Smarten
Advanced Data Discovery
Powered by ElegantJ BI

Working with GeoMaps

Business Intelligence & Advanced Data Discovery

www.Smarten.com

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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.

Contents

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,

Location	Latitudes	Longitudes
India	20	77
USA	38	-97
Washington	47.400902	-121.490494

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
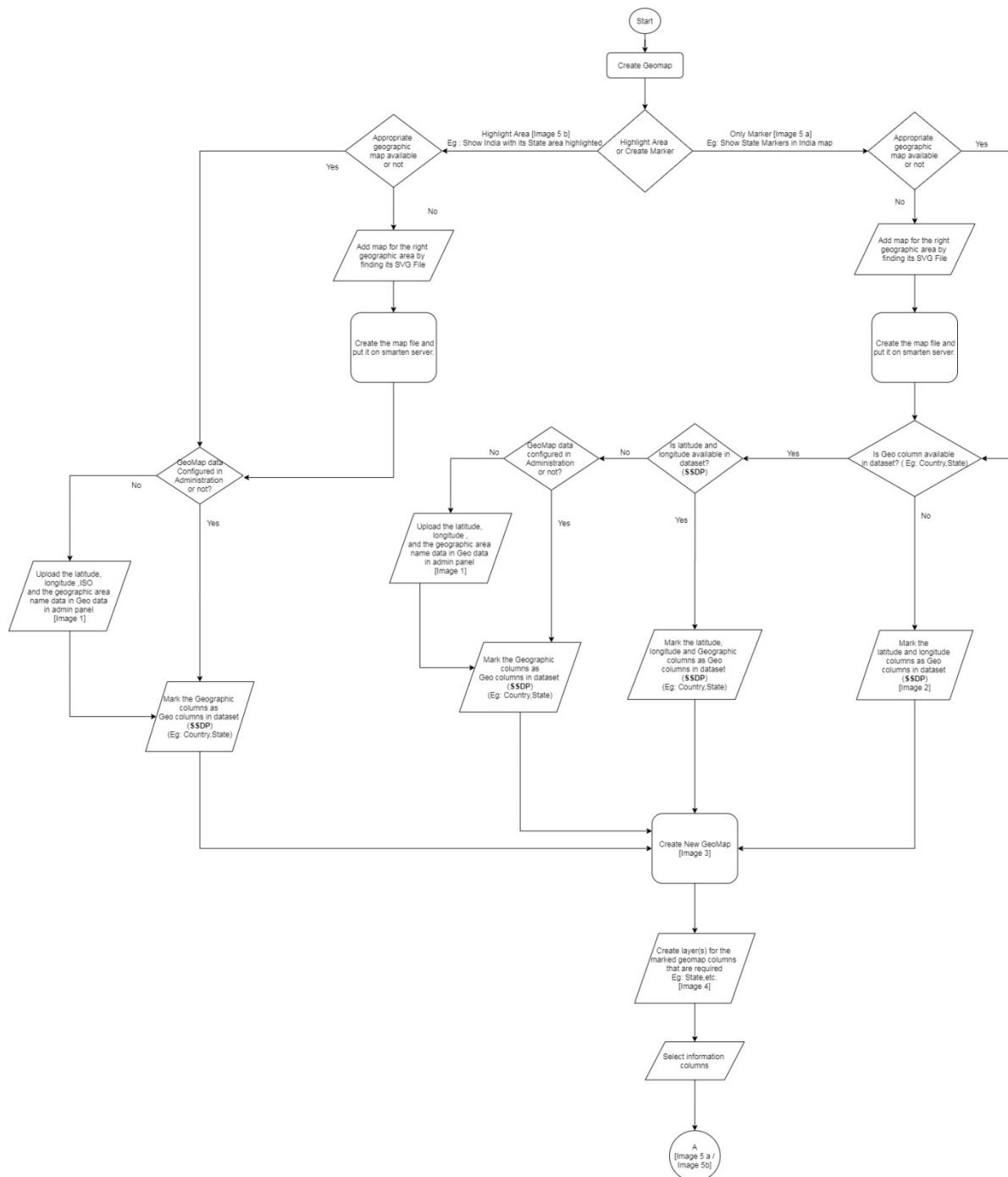
CREATE GEOMAP — WORKFLOW

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
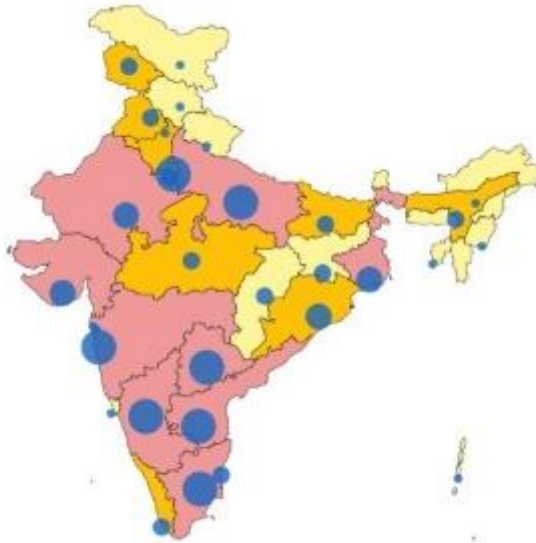

CREATE GEOMAP — CREATE NEW GEOMAP

Image 4: Create layer

CREATE GEOMAP — CREATE LAYER

Image 5a: Geomap with only markers highlighted

CREATE GEOMAP — GEOMAP WITH ONLY MARKERS HIGHLIGHTED

Image 5b: Geomap with area highlighted

CREATE GEOMAP — GEOMAP WITH AREA 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.

ASSOCIATE CUBE COLUMN (GEOMAP DIMENSION) WITH 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

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).

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

VISUALISE USING A GEOMAP: SELECT MAP TYPE

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.
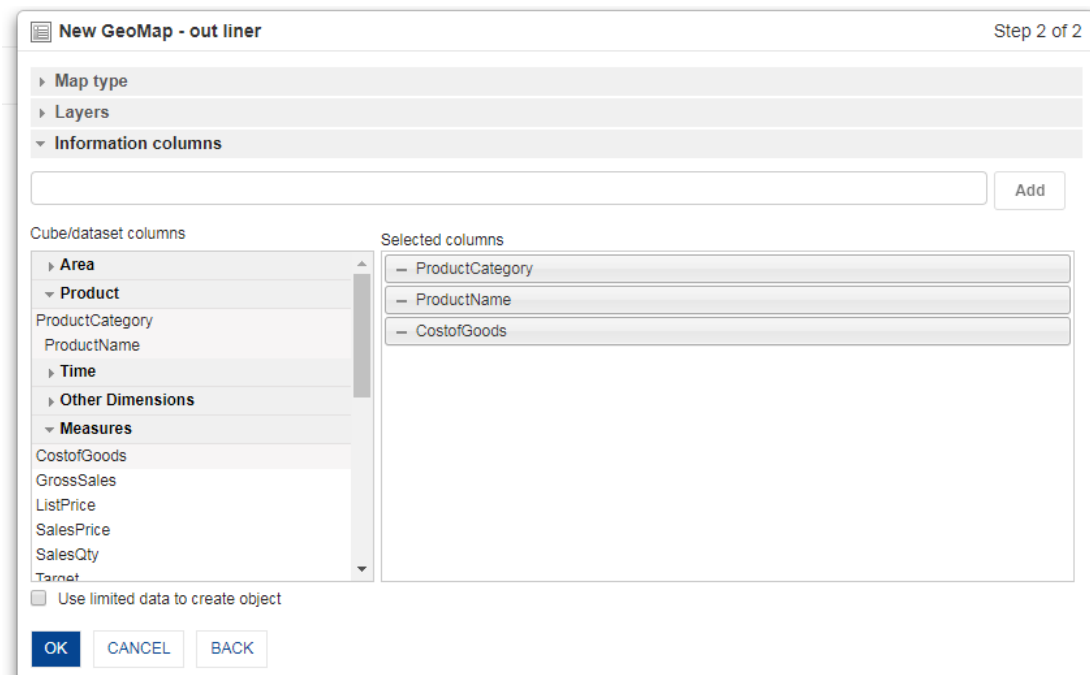
VISUALISE USING A GEOMAP: LAYERS

VISUALISE USING A GEOMAP: ADD A LAYER

4. Select other cube or dataset columns to show information for GeoMap locations on mouseover
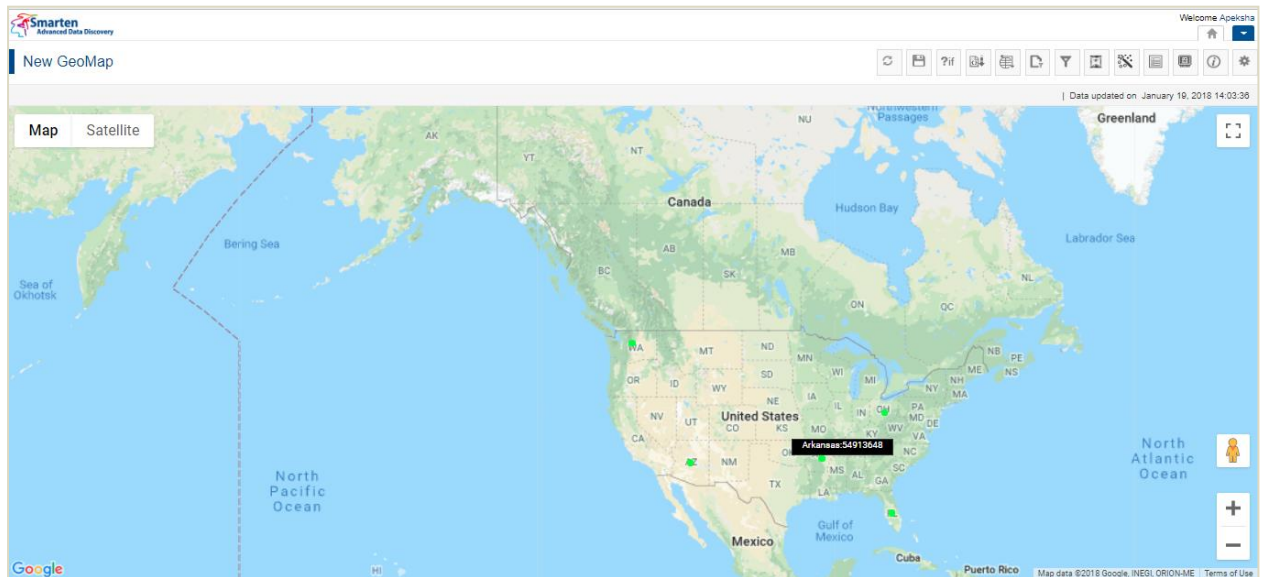
VISUALISE USING A GEOMAP: OUT LINER

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.
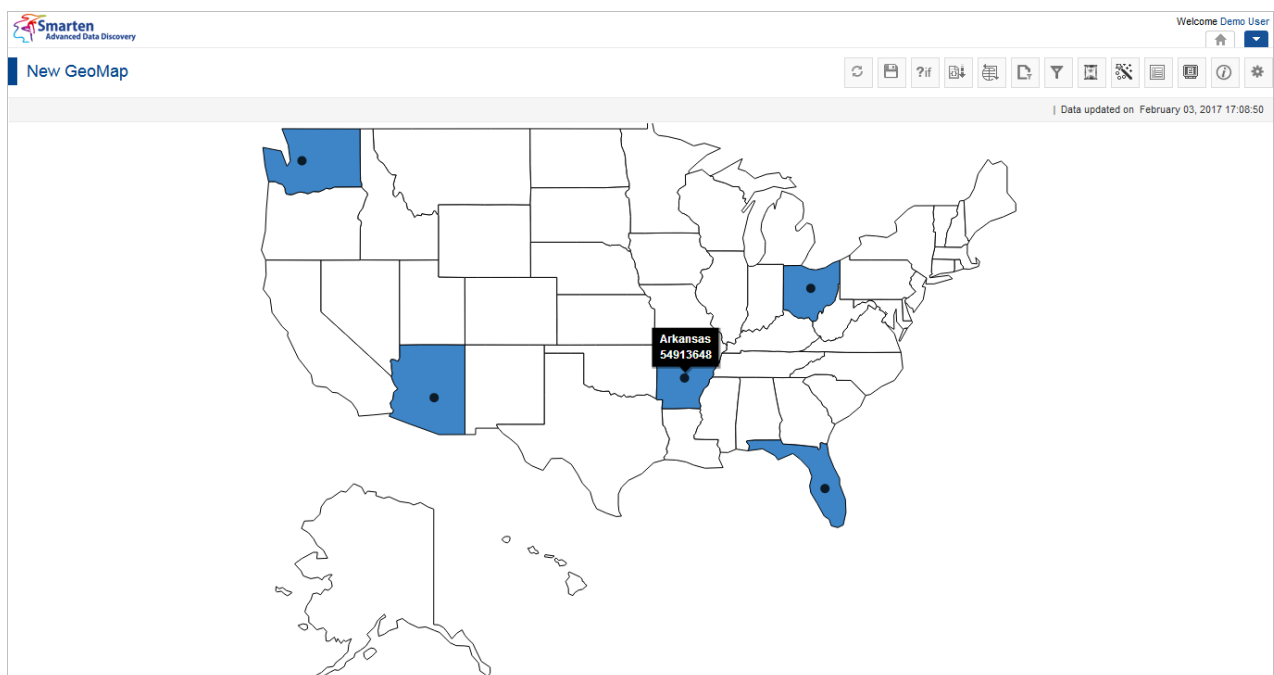
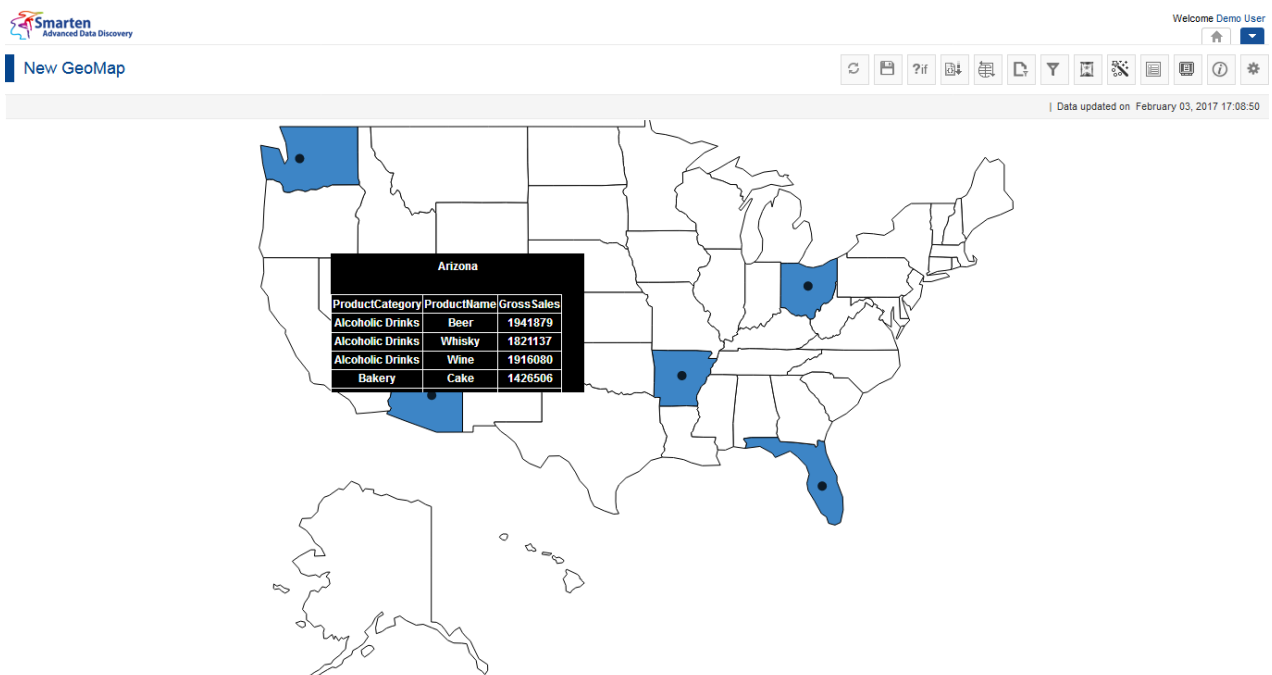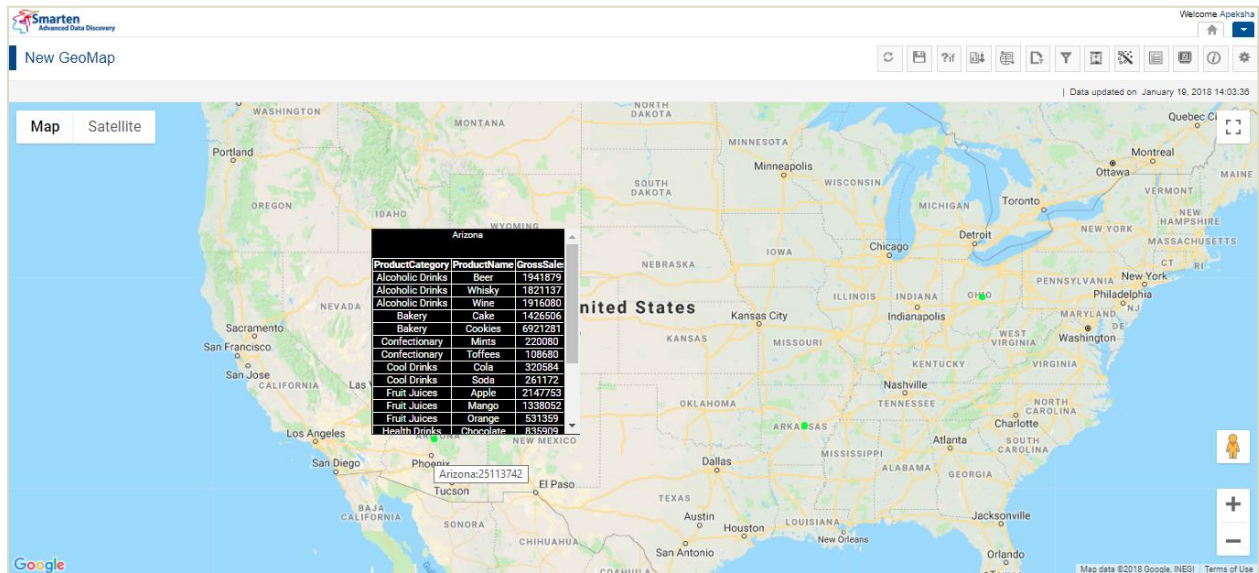**GEOMAP—ONLY MEASURE VALUE ON MOUSEOVER**

GOOGLE MAP—ONLY MEASURE VALUE ON MOUSEOVER

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.

GEOMAP—DIMENSIONS AND MEASURES TABLE ON MOUSEOVER

GOOGLE MAP—DIMENSIONS AND MEASURES TABLE ON MOUSEOVER

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—SCENARIO 1

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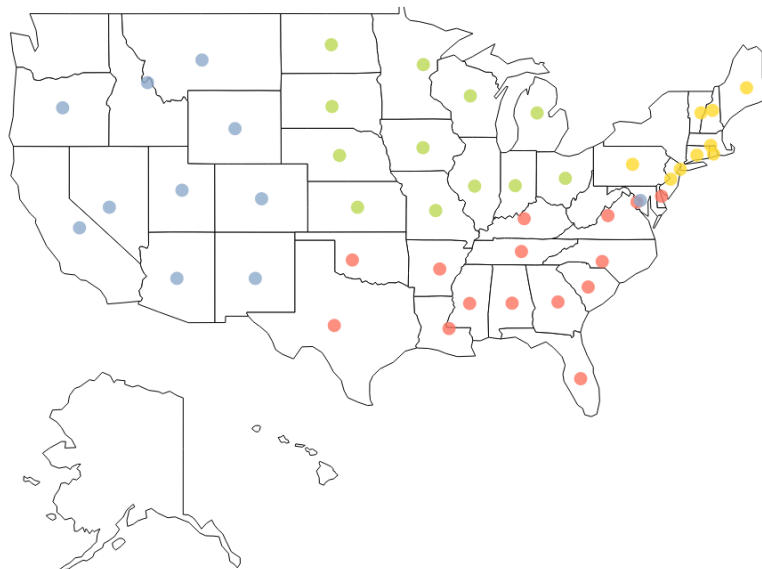
To indicate the marker shape of dealers based on distributors, spotlighter can be configured as shown below.

SPOTLIGHTER SETTINGS—SCENARIO 2
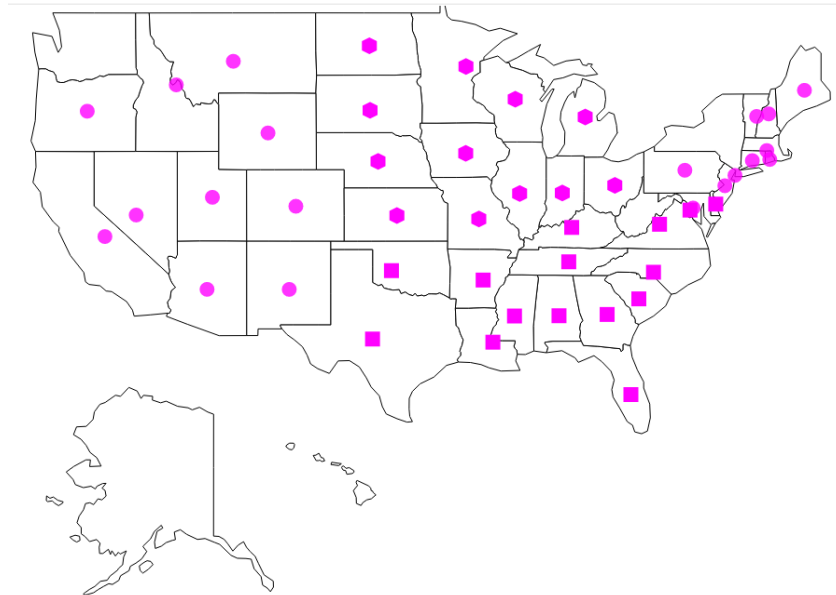
SPOTLIGHTER RESULT—SCENARIO 2

To indicate distributor marker size based on their sales, spotlighter can be configured as shown below.

SPOTLIGHTER SETTINGS—SCENARIO 3
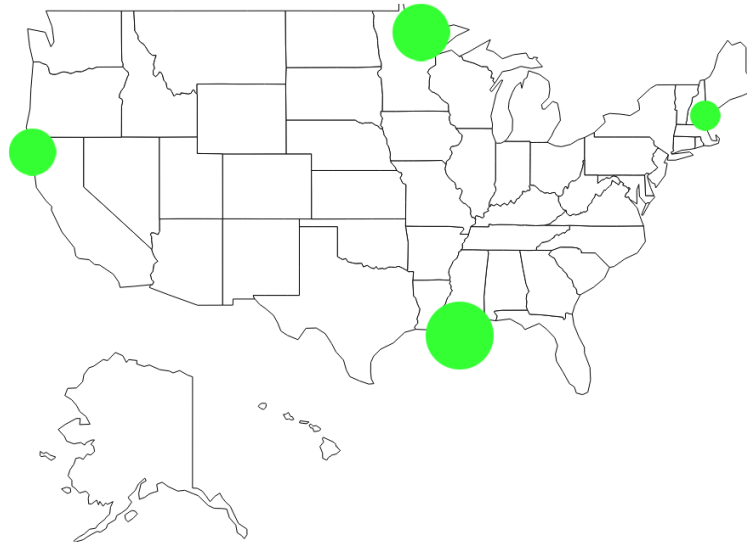
SPOTLIGHTER RESULT—SCENARIO 3

To indicate state area color based on distributors, spotlighter can be configured as shown below.

SPOTLIGHTER SETTINGS—SCENARIO 4
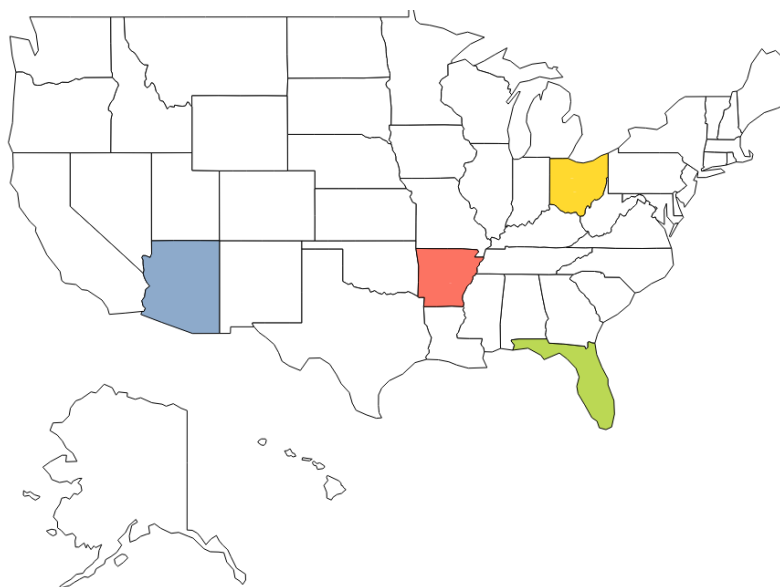
SPOTLIGHTER RESULT—SCENARIO 4

To indicate dealer marker color as RED when sales < 1500 condition, spotlighter can be configured as shown below.

SPOTLIGHTER SETTINGS—SCENARIO 5

SPOTLIGHTER RESULT—SCENARIO 5

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:

Column name	Description	Example
Name	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	USA
ISO code	ISO code of the Geo Location. For example, "US" for USA, "IN" for India	US
Latitude	Latitude of Geo Location. For example, "37.0902" for USA	37.0902
Longitude	Longitude of Geo Location. For example, "-95.7129" for USA	- 95.7129

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
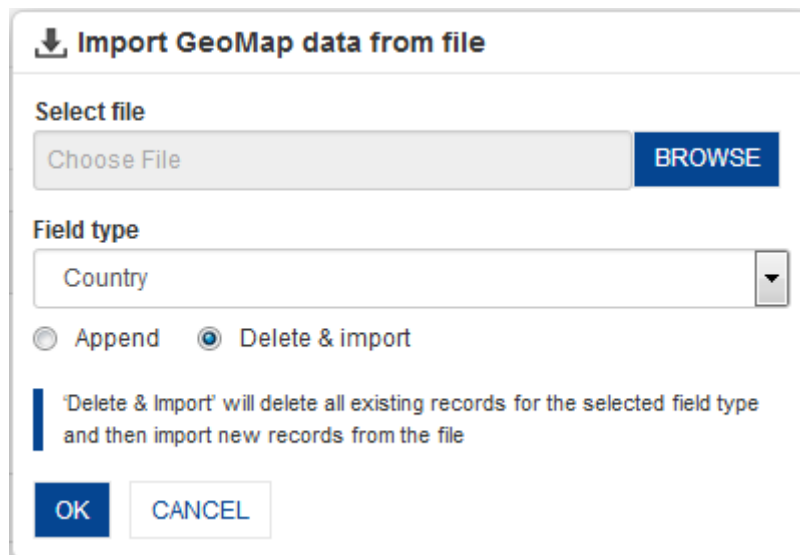
AREANAME	CODE	LATITUDE	LONGITUDE
USA	US	37.0902	- 95.7129
India	IN	20.5937	78.9629

For State

AREANAME	CODE	LATITUDE	LONGITUDE
Arizona	US-AZ	33.729759	-111.431221
Gujarat	IN-GJ	22.258652	71.192381

For City

AREANAME	CODE	LATITUDE	LONGITUDE
Phoenix	US-AZ-PH	33.4484	-112.074
Ahmedabad	IN-GJ-AH	23.022505	72.571362

IMPORT GEOMAP DATA

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.
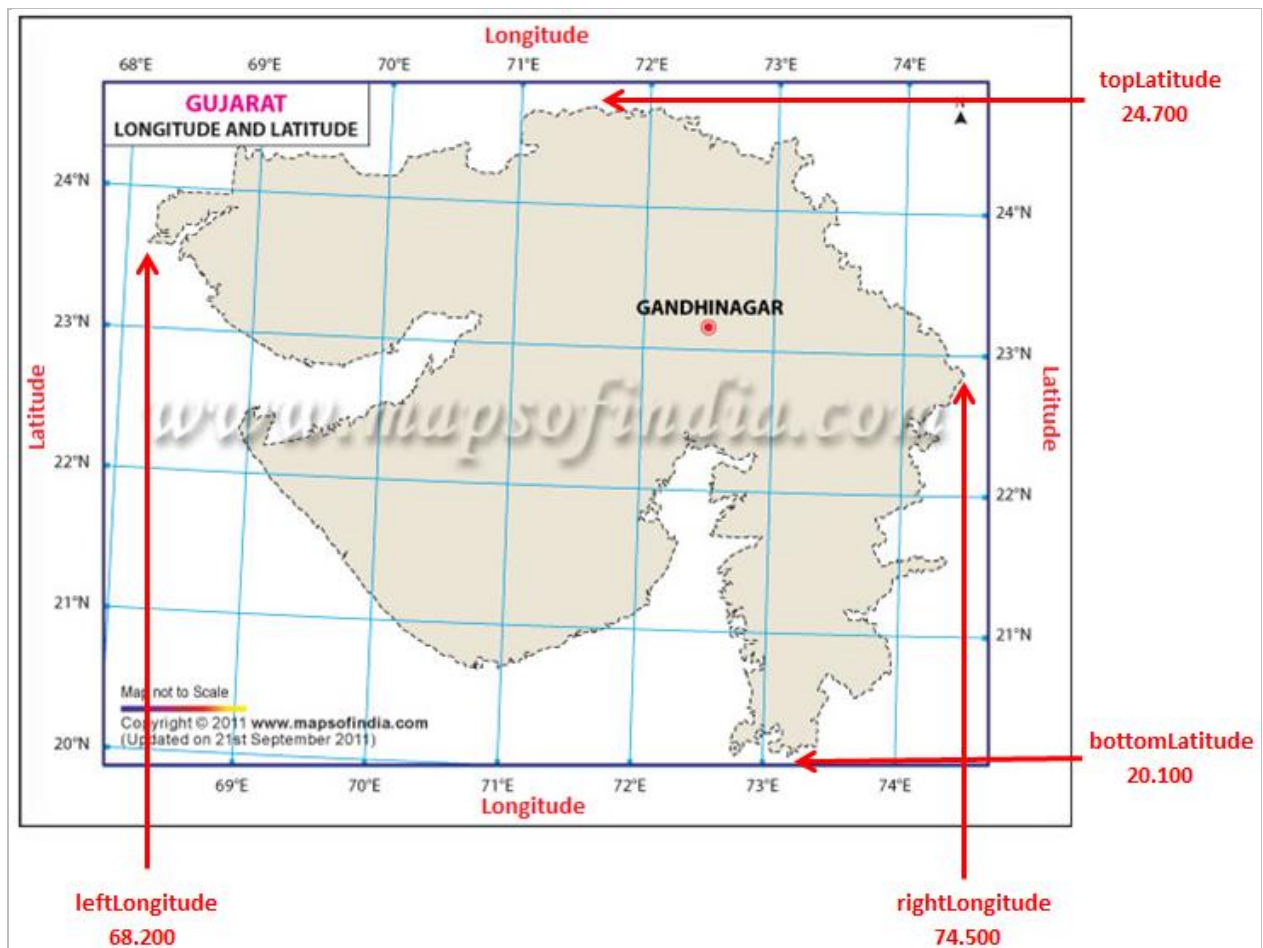
LEFTLONGITUDE, TOPLATITUDE, RIGHTLONGITUDE, AND BOTTOMLATITUDE FOR GUJARAT

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\ammap** 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:ammap":{"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.

FileName:gujarat.js
AmCharts.maps.gujarat={"svg":{"defs":{"amcharts:ammap":{"projection":"mercator","leftLongitude":" ","topLatitude":" ","rightLongitude":" ","bottomLatitude":" "}},"g":{"path":[

<div align="center">A SAMPLE MAP FILE</div>

Set GeoCoordinates values:

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

FileName:gujarat.js
AmCharts.maps.gujarat={"svg":{"defs":{"amcharts:ammap":{"projection":"mercator","leftLongitude":"68.200", "topLatitude":"24.700 ","rightLongitude":" 74.500","bottomLatitude":"20.100"}},"g":{"path":[

<div align="center">VALUES OF LEFTLONGITUDE, TOPLATITUDE, RIGHTLONGITUDE, AND BOTTOMLATITUDE</div>

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.

FileName:gujarat.js

```
AmCharts.maps.gujarat={"svg":{"defs":{"amcharts:ammap":{"projection":"mercator","leftLongitude":"
68.200",
"topLatitude":"24.700 ","rightLongitude":" 74.500","bottomLatitude":"20.100"}},"g":{"path":[
{"id":"IN-GJ-GN","fill":"#FFF","title":"Gandhinagar","d":" "
},
{"id":"IN-GJ-AH","fill":"#FFF","title":"Ahmedabad","d":" "
},
{"id":"IN-GJ-GN","fill":"#FFF","title":"Surat","d":" "
},
```

VALUES OF ID, FILL, AND TITLE ATTRIBUTES

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.

FileName:gujarat.js

```
AmCharts.maps.gujarat={"svg":{"defs":{"amcharts:ammap":{"projection":"mercator","leftLongitude":"6
8.200",
"topLatitude":"24.700 ","rightLongitude":" 74.500","bottomLatitude":"20.100"}},"g":{"path":[

{"id":"IN-GJ-GN","title":"Gandhinagar","d":"M192.36 71.8997c-0.407,0.9427 -0.7045,1.6891 -
0.8303,2.7233 -0.0539,0.4438 -0.2495,1.0653 -0.1278,1.4896 0.1711,0.596 0.8237,0.2108
1.2227,0.1828l0.4471 -0.1828 0 0 0.2737 0.7128c-0.1048,0.1765 -0.0082,0.6763 -0.3832,0.6763 -
0.1691,0 -0.5365,-0.0655 -0.6387,0.1005 -0.4095,0.6645 1.087,0.5869 -0.0091,1.4896 -0.4533,0.3732 -
0.5146,0.7253 -0.8942,1.1058 -0.3779,0.3786 -0.7485,-0.7997 -1.2774,-0.7219 -0.9211,0.1354 -
0.9088,1.3333 -1.396,1.9739 -0.2831,0.3721 -0.8037,0.3812 -1.1771,0.6123l-1.0219 0.3564 0 0c-0....36 -
0.4877,0.5757 -1.0858,0.5757 -0.1312,0 -0.233,0.1542 -0.3923,0.1188 -0.2454,-0.0547 -0.9447,-0.055 -
0.8486,0.4021 0.0502,0.2392 0.5755,0.1516 0.73,0.4296 0.2283,0.411 0.1887,0.9595 0.885,0.9595
0.4868,0 1.0493,-0.2789 1.0493,0.457 -0.0578,0.6807 0.0283,0.7373 0.6114,0.5757 0.2752,-0.0763
0.6022,0.482 0.958,0.4935 0.5397,0.0174 1.8116,-0.7389 2.1077,-0.0274 0.1601,0.3846 -0.7104,0.9331
-0.3285,1.0326 0.9923,0.2588 0.4775,0.8866 1.1588,1.4257 0.6053,0.4788 1.206,-1.2636 1.8522,-
1.3434l0.5384 0.3564 0 0z"
},
{"id":"IN-GJ-AH","title":"Ahmedabad","d":"M169.408 88.2504c-0.1425,0.1632 -0.2911,0.245 -
0.4463,0.245 -0.1388,0 -0.2545,-0.0512 -0.3467,-0.1533 -0.0922,-0.1026 -0.1388,-0.2512 -0.1388,-
0.4459 0,-0.1783 0.0367,-0.341 0.1096,-0.4887 0.0734,-0.1473 0.1647,-0.2578 0.2743,-0.3312 0.11,-
0.0738 0.2201,-0.1105 0.3302,-0.1105 0.182,0 0.3193,0.088 0.412,0.2634l0.1656 -0.7869 0.2478 0 -
0.4219 2.0202 -0.23 0 0.0442 -0.2121zm-0.6834 -0.4013c0,0.1021 0.0099,0.1825 0.0301,0.2413
0.0202,0.0588 0.0546,0.1078 0.1035,0.1468 0.0484,0.039 0.1067,0.0583 0.175,0.0583 0.1128,0 0.2154,-
0.0588 0.3071,-0.1764 0.1232,-0.1561 0.1849,-0.349 0.1849,-0.5785 0,-0.1157 -0.0306,-0.206 -0.0908,-
0.2714 -0.0607,-0.0654 -0.1369,-0.0979 -0.2291,-0.0979 -0.0597,0 -0.1138,0.0132 -0.1632,0.04 -
0.0489,0.0264 -0.0978,0.072 -0.1458,0.1355 -0.0485,0.064 -0.0889,0.1453 -0.1223,0.2436 -
0.0329,0.0979 -0.0494,0.1844 -0.0494,0.2587z"
},
```
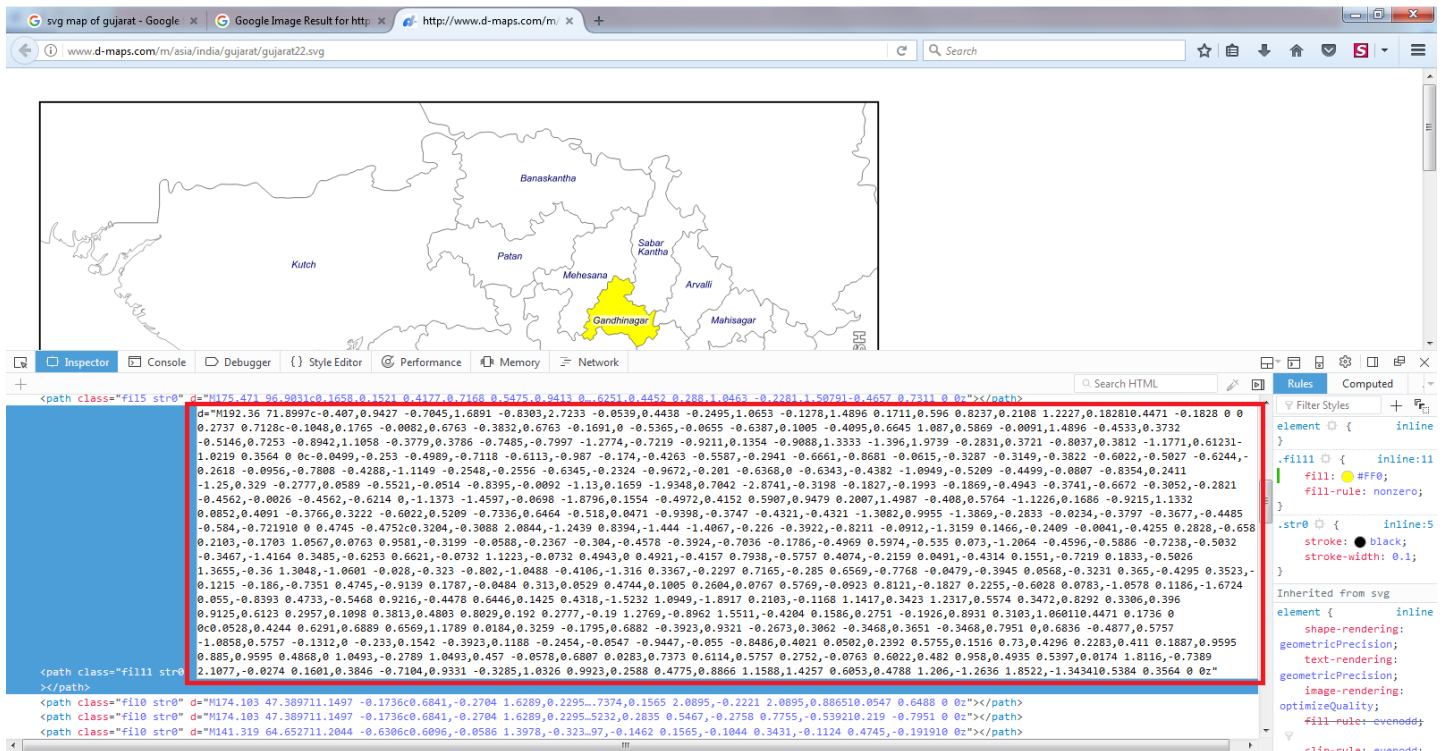
VALUES OF "D" ATTRIBUTE

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.

CREATED CUSTOM MAP IN SELECT MAP DROP DOWN

7   Product and Support Information

Find more information about Smarten and its features at www.smarten.com

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