Working with GeoMaps

Business Intelligence & Advanced Data Discovery
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Disclaimer

This document is intended to support administrators, technology managers or developers using and implementing Smarten. The business needs of each organization will vary and this document is expected to provide guidelines and not rules for making any decisions related to Smarten. The overall performance of Smarten depends on many factors, including but not limited to hardware configuration and network throughput.
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1 Introduction

Smarten provides visualization with worldwide GeoMaps. It is available as an individual component, such as a graph or tabular or crosstab, and can also be added as a section within a dashboard. It provides such features as layers, drill down, spotlighter, zoom in/zoom out, and other visual properties, and does not need any active connection to the Internet.

Smarten also provides support for Google Maps to plot data. Users should have a live Internet connection to render Google Maps.

GeoMap coordinates (latitude & longitude)
Any GeoLocation on a map is mapped with GeoCoordinates (latitude & longitude). GeoCoordinates are used to mark various locations on a map. Every location, such as country, state, and city, is denoted with a unique latitude and longitude value.

For example,

<table>
<thead>
<tr>
<th>Location</th>
<th>Latitudes</th>
<th>Longitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>USA</td>
<td>38</td>
<td>-97</td>
</tr>
<tr>
<td>Washington</td>
<td>47.400902</td>
<td>-121.490494</td>
</tr>
</tbody>
</table>

GeoMap dimensions and field types
Smarten cube or dataset columns that represent geographic locations need to be marked as GeoMap dimensions, which need to be assigned a GeoMap field type. This definition will be used while plotting GeoMap data.

Smarten provides the following GeoMap field types (Geo levels) for GeoMap dimensions:
- Country
- County
- State
- City
- Area
- ZIP code
- Latitude
- Longitude

For example, if there are cube or dataset columns, such as BranchCountry and BranchCity in a cube or dataset, a user has to define GeoMap dimensions for these two columns. For the BranchCountry column, a Country field type will be assigned, and a City field type will be given to the BranchCity column.

By default, Smarten provides some GeoMaps in the system. GeoMaps are available for certain countries (e.g., USA, UK, India) with GeoMap data up to a certain Geo level (e.g., state level). Check with technical support for maps and Geo level details available in the system.

If the GeoMap for a particular country is available in the system but you want to add more Geo level details in the system, you need to import GeoMaps data into the system. For example, if you need city level details for the USA but these details are not available in the system, you can import Geo level (e.g., city level in this case) details in the system for the USA GeoMap using the Import GeoMap data process.
If the GeoMap for a particular country is not available in the system (e.g., Japan) and you need to create a GeoMap for that particular country, you need to import the custom GeoMap in the system using the Create Custom GeoMap process. You also need to create a custom GeoMap for other Geo levels, such as a district map of the state of Gujarat. If such a map is not available, you can use Create Custom GeoMap.

2 Workflow to create GeoMap
Image 1: Upload Geomap data in Admin Panel

CREATE GEOMAP — UPLOAD GEOMAP DATA IN ADMIN PANEL

Image 2: Mark latitude and longitude as Geo columns in dataset

CREATE GEOMAP — MARK LATITUDE AND LONGITUDE AS GEO COLUMNS IN DATASET

Image 3: Create New Geomap

CREATE GEOMAP — CREATE NEW GEOMAP
**Image 4: Create layer**

**Add layer**

**Name**
Layer-1

**Definition**
- GeoMap column
- Latitude-Longitude

GeoMap columns
State

Use latitude longitude from
- Admin configuration
- Cube/Dataset columns

**Default Marker**

**OK** | **CANCEL**

CREATE GEOMAP — CREATE LAYER

**Image 5a: Geomap with only markers highlighted**

CREATE GEOMAP — GEOMAP WITH ONLY MARKERS HIGHLIGHTED
3 Create GeoMap Visualization

The following basic steps will be required to create GeoMap visualization:

1. Use GeoMap available in the system or use Google map
2. If you need more Geo level details for a GeoMap available in the system, import GeoMap data
3. If the GeoMap you need is not available in the system, create a custom GeoMap
4. Define GeoMap dimensions for the cube or dataset
5. Visualize using a GeoMap

**Define GeoMap dimensions for the cube or dataset**

A user can define GeoMap dimensions from the admin interface. The user can select cube or dataset columns representing GeoMap location data and associate it with the appropriate GeoMap field type.

**Note:**

For datasets, the system automatically identifies and marks column as GeoMap dimension based on predefined criteria. In any case, if the system is not able to mark any column, users can define GeoMap dimensions from the Smarten SSDP interface.
Visualise using a GeoMap
The user can create a visualisation using GeoMap from the front-end user interface. A user can select the map type (Default map or Google map) and associate GeoMap dimension of the cube or dataset with the map.

The following steps are involved to create a visualisation using GeoMap:

1. Select Cube or dataset

![Image of GeoMap select cube interface]

**VISUALISE USING A GEOMAP: SELECT CUBE**

2. Select the map type (Default map or Google map). In case of the Default map type, select the map (Auto, World map, or a map for a specific country).

   ![Image of GeoMap select map type interface]

   **VISUALISE USING A GEOMAP: SELECT MAP TYPE**

   Note:
   For Google map, the administrator needs to configure the Google Maps key using the administrator interface.

3. Define layer using the geographic information. User can define multiple layers based on different type of GeoMap columns or GeoMap coordinates. While defining a layer, there are two options: GeoMap column and Latitude-Longitude. Users can either map the Geo columns from data with the GeoMap dimension (e.g., Country, State, City) or map the Latitude and Longitude with the respective dimension columns. User can specify default marker properties for a specific layer while defining a layer.

![Image of GeoMap define layer interface]
4. Select other cube or dataset columns to show information for GeoMap locations on mouseover
When only measures are selected as information columns, measured values will be shown on mouse-over. For example, if Sales and Target measures are selected, measure values for each country will be displayed.
When dimensions and measures are selected as information columns, a table will be displayed for each location on mouseover. For example, if ProductCategory and Sales are selected, it will show ProductCategory sales data in a table format for each country.
4 Spotlighters

Smarten GeoMap provides the spotlighter feature to configure map area color or marker color, size, and shape based on required conditions and column values.

For example, to indicate the marker color of dealers based on distributors, spotlighter can be configured as shown below.

![Spotlighter Settings](image)

**SPOTLIGHTER SETTINGS—SCENARIO 1**
To indicate the marker shape of dealers based on distributors, spotlighter can be configured as shown below.

**SPOTLIGHTER SETTINGS—SCENARIO 2**
To indicate distributor marker size based on their sales, spotlighter can be configured as shown below.
To indicate state area color based on distributors, spotlighter can be configured as shown below.

**SPOTLIGHTER SETTINGS—SCENARIO 4**
To indicate dealer marker color as RED when sales < 1500 condition, spotlighter can be configured as shown below.

For example, there are statewise distributors and their dealers’ sales data. One distributor handles multiple states. You want to see a distributor’s dealers marker based on condition, e.g., if sales < 1500, then color = RED, and if sales > 1500, then color = GREEN. So, there are two layers defined for states and dealers. So, one spotlighter is created for state layer to indicate a state’s color based on distributors. Another spotlighter is created to indicate a dealer’s marker color based on conditions. Spotlighter can be configured as shown below.
SPOTLIGHTER SETTINGS—SCENARIO 6

SPOTLIGHTER RESULT—SCENARIO 6
5 Import GeoMap Data

By default, Smarten provides some GeoMaps in the system. GeoMaps are available for certain countries (e.g., USA, UK, India) with GeoMap data up to a certain Geo level (e.g., state level). Check with technical support for maps and Geo level details available in the system.

If the GeoMap for a particular country is available in the system but you want to add more Geo level details in the system, you need to import GeoMaps data into the system. For example, if you need city level details for the USA but these details are not available in the system, you can import Geo level details in the system for the USA GeoMap using the Import GeoMap data process.

Based on values of GeoMap dimensions, GeoMap data (coordinates) should be configured in Smarten from the admin interface. A user can import data through XLS-based import utility. The user can obtain GeoMap data from the Internet or other sources.

The imported XLS file format should have the following columns:

<table>
<thead>
<tr>
<th>Column name</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Specifies the Geo Location name as per selected field type for the file, e.g., name of the country if data is being imported for field type country</td>
<td>USA</td>
</tr>
<tr>
<td>ISO code</td>
<td>ISO code of the Geo Location. For example, “US” for USA, “IN” for India</td>
<td>US</td>
</tr>
<tr>
<td>Latitude</td>
<td>Latitude of Geo Location. For example, “37.0902” for USA</td>
<td>37.0902</td>
</tr>
<tr>
<td>Longitude</td>
<td>Longitude of Geo Location. For example, “-95.7129” for USA</td>
<td>- 95.7129</td>
</tr>
</tbody>
</table>

It is required to import the xls file per GeoMap field type, such as country, state, city.

Below are examples of the xls file format for different field types, such as country, state and city.

For Country

<table>
<thead>
<tr>
<th>AREANAME</th>
<th>CODE</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>US</td>
<td>37.0902</td>
<td>- 95.7129</td>
</tr>
<tr>
<td>India</td>
<td>IN</td>
<td>20.5937</td>
<td>78.9629</td>
</tr>
</tbody>
</table>

For State

<table>
<thead>
<tr>
<th>AREANAME</th>
<th>CODE</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>US-AZ</td>
<td>33.729759</td>
<td>-111.431221</td>
</tr>
<tr>
<td>Gujarat</td>
<td>IN-GJ</td>
<td>22.258652</td>
<td>71.192381</td>
</tr>
</tbody>
</table>

For City

<table>
<thead>
<tr>
<th>AREANAME</th>
<th>CODE</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix</td>
<td>US-AZ-PH</td>
<td>33.4484</td>
<td>-112.074</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>IN-GJ-AH</td>
<td>23.022505</td>
<td>72.571362</td>
</tr>
</tbody>
</table>
6 Create Custom GeoMap

Smarten provides a predefined list of maps in GeoMap. If the required map is not available, you can create your own custom maps and use them as GeoMap in Smarten.

6.1 Map definition file

Map file is used to draw the surface or part of that surface showing the shape and position of different areas, such as countries, regions, or cities, using the map coordinates, such as leftLongitude, topLatitude, rightLongitude, and bottomLatitude.

The figure below shows the basic concept of maps and their coordinates and how to define values of leftLongitude, topLatitude, rightLongitude, and bottomLatitude.

Shown below is an example for the state of Gujarat in India.
LEFTLONGITUDE, TOPLATITUDE, RIGHTLONGITUDE, AND BOTTOMLATITUDE FOR GUJARAT

Create a new map definition file:

The map file should meet some structure requirements. To understand the structure of the map file, open any of the maps available in \Smarten.war\js\ammmap directory with any text editor.

As you see, shown below is the structure of the map file.

```
FileName:<areaname>Low.js

AmCharts.maps.<areaname>Low="{"svg":{"defs":{"amcharts:ammmap":{"projection":"mercator","leftLongitude":"","topLatitude":"","rightLongitude":"","bottomLatitude":""}},"g":{"path":[
{"id":"","fill":"<colorcode>" ,"title":"<Location/Area Name>" ,"d":" "
},
{"id":"" ,"fill":"<colorcode>" ,"title":"<Location/Area Name>" ,"d":" "
},
.
.
.
.
{"id":"" ,"fill":"<colorcode>" ,"title":"<Location/Area Name>" ,"d":" "
},
]]}}
```

STRUCTURE OF THE MAP FILE
For example, if you want to display a map of only the Gujarat state to show district sales data for it, you need to create a custom map of Gujarat if a map for Gujarat is not available in the predefined list of maps.

To create a map file for Gujarat, you need to create a file with a name (e.g., `gujarat.js`) and a SVG object with a name “AmCharts.maps.gujarat” in it. There is no particular naming convention you need to follow, but it is advisable to follow a structured naming convention for better management of the map structure.

You can take any map file available in the system and save as a new file name and edit that file as shown in the example below.

Here is an example of how to create a map for Gujarat.

A SAMPLE MAP FILE

Set GeoCoordinates values:

Set values for `leftLongitude`, `topLatitude`, `rightLongitude`, and `bottomLatitude` of the Gujarat state to draw a map.

VALUES OF LEFTLONGITUDE, TOPLATITUDE, RIGHTLONGITUDE, AND BOTTOMLATITUDE

You can find values of `leftLongitude`, `topLatitude`, `rightLongitude`, and `bottomLatitude` for selected areas from any data source that you may have, or you can find such data from the Internet.

Set values for the path element:

The path element is the most powerful element in the SVG library of basic shapes. There will be one path element for one GeoMap, and if you want various parts in that GeoMap (for example, various districts within a state or various states within a country), you need to create a “d” element for each of these parts. For example, if you want to create 33 districts within a map of the Gujarat state, you need to define “d” elements for all 33 districts.

The path element should have ID, Fill, Title, and “d” attribute for each part. For example, if you are creating a map of the Gujarat state, for each district of Gujarat, you need to define ID, Fill, Title, and “d” attribute (e.g., "id":"IN-GJ-GN","fill":"#FFF","title":"Gandhinagar","d":" M192.36 71.8997c 0.407...... ")
The example below shows how to define districts within the Gujarat state.

VALUES OF ID, FILL, AND TITLE ATTRIBUTES

VALUES OF "d" ATTRIBUTE

Once districts are defined, you need to set values of the "d" attribute for each district of the Gujarat state as shown in the example below.
You can find values of the “d” attribute for each area from any data source that you may have, or you can find such data from the Internet.

If you already have a SVG file for a particular area (e.g., a particular district), open that SVG file in your browser, select a particular area of interest (e.g., a particular district), use the Inspect Element function of your browser to view the source file for that selected area, and copy “d” attribute values from the highlighted text.

Shown below is an example of how to find the “d” attribute of the Gandhinagar district of the Gujarat state.

Values of “d” Attribute from SVG Image

Configure created map in Smarten

Perform the following steps to configure a new map file in Smarten.

1. Place the created map (e.g., gujarat.js) file inside the \Smarten.war\js\ammap directory.

2. Edit the “countryDropdownValues.jsp” file available in the \Smarten.war\jsp\map directory, and add option value node as below.

```
<option value=" SVG Object Name">Area Name</option>
```

(Note: “SVG Object Name” should be the same as the created map file (e.g., gujarat.js) name. For example, here we have created a map file for Gujarat, so the option value node should be

```
<option value=" gujarat">Gujarat</option>
```

A configured new map will displayed in the Select map drop down along with a list of other predefined maps in New GeoMap – out liner dialog.)
7 Product and Support Information

Find more information about Smarten and its features at [www.smarten.com](http://www.smarten.com)

Support: [support@smarten.com](mailto:support@smarten.com)
Sales: [sales@smarten.com](mailto:sales@smarten.com)
Feedback & Suggestions: [support@smarten.com](mailto:support@smarten.com)
Support & Knowledgebase Portal: [support.smarten.com](http://support.smarten.com)