Getting Started with Maps in OBIEE, BICS and Data Visualization Desktop

Wayne D. Van Sluys

interRel Consulting
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Begin with an overview of what Spatial analysis is and the language of Geographic information systems (GIS)
Cover the necessary database objects required for a good foundation on which to build maps
Discuss the software necessary to combine maps with OBIEE Analysis
Building Thematic Maps in OBIEE
Demo some of the software
Abstract

All data has some form of location associated with it. By incorporating a map view of the data we gain a sense of relationship & can see patterns in space that are not easily observed in any form of visualization. Many BI Developers wish to incorporate Map Views is where to start, where to find map boundary data and how to pull it together with data sourced in the subject area. Go behind the curtain on map integration & get a jump start into incorporating Map Views in your BI Dashboards, BI Mobile Applications & Visual Analyzer.

This is a cross-over presentation that incorporates topics from the Spatial Summit and BIWA Summit. This session will show via demos the steps necessary for developers to set up OBIEE and MapViewer to work together and present Map Views in OBIEE Analysis and Dashboards. I will also show how to extend map layers into Mobile App Designer and Data Visualization Desktop and Visual Analyzer with BICS.
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- 4-Time Winner of Oracle's BI & EPM Partner of the Year
- *Six* Oracle ACE Directors & Associates
- 10+ Best selling books on Hyperion, Essbase, & Oracle EPM Cloud
- 150+ EPM Cloud specializations
- 10+ Active Cloud implementations including
  - 1st ARCS Implementation
  - 1st EPBBS Implementation
  - 1st FCCS Implementation
- Oracle Platinum & Oracle Cloud Partner
- 9-Time Inc. 5000 Fastest Growing company in USA

Founded in 1997, we are the longest-standing, Oracle EPM/BI-dedicated partner in the world
Why Use Maps with Business Analytics?
Tabular Geo Data is Hard to Determine Patterns

<table>
<thead>
<tr>
<th>R62 Geo Ctry State Name</th>
<th>1- Revenue</th>
<th>2- Billed Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA_Alabama</td>
<td>37,426</td>
<td>3,588</td>
</tr>
<tr>
<td>USA_Alaska</td>
<td>21,855</td>
<td>2,187</td>
</tr>
<tr>
<td>USA_Arkansas</td>
<td>70,026</td>
<td>6,453</td>
</tr>
<tr>
<td>USA_California</td>
<td>1,865,010</td>
<td>175,188</td>
</tr>
<tr>
<td>USA_Colorado</td>
<td>63,266</td>
<td>5,912</td>
</tr>
<tr>
<td>USA_Florida</td>
<td>31,452</td>
<td>3,060</td>
</tr>
<tr>
<td>USA_Georgia</td>
<td>27,863</td>
<td>2,696</td>
</tr>
<tr>
<td>USA_Hawaii</td>
<td>23,743</td>
<td>2,358</td>
</tr>
<tr>
<td>USA_Idaho</td>
<td>41,387</td>
<td>4,136</td>
</tr>
<tr>
<td>USA_Illinois</td>
<td>7,766</td>
<td>792</td>
</tr>
<tr>
<td>USA_Indiana</td>
<td>55,223</td>
<td>5,149</td>
</tr>
<tr>
<td>USA_Iowa</td>
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<td>5,690</td>
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<tr>
<td>USA_Kansas</td>
<td>28,126</td>
<td>2,864</td>
</tr>
<tr>
<td>USA_Kentucky</td>
<td>29,703</td>
<td>2,901</td>
</tr>
<tr>
<td>USA_Louisiana</td>
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<td>714</td>
</tr>
<tr>
<td>USA_Michigan</td>
<td>2,818</td>
<td>229</td>
</tr>
</tbody>
</table>
Maps Provide Context and Relation
Maps Used

- Disaster Declaration and Impact
- Electoral Results
- Crime Stats
- Weather
- Market Penetration & Retail
  - zip code, MyLowes
Natural disasters: The riskiest spots in the U.S.

What are the chances your home will get damaged by a tornado, hurricane, earthquake or fire? RealtyTrac crunched the data in more than 3,000 counties nationwide to find out.
Crime in Philadelphia

Browse the change in crimes reported from Dec. 26, 2016 to Jan. 25, 2017 in Philadelphia. Drag slider to see where crime happens or click play to animate the map. Click on the crime type to narrow your view to specific crime types.

CRIMES FROM DEC. 26, 2016 TO JAN. 25, 2017

VIOLENT CRIMES

1,209
- Homicides: 28
- Robbery: 550
- Assault: 550

Percent of violent crimes: 23.43%

PROPERTY CRIMES

3,952
- Burglary: 517
- Thefts: 2,689
- Auto: 768

Percent of property crimes: 76.58%

SEARCH DIFFERENT DATES

12/26/2016 TO 01/25/2017

SEARCH
Non-Geographical Map - Context

American Airlines Seat Maps - Boeing 737-800 (738)

Seating details:
- First: 8 in rows, 28 seats
- Main Cabin: 31.5 in rows, 17.2 seats
- Economy: 31.5 in rows, 17.2 seats

American Airlines Seat Maps - Boeing 767-300 (763)

Seating details:
- First: 28 in rows, 64 seats
- Main Cabin: 39.5 in rows, 18 seats
- Economy: 39.5 in rows, 14 seats

http://seatguru.com
Non-Geographical Map - Context

http://ticketmaster.com
4.11 Non Geo Examples

**Arena Map**

**Description:** This example shows how multiple metrics may be displayed on an arena map. Arena sections are colored coded based on attendance metric values from the Analysis.

<table>
<thead>
<tr>
<th>ID</th>
<th>Type</th>
<th>Male</th>
<th>Female</th>
<th>Child</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Floor</td>
<td>54</td>
<td>70</td>
<td>3</td>
<td>137</td>
</tr>
<tr>
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<td>317</td>
<td>62</td>
<td>7</td>
<td>406</td>
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<tr>
<td>103</td>
<td>Floor</td>
<td>223</td>
<td>181</td>
<td>14</td>
<td>338</td>
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<tr>
<td>104</td>
<td>Floor</td>
<td>165</td>
<td>120</td>
<td>19</td>
<td>324</td>
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<tr>
<td>105</td>
<td>Floor</td>
<td>178</td>
<td>187</td>
<td>22</td>
<td>387</td>
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<tr>
<td>106</td>
<td>Floor</td>
<td>130</td>
<td>126</td>
<td>19</td>
<td>315</td>
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<tr>
<td>107</td>
<td>Floor</td>
<td>49</td>
<td>35</td>
<td>10</td>
<td>94</td>
</tr>
<tr>
<td>108</td>
<td>Floor</td>
<td>140</td>
<td>72</td>
<td>3</td>
<td>215</td>
</tr>
<tr>
<td>109</td>
<td>Floor</td>
<td>204</td>
<td>135</td>
<td>25</td>
<td>384</td>
</tr>
<tr>
<td>110</td>
<td>Floor</td>
<td>273</td>
<td>79</td>
<td>2</td>
<td>354</td>
</tr>
<tr>
<td>111</td>
<td>Floor</td>
<td>115</td>
<td>33</td>
<td>18</td>
<td>166</td>
</tr>
<tr>
<td>112</td>
<td>Floor</td>
<td>140</td>
<td>177</td>
<td>25</td>
<td>342</td>
</tr>
<tr>
<td>113</td>
<td>Floor</td>
<td>71</td>
<td>13</td>
<td>15</td>
<td>99</td>
</tr>
<tr>
<td>114</td>
<td>Floor</td>
<td>243</td>
<td>140</td>
<td>7</td>
<td>490</td>
</tr>
<tr>
<td>115</td>
<td>Floor</td>
<td>185</td>
<td>167</td>
<td>18</td>
<td>369</td>
</tr>
<tr>
<td>116</td>
<td>Floor</td>
<td>203</td>
<td>233</td>
<td>5</td>
<td>441</td>
</tr>
<tr>
<td>117</td>
<td>Floor</td>
<td>241</td>
<td>51</td>
<td>25</td>
<td>317</td>
</tr>
<tr>
<td>118</td>
<td>Floor</td>
<td>272</td>
<td>101</td>
<td>5</td>
<td>378</td>
</tr>
<tr>
<td>119</td>
<td>Floor</td>
<td>177</td>
<td>183</td>
<td>17</td>
<td>377</td>
</tr>
<tr>
<td>120</td>
<td>Floor</td>
<td>101</td>
<td>95</td>
<td>19</td>
<td>206</td>
</tr>
<tr>
<td>121</td>
<td>Floor</td>
<td>230</td>
<td>69</td>
<td>4</td>
<td>363</td>
</tr>
<tr>
<td>122</td>
<td>Floor</td>
<td>114</td>
<td>49</td>
<td>24</td>
<td>187</td>
</tr>
</tbody>
</table>
Typical Types of Maps in BI
Geocoding

Here
https://developer.here.com/rest-apis
US Census
https://geocoding.geo.census.gov/
Texas A&M
http://geoservices.tamu.edu/Services/Geocode/
BatchGEO
http://batchgeo.com/features/geocode-addresses/
GPS Visualizer
http://www.gpsvisualizer.com/geocoding.html
Find Latitude and Longitude
http://www.findlatitudeandlongitude.com/batch-geocode
Google API
https://developers.google.com/maps/documentation/geocoding
Spatial Vocabulary & Concepts
A feature is an entity with spatial and non-spatial attributes such as cities, rivers and highways. A polygon, a line or a point may represent a feature. Some features displayed on a map essentially provide a spatial context and the user is unlikely to want to click on them and have some action performed as a result. Streets, rivers, and forest may be such features. The user may want to interact with other features, such as store locations, postal code boundaries, or oil pipelines displayed on the map. These are called Features of Interest (FOIs). Within the context of a MapViewer application, FOIs usually display the geographic extent or location of some business object such as customer or store location, sales territory, or delivery zone.
A style defines rendering properties for a feature. For example, if the feature is a polygon showing a county, then the style may define the fill color for the county or it may define a pie chart to be drawn over the county.
A theme is any collection of features that have a common set of attributes and a location. Typically, a theme is associated with a spatial geometry layer. For example, a layer on the map displaying boundaries for US states would be considered a theme. A layer on the map displaying major US highways would also be considered a theme. Other types of themes include, but are not limited to, image themes which may be used to display satellite overlay or a relief map.
Theme Example
A basemap consists of one or more themes. For instance, a base map may be composed of themes that show US state boundaries, county boundaries and markers for cities.
A map can have a basemap and a stack of themes rendered on top of each other in a window. A map has an associated coordinate system that all themes in the map must share.
Map Tile Layers

Coarse resolution

Detailed resolution

Level 0

Level 1
Map Projections Matter

Albers equal-area conic
Lambert’s conformal conic
Mollweide pseudocylindrical

Spatial Data-Type called SDO_GEOMETRY

- Point
- Line String
- Polygon
- Arc Line String
- Arc Polygon
- Compound Polygon
- Compound Line String
- Circle
- Rectangle
Architecture Overview
Components Required to Create a Map

- Oracle DB (Locator free, Spatial option licensed)
  - Persistent storage of Geometry definitions, tables and metadata.
- Oracle FMW MapViewer Servlet
  - Map renderer and querying engine
  - Supports only Oracle DB for now
- Oracle FMW MapBuilder
  - Thick client tool to manage map metadata
  - Define layers/themes, basemaps etc
- Geometry data (e.g. Navteq)
  - Customers can obtain political boundary data from Navteq or any other data provider
- OBIEE
  - OBIPS Admin
MapViewer BI Integration Architecture

Mapbuilder: Basemaps/ themes/ styles manager (thick client)

NSDP (Non-Spatial Data Provider) key MapViewer integration feature

Mapviewer

OBIEE

Oracle Database

Oracle Fusion Middleware

Other Oracle/non-Oracle databases, data warehouses ...
Cont.
**USER_SDO_MAPS** – Stores definitions of base maps

**USER_SDO_THEMES** – stores definitions of individual map layers or themes

**USER_SDO_STYLES** – stores individual map symbols and other types of styles such as LINE patterns, COLOR definitions and thematic mapping styles

**USER_SDO_CACHED_MAPS** – Stores maps in Tiles for faster retrieval
Maps in OBIEE
### Manage Map Data

Manage map components and associate geographic layers to BI data

<table>
<thead>
<tr>
<th>Layers</th>
<th>Background Maps</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Location</th>
<th>Associated Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click here to add a new Background Map</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Import Background Maps

**Look in** OracleMaps

Available Maps

Previewing ORACLE_MAPS

[OK] [Cancel]
Add Layer to Background & Set Zoom

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Location</th>
<th>Associated Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORACLE_MAPS</td>
<td></td>
<td>OracleMaps/ORACLE_MAPS</td>
<td></td>
</tr>
</tbody>
</table>

Interactive BI Layers and Feature Layers
For each layer, select the zoom levels at which it can be displayed.
<table>
<thead>
<tr>
<th>State Province</th>
<th>Communication Revenue</th>
<th>Digital Revenue</th>
<th>Electronics Revenue</th>
<th>Games Revenue</th>
<th>Services Revenue</th>
<th>TV Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>$183,176</td>
<td>$143,031</td>
<td>$129,367</td>
<td>$147,686</td>
<td>$23,270</td>
<td>$148,872</td>
</tr>
<tr>
<td>Alaska</td>
<td>$27,456</td>
<td>$43,901</td>
<td>$30,975</td>
<td>$26,563</td>
<td>$3,766</td>
<td>$22,320</td>
</tr>
<tr>
<td>Arkansas</td>
<td>$227,668</td>
<td>$157,624</td>
<td>$191,725</td>
<td>$171,325</td>
<td>$24,219</td>
<td>$170,599</td>
</tr>
<tr>
<td>California</td>
<td>$12,440,509</td>
<td>$11,876,649</td>
<td>$9,988,444</td>
<td>$11,037,860</td>
<td>$1,482,563</td>
<td>$10,000,728</td>
</tr>
<tr>
<td>Colorado</td>
<td>$173,264</td>
<td>$150,137</td>
<td>$145,353</td>
<td>$145,363</td>
<td>$21,736</td>
<td>$162,804</td>
</tr>
<tr>
<td>Connecticut</td>
<td>$34,735</td>
<td>$25,640</td>
<td>$17,694</td>
<td>$26,854</td>
<td>$3,692</td>
<td>$29,122</td>
</tr>
<tr>
<td>EN</td>
<td>$11,520,717</td>
<td>$11,114,108</td>
<td>$9,715,700</td>
<td>$10,419,231</td>
<td>$1,382,802</td>
<td>$9,134,364</td>
</tr>
<tr>
<td>Florida</td>
<td>$138,079</td>
<td>$129,220</td>
<td>$116,200</td>
<td>$121,785</td>
<td>$15,281</td>
<td>$140,754</td>
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<tr>
<td>Georgia</td>
<td>$234,226</td>
<td>$245,249</td>
<td>$179,419</td>
<td>$219,999</td>
<td>$27,718</td>
<td>$200,099</td>
</tr>
<tr>
<td>Hawaii</td>
<td>$41,844</td>
<td>$44,817</td>
<td>$24,717</td>
<td>$24,399</td>
<td>$3,478</td>
<td>$26,915</td>
</tr>
<tr>
<td>Idaho</td>
<td>$95,130</td>
<td>$100,747</td>
<td>$56,903</td>
<td>$105,048</td>
<td>$8,593</td>
<td>$88,510</td>
</tr>
<tr>
<td>Illinois</td>
<td>$99,057</td>
<td>$89,923</td>
<td>$81,243</td>
<td>$105,149</td>
<td>$12,678</td>
<td>$114,199</td>
</tr>
<tr>
<td>Indiana</td>
<td>$122,684</td>
<td>$95,565</td>
<td>$92,880</td>
<td>$95,369</td>
<td>$11,958</td>
<td>$88,791</td>
</tr>
<tr>
<td>Iowa</td>
<td>$180,693</td>
<td>$174,874</td>
<td>$161,975</td>
<td>$180,492</td>
<td>$20,820</td>
<td>$153,118</td>
</tr>
</tbody>
</table>
Add Map View to Analytics
Maps in BICS
Manage Map Data

- Users and Roles: Manage users and their roles.
- Snapshots and Models: Take snapshots of your service. Restore your service from snapshots. Upload snapshots and models.
- Sessions and Query Cache: Monitor users who are signed in. Analyze SQL queries and logs.
- Manage datasets: Manage data file uploads.
- Connections: Manage database connections.
- Manage Map Data: Define how data elements are displayed on map views.
Add Layers

Manage Map Data

Manage map components and associate geographic layers to BI data

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click here to add a new Layer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Import Layers

Look in: OracleMaps
- EMEA_Countries
- Europe_Countries
- South_America_Countries
- USA_Counties

Available Layers:
- USA_States
- World_Cities
- World_Countries
- World_Regions
- World_Regions_Alt
- World_States_Provinces

Preview Map: ORACLE_MAPS

[OK] [Cancel]
Associate to BI Data

 Manage Map Data

Manage map components and associate geographic layers to BI data

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA_States</td>
<td></td>
<td>OracleMaps/USA_States</td>
</tr>
</tbody>
</table>

Select BI Key Columns

Available:
- SampleApp
- Revenue Metrics
- Customers
- Payment Metrics
- Products
- Geography
  - Address 1
  - Address 2
  - Address Key
  - Area
  - City
  - Country Name
  - Postal Code
  - Region
  - State Province

Selected:
- "State Province"
- "Geography"
- "PCI"

Edit Layer - USA_States

BI Associations
Associate map layers to BI columns to enable their display on maps.

- Layer Key
- State Name
- Sample Data: Wyoming

- Geometry Type
  - Polygon

- BI Key Columns
  - "State Province"
  - Sample Data: "PCI"
## Add Background

### Manage Map Data

Manage map components and associate geographic layers to BI data

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Location</th>
<th>Associated Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Maps</td>
<td>Click here to add a new Background Map</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Import Background Maps

- **Look in**: OracleMaps
- **Available Maps**: ORACLE_MAPS

Previewing ORACLE_MAPS
### Add Layer to Background & Set Zoom

#### Layers

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Location</th>
<th>Associated Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORACLE_MAPS</td>
<td></td>
<td>OracleMaps/ORACLE_MAPS</td>
<td></td>
</tr>
</tbody>
</table>

#### Edit Background Map - ORACLE_MAPS

**Name:** ORACLE_MAPS  
**Location:** OracleMaps/ORACLE_MAPS  
**Description:**

**Interactive BI Layers and Feature Layers**

- For each layer, select the zoom levels at which it can be displayed.

```plaintext
<table>
<thead>
<tr>
<th>Layer</th>
<th>Zoom Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA_Homes</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>USA_Cities</td>
<td>3, 4, 5</td>
</tr>
<tr>
<td>USA_City</td>
<td>6, 7</td>
</tr>
<tr>
<td>USA_State</td>
<td>8, 9</td>
</tr>
</tbody>
</table>
```

---

**OK**  
**Cancel**
Great Online Tutorial


**Working with Maps in Oracle BI Cloud Service**

- **Before You Begin**
- **Configuring Map Data**
- **Working with a Map View**

In this section, you create an analysis and display results in a map view by using the World_Regions and World_Countries layers prepared in the previous section. You also modify the map formats.

- **Creating an Analysis with a Map View**
- **Editing a Map View**

1. Click the **Edit View** icon for the Map view to open the Map Editor.
Customize
- Heatmap Plugin
- Custom Points Map Plugin
- Daum Maps Plugin
- Auto-Cluster Map Plugin
- Exp: Custom Map in DV Desktop
Maps in BICS Visual Analyzer / DVCS
Map Customization

Untitled

Map
- Title: State Province, Revenue
- Map Key: Thematic
- Map Layer: Usa_states

Map Customization Options:
- Zoom control: Off
- Scale Bar: None
- Background: None
- Map: Thematic
- Map Key: Oracle BI
- Map Layer: Oracle Maps

Data Sources:
- emea_countries
- usa_airports
- world_regions
- world_states_provinces
- usa_countries
- australie_countries
- world_continents
- apac_countries
- asia_countries
## Comparison View

<table>
<thead>
<tr>
<th>Feature</th>
<th>OBIEE</th>
<th>OBIEE-VA</th>
<th>BICS</th>
<th>BICS-VA &amp; DVCS</th>
<th>DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geo Boundary Fill</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Long/Lat</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Custom Layers</td>
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<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Custom Background</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Map Services</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OOTB Maps</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

As Background
Tools Used in Setting up Maps with OBIEE
- Stores the definitions of spatial objects (using special geometry data types)
- “Locator” database option for querying, filtering, joining spatial data
- “Spatial” database option for manipulating and aggregating spatial data
Locator vs. Spatial

Oracle Database

- GeoRaster
- Geocoder
- Routing Engine
- 3D
- Misc advanced spatial analyses
- Topology Data Model
- Linear Referencing System
- Spatial Analytic Functions
- OGC Web Services
- Native Spatial datatype
- Native Spatial index
- Basic spatial queries
- Full projection support

http://docs.oracle.com/cd/B28359_01/appdev.111/b28400/sdo_locator.htm#i632018
A J2EE application used for rendering interactive map images and features---of---interest (FOI)

Invoked via a series of XML, Java, PL/SQL and JavaScript APIs

Provides a layer of caching
Property:
  tile_layer_name
Values:
  elocation_mercator.bi_world_map
  elocation_mercator.bi_world_map_light
  elocation_mercator.world_map
Oracle MapBuilder

- The development tool for MapViewer
- A graphical Map builder tool that enables you to define the content and structure of maps and their rendering rules
- Import .shp files
- Export to geoJSON
### Theme
- Collection of geometries and includes information for visually representing a layer (default formats, labels)
- The tables defining shapes (geometry columns) are assumed to be in the Oracle DB

### Basemap
- Logical collection of themes with associated scale and order
- Mapviewer engine generates tile images based on the basemap definition

### Tile Layer
- An instance of basemap presented as image by the Mapviewer engine
OBIPS: Map Administration

Manage map components and associate geographic layers to BI data

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDC 2 Districts</td>
<td>OBIEE_NAVTEQ_Sample/NO_DISTRICTS</td>
</tr>
<tr>
<td>IDC 2b Districts Pop Heatmap</td>
<td>OBIEE_NAVTEQ_Sample/NO_DISTRICTS_POP_HEATMAP</td>
</tr>
<tr>
<td>IDC 2c Districts Savings Color</td>
<td>OBIEE_NAVTEQ_Sample/NO_DISTRICTS_SAVINGS_COLOR</td>
</tr>
<tr>
<td>IDC 3 Subdistricts</td>
<td>OBIEE_NAVTEQ_Sample/NO_SUBDISTRICTS</td>
</tr>
<tr>
<td>IDC 4 Neighbourhoods</td>
<td>OBIEE_NAVTEQ_Sample/NO_NEIGHBOURHOODS</td>
</tr>
<tr>
<td>IDC 4b Neighbourhoods Savings Color</td>
<td>OBIEE_NAVTEQ_Sample/NO_NEIGHBOURHOODS_SAVINGS_COLOR</td>
</tr>
<tr>
<td>IDC 4c Neighbour Population Heatmap</td>
<td>OBIEE_NAVTEQ_Sample/NO_NEIGHBOURHOODS_POP_HTMAP</td>
</tr>
<tr>
<td>IDC 5 Mumbai Details</td>
<td>OBIEE_NAVTEQ_Sample/5_MUMBAI_DETAILS</td>
</tr>
<tr>
<td>OBIEE Floorplan</td>
<td>OBIEE_NAVTEQ_Sample/5_FLOORPLAN</td>
</tr>
<tr>
<td>SF ATMs</td>
<td>OBIEE_NAVTEQ_Sample/5_SF_ATMS</td>
</tr>
<tr>
<td>SF Banks</td>
<td>OBIEE_NAVTEQ_Sample/5_SF_BANKS</td>
</tr>
<tr>
<td>SF Banks Feature</td>
<td>OBIEE_NAVTEQ_Sample/5_SF_BANKS_FEATURE</td>
</tr>
<tr>
<td>SF Blocks</td>
<td>OBIEE_NAVTEQ_Sample/5_SF_BLOCKS</td>
</tr>
<tr>
<td>SF Business Facilities</td>
<td>OBIEE_NAVTEQ_Sample/5_SF_BUSINESS_FACILITIES</td>
</tr>
</tbody>
</table>

BI Associations

Associate map layers to BI columns to enable their display on maps.

<table>
<thead>
<tr>
<th>Layer Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Sample Data</td>
</tr>
</tbody>
</table>

BI Key Columns

<table>
<thead>
<tr>
<th>BI Key</th>
<th>Subject Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Name 1</td>
<td>Sample Data</td>
</tr>
<tr>
<td>State Code</td>
<td>Sample Data</td>
</tr>
</tbody>
</table>

IS DEPARTMENT
OBIEE Map Admin
3x – GeoRaptor Plug-in
  ▪ Easy Access to Spatial Metadata and Spatial Indexes

4x

Review or Create Metadata
  ▪ Add Additional Attributes

Create New Spatial Objects
  ▪ Merge features – States to Regions
SQLDeveloper
### Already has Region ID and Division ID

<table>
<thead>
<tr>
<th>REGION</th>
<th>DIVISION</th>
<th>STATEFP</th>
<th>STATENS</th>
<th>GEOID</th>
<th>STUSPS</th>
<th>NAME</th>
<th>INTPTLAT</th>
<th>INTPTLON</th>
<th>GEOMETRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>5</td>
<td>54</td>
<td>01779805</td>
<td>54</td>
<td>WV West Virginia</td>
<td>-38.6472854</td>
<td>-80.6183274</td>
<td>[MDSYS.SDO_GEOGRAPHY]</td>
</tr>
<tr>
<td>2</td>
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<td>5</td>
<td>12</td>
<td>00294248</td>
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<td>Fl Florida</td>
<td>-28.4574302</td>
<td>-82.4091478</td>
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<tr>
<td>3</td>
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<td>-89.1525108</td>
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</tr>
<tr>
<td>4</td>
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<td>00662849</td>
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<td>-46.3161343</td>
<td>-94.1994801</td>
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<td></td>
</tr>
<tr>
<td>5</td>
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<td>24</td>
<td>01714934</td>
<td>24</td>
<td>MD Maryland</td>
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<tr>
<td>6</td>
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<td>44</td>
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<td>Ri Rhode Island</td>
<td>-41.5974187</td>
<td>-71.527223</td>
<td>[MDSYS.SDO_GEOGRAPHY]</td>
<td></td>
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<tr>
<td>7</td>
<td>4</td>
<td>15</td>
<td>01779783</td>
<td>16</td>
<td>Id Idaho</td>
<td>-44.3020993</td>
<td>-114.5956279</td>
<td>[MDSYS.SDO_GEOGRAPHY]</td>
<td></td>
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<tr>
<td>8</td>
<td>1</td>
<td>33</td>
<td>01779794</td>
<td>33</td>
<td>NH New Hampshire</td>
<td>-43.6726907</td>
<td>-71.5843145</td>
<td>[MDSYS.SDO_GEOGRAPHY]</td>
<td></td>
</tr>
</tbody>
</table>
select `sdo_aggr_union(sdoaggrtype(\(geometry,0.05\)))` state from us_county where state_abrv='TN';
5 Easy Steps

1. Create New Table with Geometry Column and at least one key column
2. Update Oracle Spatial Meta Data
3. Load data into new table using `sdo_aggr_union` Function
4. Create Spatial Index on new table
5. View new table / Custom Region
create table us_custom_regions ( 
    region_id varchar2(2), 
    region_name varchar2(15), 
    region_name_caps varchar2(15), 
    geometry mdsys.sdo_geometry) ;
commit;
Enter 8307 for the coordinate system identifier. Add two rows for the spatial dimensions and enter the values Longitude, -180, 180, 0.05 and Latitude, -90, 90, 0.05

The SQL insert statement for the above action is:

```sql
Insert into user_sdo_geom_metadata values ('US_REGIONS', 'GEOMETRY',
mdsys.sdo_dim_array(mdsys.sdo_dim_element('Longitude', -180, 180, 0.05),
mdsys.sdo_dim_element('Latitude', -90, 90, 0.05)), 8307);
commit;
```
INSERT INTO US_REGIONS
select '1', 'East', 'EAST', sdo_aggr_union(sdoaggrtype(geometry, 0.05)) FROM US_STATE WHERE REGION = '1';

INSERT INTO US_REGIONS
select '2', 'Central', 'CENTRAL', sdo_aggr_union(sdoaggrtype(geometry, 0.05)) FROM US_STATE WHERE REGION = '2';

INSERT INTO US_REGIONS
select '3', 'South', 'SOUTH', sdo_aggr_union(sdoaggrtype(geometry, 0.05)) FROM US_STATE WHERE REGION = '3';

INSERT INTO US_REGIONS
select '4', 'West', 'WEST', sdo_aggr_union(sdoaggrtype(geometry, 0.05)) FROM US_STATE WHERE REGION = '4';

COMMIT;
View the New Region
Oracle DV - Custom Line Geometries on DV Desktop Maps
https://youtu.be/T5F_s5j15og?list=PLOcpw36tp3yLJ5EK7U6EwXF6Z4jLYGmSF

Oracle DV - Custom map views on DV Desktop Analysis
https://youtu.be/8C7qXxzH8Rc?list=PLOcpw36tp3yLJ5EK7U6EwXF6Z4jLYGmSF

Oracle DV On Premises : How to add a custom map layer to DV
https://youtu.be/9npXJ1tcBgw

How to add file based map layers to OBIEE 12c
https://youtu.be/Ebl_mjUC6hI
Geocoding

Here
https://developer.here.com/rest-apis
US Census
https://geocoding.geo.census.gov/
Texas A&M
http://geoservices.tamu.edu/Services/Geocode/
BatchGEO
http://batchgeo.com/features/geocode-addresses/
GPS Visualizer
http://www.gpsvisualizer.com/geocoding.html
Find Latitude and Longitude
http://www.findlatitudeandlongitude.com/batch-geocode
Google API
https://developers.google.com/maps/documentation/geocoding
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- Execute the reporting cycle from start to finish
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- Assign security
- Migrate objects between environments

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- Studio
- Smart View

**Planning**
- Admin
- End User
- Advanced

**Cloud**
- Admin/End Users
Upcoming Events

- **BIWA Summit** – Redwood Shores, CA: January 31 – February 2, 2017
- **RMOUG Training Days** – Denver, CO: February 7-9, 2017
- **COLLABORATE 17** – Las Vegas – April 2-6
- **Healthcare Industry User Group Interact** – Orlando: June 18-21, 2017
- **ODTUG Kscope17** – San Antonio: June 25-29, 2017
- **2017 Road Shows:**
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  - Michigan
  - New York
  - Washington D.C.

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