailed map display and also with thematic mapping material on the levels of world maps, continents and individual countries. The reference data levels involve country boundaries, state boundaries, towns, streets, railways, lakes and rivers. The mapping data is subdivided into data for 21 separate maps.

There is mapping data for:

- a world map
- seven maps on continent level, for example, Asia, Europe, Africa, North America, South America.
- 13 maps on country level: The data for countries may vary. Most of the country boundaries are from 1960-1988, some countries have been updated to their position in 1995.

The names of the shape files on the ESRI BW mapping data CD follow a three-part naming convention.

- The first part consists of an abbreviation of the thematic content of the shape file, for example, *cntry* stands for a shape file with country boundaries.
- The second part of the name indicates the level of detail. There are, for example, three shape files with country boundary information at different levels of detail. The least detailed shape file begins with *cntry1*, whereas the most detailed shape file begins with *cntry3*.
- The third part of the name indicates the version number of the shape file, based on the last two digits of the year beginning with the year 2000. Therefore, the full name of the shape file with the most detailed country boundary information is *cntry300*.

All shape files on the ESRI BW mapping data CD already contain the SAPBWKEY column. For countries, the two-figure SAP country key is entered in the SAPBWKEY column.



The file *Readme.txt* on the ESRI BW mapping data CD contains further, detailed information on the delivered shape files, the file name conventions used, the mapping data descriptions and specifications, data sources, and how up-to-date the data is.

Integration

While the BEx Map is running, the shape files are downloaded from BW to the file system of the local computer on which BEx Map is running. The files are copied to the directory that is identified in the Windows environment by the variable \$TEMP. If a specific shape file is already in this directory, it is not copied again. If the shape file has been changed in the Business Document Service (BDS) in the meantime, the latest version is copied automatically into the local directory.

Depending on the level of detail, shape files can be quite large. The shape file cntry200.shp with the country boundaries for the entire world is around 2.2 megabytes. For small organizational units, such as federal states, the geometric information is saved in several shape files. That is, you can assign a characteristic to several shape files (for example, states in Germany and in France.).

Delivered Geo-Characteristics

Definition

With Business Content, SAP BW delivers a range of geo-characteristics.

Structure

The following are the most important delivered geo-characteristics:

Static geo-characteristics

Technical name	Description
0COUNTRY	Country key
0DATE_ZONE	Time zone
0REGION	Region (state, province, county)

Dynamic geo-characteristics

Technical name	Description
0APO_LOCNO	Location number
0TV_P_LOCID	IATA location [Extern]

Dynamic geo-characteristics with values from attributes

Technical name	Attributes	Description
0BPARTNER	0POSTCD_GIS	Business partner
0CONSUMER	0POSTCD_GIS	Consumer
0CUSTOMER	0POSTCD_GIS	Customer number
0PLANT	0POSTCD_GIS	Plant
0VENDOR	0POSTCD_GIS	Vendor

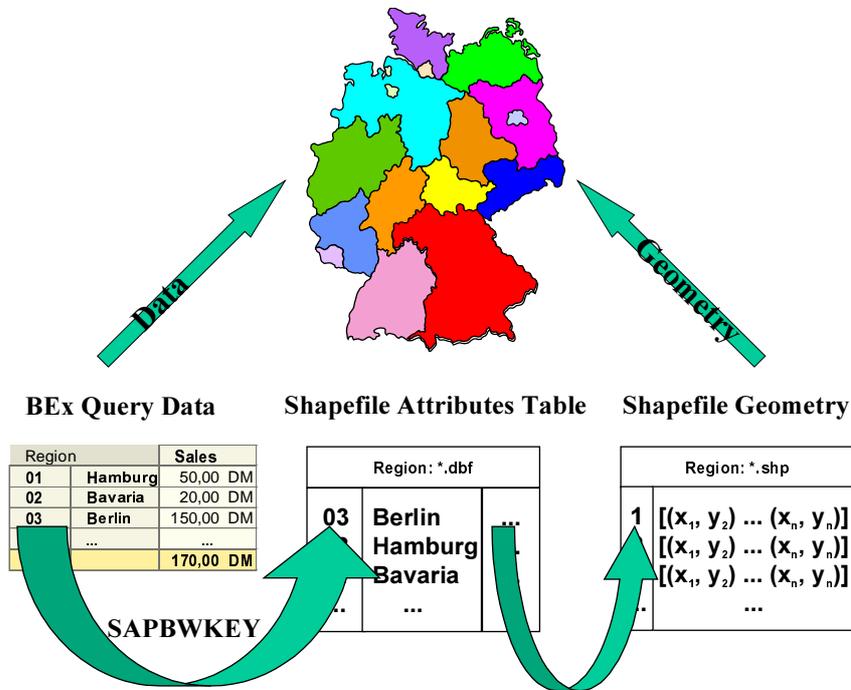
Static geo-characteristics with geo-attributes

Technical name	Description
0CITYP_CODE	Locational area coding for location and street data.
0CITY_CODE	Location coding for location and street data
0POSTALCODE	Postal code
0POSTCD_GIS	Postal code (geo-relevant)

SAPBWKEY Maintenance for Static Geo-Characteristics

Purpose

During runtime, BW data is combined with a corresponding [shape file \[Seite 10\]](#). This enables the BW data to be displayed in geographical form (country, region, and so on) using color shading, bar charts, or pie charts. The SAPBWKEY makes sure that the BW data is assigned to the appropriate shape file.



In the standard shape files delivered with the ESRI BW map CD, the SAPBWKEY column is already filled with the two-character SAP country keys (DE, EN, and so).

You can use these shape files without having to maintain the SAPBWKEY beforehand.

Prerequisites

You have marked the geo-relevant characteristic as geo-relevant in the [InfoObject maintenance \[Extern\]](#). See [Tabstrip: Business Explorer \[Extern\]](#)



Before you are able to follow the example that explains how you maintain the SAPBWKEY for static geo-characteristics, [SAP DemoContent \[Extern\]](#) must be active in your BW system.



You can use ArcView GIS from ESRI to maintain the SAPBWKEY, or you can use other software (MS Excel or FoxPro, for example) that has functions for displaying and editing dBase files.

Process

For static geo-characteristics (such as *Country* or *Region*) that represent the geographical drilldown data for a country or a region, you have to maintain the SAPBWKEY for the individual country or region in the attributes table of the shape file. The attributes table is a database table stored in dBase format. Once you have maintained the SAPBWKEY, you load the shape files (.shp, .dbf, .shx) into

BW. The shape files are stored in the Business Document Service (BDS), a component of the BW server.

The following section uses the example of the 0D_COUNTRY characteristic to describe how you maintain the SAPBWKEY for static geo-characteristics. You use the CNTRY200 shape file from the ESRI BW map data CD. The CD contains the borders of all the countries in the world. The maintenance of the SAPBWKEY for static geo-characteristics consists of the following steps.

1. You [create a local copy of the shape file from the BW data CD \(.shp,.shx,.dbf\) \[Seite 15\]](#).
2. You [download BW master data into a dBase \(.dbf\) file \[Seite 16\]](#).
3. You [open the dBase attributes table for the shape file \(.dbf\) in Excel, and maintain the SAPBWKEY column \[Seite 17\]](#).
4. You [load the copy of the shape file into BW \[Seite 18\]](#).



In this example scenario using the 0D_COUNTRY characteristic, the SAPBWKEY column is already maintained in the attributes table and corresponds with the SAP country keys in the master data table. If you maintain a shape file where the SAPBWKEY has not been maintained, or where the SAPBWKEY is filled with values that do not correspond to BW master data, you proceed as described in the steps above.

Result

You are now able to use the characteristic as a static geo-characteristic in the BEx Map. Every user that works with a query containing this static geo-characteristic, is able to attach a map to the query and analyze the data on the map directly.



If you want to publish maps on the Web, you have to install the shape files on the ITS. See [Publishing Maps on the Web \[Extern\]](#) → Section: **Copying Maps to the Shapes Directory on the ITS**

Creating a Local Copy of the Shape File

Use

You need a local copy of the shape file before you are able to maintain the SAPBWKEY column in the attributes table of the shape file.

Procedure

1. Use your file manager (Windows Explorer, for example) to localize the three files *cntry200.shp*, *cntry200.shx* and *cntry200.dbf* on the ESRI BW map data CD, and copy the files to the C:\SAPWorkDir directory, for example.
2. You must deactivate the *Write Protected* option before you are able to edit the files. (Select the files and choose the *Properties* option from the context menu (right mouse-click). Under *Attributes*, deactivate the *Write Protected* option).

If you do not have access to the ESRI BW map data CD, proceed as follows:



The files are already maintained in the BW Business Document Service (BDS). The following example explains how, for the characteristic 0D_COUNTRY in InfoCube 0D_SD_C0, you download these files from the BDS to your local directory.

1. Log onto the BW system and go to the InfoObject maintenance (transaction **RSD1**). This takes you to the *Edit InfoObjects: Initial Screen* dialog box.
2. In the InfoObject field, specify 0D_COUNTRY and choose *Display*. This takes you to the *Display Characteristic 0D_COUNTRY: Detail* dialog box.
3. Choose the *Business Explorer* tabstrip. In the *BEx Map* area, 0D_COUNTRY is displayed as a static geo-characteristic.
4. Choose *Display Shape files*. This takes you to the *Business Document Navigator* that already associates three shape files with this characteristic.
5. Open up the shape files completely in the *BW Metaobjects* tree.
6. Select the .dbf file BW_GIS_DBF and choose *Export Document*. This loads all the files to your local SAPWorkDirectory. (The system proposes the C:\SAPWorkDir directory as your SAPWorkDirectory).
7. Repeat the last step for the .shp (BW_GIS_SHP) and .shx (BW_GIS_SHX) files.

Downloading BW Master Data into a dBase File

Use

To be able to maintain the SAPBWKEY column in the shapefile attribute table, you have to specify the corresponding SAP BW country key for every row in the attribute table. Since this information is contained in the BW master data table, you have to download it into a local dBase file to compare it with the entries in the attribute table and to be able to maintain the SAPBWKEY.

Prerequisites

You have [created a local working copy of the shapefile \[Seite 15\]](#)

Procedure

1. Log on to the BW system and go to the InfoObject maintenance (transaction **RSD1**). You reach the *Edit InfoObjects: Start* screen.
2. In the InfoObject field, enter 0D_COUNTRY and choose *Display*. You reach the *Display Characteristic 0D_COUNTRY: Detail* screen.
3. Choose the *Business Explorer* tabstrip. In the *BEx Map* area, 0D_COUNTRY is shown as a static geo-characteristic.
4. Choose *Geo Data Download (Everything)*.
5. Accept the file name proposed by the system by choosing *Transfer*.



The proposed file name is made up of the technical name of the characteristic and the .dbf extension. For example, in this case the file is called 0D_COUNTRY.DBF.



If the *Geo Data Download (Everything)* pushbutton is deactivated (gray), there is no master data for the InfoObject. If this is the case, download the texts for the InfoObject manually in order to get to the SAPBWKEY.

See also: [Creating InfoObjects: Characteristics \[Extern\]](#) [Tabstrips: Master Data/Texts \[Extern\]](#)

Result

The status bar displays information on how much data has been transferred.



If you have not specified a directory for the file name, the file is saved in the local SAP work directory.

Maintaining the SAPBWKEY Column

Prerequisites

You have worked through the following steps:

[Created a local copy of the shape file \[Seite 15\]](#)

[Downloaded the BW master data into a dBase file \[Seite 16\]](#)

Integration

You maintain the SAPBWKEY in the dBase file that contains the attributes table and has the **.dbf** suffix in its file name.

Procedure

1. Start Microsoft Excel, and choose *File* → *Open*.
2. In the *File Type* field, choose *dBASE Files (*.dbf)* from the dropdown box.
3. From the *C:\SAPWorkDir* directory, choose *cntry200.dbf*, and open the file. The attributes table for the shape file is displayed in an Excel workbook.
4. Repeat this process for the *0D_COUNTRY.DBF* file that you created in the step where you [loaded BW master data into the dBase file \[Seite 16\]](#). This file shows which SAPBWKEY values are used for the individual countries.
5. Use the short description (*0TXTSH* column) in the *0D_COUNTRY.DBF* file to compare and adjust the entries in the two tables.



The ESRI BW map data CD, delivered by ESRI, contains the SAPBWKEY (that corresponds to the SAP country key) for the *0D_COUNTRY* characteristic. This means that the *SAPBWKEY* column in the *cntry200.dbf* file already contains the required values.

You transfer the SAPBWKEY to the attributes table of the shape file manually

- if you are using a different country key
- for characteristics where the *SAPBWKEY* column has not been defined, or has been filled with the wrong values



With compounded characteristics, transfer the complete SAPBWKEY, for example, for region *01* compounded to country *DE* you transfer the complete value *DE/01*.

Under no circumstances change the sequence of the entries in the attributes table (for example, by sorting or deleting rows!) If you were to change the sequence of the entries at all, it would mean that the attributes table would no longer agree with the index and with the geometry files.

6. Once you have finished maintaining the SAPBWKEY column, you save the attributes table for the shape file (the *cntry200.dbf* file in this example).

Uploading an Edited Shapefile into BW

Prerequisites

You have completed the following steps:

[Creating a Local Working Copy of the Shapefile \[Seite 15\]](#)

[Downloading BW Master Data into a dBase File \[Seite 16\]](#)

[Maintaining the SAPBWKEY Column \[Seite 17\]](#)

Procedure

The last step is to attach the shapefile InfoSet (.shp, .shx, .dbf) to the InfoObject, by uploading it into the Business Document Service (BDS) on the BW server.

1. Log on to the BW system and go to the InfoObject maintenance (transaction **RSD1**). You reach the *Edit InfoObjects: Start* screen.
2. In the InfoObject field, enter 0D_COUNTRY and choose *Maintain*. You reach the *Change Characteristic 0D_COUNTRY: Detail* screen.
3. In the *Business Explorer* tabstrip, choose *Upload Shapefiles*. The *Business Document Service: File Selection* dialog box appears.
4. Select the *cntry200.shp* file and choose *Open*. The Business Document Service suggests entries for the file name, description, and so on, and allows you to enter key words that will make it easier for you to find the file in BDS at a later date.
5. Choose *Continue*.
6. The system automatically asks you to upload the *cntry200.dbf* and *cntry200.shx* files for the shapefile.

Result

You have uploaded the edited shapefile into BW. You can now use the characteristic in the BEx Map. Every user that works with a query that contains the 0D_COUNTRY InfoObject can now attach a map to the query and analyze the data on the map.

SAPBWKEY Maintenance for Dynamic Geo-characteristics – Geocoding

Purpose

To display dynamic geo-characteristics as points on a map, you have to determine the geographic coordinates for every master data object.



The master data table for dynamic geo-characteristics is therefore extended with a number of standard geo-attributes such as LONGITUDE and LATITUDE (see [Static and Dynamic Geo-Characteristics \[Seite 8\]](#)).

Prerequisites

You have marked the geo-relevant characteristic as geo-relevant in the [InfoObject maintenance \[Extern\]](#). See [Tabstrip: Business Explorer \[Extern\]](#)



To be able to follow the example which explains the process of SAPBWKEY maintenance for dynamic geo-characteristics, [SAP DemoContent \[Extern\]](#) must already be active in your BW system.

Process

An address data field for the master data field is required for geocoding, which takes place in ArcView GIS. ArcView GIS determines the geographical coordinates of addresses, by identifying these addresses in a reference shape file. To carry out this process, you have to load the BW master data table into a dBase file. The geographical coordinates are determined for every master data object. After you have done this, convert the dBase file with the determined geo-attributes into a CSV file (comma-separated value file), which you can use for a master data upload into the BW master data table.

The following steps explain the process of SAPBWKEY maintenance and geocoding dynamic geo-characteristics using the 0D_SOLD_TO characteristic (sold-to party) from the 0D_SD_C03 *Sales Overview Demo-Content InfoCube*.

1. [Downloading BW Master Data into dBase \(.dbf\) Files \[Seite 20\]](#)
2. [Creating New ArcView GIS Projects \[Seite 21\]](#)
3. [The Geocoding Process \[Seite 24\]](#)
4. [Converting dBase Files into CSV Files \[Seite 26\]](#)
5. Schedule a master data upload for the CSV file.



The system administrator is responsible for the master data upload.

Result

You can now use the characteristic as a dynamic geo-characteristic in the BEx Map. Every user that works with a query that contains this dynamic geo-characteristic, can now attach a map to the query and analyze the data on the map.

Downloading BW Master Data into a dBase File

Use

The first step in the SAPBWKEY maintenance for dynamic geo-characteristics and their geocoding is to download the BW master data table into a dBase file.

Procedure

1. Log on to the BW system and go to the InfoObject maintenance (transaction **RSD1**). You reach the *Edit InfoObjects: Start* screen.
2. In the InfoObject field, specify the name of the **dynamic** geo-characteristic that you want to geocode (in this example: 0D_SOLD_TO).
3. Choose *Display*. You reach the *Display Characteristic 0D_SOLD_TO: Detail* screen.
4. Choose the *Business Explorer* tabstrip. In the *BEx Map* area 0SOLD_TO is shown as a *dynamic geo-characteristic*.
5. Choose *Geo Data Download (Everything)*.



If you only want to maintain those entries that have been changed since the last attribute master data upload, choose *Geo Data Download (Delta)*. The geo-data has to be downloaded in the delta version before you execute the realignment run for the InfoObject, otherwise the delta information is lost.

6. The system asks you to select a geo-attribute that you want to include in the dBase file. The system only displays those attributes that were defined as geo-relevant. In this case, select both attributes: 0D_COUNTRY and 0D_REGION.
7. Choose *Transfer Selections*.
8. Accept the file name proposed by the system by choosing *Transfer*.



The proposed file name is made up of the technical name of the characteristic and the .dbf extension. You can change the file name and create a directory. If you do not specify a path, the file is save automatically in the SAP work directory.

Result

The status bar displays information on how much data has been transferred.

Creating New ArcView GIS Projects

Use

Before you are able to geocode dynamic characteristics, you have to create a new ArcView GIS project. All the files that you need in the geocoding process are organized as an ArcView GIS project. Each project is identified by the *.apr* suffix added to the project name.

Prerequisites

You have [downloaded BW master data into a dBase \(.dbf\) file \[Seite 20\]](#).

Procedure

Starting a New ArcView GIS Project

1. Start ArcView GIS.
2. In the *Welcome to ArcView GIS* dialog box, choose the *Create a New Project: Empty Project* option.
3. Choose *OK*. You get to the *Unnamed* project dialog box.
4. In the menu toolbar, choose *File* → *Save Project* to give the project a name and save it.
5. In the *File Name* field, specify a name for the project, *BW Geocoding*, for example, and select the local directory in which you want to save the project.
6. Choose *OK*.

Adding BW Master Data Attributes

1. In the *BW Geocoding* project dialog box, choose the *Tables* symbol.
2. Choose *Add* to add the BW master data attributes to the project – in the case the dBase file *0D_SOLD_TO.DBF*.
3. Choose the file *0D_SOLD_TO.DBF* from the directory that you stored the project in (the default directory is *SAPWorkDirectory: C:\SAPWorkDir*).
4. Choose *OK*. The dBase file is added to the list of names in the *BW Geocoding* project dialog box. At the same time, the dBase table opens in a separate window.



The table has 5 columns: *0d_sold_to*, *0d_country*, *0d_region*, *Masterkey*, *Otxtsh*, *1_0d_count* and *1_0d_regio*. The *1_0d_regio* column contains the shortened keys for the fields *0d_country* and *0d_region*, because *0d_region* is compounded with *0d_country*.



This table always contains

- all the attributes and keys, in both internal and external format
- the master key (a value that includes the values for all the keys in a compounded characteristic)
- a text field

Adding a Reference Shape file

A reference shape file is used to determine the geographical coordinates of the addresses of the dynamic geo-characteristics in order to display them in point form on the map. It controls how precisely the address coordinates are determined.



Since the geocoded coordinates refer to the central points in the polygons of the shape file, the accuracy of the geocoding is directly related to the level of detail in the shape file. The geocoding on the postal code level, for example, is more accurate than the geocoding on the regions level.

1. Install the ESRI BW map data CD and choose a shape file as a reference, for example, *g_stat00* containing the state boundaries of the German states.
2. Create a local copy of the reference shape file, in this example, this is a copy of the files *g_stat00.dbf*, *g_stat00.shp*, *g_stat.00shx*.
3. Deactivate the *Write Protected* option for the *g_stat00.dbf* file if you want to edit the file. (Select the file and choose the *Properties* option from the context menu (right mouse-click).) Under *Attributes*, deactivate the *Write Protected* option).
4. Adjust the *SAPBWKEY* column for the *g_stat00.dbf* file so that it matches the master key in the *OD_SOLD_TO.DBF* file. Save the file. Under no circumstances change the name of the file!



If you want to geocode the postal code level, you do not have to maintain the *SAPBWKEY* in the reference shape file beforehand. In this instance, it is the postal code that guarantees that the BW master data for the dynamic geo-characteristic agrees with the geographical information in the reference shape file.

5. [Load the SAP enhancement from ArcView \[Seite 23\]](#).
6. In the project dialog box *BW Geocoding*, choose the *Views* symbol. Double-clicking on *Views* opens a new window, *View 1*.
7. In the menu toolbar, choose *View → Add Topic*, and in the *Add Topic* dialog box that appears, choose the *g_stat00.shp* file from your local directory. From the left side of the box, select the *g_stat00.shp* file, and choose *OK*. The reference shape file is embedded into the *View1* window.
8. In the *View1* window, select the pushbutton on the left next to *g_stat00.shp*. On the right-hand side of *View1*, the reference shape file is displayed as a map.



A *Topic* is similar to a shape file in that it is a source of spatial data or individual map layers. The topics concept is, however, a lot more comprehensive. For more information, see the ArcView help.

Saving a Project

In the menu toolbar, choose *File → Save Project* to save your project.



If you want to use the reference shape file *g_stat00* to geocode BW master data a second time, you can use the *BW Geocoding* project again. In the *Welcome to ArcView GIS* dialog box, choose the *Open Existing Project* option.

Loading SAP Enhancements from ArcView

Use

SAP offers an enhancement to ArcView GIS that simplifies the geocoding process in BW.



You need the SAP enhancement to geocode only the dynamic geo-characteristics.

Prerequisites

You have started ArcView.

Procedure

1. Choose *File* → *Enhancements*.
2. Choose *SAP*.
3. Choose *Create Standard*. This means that the enhancement is loaded automatically every time you start ArcView.
4. Choose *OK*.



The list of available enhancements includes all the enhancement files in the directories identified by the variables *\$AVEXT* and *\$USEREXT*. The enhancement files are store by default on the *C:\esri\av_gis30\arcview\ext32* directory. All the enhancement files have the suffix *.avx* added to their file name.

The name of the SAP enhancement files is *SAPext.avx*. In the list of available enhancements it appears as *SAP*.



If you cannot find the SAP enhancement, you might need to copy it from the BW Add On installation path (default path *C:\Program Files\SAPpc\BW\ArcView*) to the ArcView enhancement path (default path *C:\ESRI\Av_gis30\ArcView\Ext32*).

Result

The SAP enhancement is loaded. In the menu toolbar, the extra *SAP* menu appears alongside the two action menus *Start Geocoding* and *Create Attributes*.



Note that these additional functions are only visible if you are working with an active ArcView project view.

The Geocoding Process

Use

During the geocoding process, the addresses in the BW master data table, which you have already loaded into a dBase table, are adjusted to match the geographical data in the reference shape file. The reference shape file localizes the addresses and provides them with geographical attributes so that the addresses can be displayed as points on a map.

Prerequisites

You have [downloaded the BW master data table for the dynamic geo-characteristic into a dBase file \[Seite 20\]](#) and [created a new ArcView GIS project \[Seite 21\]](#).

Procedure

Determining the address format of the reference shape file

ArcView uses an address format to determine how the addresses are determined in the reference shape file. The address format determines the method that is used to geocode the addresses, and includes the definition of the data fields for the reference shape file that is needed in the geocoding process.

Use the *Single Field* address format in this instance. This format is used in geocoding that is based on the value of a single field in the attributes table. The format contains one field, the *KeyField*. You choose the key that you want to use as the basis for comparing the attributes table with the reference shape file.

1. From the menu toolbar, choose *Topic* → *Properties*. This takes you to the *Properties: Topic* dialog box.
2. From the left-hand side of the box, choose the *Geocoding* symbol.
3. In the *Address Format* field, choose *Single Field* from the dropdown box.
4. In the *KeyField* field, choose *Sapbwkey* from the dropdown box.
5. Choose *OK*. Confirm that you want to create the geocoding indexes with a single field, by clicking on *Yes*.

Two additional files are added to the directory in which you stored the 0D_SOLD_TO.SHP file: 0D_SOLD_TO.SHX and 0D_SOLD_TO.MXS.

Geocoding

1. From the menu toolbar, choose *SAP* → *Start Geocoding*. This takes you to the *Geocode Addresses* dialog box.
2. Transfer the entries from the following fields:
 - *Reference Topic*: G_stat00.shp
 - *Connection Field*: <None>
 - Use the Address Format: Single Field
 - *Addresses Table*: 0d_sold_to.dbf
3. In the *Addresses Field* specify 1_0D_REGIO, for example. This is the table field containing the address that you want to geocode, in this case the compounded key for the fields 0D_COUNTRY and 0D_REGION (for example, DE/01)
4. *Geocoded Topic*:

During the geocoding process, ArcView creates a new shape file, the geocoded topic that contains the geocoded addresses. This file is used in the master data upload.

You can accept the file name proposed by the system in the *Geocoded Topic* field, or you can specify a name of your own. Type *Geocd_regio.shp*, for example, into the field.

5. Choose *Adjust*. The geocoding process is run in the background.
6. Once the process is complete the *Addresses Readjusted* dialog box tells you how many addresses have been geocoded using the reference data. You can assign manually any addresses that have not been geocoded.
7. Choose *Finished*.

The geocoded topic files are created in the C:\TEMP directory. This is where the three files *Geocd_regio.shp*, *Geocd_regio.dbf* and *Geocd_regio.shx*. are stored.



In this example, not all of the addresses could be localized, because the master data that you downloaded has not been maintained fully in the DemoCube. The file name for the geocoded topic can be changed in certain circumstances.

Creating geo-attributes

1. The geocoded topic is added automatically to View1. In View1, select the radiobutton next to *Geocd_regio.shp* to display on the map the locations that have been found in the addresses table.
2. Choose *Topic* → *Table* to display the attributes table for the generated topic. This table is similar to the addresses table and contains a number of extra ArcView-specific columns.
3. Choose *View* followed by the name of the geocoded topic to create the geo-attributes in the attributes table of the geocoded topic
4. From the menu toolbar, choose *SAP* → *Create Attributes*.

The geo-attributes *Latitude*, *Longitude*, *Altitude*, *SourceID* and *PrecisID* are processed very quickly and added to the attributes table in the *Geocd_regio.shp* file

Converting dBase Files into CSV Files

Prerequisites

You have completed the following steps:

[Downloaded BW master data into a dBase file \[Seite 20\]](#)

[Created a new ArcView GIS project \[Seite 21\]](#)

[Completed the geocoding process \[Seite 24\]](#)

Integration

As part of the geocoding process you obtained a geocoded theme. The attribute table for the geocoded theme contains the SAPBWKEY along with the geo-attributes. Since the attribute table is saved in dBase file format, you now have to convert the attribute table into a CSV (comma separated value) format that can be processed by the BW Staging Engine. You can convert the table in Microsoft Excel.

Procedure

1. Launch Microsoft Excel and choose *File* → *Open...*
2. From the selection list in the field *Files of Type*, choose *dBase Files (*.dbf)*.
3. From the *C:\TEMP* directory, choose the *Geocd_regio.dbf* attribute table. Excel displays the attribute table with the geo-attributes.
4. Choose *File* → *Save As*
5. From the *Save as Type* selection list, choose *CSV (Comma Delimited)*.
6. Save the table.

Result

You now have a CSV file with the geo-attributes of the dynamic geo-characteristic 0D_SOLD_TO. You system administrator can now schedule a master data upload.

Geographical Data Analysis with BEx Map

Use

With the BEx Map that is integrated into the BEx Analyzer, you can prepare and analyze data that has geographical relevance. The geo-relevant data is displayed on a map, so that you can see regional features and geographical connections at a glance.

Integration

The BEx Map is part of the BEx Analyzer, and appears in a new worksheet in the workbook. The size of the BEx Map corresponds to the initial size of the workbook.

Prerequisites

In the BEx Analyzer, you have to execute a query containing at least one geo-relevant characteristic, meaning that the query contains at least one InfoObject (characteristic) that has been defined as a *static geo-InfoObject* in the InfoObject maintenance, and for which data with geographical relevance exists.

Functions

The BEx Map allows you to analyze regional features at different levels of detail. The basic concept underlying the BEx Map, is that of laying different map layers, each containing various geographical data, one on top of the other, and displaying at them on one map. A map layer behaves in the same way as a transparent slide, which can be changed from visible to invisible. For every map layer, you can choose various types of graphical presentation (Renderers) to display your data, for example, color shading, bar charts or pie charts. You can arrange the map layers hierarchically, for example, continents → countries → states → districts, and navigate from one map layer to the next.

Choosing various renderers to display your data, also means that you can display several key figures on a single map layer, for example, as bar charts and color shading.

Activities

Execute a query that has geo-relevant data. Choose *Layout* → *Attach Map* from the BEx standard toolbar. A new worksheet appears in the workbook with the name of your query in the title line.

The BEx Map consists of the following parts:

Map Design

In the map design area (left) you define the navigation state for the query that you want to see on the map. Here, you can specify the map layer on which you want to navigate, and set the key figures that you want to display.

Map View

The maps are displayed in the chosen setting in the map view area (middle). Using the symbols from the BEx Map toolbar, you can pan, zoom in and zoom out, and determine the sequence of the map layers. The buttons found under the map, display

which map layers are visible, and allow you to display and remove the different map layers quickly.

Legend

The legend (to the right) helps to explain the data displayed on the map. The legend gets its values from the query, and adjusts itself dynamically to the current navigational state.

See also:

[Analyzing Data Geographically Using the BEx Map \[Seite 29\]](#)

Analyzing Data Geographically Using the BEx Map

Prerequisites

You have executed a query with geo-relevant data, and chosen *Layout* → *Attach Map* from the toolbar.

Procedure

Map Design Settings

You can see your key figures and characteristics of your query in the map design. The static geo-relevant characteristics are displayed as tabstrips. In every tabstrip, the remaining key figures and characteristics of the query are ready for you to select. The fields with the key figures and characteristics they contain, are arranged in a way that enables you, for example, to make the following settings: “*Show me* the key figure (sales figures, for example) *by* the characteristic (calendar year/month, for example) *using* the renderer (bar chart, for example)”.

1. In the tabstrips, choose the map layer that you want to work with.

You can choose from the following settings options:

Display a key figure	<ol style="list-style-type: none"> 1. Choose a key figure from the <i>Show me...</i> field. 2. In the <i>using...</i> field, choose a renderer (color shading, bar chart or pie chart). <p>If you want to display only one key figure on the map, we recommend that you display it as color shading.</p>
Display several key figures	<ol style="list-style-type: none"> 1. Choose the key figures you want to display from the <i>Show me...</i> field. 2. In the <i>using...</i> field, choose a renderer (color shading, bar chart or pie chart). <p>We recommend that you display several key figures as bar charts or pie charts, because with color shading, you can only display one key figure.</p>
Display key figures restricted by characteristic	<ol style="list-style-type: none"> 1. In the <i>Show me...</i> field, select a key figure (sales figures, for example) and, in the <i>by</i> field, choose a characteristic (calendar year/month, for example) that you want to use to drilldown on the characteristic. 2. In the <i>using...</i> field, choose a renderer (color shading, bar chart or pie chart). <p>If you want to see both the relative values and the sum of the characteristic values, we recommend that you use a pie chart.</p> <p>If you want to see an absolute comparison of the individual values, we recommend that you choose a bar chart.</p>

Superimpose key figures	<ol style="list-style-type: none"> 1. In the <i>Show me...</i> field, select the key figures you want to display, and choose a renderer (color shading, bar chart or pie chart) in the <i>using...</i> field. <p style="text-align: center;">Since the underlaid key figure is displayed automatically as color shading, we recommend that you display these key figures as bar charts or pie charts.</p> 2. Choose <i>Over</i>. A window appears in which you choose the overlaid key figure. This is displayed automatically as color shading.
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2. Choose *Apply to map*.

Displaying Dynamic Geo-characteristics

You can also display dynamic geo-characteristics on the map (**see also:** [Static and Dynamic Geo-characteristics \[Seite 8\]](#)). Since dynamic geo-characteristics deal with regional information (customer / vendor addresses, for example) the regional location display enables you to see distribution within a region.

1. Choose *Show* in the *Regional Locations* area.
2. Select the geo-characteristic you want to use.
3. Choose *Apply to map*.

Setting up the Properties of the Graphical Displays

You determine the properties of the graphical displays as follows:

1. Choose the *Settings...* button located next to the *using...* field. You get to the *Renderer Properties* popup.
2. You can change the title of the legend here: Choose *Change Default Title* and enter a title in the field *Legend Title*.
2. You can set the following properties for every renderer:

Color shading	Bar chart	Pie chart
<ul style="list-style-type: none"> • Color selection • Color ramp • Number of colors used 	<ul style="list-style-type: none"> • Color selection • Bar height • Bar width 	<ul style="list-style-type: none"> • Color selection • Maximum pie size • Minimum pie size

Setting Regional Location Symbol Properties

You determine the properties of the regional location symbols as follows:

1. Choose the *Properties* button in the *Regional Locations* area. You get to the *Symbol Settings* popup.
3. You can change the title of the legend here: Choose *Change Default Title* and enter a title in the field *Legend Title*.
3. You can set the following properties for the regional location symbols:
 - Symbol type: Circle, square, triangle, cross
 - Symbol color
 - Symbol size

Navigation Options in the *Map View*

Default Navigation

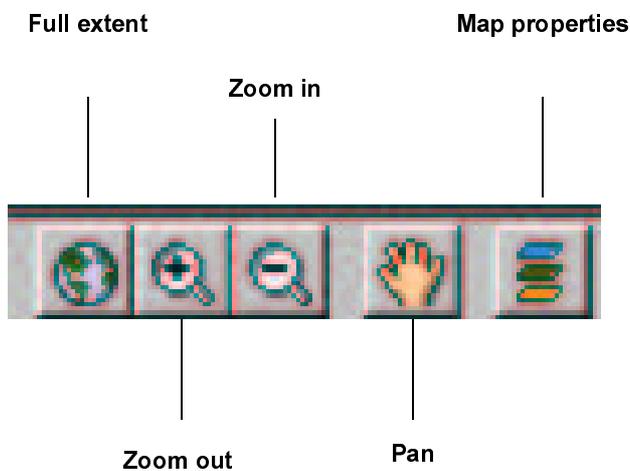
- You can **zoom in on a detailed view**.

Lasso a part of the map that you want to look at in more detail (hold down the left mouse button and select the section you want to see by dragging the cursor across the relevant area). You get a detailed view of this part of the map.

- You can **use geo-drilldown to navigate in the lower layers**.

By double clicking on a region on the map, you get to the next lower map layer. The map design settings are transferred automatically to this map layer. At the same time, you zoom in on the region you lassoed. The buttons located under the map show you which map layers are currently visible.

Navigation using Symbols from the BEx Map Toolbar



- Full Extent**

Choose *Full Extent* if you want to see a view of the whole map.

- Zoom In**

Choose *Zoom In* if you want to display a more detailed view of the current map.

- Zoom Out**

Choose *Zoom Out* if you want to display a less detailed view of the current map.

- Pan**

Choose *Pan*, if you want to look at adjoining areas of the map, but do not want to change the size of the map. The mouse cursor appears as a “hand”. By holding down the left mouse button, you can pan all over the map.

- Map Properties**

You can determine the sequence of the map layers, and the properties of a map layer.

- Choose *Map Properties*. You get to the popup *Map Properties*.
- Choose *Move Up* or *Move Down*, if you want to change the sequence of the map layers.

Note that, in some cases, the regions in the layer above may hide the regions in the layer below.

3. Choose *Layer Properties*, if you want to change the settings for a map layer. You get to the popup *Map Layer Settings*. Here you can make the following settings for every map layer.
 - Fill color
 - Fill type: Solid fill, transparent, diagonal, diagonal stripes
 - Outline color
 - Outline width

Using Buttons to Show/Hide Map Layers

The buttons found underneath the map show you which map layers are visible. The arrangement from left to right corresponds to the sequence of the map layers from bottom to top. You can show several map layers at any one time. If you choose to show a map layer, the tabstrip belonging to it appears automatically in the *Map Design*.