April 2010
Oracle Spatial User Conference
Location Intelligence
A Case Study on Fund Distribution for the Wine Sector from an Italian Regional Agricultural Agency
Agenda

• Background Information
• Need for Location Intelligence
• Live DEMO
• Technical Details
• Benefits
• Conclusions and Future Work
Iconsulting is a consulting firm specialized in designing and implementing Data Warehouse, Business Intelligence and Corporate Performance Management solutions.

Our mission is to be a center of excellence, a benchmark in the market, where quality, professionalism and enthusiasm serve client satisfaction.

To reach our goals we rely on the competence and the passion of our people, on the quality of processes and the experience gained from over 270 successful projects.

"We address those who pursue excellence with an approach based on strong expertise and method. This is our distinctive character."
Iconsulting: Our History

• In **1998** the Data Warehouse and Business Intelligence Laboratory was founded, within an important Research Consortium, with the aim of disseminating knowledge and methodologies related to these technologies.

• **1998-2001** The Laboratory established itself as a competence center in the academic field and carried out the first BI projects for companies.

• **2001** Iconsulting was born; a spin-off from the original Laboratory group.

• **2001-Present**: Iconsulting becomes a landmark in the Italian Business Intelligence and Corporate Performance Management market.
Iconsulting: Our Services

- Strategy Management Dashboard
- Corporate Performance Management
  - Planning, Budget & Forecast
  - What-if simulations
  - Group consolidated balance sheet
- Business Intelligence
  - Query and reporting
  - Multidimension analysis
- Data Warehouse
  - Data integration, Data quality
  - Data modelling, Metadata Management

Synthesis analysis and strategic planning
Planning and control activities
Operational decision making activities
AGREA is a governmental organization in charge of distributing EU funds and economical aid to farmers in the region of Emilia-Romagna. AGREA manages the whole process from farmer application to funds distribution.
Different Data Sources (Monitor funds distributed for vineyards)

- **Internal data sources**
  - *Numeric data:* Different fund application modules, application state, farmer's age and gender, areas by grape typology (Sangiovese rather than Lambrusco), allocated and erogated funds etc.
  - *Geographical data:* tourist areas, water pollution zones, natural disaster risk zones etc.

- **External data sources**
  - *Numeric data:* weather historical data and forecasts, pollution data etc.
  - *Points of interest:* wine bars, wineries, farm locations, agro-tourism centers, etc.
Challenging issues AGREA is concerned with:

- How can we speed up controls to decide application eligibility?
- How can we measure the impact EU Policies have on territory?
- Can we better estimate investment risks?
- How to optimize fund distribution?
AGREA needs to integrate its various data sources, present in different databases with geographical information in order to have a complete 360° overview using powerful visual analysis.

Location Intelligence combines the visualization and spatial queries of GIS technologies with the elaborative power and analysis capabilities of Business Intelligence (BI) to implement a Decision Support System which integrates all these features together.
Application Stack

- Oracle Enterprise Linux 5
- Oracle Database 11gR2 (with Spatial)
- Oracle Mapviewer 11g
- Oracle Business Intelligence EE 10.1.3
- Oracle Application Server OC4J 10.1.3.1.0
OBIEE and Mapviewer

- Bidirectional communication between OBIEE and Mapviewer

NSDP

PortalPageNav (GET)
Demonstration
Fund Distribution Dashboard
Spatial data setup

1. Validation of spatial data:
   
   ```sql
   CALL SDO_GEOM.VALIDATE_LAYER_WITH_CONTEXT('GEO_TABLE','SHAPE','VAL_RESULTS');
   ```

2. Repairing invalid data:
   
   ```sql
   UPDATE GEO_TABLE a SET a.shape = SDO_GEOM.SDO_INTERSECTION(a.shape,a.shape, 0.001);
   ```

3. Conversion to SRID 3785 (for integration with OpenLayer standard):
   
   ```sql
   UPDATE GEO_TABLE set shape = SDO_CS.TRANSFORM(shape, 3785);
   ```

4. Union of polygons of the same land parcel:
   
   ```sql
   SELECT SDO_AGGR_UNION(SDOAGGRTYPE(s.shape, 0.001)) FROM GEO_TABLE s
   ```

5. Building the Geographic Dimension (spatial aggregation):
   
   ```sql
   SELECT s.NAT_CODE, s.SHEET, SDO_AGGR_CONVEXHULL(SDOAGGRTYPE(s.shape, 0.005)) FROM GEO_TABLE s GROUP BY s.NAT_CODE, s.SHEET;
   ```
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11gR2 “TRANSFORM_LAYER” is much faster!
1. Create a Pie Chart Advanced Style
2. From OBIEE Answers, create a report with a data column for each desired slice of the pie.
3. Add the Static Text view to the report to include the map in the dashboard and to set up NSDP.
Pie Charts on map

4. From the included JavaScript code, use NSDP to achieve the join between the previously-defined style and the results of the report.

```javascript
function setupNsdpPie(dynFOI) {
    var nsdpInfo = new MVNSDP("defaultNSDP");
    nsdpInfo.setTheme("AZIENDE_NAKED");
    nsdpInfo.setRenderStyle("V.PIE_ETTARI");
    nsdpInfo.setKeyColumn("ID_AZIENDA");
    var ps = new Object();
    ps["xml_url"] = "http://"+document.location.host+"/analytics/obiee_nsdp_xml_direct.jsp?nqid=" + nqid + "&sid=" + sid;
    nsdpInfo.setParameters(ps);
    dynFOI.setNSDP(nsdpInfo);
}
```
Drill-down

- Link from the Info Window that calls “PortalPageNav”, passing the selected ID as a parameter.

```
"<a href="javascript: void(null)"
    onclick="javascript: parent.PortalPageNav(event," +
    "/users/administrator/_portal"," // dashboard catalog path
    'Viti Demo 1 Comuni','"+
    "GEOGRAFIA','"+
    "DENO_PROV','"+
    foi.attrs[0] + // target value
    ");">Detail about " + foi.attrs[0] + "</a>
```
Spatial query: how to (1)

• Circle Tool selects some FOIs.
• A highlighting theme is created.

```javascript
function circleDone()
{
    var geom = circleTool.getCircle();  //this will be our filtering geom
    var highlitedFois = new MVThemeBasedFOI('highlightedFois', 'viti.FOIS');

    highlightedFois.setHighlightOnly(true);
    highlightedFois.setFilteringGeom(geom);
    highlightedFois.addEventListener("after_refresh", afterRefresh);
    mapView.addThemeBasedFOI(highlightedFois);
    highlightedFois.refresh();
}
```
Spatial query: how to (2)

- Circle Tool selects some FOIs.
- A highlighting theme is created.
- The dashboard “Navigate” command is issued. Parameters are passed in GET with the URL.

```javascript
function afterRefresh()
{
    var themebasedfoi = mapView.getThemeBasedFOI('highlightedFois');
    var filtro = "";
    var nfiltril = 0;
    for (i=0; i<themebasedfoi.getFOIData().length; i++)
    {
        filtro=filtro + "+" + themebasedfoi.getFOIData()[i].attrs[6];
        nfiltril++;
    }
    filtro = "/analytics/avl.dll?Dashboard&Action=Navigate&PO=1&P1=eq&P2=TABLE.KEY&P3=" + nfiltril + filtro;
    parent.location.href=filtro;
}
```
External Tile Servers

- To integrate external web Tile Servers (e.g. OpenStreetMap):
  - Use SRID 3785
  - 20 Standard zoom levels
  - Use of `MVCustomMapTileLayer`:

```javascript
var basemap = new MVCustomMapTileLayer(mapConfig, getOSMMAPTileURL);

function getOSMMAPTileURL(tx, ty, tw, th, level)
{
  var x = (tx-mapConfig coordSys minX)/mapConfig zoomLevels [level].tileWidth ;
  var y = (mapConfig coordSys maxY-ty)/mapConfig zoomLevels [level].tileHeight-1 ;

  if (selectedBaseMap == "osm1")
    return "http://tile.openstreetmap.org/+(level)+/"+x+"/"+y+".png";
  else if (selectedBaseMap == "osm2")
    return "http://tah.openstreetmap.org/Tiles/tile/+(level)+/"+x+"/"+y+".png";
  else if (selectedBaseMap == "osm")
    return "http://a.an doy.sandbox.cloudmade.com/tiles/cycle/+(level)+/"+x+"/"+y+".png";
  else if (selectedBaseMap == "gm")
    return "http://mt.google.com/vt/lyrs=m@114&hl=it&x= " + x + "&y=" + y + "&z=" + level + "&s=G";

...}
```
Benefits

- **Improved decision making**: information is readily available.

- **New insights** can be derived correlating different data sources based on geographical dimension.

- **Certified data quality**: resolved mismatches, geocoding improved address accuracy.

- **Enhanced analysis**: integrated map and numeric visualizations, spatial queries.

- Users can benefit from a **flexible profiling** to access their reports.
Conclusions and Future Work

Conclusions

• By using Location Intelligence organisations can derive new insights, optimize their processes and make better decisions.

• Oracle Suite gives a complete all-in-one solution to meet a multitude of needs.

Future Work

• Migration to Oracle OBIEE 11g: integration with maps will be much easier; users will be able to customize or create maps on their own.

• Spatial-OLAP: a MOLAP architecture that can store maps and data.