Oracle Spatial Summit

2015

Using Map Views in Oracle Business Intelligence Analytics

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The Spatial & Graph SIG User Group

- The SIG promotes interaction and communication that can drive the market for spatial technology and data

- Members connect and exchange knowledge via online communities and at annual conferences and events

- **Meet us here at the Summit**

Morning Reception	Social Hours
Tuesday and Wednesday 7:45 to 8:30 a.m. Registration Area	Tuesday and Wednesday 6 to 7 p.m. Registration Area

- **Join us online**
  - LinkedIn (search for "LinkedIn Oracle Spatial")
  - Google+ (search for "Google+ Oracle Spatial")
  - IOUG SIG (sign up for free membership through www.ioug.org)
  - OTN Spatial – Communities (search for "Oracle Spatial and Graph Community")
- **Contact the Board at oraclespatialsig@gmail.com**

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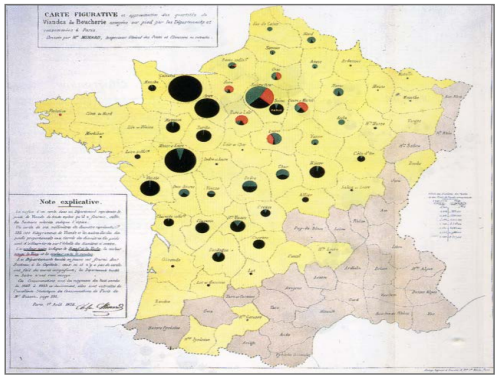
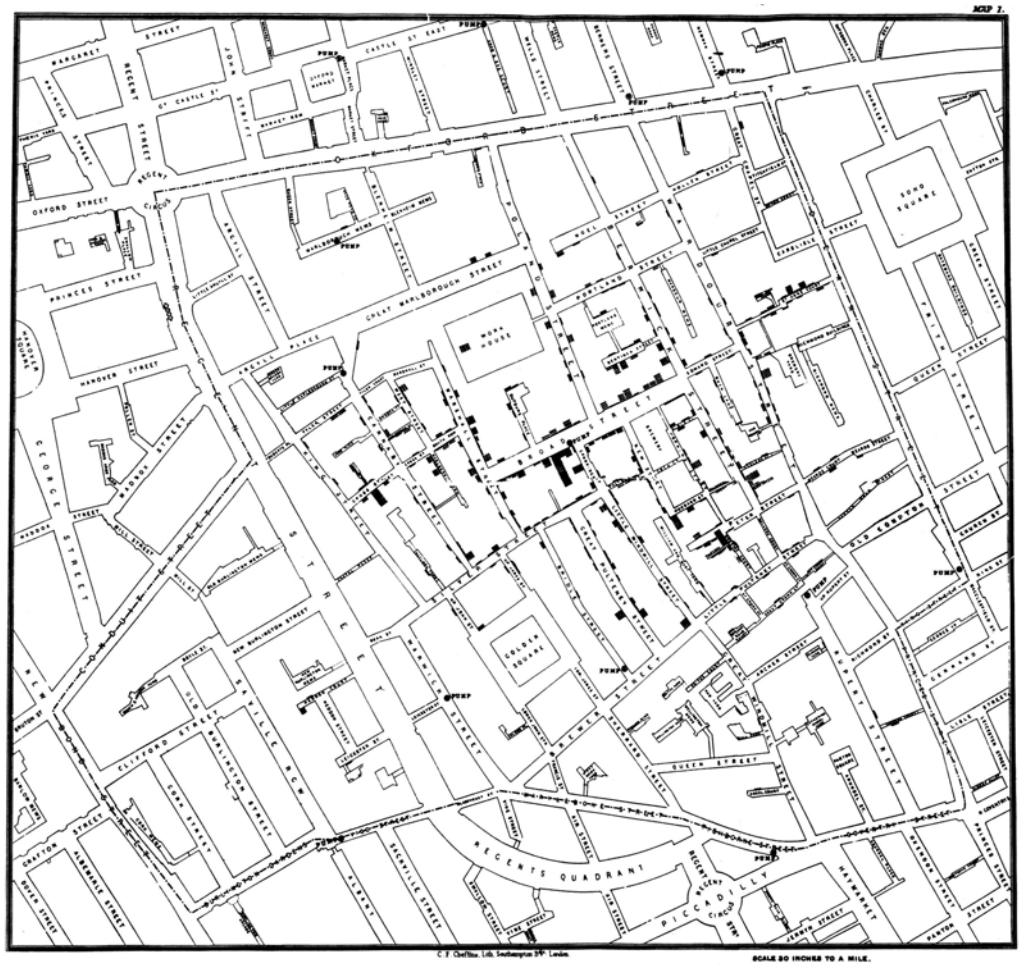
Program Agenda

1. Why Maps ?
2. Using Map Views in OBIEE
3. Oracle's Core Spatial Technologies
4. Spatial Data
5. Linking BI items and spatial data

Why Maps ?

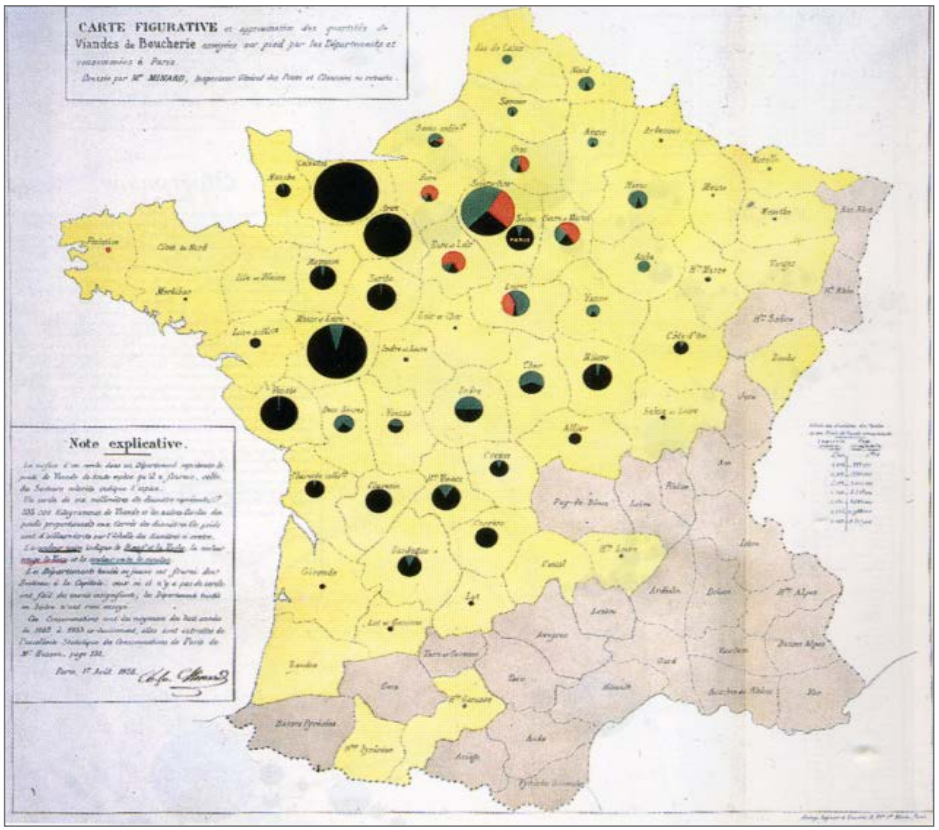




BI and Maps: A Natural Fit

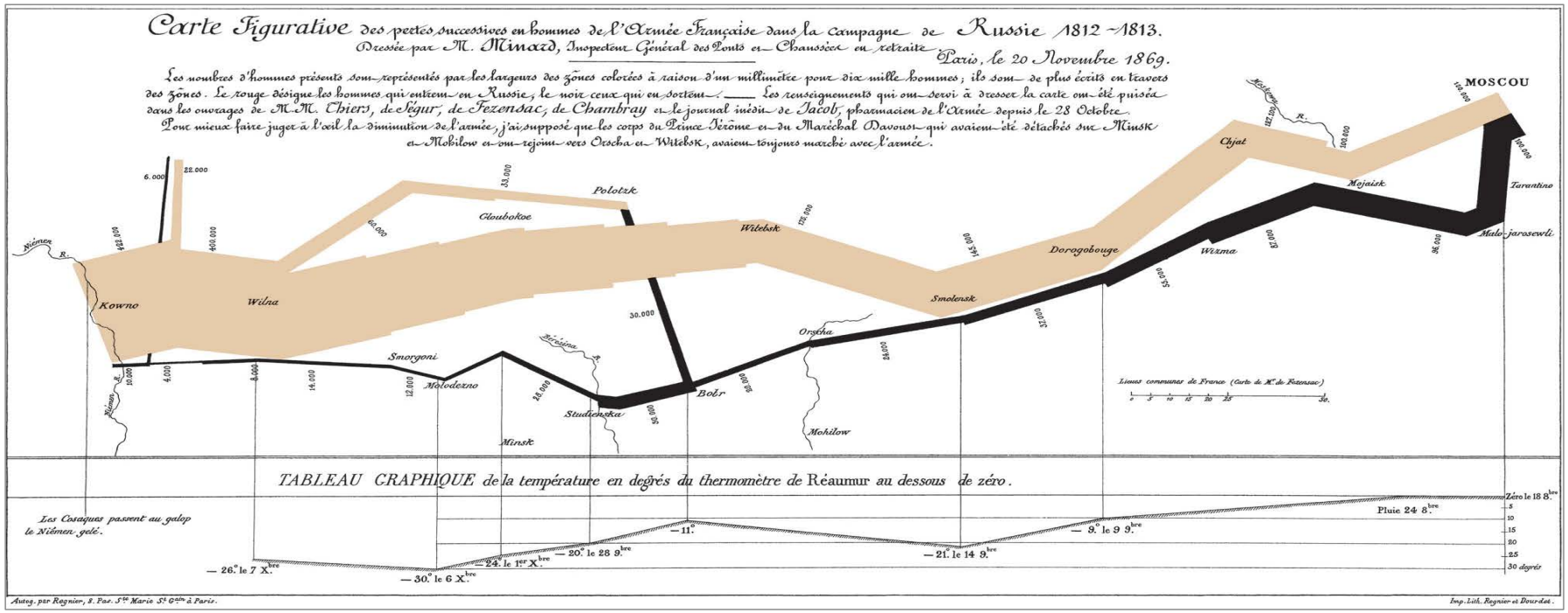
- Maps are a natural choice for representing spatially-related data
- Help understand many phenomena's and their relationships

Map courtesy Wikipedia (John Snow,)



Map courtesy Wikipedia (Charles Joseph Minard)

Innovative Information Representation

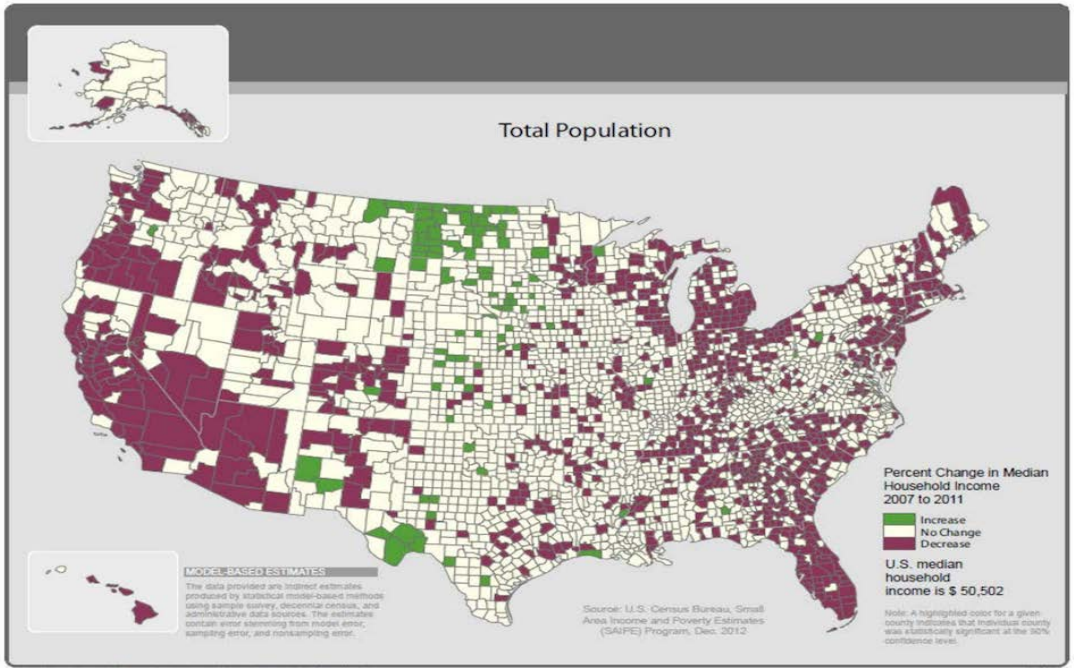


Map courtesy Wikipedia (Charles Joseph Minard)

More Interesting Maps

"36 Maps That Explain The Entire World"

Figure 5. **County Changes in Median Household Income: 2007 to 2011**



Maps …

- Show many values
- Highlight spatial proximity
- Highlight spatial correlations

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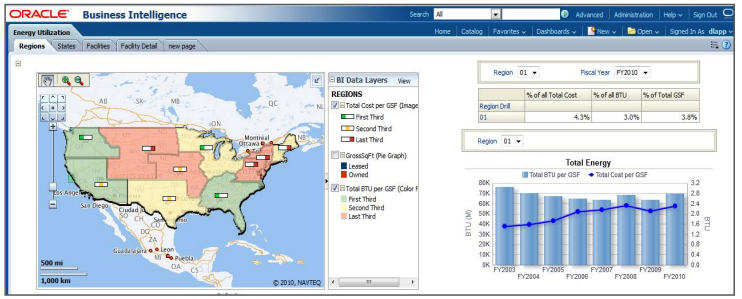
http://www.businessinsider.com/maps-that-explain-the-world-2013-2

Why BI and Maps ?

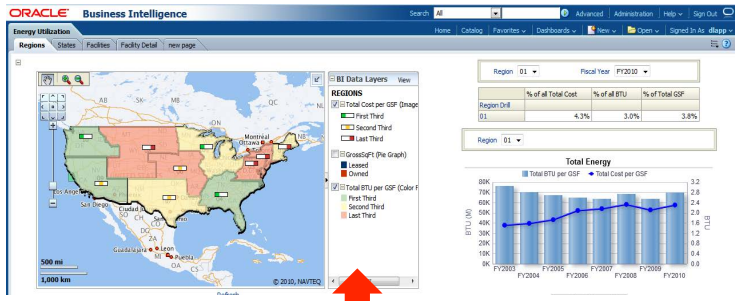
- Because business data is “spatially-related”
  - *“80 % of data is spatially-related”*
- Because business transactions typically involve:
  - A product or service
  - A consumer and/or a provider
  - A time
  - A location
- Because maps help understand the location aspects
  - Where are most of my sales ?
  - Compare with competitors.
  - Relate with my stores.

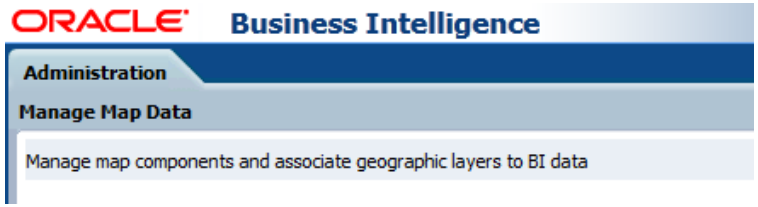
Using OBIEE Map Views



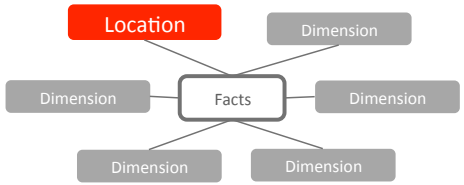
OBIEE's Mapping Capability
The "Map View"

- The ability to add colorful and interactive maps to any dashboard.
- Standard feature of OBIEE.
- Uses Oracle MapViewer
- Render results of OBIEE analysis as interactive, drillable color coded maps
- Inherits all OBIEE functionality; drilling, navigation, master-detail
- A map view is just like any other view
- No coding or technical know-how required!



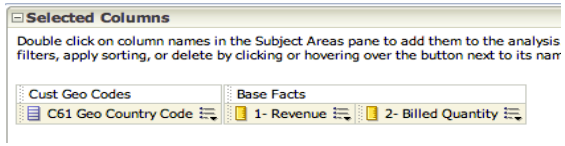


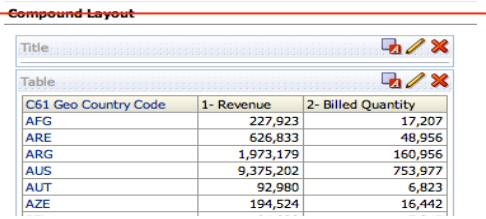
OBIEE Common Enterprise Information Model



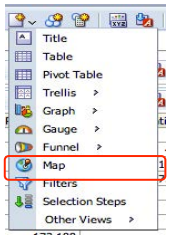
Creating a Map is easy as 1, 2, 3 …

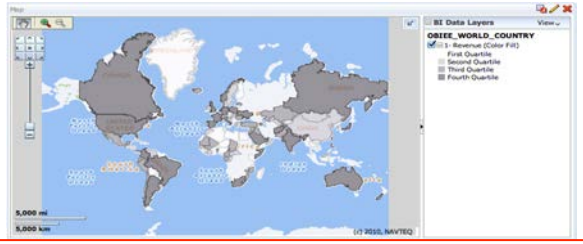
① Define your result as usual



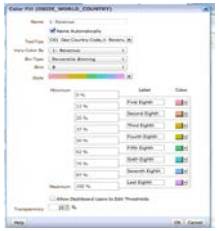


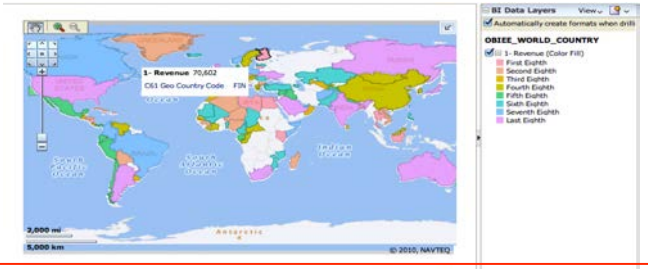
② Add a map view over that result





③ Customize the map

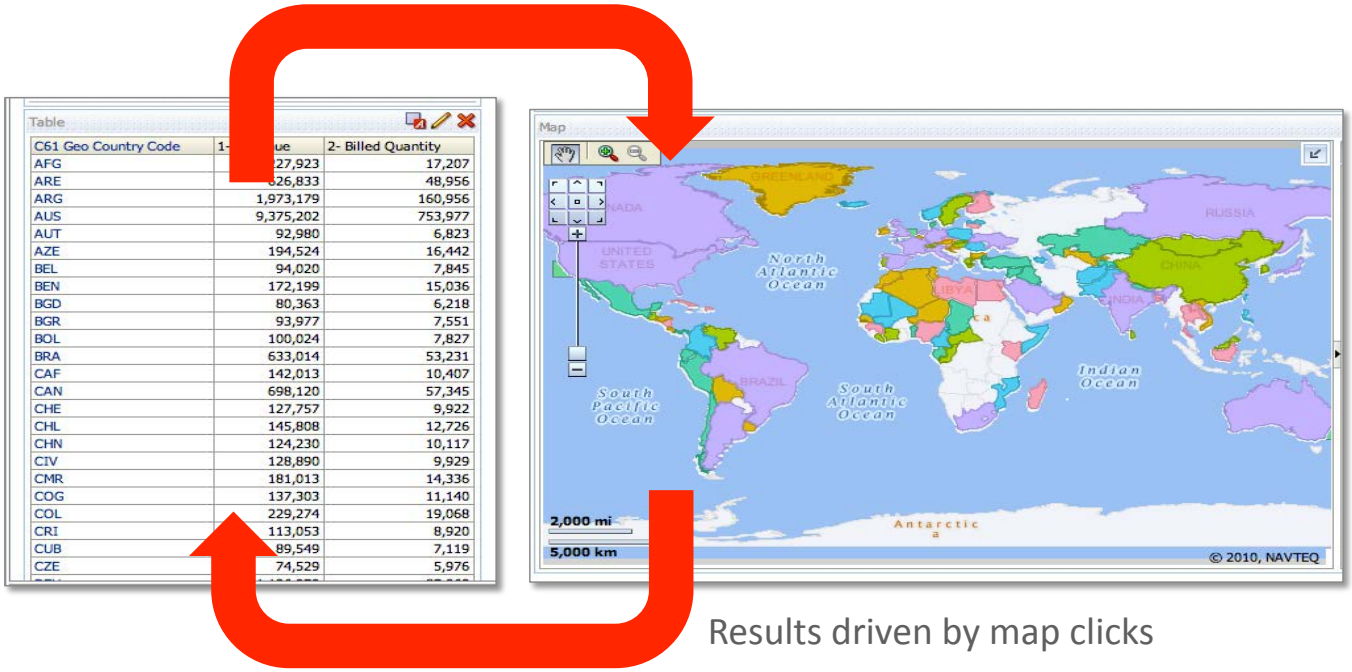




How does it work ?

Results from BI queries shown as tables, charts and also as maps

Map automatically updated when results change

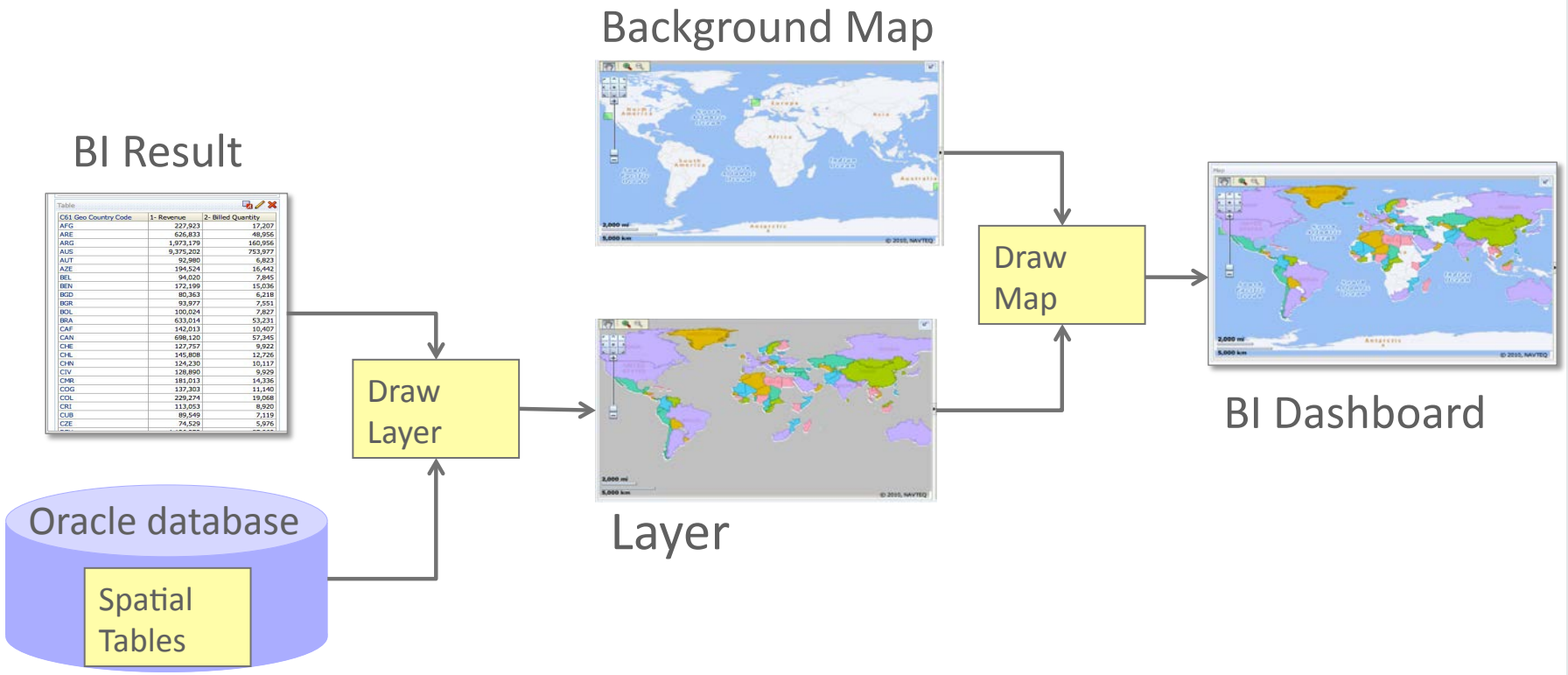


Results driven by map clicks

Architectural Concepts

- **Background Map**
  - The map on which the results are drawn
  - Can be produced from spatial tables in an Oracle database
  - Can come from an external service (Google, eLocation, WMS, …)
- **Layers**
  - The graphical results drawn on the background map
  - Shapes and locations come from an Oracle database
    - Country boundaries, regions, etc
  - Graphical representation driven by BI results
    - Sales, revenue, etc

Drawing a Map: Flow of Operation



Preparation Steps: *Some Assembly Required*

- ✓ Get the spatial data for your project
  - Identify the data you need
  - Decide on the background map to use
  - Free data, commercial data
  - Load, convert, merge, generate, link

OBIEE Administrator
Some "GIS" knowledge may be needed

- ✓ Prepare the maps for your project
  - Styles, themes, maps, tile layers – or use existing external maps

- ✓ Import into OBIEE
  - Link with BI data

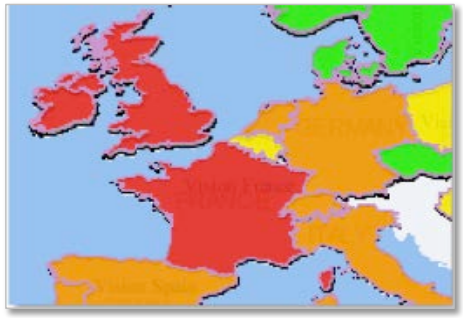
OBIEE Administrator

- ✓ Add map views to dashboards
  - Customize to fit your needs

Dashboard designer

Many Ways to Render the Results

Color Fill



Bar Chart

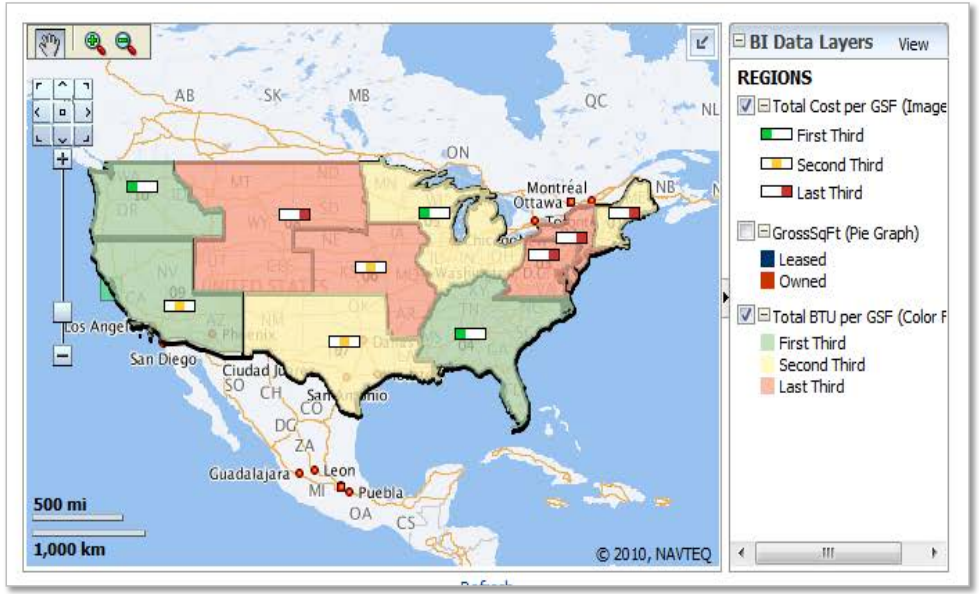
Pie Chart

Images

Markers

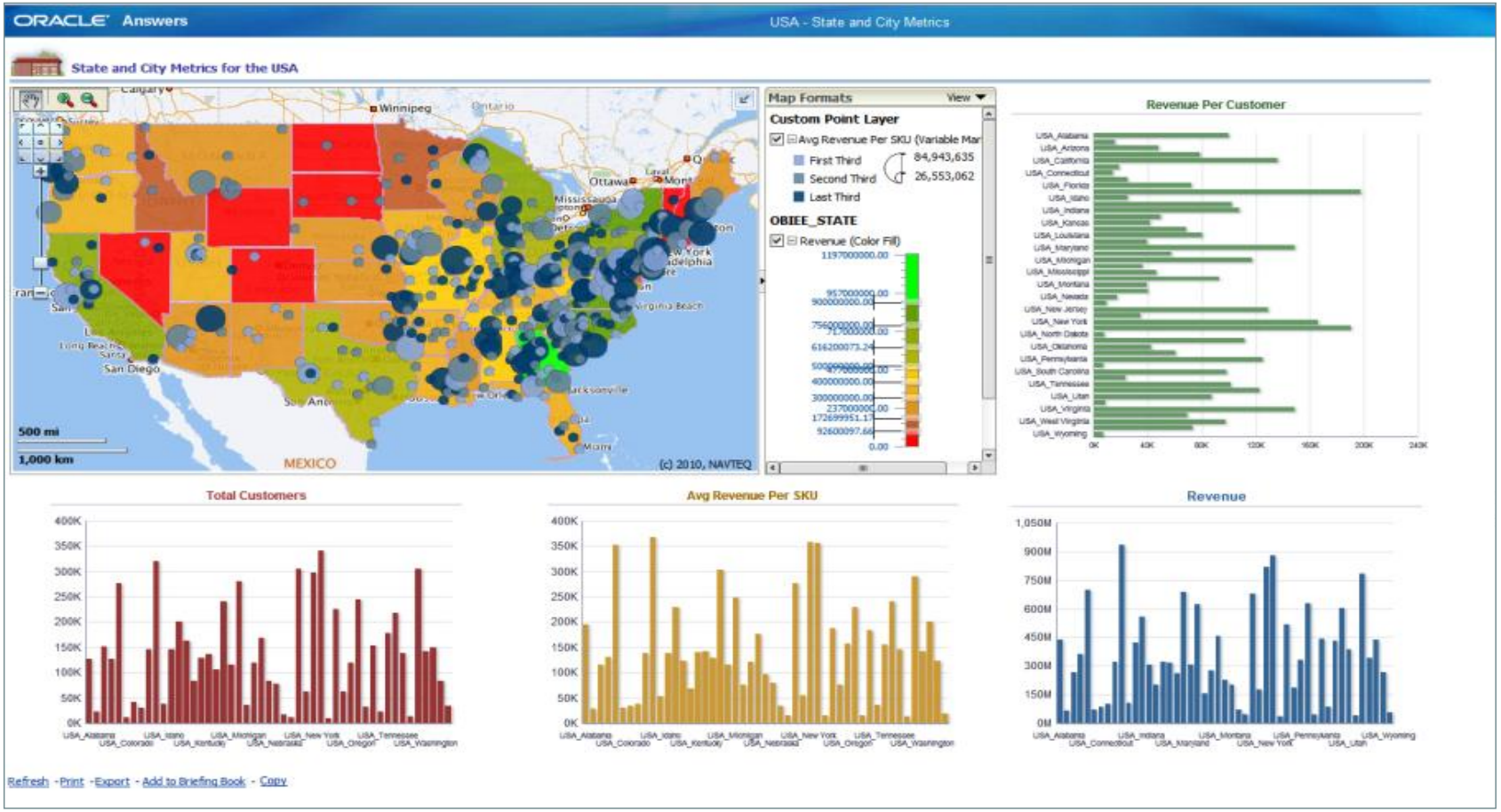
Bubble

Show Multiple Results on a Map



- A map can show multiple facts
- User can turn facts on or off

Demo



Oracle's Core Spatial Technologies

What is Spatial Data?

- Business data that contains or describes location
  - Geographic features (roads, rivers, parks, etc.)
  - Assets (cell tower, fire hydrant, electrical transformer, etc.)
  - Sales data (sales territory, customer registration, etc.)
  - Street and postal address (customers, stores, factory, etc.)
- Anything connected to a physical location
- Almost every database contains some form of business data that can be leveraged using spatial technologies
- Location is a “universal key”

“Spatial” Tables

- Just like regular tables
- Contain a column of type SDO_GEOMETRY to store the geometric shape of the objects

```
CREATE TABLE map_countries (
  id            NUMBER PRIMARY KEY,
  name          VARCHAR2(30),
  geometry      SDO_GEOMETRY
);
```

Spatial Data

Contains a list of X and Y coordinates for points that describe the shape

```
SQL> SELECT geometry FROM map_countries WHERE name = 'France';
```

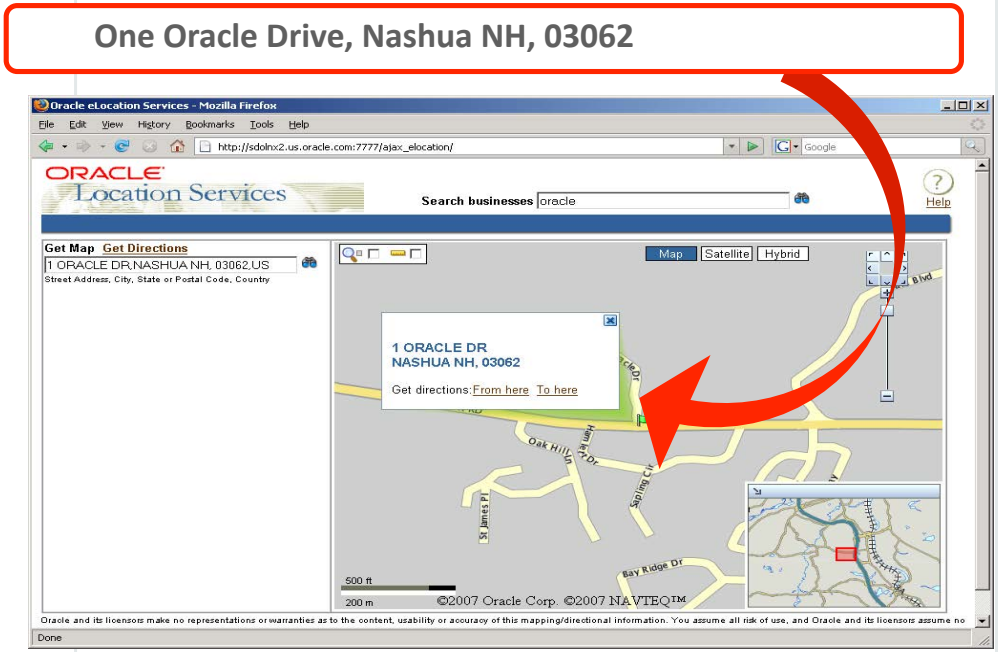
```
SDO_GEOMETRY(
  2007, 4326, NULL,
  SDO_ELEM_INFO_ARRAY(1, 1003, 1, 2209, 1003, 1
   2427, 1003, 1, 2465, 1003, 1, 2511, 1003, 1
  ),
  SDO_ORDINATE_ARRAY(
    6.63215688, 45.102186, 6.77118888, 45.142299,
    6.86673792, 45.115519, 6.90344604, 45.12864,
    ...
    -3.2208998, 47.377866, -3.245697, 47.353725
  )
)
```

Coordinate system of the shape (here Longitude/ Latitude)

Coordinates of points that describe the shape

Geocoding

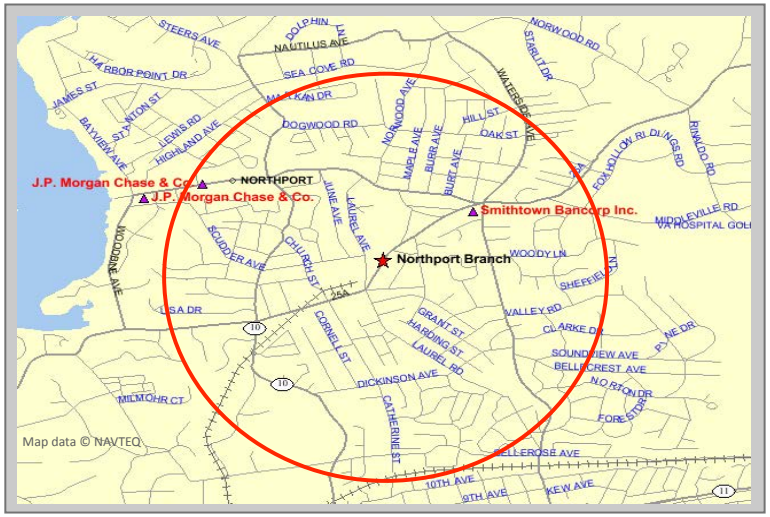
- Generates latitude/longitude (points) from addresses
- International addressing standardization
- Formatted and unformatted addresses
- Tolerance parameters support fuzzy matching
- SQL and XML APIs
- Record-level and batch processes
- Data provided by leading data vendors



Spatial Analysis

Find all competitors within 2 miles of Northport Branch

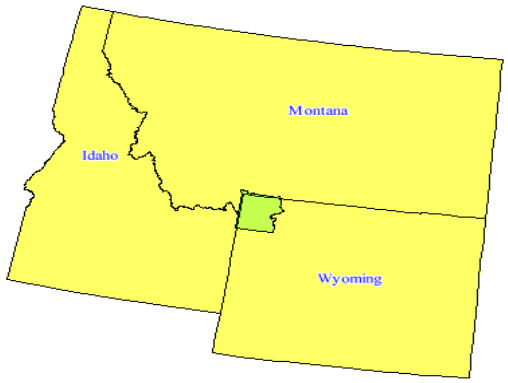
```
SELECT c.holding_company, c.location
  FROM competitor c,
       bank b
 WHERE b.site_id = 1604
   AND SDO_WITHIN_DISTANCE(
         c.location, b.location,
         'distance=2 unit=mile'
       ) = 'TRUE'
```



Spatial Analysis – a more complex example …

What percentage of Yellowstone is in each state ?

```
WITH p AS (
  SELECT s.state,
         sdo_geom.sdo_area (
           sdo_geom.sdo_intersection (
             s.geom, p.geom, 0.5),
           0.5, 'unit=sq_km') area
    FROM us_states s, us_parks p
   WHERE SDO_ANYINTERACT (s.geom, p.geom) = 'TRUE'
     AND p.name = 'Yellowstone NP'
)
SELECT state, area,
       RATIO_TO_REPORT(area) OVER () * 100 AS pct
FROM p
ORDER BY pct DESC;
```



STATE	AREA	PCT
Wyoming	8100.7515	91.0636012
Montana	640.296007	7.19780878
Idaho	154.659879	1.73859

Oracle Locator

Included in Oracle Database – All Editions

- Support for all 2D geometry types
  - Points, lines, polygons
- All Spatial Searches
- Measurements: distance, area, length
- Utility, tuning and validation
- Full Coordinate Systems support
- Spatial processing functions

Oracle Spatial

A cost option of Oracle Database Enterprise Edition

Includes all Locator features +

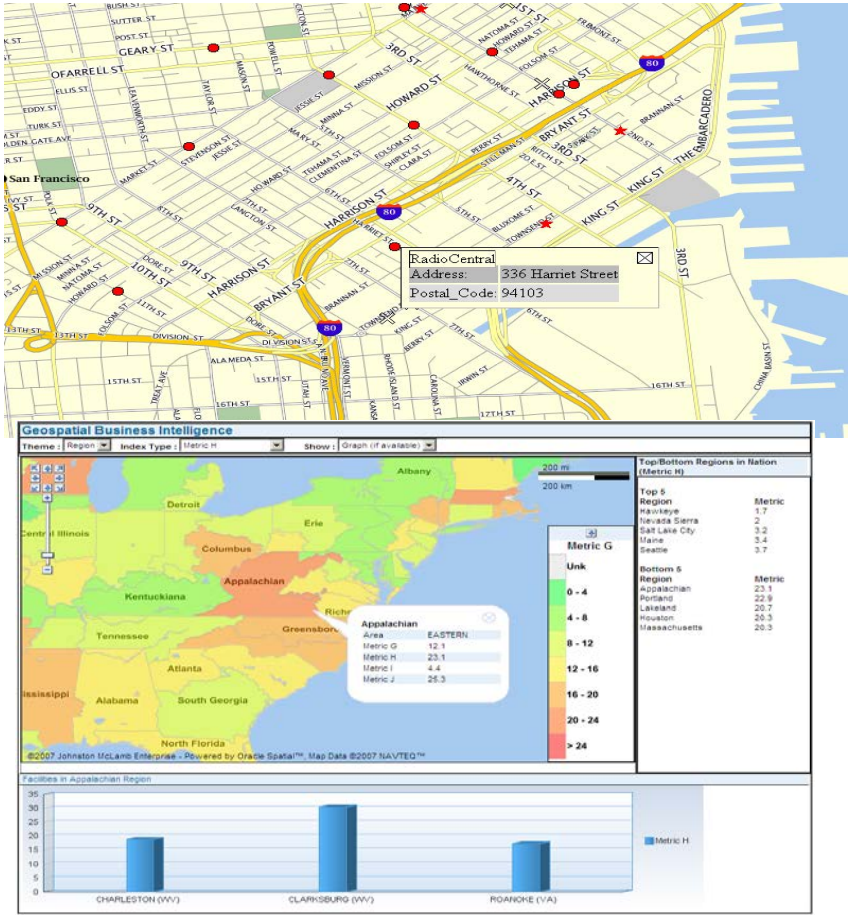
- Vector Performance Accelerator (VPA)
- 3D structures
- Geocoding
- Linear Referencing
- Network Data Model and Routing engine
- Raster (imagery and grids)
- Specialized 3D types (LIDAR, TINS)
- Web Services (WFS, …)

Oracle MapViewer

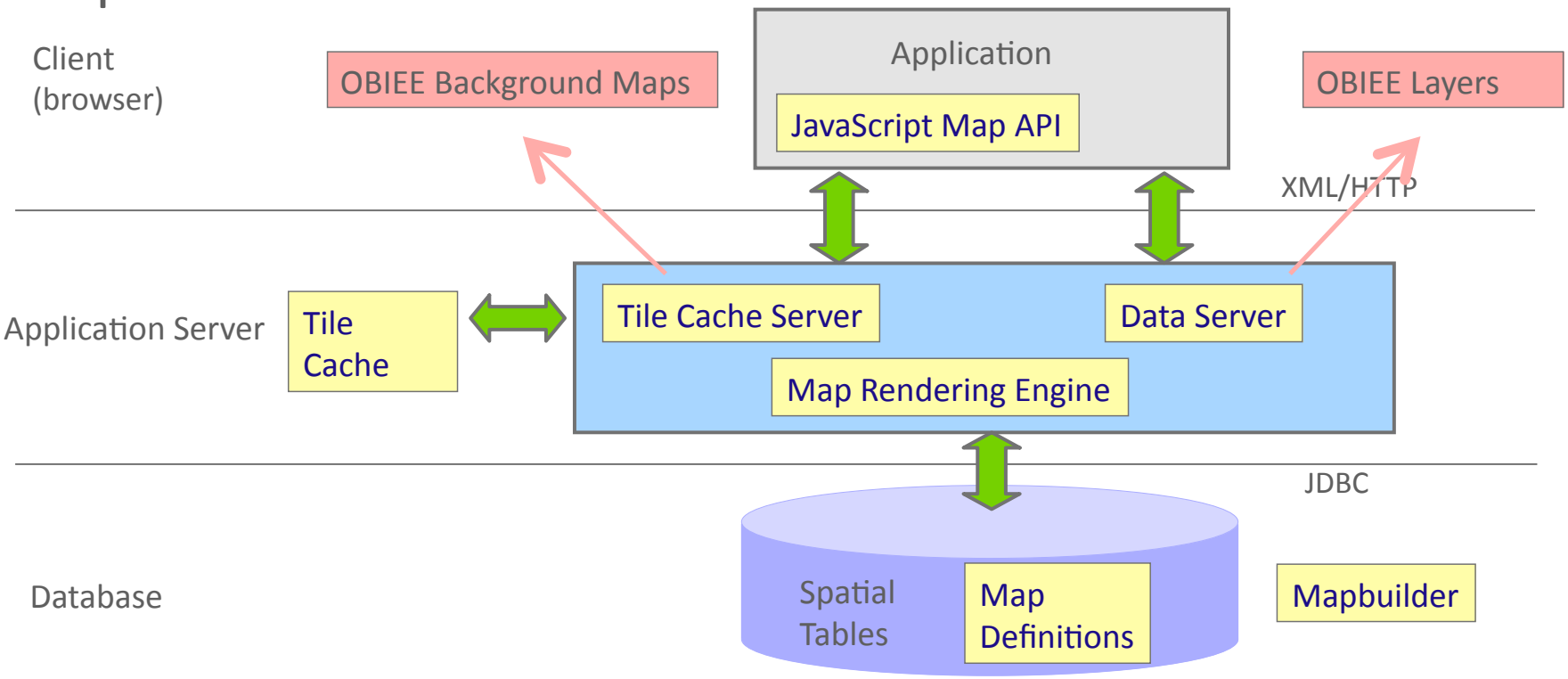
Included with all licenses of Oracle Fusion Middleware

Embedded with OBIEE

- Standards-based J2EE and Java Server Faces component
  - XML/HTTP, Java/AJAX
- Publish spatial data to the web
- Map and feature cache provides smooth scroll (pan, zoom)
- Rich Java, XML, JavaScript APIs provide client side interactivity
- Centrally managed map definitions, symbology, and styling rules



MapViewer Architecture



Spatial Data

What Spatial Data do you need ?

- **Background Data (OBIEE Background Map)**
  - This is used to build maps on which the business data is displayed
  - Roads, rivers, forests, buildings, etc
  - Could also be from satellite or aerial photos.
  - Not always required
  - Provides context for the business data
  - Can come from external providers (Google, …)
- **Business Data (OBIEE Layers)**
  - This is the data you need in order to show the results of your BI queries
  - For example: country boundaries, states, provinces, postal code areas, etc.

Sources for Spatial Data

- Here (Navteq): *Oracle Delivery Format (ODF)*
  - Plug and play
  - Supplied as “transportable tablespaces”
  - Two releases a year
  - Ready for use for geocoding, routing and mapping
  - 200 GB for a full European cover
  - Full street-level details
  - Points of Interest (businesses, public buildings, etc)
- Data also available from TomTom, GfK and other geospatial data providers (mapping agencies, etc)

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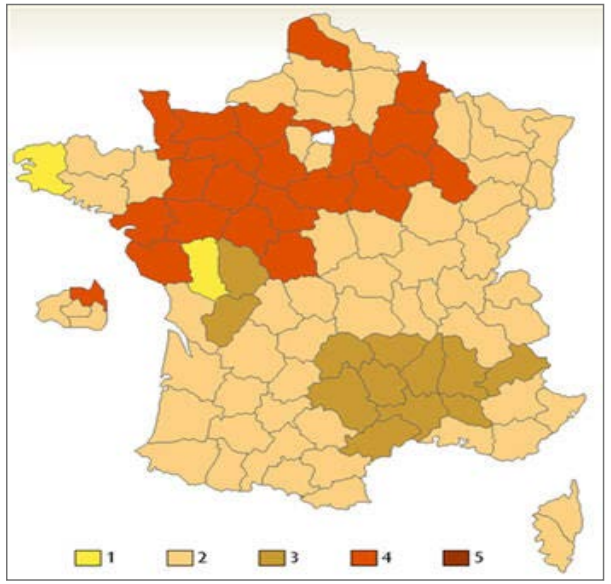
BI-specific Data

- Administrative boundaries
  - Four levels: countries and three subdivisions
  - For example: France “régions”, “départements”, “communes”
  - Clear hierarchical structure
  - Oracle dumps
- Postal code boundaries
  - Generalized and non-generalized
  - Postal code centroids
  - Available in ESRI shape files
- Similar offers also available from GfK and TomTom

Using Standard Administrative Regions

- Example: analyzing sales per provinces and province subdivisions
- Can use standard boundaries (possibly from the free “world-sample” dataset)
- But still need to relate the region codes used in BI with those in the spatial data
- Can match on names
  - But watch spelling differences (accents, dashes)
  - May need to manually fix the names of the spatial regions to match the BI data



Map courtesy of http://strangemaps.wordpress.com/

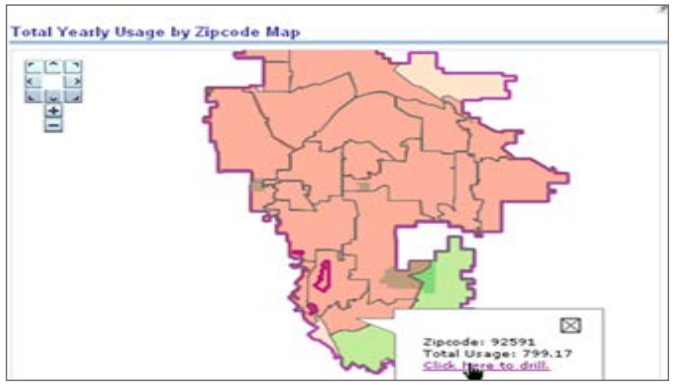
Using Combinations of Standard Administrative Regions

- Example: the “sales regions” used by the customer are formed by combining various standard admin regions.
- Must have a clear definition of how the customer defines those regions!
- Construct the customer-specific regions by spatially merging the standard regions.
- Use spatial processing functions provided by Oracle Spatial.
  - Union, intersection, buffer, …

Using Other Administrative Areas

- School districts, wards, precincts, voting districts
- Statistical units
  - French IRIS codes, US Census Blocks
- Not available from the usual suppliers
- GfK has many of those

GfK GeoMarketing



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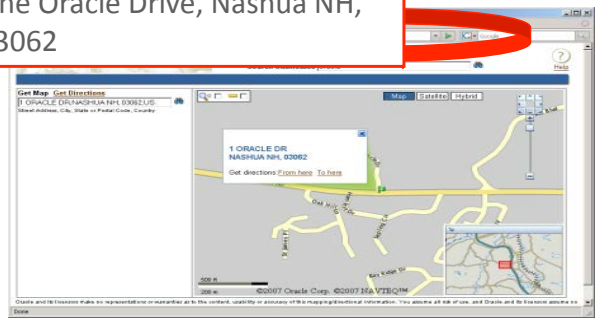
Loading the Spatial Data

- Some data provided in Oracle formats
  - Transportable tablespaces, dumps
- Some provided in “GIS” files
  - ESRI shapefile is a common format
  - Load using Mapbuilder
- Other “GIS” formats
  - If possible, ask for a “shapefile” copy
  - If not, need more tools
  - Open Source (GDAL)
  - FME (Safe Software)

Locating Individual "Business Events"

- "Business Events" are individual customer locations (or crime locations, or network failures, …)
- They are identified by their addresses
- For mapping, they must be identified spatially (using geographical coordinates)
- This is a process called "Geo-coding"
- Requires Oracle Spatial
- Requires a geocoding (addresses) data set

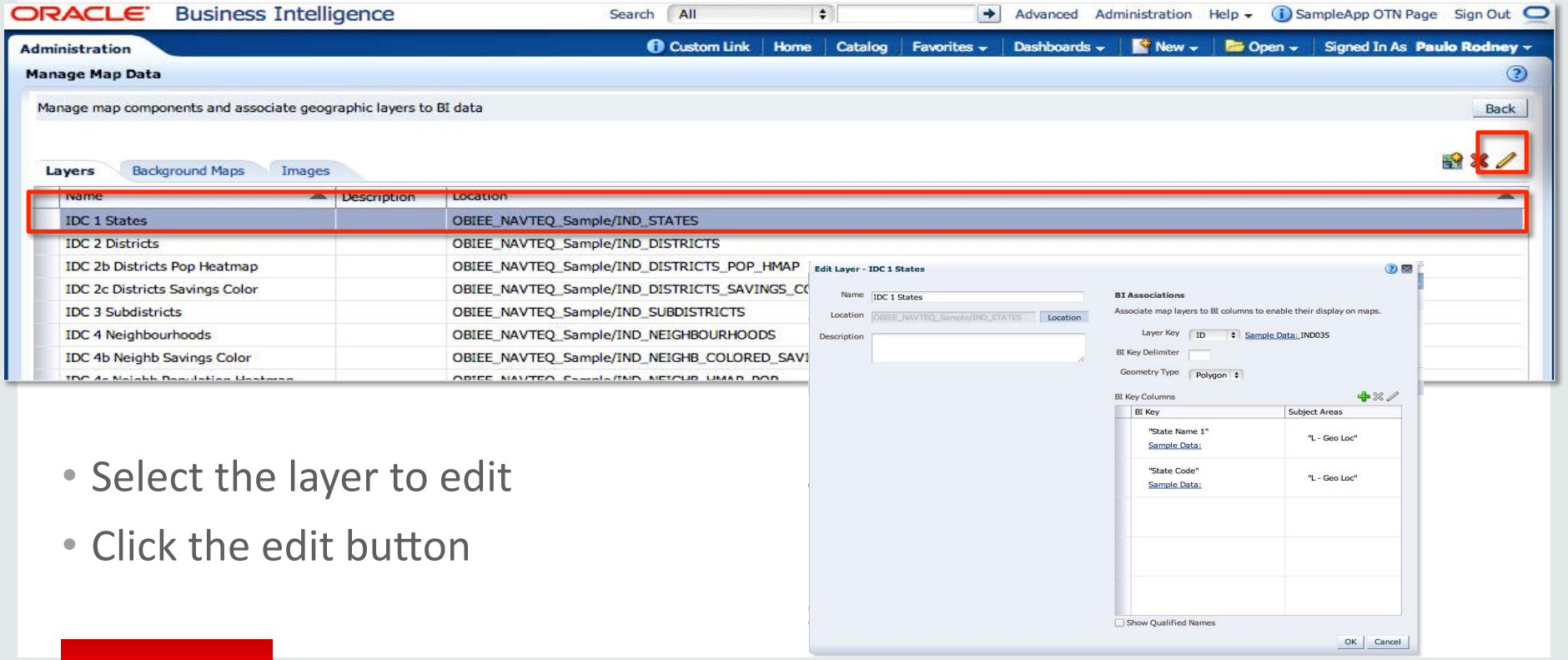
One Oracle Drive, Nashua NH, 03062



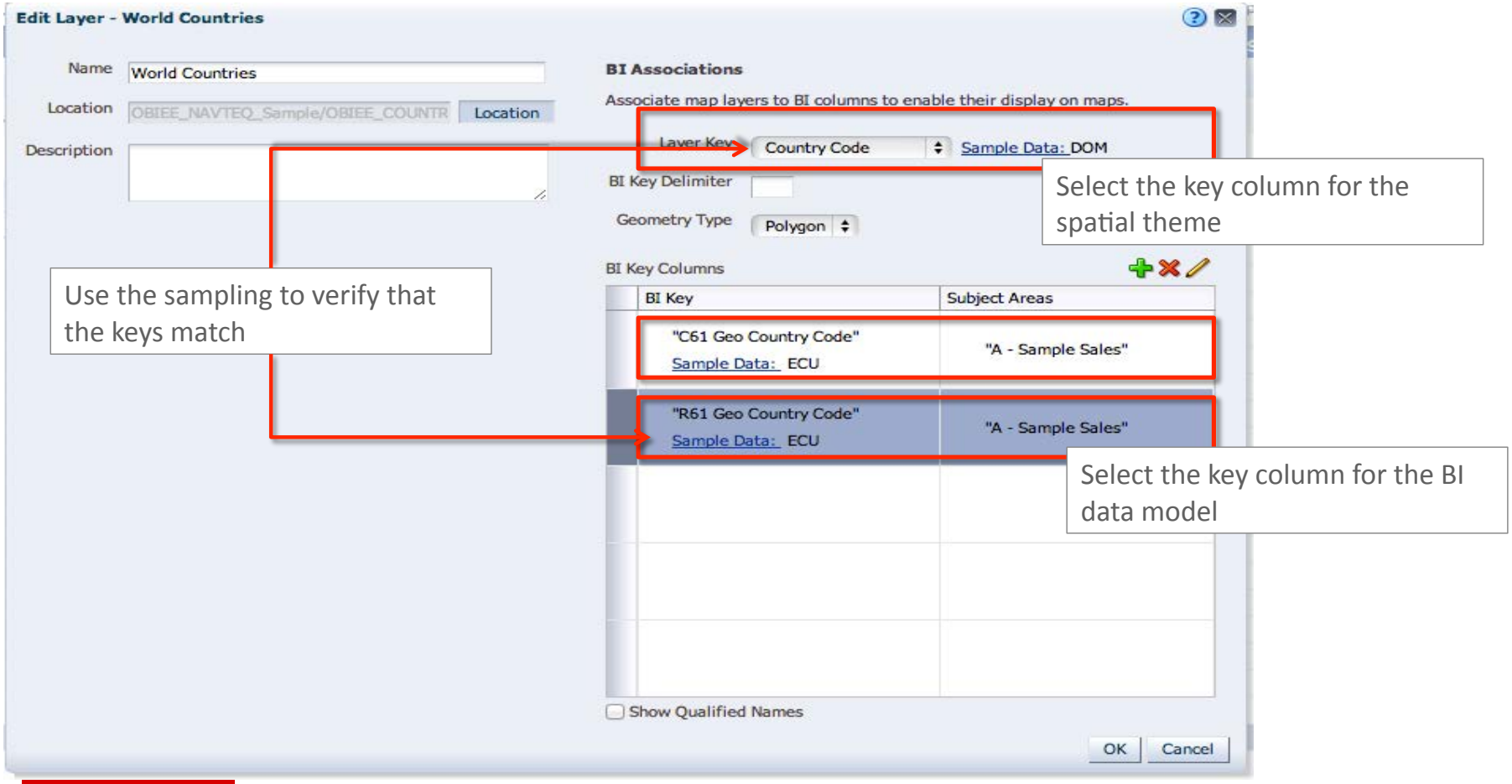
Background Maps

- Provides visual context for business information
- Can be generated from local detailed spatial data
- Can be provided by external mapping services (Oracle eLocation, Google Maps, …)
- Could also be imagery

Linking Layers and BI data



- Select the layer to edit
- Click the edit button



Linking Layers and BI data

- Ideally, match on **codes** if possible
  - For example ISO country codes
    - 2-letters (FR) vs 3-letters (FRA) codes
  - US State codes, French départements, …
  - Rarely available for other admin areas
  - Rarely used outside national statistical offices
  - US FIPS codes, EU NUTS codes
- Mostly match on **names**
  - But watch spelling differences (case, accents, dashes)
  - Watch language (“Germany” vs “Deutschland” vs “Allemagne”)
  - Will need to manually fix the names of the spatial regions to match the BI data

Try it out!

- **Download and install a virtual machine**
  - Ready for use. Includes OBIEE and Oracle Database with a full sample application environment.
  - http://www.oracle.com/technetwork/middleware/bi-foundation/obiee-samples-167534.html
  - Revisit regularly for new and updated versions
- **Online test drive - shared**
  - Shared environment – don't change anything
  - http://slc02ojw.oracle.com:7780/analytics/
- **Online test drive - dedicated**
  - Own environment, provided by our partner Vlamis in Amazon AWS
  - Limited to 5 hours
  - http://www.vlamis.com/testdrive-registration

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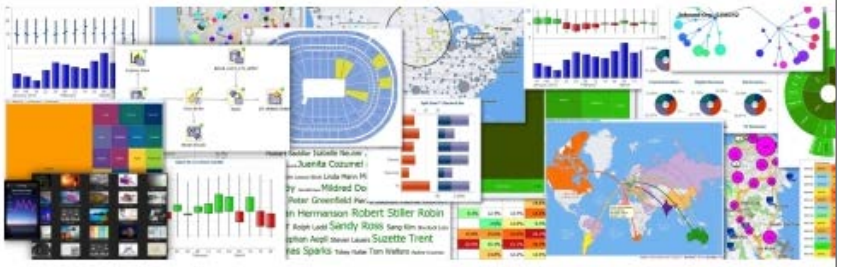
Oracle Business Intelligence Enterprise Edition Samples

Oracle Business Intelligence Foundation Suite, is a comprehensive, modern and market-leading BI platform provides the industry's best in class platform for ad hoc query and analysis, dashboards, enterprise reporting, mobile analytics, scorecards, multidimensional OLAP, and predictive analytics, on an architecturally integrated business intelligence foundation.

OBIEE Sample Application combines all of these technologies together in a standalone virtual box image creating a comprehensive OOB collection of examples and integrations designed to demonstrate Oracle BI capabilities, product integrations, and design best practices.

Disclaimer: The SampleApp contents and its code are distributed free for demonstrative pu
only. It is neither maintained nor supported by Oracle as a licensed product.



Download SampleApp Virtual Machine

SampleApp uses sample spatial and boundary mapping data from NAVTEQ. This data is pr
under terms and conditions as specified here

You must accept the OTN License Agreement to download this software.
(•) Accept License Agreement | ( ) Decline License Agreement

SampleApp "Explained"

OBIEE 11.1.1.7.1 - Sample Application version 406
VirtualBox Image (includes OEL6.5, Mobile App Designer v2 & Oracle Database 12c)
Oracle BI Tech Demos YouTube Channel | Video: How to download all image files at once

File	Description
SampleApp v406 Docs	Quick deployment guide, user guide and whats new in SA 406
Known Issues & FAQs (updated 10-21-14)	Fixes, updates and tips for SampleApp v406 release (new faq on DB password expiry issue)
SampleAppv406.zip.001 SampleAppv406.zip.002 SampleAppv406.zip.003 SampleAppv406.zip.004 SampleAppv406.zip.005 SampleAppv406.zip.006 Checksums (MD5)	1. Download all zip files into a single directory (approx 28.5 GB). 2. Optionally verify integrity of zip files using checksums. 3. Use 7zip manager, select the first zip file (001) and extract. 4. This will create a Sampleappv406appliance folder. 4a.A compressed vmdk and ovf file will be in this folder 5. Open VBox Manager, select Import, navigate to the directory, select the .ovf file and click import.
SampleApp v406 Plug-ins	Plug-ins available for v406 * **OPTIONAL DOWNLOADS***
EPMStandAloneV406.tar Checksum (MD5) (* Optional Download)	For users who require full standalone EPM deployment. Please refer to EPM Plug-in for SampleApp v406.pdf for details.
Patch Storage.tar Checksum (MD5) (* Optional Download)	For users that want to patch their own SampleApp v406 environment. Please refer to the Patch Storage SampleAppv406.pdf for details. Note v406 has the latest PSU for BIEE already applied.

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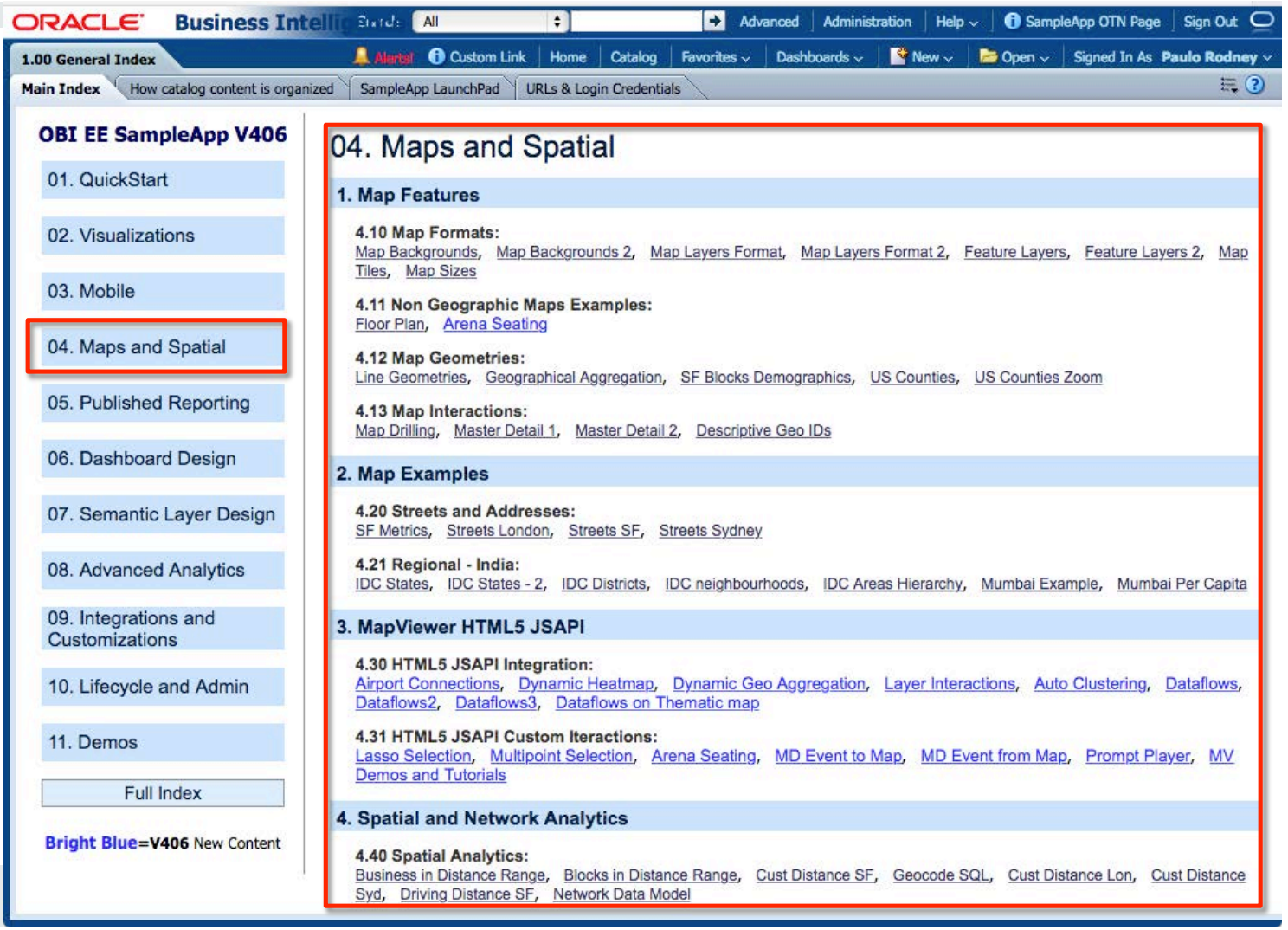
Try it out!


ORACLE Business Intelligence
All
Advanced
Administration
Help
SampleApp OTN Page
Sign Out
1.00 General Index
Alerts!
Custom Link
Home
Catalog
Favorites
Dashboards
New
Open
Signed In As Paulo Rodney
Main Index
How catalog content is organized
SampleApp LaunchPad
URLs & Login Credentials
OBI EE SampleApp V406
01. QuickStart
02. Visualizations
03. Mobile
04. Maps and Spatial
05. Published Reporting
06. Dashboard Design
07. Semantic Layer Design
08. Advanced Analytics
09. Integrations and Customizations
10. Lifecycle and Admin
11. Demos
Full Index
Bright Blue=V406 New Content
04. Maps and Spatial
1. Map Features
4.10 Map Formats:
Map Backgrounds, Map Backgrounds 2, Map Layers Format, Map Layers Format 2, Feature Layers, Feature Layers 2, Map Tiles, Map Sizes
4.11 Non Geographic Maps Examples:
Floor Plan, Arena Seating
4.12 Map Geometries:
Line Geometries, Geographical Aggregation, SF Blocks Demographics, US Counties, US Counties Zoom
4.13 Map Interactions:
Map Drilling, Master Detail 1, Master Detail 2, Descriptive Geo IDs
2. Map Examples
4.20 Streets and Addresses:
SF Metrics, Streets London, Streets SF, Streets Sydney
4.21 Regional - India:
IDC States, IDC States - 2, IDC Districts, IDC neighbourhoods, IDC Areas Hierarchy, Mumbai Example, Mumbai Per Capita
3. MapViewer HTML5 JSAPI
4.30 HTML5 JSAPI Integration:
Airport Connections, Dynamic Heatmap, Dynamic Geo Aggregation, Layer Interactions, Auto Clustering, Dataflows, Dataflows2, Dataflows3, Dataflows on Thematic map
4.31 HTML5 JSAPI Custom Iteractions:
Lasso Selection, Multipoint Selection, Arena Seating, MD Event to Map, MD Event from Map, Prompt Player, MV Demos and Tutorials
4. Spatial and Network Analytics
4.40 Spatial Analytics:
Business in Distance Range, Blocks in Distance Range, Cust Distance SF, Geocode SQL, Cust Distance Lon, Cust Distance Syd, Driving Distance SF, Network Data Model

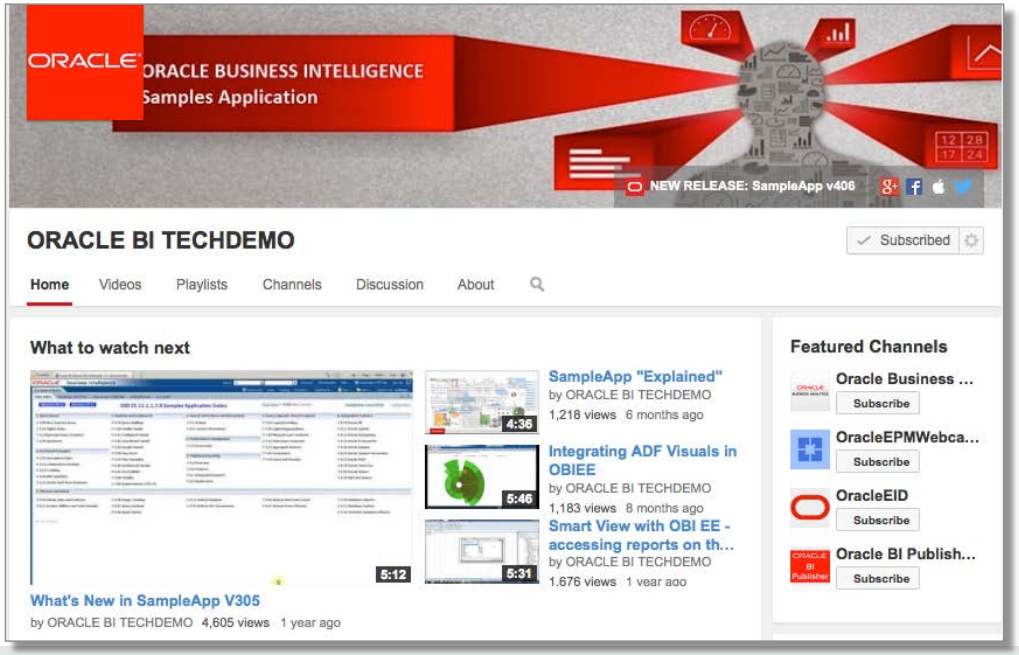
Upcoming sessions on Maps in Oracle BI

- **Oracle BI and Geo-Spatial Big Data**
  - Tony Heljula, PeakIndicators, UK
- **Geomarketing Analysis: for Italy's Leading Supermarket Chain, Unicoop Firenze**
  - Michele Sacchi, Bridge Consulting, Italy
- **Location Intelligence for Italian and UK Justice and Public Sector**
  - Nicola Sandoli, IConsulting, Italy

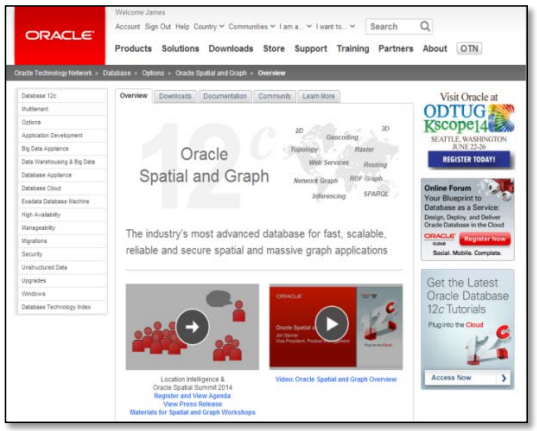
- Available Workshop materials on OTN
  - „Create Custom, Interactive Map Visualizations Using Oracle Business Intelligence Integration Frameworks" including VirtualBox image and step-by-step guide

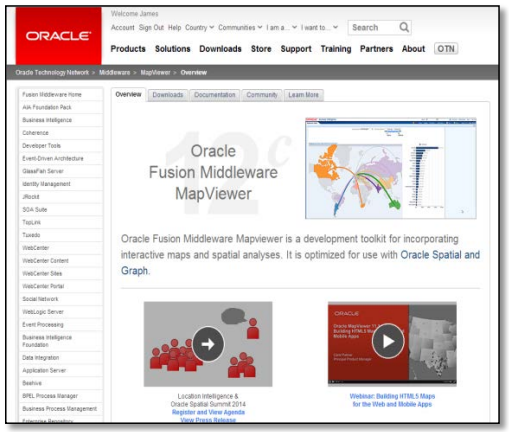
Learn more from our YouTube Channel

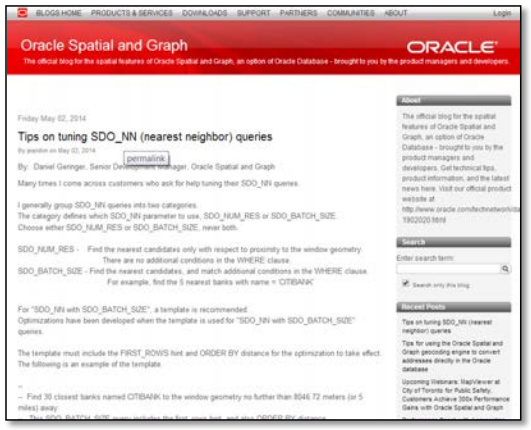
www.youtube.com/user/OracleBITechDemo



Resources: Oracle Technology Network

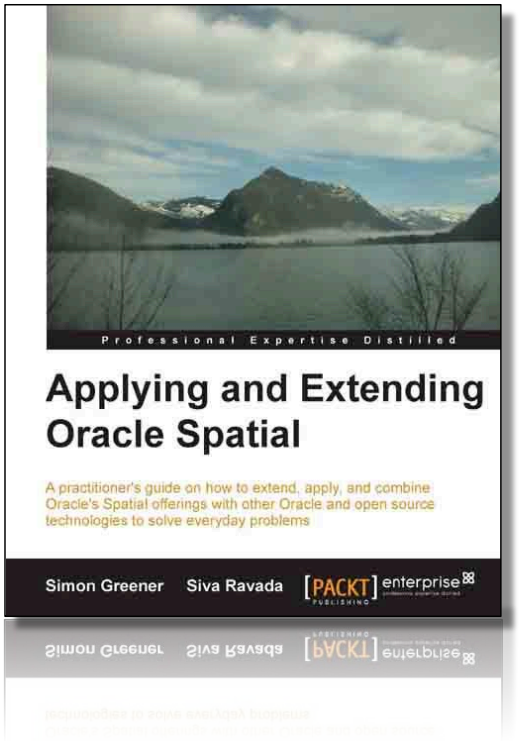






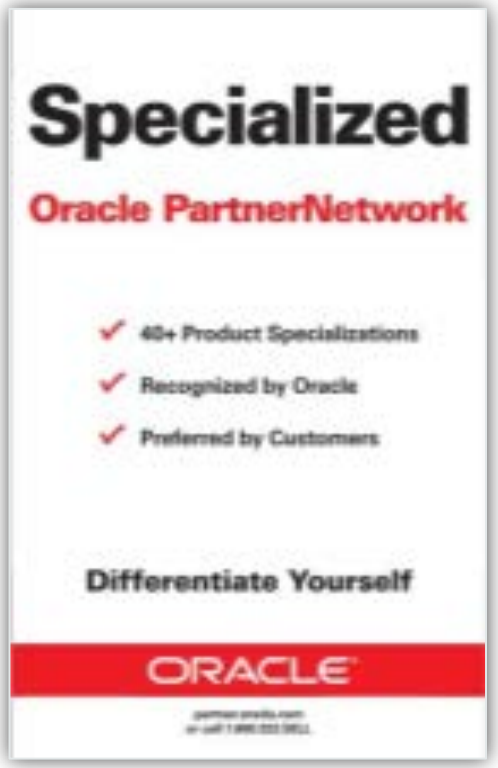
- www.oracle.com/technetwork/database/options/spatialandgraph
- www.oracle.com/technetwork/middleware/mapviewer
- blogs.oracle.com ➔ oraclespatial ➔ oracle_maps_blog

More Resources



Certification

- **Individual Certification, Partner Specialization**
  - Credentials for individuals with Spatial implementation expertise
  - OPN Specialization – differentiates partner organizations delivering Spatial services
  - Study materials, exam information, program guidelines are available at www.oracle.com/technetwork/database/options/spatialandgraph/learnmore/spatial-partners-423197.html
  - Talk to Oracle team this week



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Q & A

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