SPATIAL

May 2012

Oracle Spatial User Conference

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Oracle Spatial User Conference

May 23, 2012

Ronald Reagan Building and International Trade Center

Washington, DC USA

Michele Sacchi

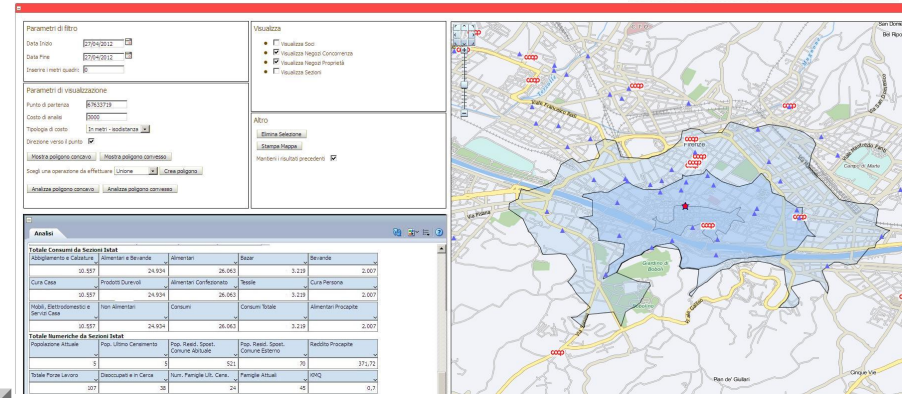
Bridge Consulting

Program Manager

Geomarketing Analysis

A developed solution for Italy's Leading Supermarket Chain, Unicoop Firenze

Bridge Consulting Geomarketing Analysis



OVERVIEW

- Incorporates all of Business Intelligence systems and all of departmental systems
- Supports Marketing, Development and Management divisions

CHALLENGES / OPPORTUNITIES

- Need to have a simple to use, standardized, complete and shared solution
- Need to integrate disparate data sets (statistical & internal)
- Need to relate more than 1.2 Million records with lat/long coordinates
- Need to decrease operational time costs

SOLUTIONS

- Oracle Database Enterprise Edition
  - Spatial Option with Network Data Model
  - Partitioning
- Oracle Fusion Middleware
  - MapViewer
- Oracle Business Intelligence Enterprise Edition

RESULTS

- Consolidation of geo data and network data model
- Standardization of all addresses and coordinates in a consistent format and datum
- The Organization now better understands activities in context of location and directs marketing and assortment policies of the stores
- The Organization now explains the business events dependent on territorial characteristics
- The solution allows to save 35% of operational costs of the people involved

Program Agenda

1. Presentation
2. Functional Requirements
3. Demo live
4. Used Infrastructure
5. Developed Solution
6. Return on Investment

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Bridge Consulting

- Based in Florence, Italy.
- Founded in 1998 by five professionals.
- More than 90 employees.
- Oracle certified on BI Foundation, on Plsql/sql and on Db administration.
- ORACLE Gold Partner
- Business Fields:
  - Fashion, Retail, Manufacturing, Risk Management

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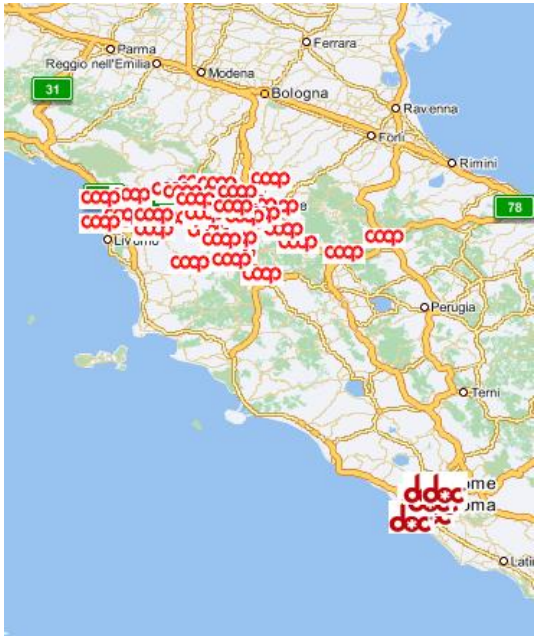
Unicoop Firenze

coop UNICOOP FIRENZE doc

The first consumer cooperative was founded in Florence, Italy in 1891.
Now Unicoop Firenze Group has:

- 120 Stores on more than 180,000 Sq. Mts.
- Sales of over 2.5 billion euros
- More than 1.3 Million Consumer Members
- More than 8000 employees



Program Agenda

1. Presentation
2. **Functional Requirements**
3. Demo live
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Functional Requirements

Territorial analysis

- Analysis of sales transactions (‘receipts’)
- Analysis of consumer-member behaviors
- Product traceability

Geomarketing analysis

- Location relationships between consumers and supermarkets
- Territory potential study
- Distribution of market share
- Consumer-members and supermarket placement

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Territorial Analysis

Store by Store

- Do we need to improve the marketing in some areas?
- Members' and Stores' receipts analysis
  - *During the 24th week, how many Sesto resident members bought in Sesto store?*
  - *In the same week, how much did sales decrease in Sesto store?*

Inc. % Soci Rif 85,85%

Inc. % Soci Conf 85,58%

Sesto Fiorentino Store

2011, 24th week

Comune di Residenza	Rif VS Conf	Inc. % Rif	Inc. % Conf
SESTO FIORENTINO	-5,17%	87,33%	86,73%
FIRENZE	-12,74%	4,93%	5,32%
CAMPI BISENZIO	-15,95%	1,53%	1,72%
CALENZANO	3,20%	1,12%	1,02%
PRATO	-10,19%	0,73%	0,76%
SCANDICCI	29,93%	0,25%	0,18%
SIGNA	17,93%	0,07%	0,06%
CERTALDO	153,38%	0,06%	0,02%
LASTRA A SIGNA	-8,55%	0,05%	0,06%
VAGLIA	-17,93%	0,05%	0,05%
PISTOIA	30,25%	0,04%	0,03%
BARBERINO DI MUGELLO	20,66%	0,04%	0,03%
PONTEDERA	229,27%	0,04%	0,01%
IMPRUNETA	67,68%	0,04%	0,02%
MONTEVARCHI	-33,02%	0,03%	0,05%
PISA	148,35%	0,03%	0,01%
EMPOLI	0,26%	0,03%	0,03%
ARCOLE	73,17%	0,03%	0,02%
VICCHIO	932,47%	0,03%	0,00%
BORGO SAN LORENZO	236,94%	0,02%	0,01%
FIESOLE	269,98%	0,02%	0,01%
SUBBIANO	66,51%	0,02%	0,01%
SAN GIOVANNI VALDARNO	94,01%	0,02%	0,01%
	-7,90%		
Totale SOCI	**-5,81%**	**100,00%**	**100,00%**
Totale NON SOCI	**-7,90%**		
Totale complessivo	**-6,11%**	**100,00%**	**100,00%**

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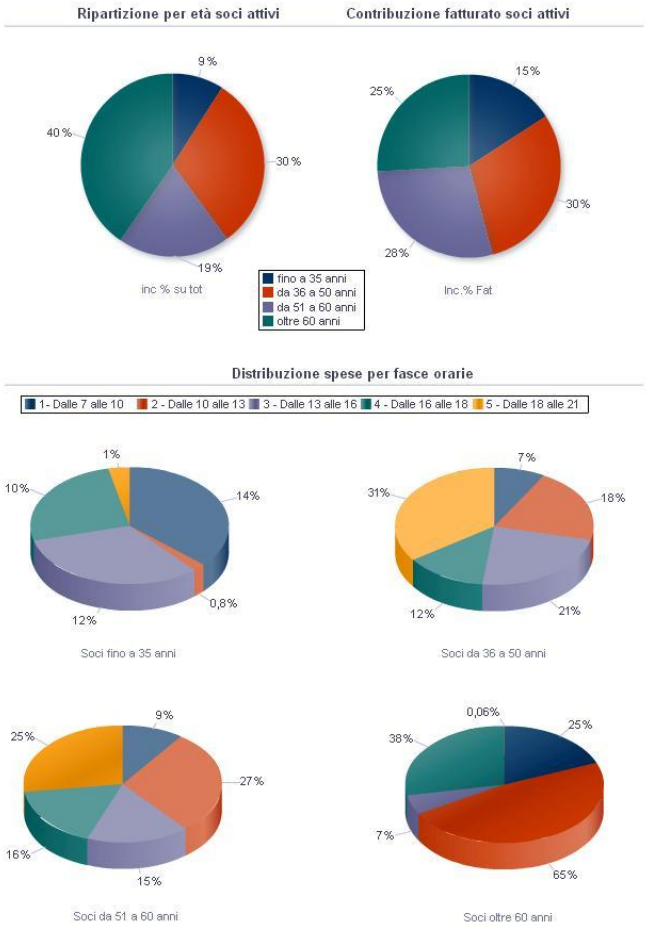
Territorial analysis

Members' behavior

Sesto Fiorentino Store 2011, 24th week



- Analysis on consumer-members' behavior in a **specific store** based on:
  1. Age groups
  2. Sales bands
  3. Sales time slots

Territorial analysis

Product traceability

- To know who purchased a specific product (and when)
- To contact the customer in case of any fault or problem
- To send an email or a letter of “product alert”

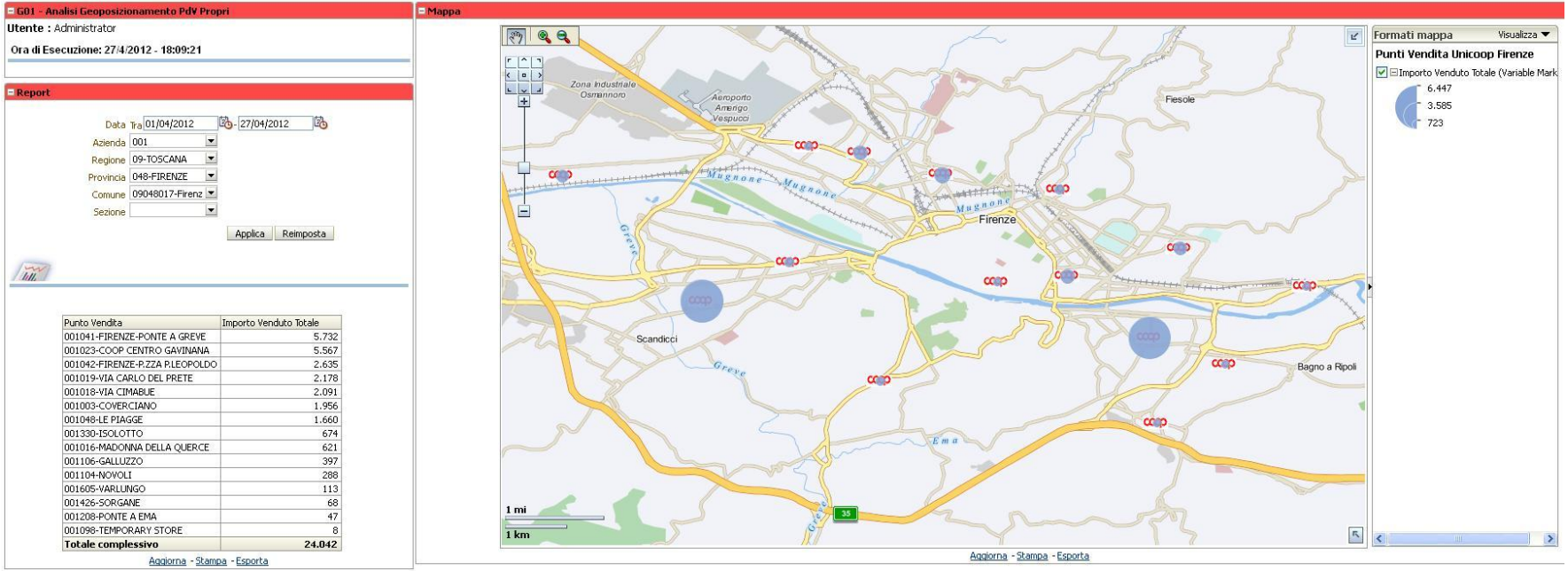
Articolo ACQUA COOP NATURALE L 1,5
Cod Magazzino Articolo 0100050000960
Codice EAN 0413

Codice Socio	Ragione Sociale	Indirizzo	Numero Civico	C.A.P.	Comune di Residenza	Provincia	Numero di Tel. Fisso	Numero di Tel. Cellulare	Email	Codice Negozio	Negozio	Flag Consenso Privacy	Quantità
00001	MICHELE SACCHI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001023	COOP CENTRO GAVINANA	N	12,00
00002	TIZIANO CAMBI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001018	VIA CIMABUE	N	12,00
00003	PIETRO PISTILLO	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001023	COOP CENTRO GAVINANA	N	12,00
00004	DANIEL BELLI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001321	GRASSINA	N	6,00
00005	ALESSANDRO MOCCIA	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001023	COOP CENTRO GAVINANA	N	6,00
00006	RICCARDO SCHILLACI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001209	COMPIOBBI	N	6,00
00007	DANIELE SCHIAVELLI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001326	ANTELLA	N	6,00
00008	MARIO SABBATINO	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001326	ANTELLA	N	6,00
00009	GABRIELE GUASTI	Via Rosellini	10	50127	FIRENZE	FI	0554476625	.	.	001018	VIA CIMABUE	N	6,00

Geomarketing Analysis

Stores & Members analysis

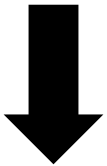
- Territory Store View with the visual indication of the sales



Geomarketing Analysis

Stores & Members analysis

- Purchasing Amount Store View of a town or postal code made by members of a specific territory.



- For example, you can show the city center store where purchases have been made by customer members residing in suburban areas
- How customer-members are distributed in a specific territory

Geomarketing Analysis

Stores & Members analysis

G01 – Analisi Geoposizionamento

Utente : Administrator

Ora di Esecuzione: 27/4/2012 - 18:20:42

Parametri Iniziali

Data Inizio Periodo	20/04/2012
Data Fine Periodo	27/04/2012
Regione PdV	09-TOSCANA
Provincia PdV	048-FIRENZE
Comune PdV	09048017-Firenz
Cap PdV	50133
Punto Vendita	
Regione Socio	09-TOSCANA
Provincia Socio	048-FIRENZE
Comune Socio	09048017-Firenz
Cap Socio	50133
Codice Sezione Socio	
Scelta Misura	Importo Totale Netto Trans. Finanziaria

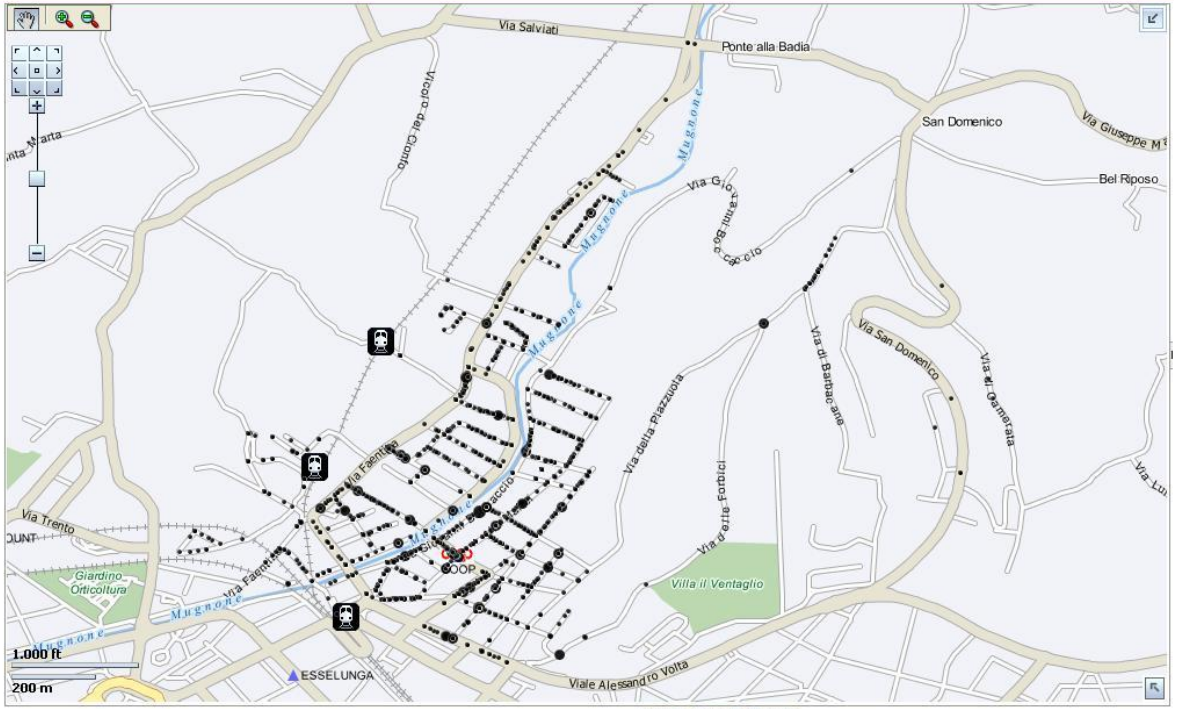
Applica | Reimposta

Tabellare

	Importo Transazione	Numero Soci Attivi
Punto Vendita		
001016-MADONNA DELLA QUERCE	464	153
Totale complessivo	**464**	**153**

Aggiorna - Stampa - Esporta

Mappa



Aggiorna - Stampa - Esporta

Geomarketing Analysis

Demographic analysis

- Census Area visualization of a portion of land colored by the tertiles of statistical consumption Amount.
- The first tertile is composed of sections, whose impact on the total weighs up to 33%, the second tertile by a weight between 34% and 66%, the third between 67% and 100%.
- The user can dynamically choose which weight to give to which band

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Geomarketing Analysis

Demographic analysis

G01 - Analisi Geoposizionamento

Utente : Administrator

Ora di Esecuzione: 27/4/2012 - 18:16:17

Parametri Iniziali

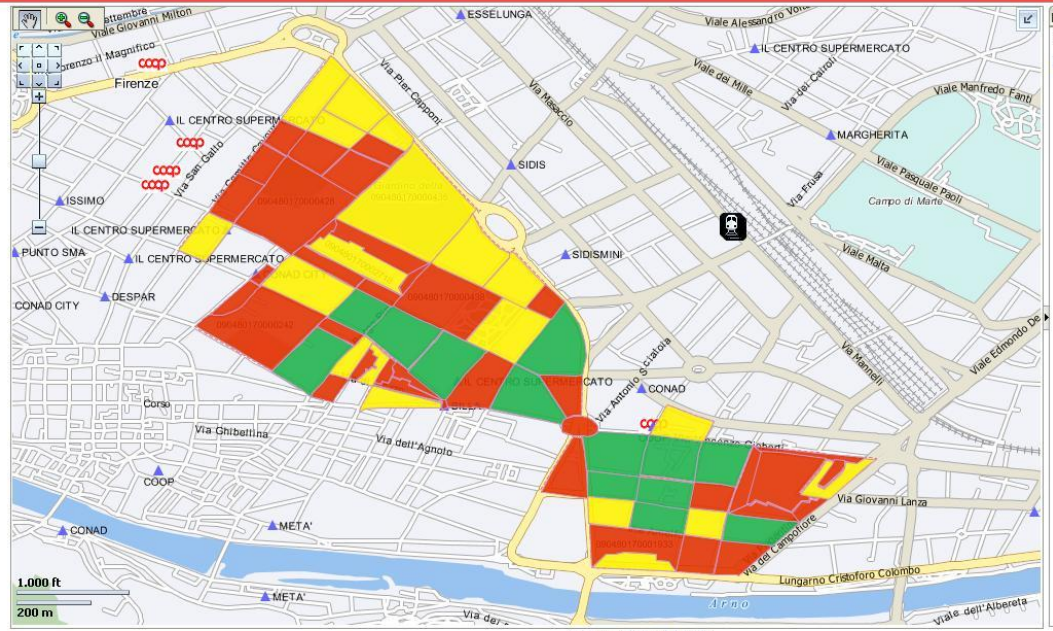
Regione: 09-TOSCANA
Provincia: 048-FIRENZE
Comune: 09048017-Firenz
Cap: 50121
Codice Sezione:
Misura: Importo Consumi Totali

Applica | Reimposta

Tabellare

RANK	Codice Sezione	Importo Consumi Totali	Incidenza	Percentile
1	090480170000436	0,00	0,00	0,00
2	090480170002721	147	0,07	0,07
3	090480170000428	219	0,10	0,17
4	090480170000427	248	0,12	0,29
5	090480170001549	459	0,21	0,50
6	090480170000425	695	0,32	0,82
7	090480170002689	732	0,34	1,16
8	090480170000310	733	0,34	1,51
9	090480170000444	844	0,39	1,90
10	090480170000258	895	0,42	2,32
11	090480170000434	941	0,44	2,75
12	090480170000441	963	0,45	3,20
13	090480170002716	1.131	0,53	3,73
14	090480170000429	1.241	0,58	4,31
15	090480170002719	1.632	0,76	5,07
16	090480170002723	1.708	0,80	5,86

Mappa



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DEMONSTRATION

GeoMarketing Demo

Geomarketing Analysis

DEMO

Interactive analysis

1. Interactive area definition:
   - Radial, polygonal, isochrone, isodistance areas
   - Editing of the previous areas using union, intersect, and difference spatial function analysis
2. Real time report of the interactive user defined polygon
3. BI Publisher Pdf production
4. Statistical analysis of underlined thematism coming from different institutional sources

Geomarketing Analysis

DEMO

Iso-chronus and Iso-distance analysis

- Business data road map display for user defined (500, 1000, etc. meters) walking path distance
- Isodistance analysis based on walking path distance
- Isochronus analysis based on the traveling road speed
- Path definition "from" and "towards" a chosen point
- Isochronus/Isodistance sales analysis

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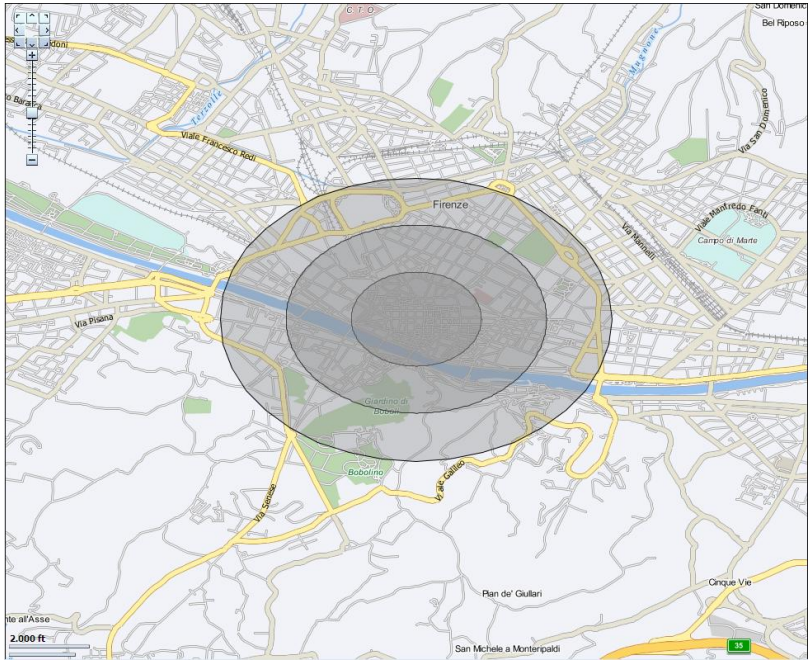
Geomarketing Analysis

Radial analysis

DEMO

- Data visualization of one or more concentric circles territory portions
- Data analysis for the receipts, as well as the statistical data for the census areas
- Possibility to directly view:



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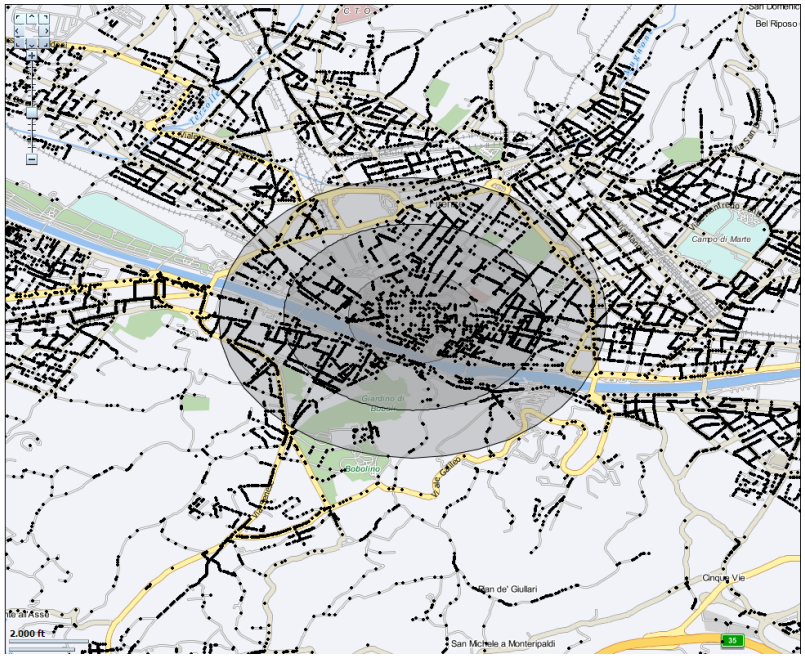
Geomarketing Analysis

Radial analysis

DEMO

- Data visualization of one or more concentric circles territory portions
- Data analysis for the receipts, as well as the statistical data for the census areas
- Possibility to directly view:
  1. Members



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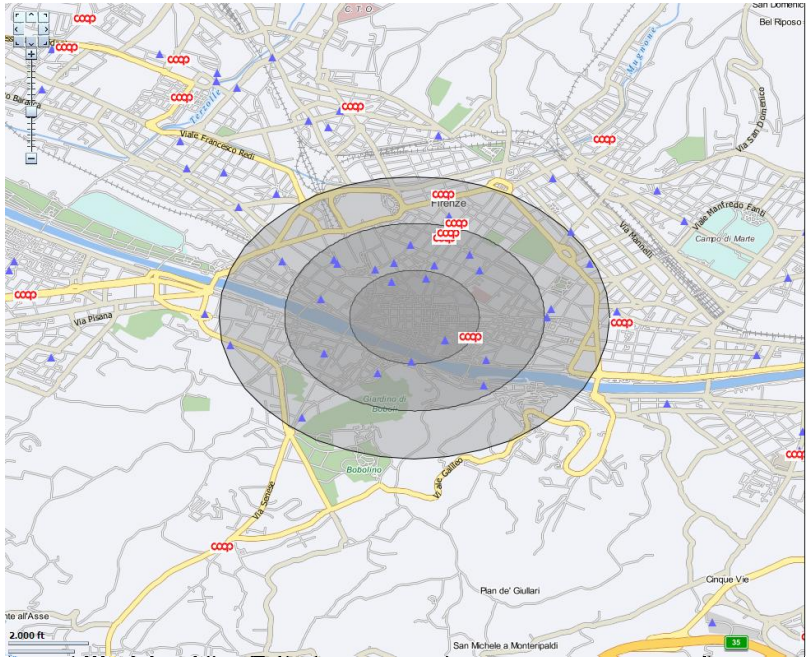
Geomarketing Analysis

Radial analysis

DEMO

- Data visualization of one or more concentric circles territory portions
- Data analysis for the receipts, as well as the statistical data for the census areas
- Possibility to directly view:
  1. Members
  2. Competitors and Unicoop stores



Geomarketing Analysis

Radial analysis

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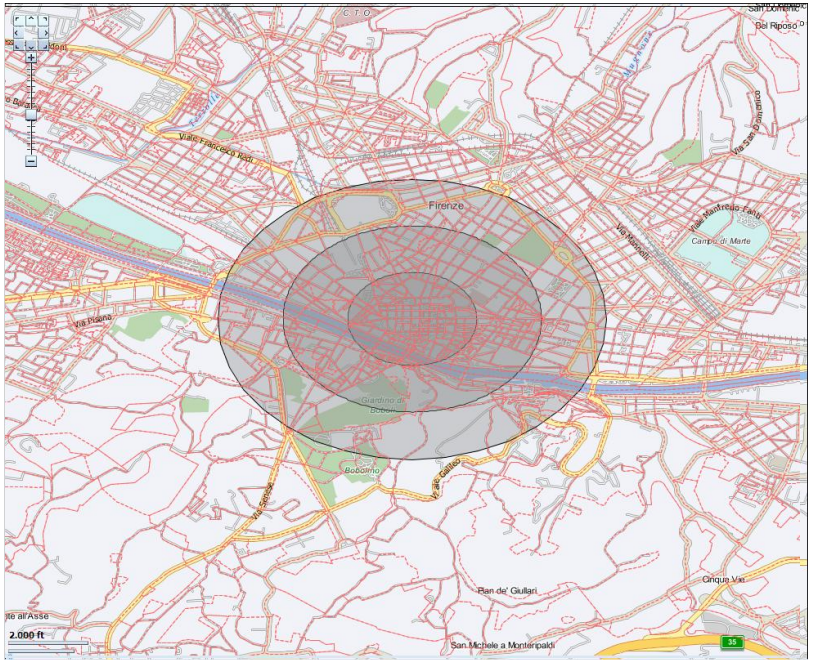
- Possibility to directly view:
  1. Members
  2. Competitors and Unicoop stores
  3. Census areas



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Geomarketing Analysis

DEMO

Radial analysis

Analisi IsoRadiale

Parametri di filtro

Data Inizio: 01/12/2011

Data Fine: 31/12/2011

Inserire i metri quadri: 0

Visualizza

- ☐ Visualizza Soci
- ☑ Visualizza Negozi Concorrenza
- ☑ Visualizza Negozi Proprietà
- ☐ Visualizza Sezioni

Parametri di visualizzazione

Inserire un valore per il raggio: 1500

Seleziona un unità di misura: Metri

Crea cerchio

Visualizza poligono risultante — Visualizza

Termina e Analizza poligono creato — Analizza

Altro

Elimina Selezione

Stampa Mappa

Mantieni i risultati precedenti ☑

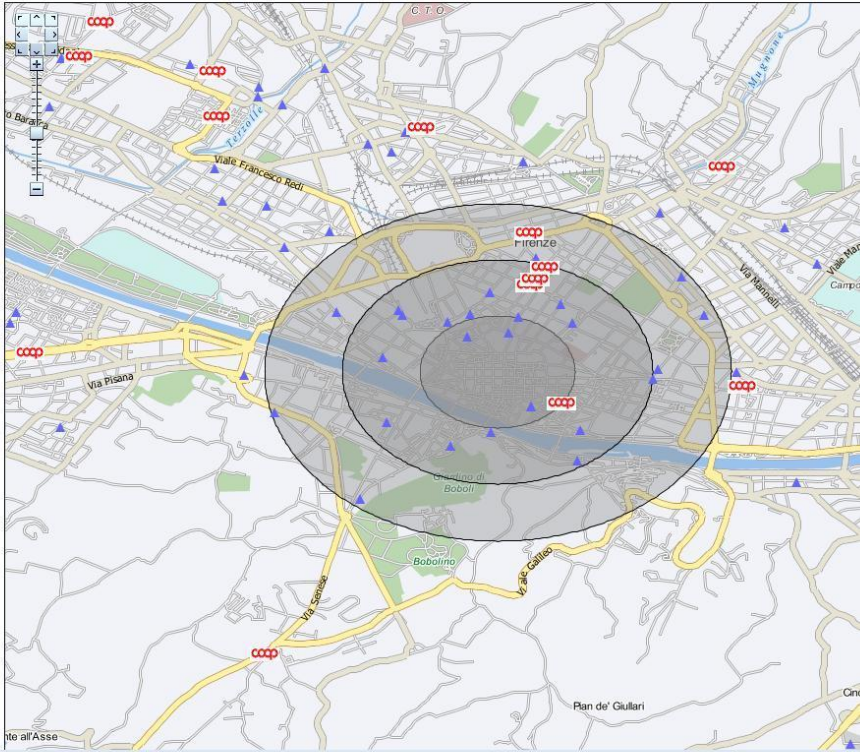
Analisi

Totale Consumi da Sezioni Istat

Abbigliamento e Calzature	Alimentari e Bevande	Alimentari	Bazar	Bevande
10.557	24.934	26.063	3.219	2.007
Cura Casa	**Prodotti Durevoli**	**Alimentari Confezionato**	**Tessile**	**Cura Persona**
10.557	24.934	26.063	3.219	2.007
Mobili, Elettrodomestici e Servizi Casa	**Non Alimentari**	**Consumi**	**Consumi Totale**	**Alimentari Procapite**
10.557	24.934	26.063	3.219	2.007

Totale Numeriche da Sezioni Istat

Popolazione Attuale	Pop. Ultimo Censimento	Pop. Resid. Spost. Comune Abituale	Pop. Resid. Spost. Comune Esterno	Reddito Procapite
5	5	521	70	371,72
Totale Forze Lavoro	**Disoccupati e in Cerca**	**Num. Famiglie Ult. Cens.**	**Famiglie Attuali**	**KMQ**
107	38	24	45	0,7
Totale Negozi Sezioni	**Reddito Totale**	**Reddito**	**Risparmio**	**Densità Popolazione**
60	44.030,49	60.673,56	11.482,37	66,59



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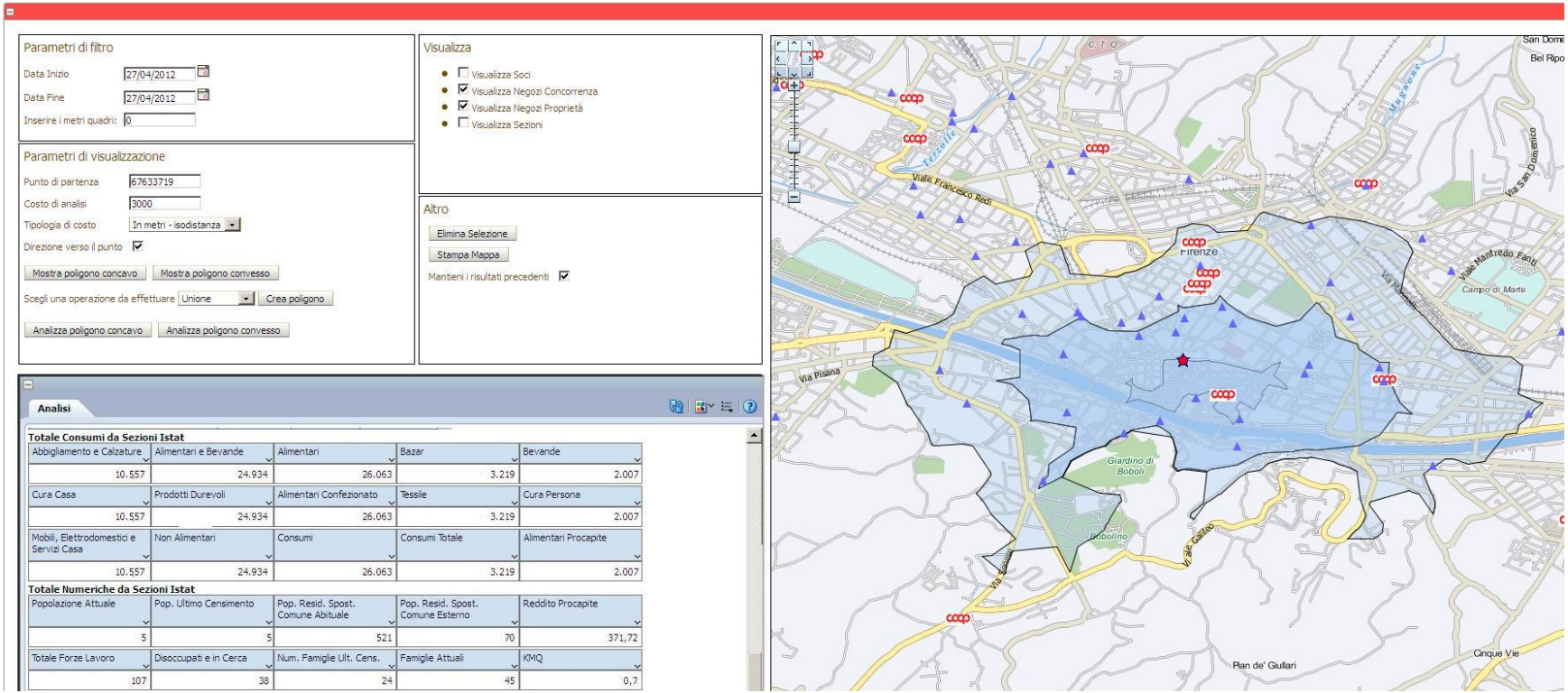
Geomarketing Analysis

DEMO

Iso-chronus and Iso-distance analysis



Geomarketing Analysis

DEMO

Manual modeling of the areas

Parametri di filtro

Data Inizio 01/04/2012

Data Fine 24/04/2012

Inserire i metri quadri: 0

Parametri di visualizzazione

Punto di partenza 67633715

Costo di analisi 500

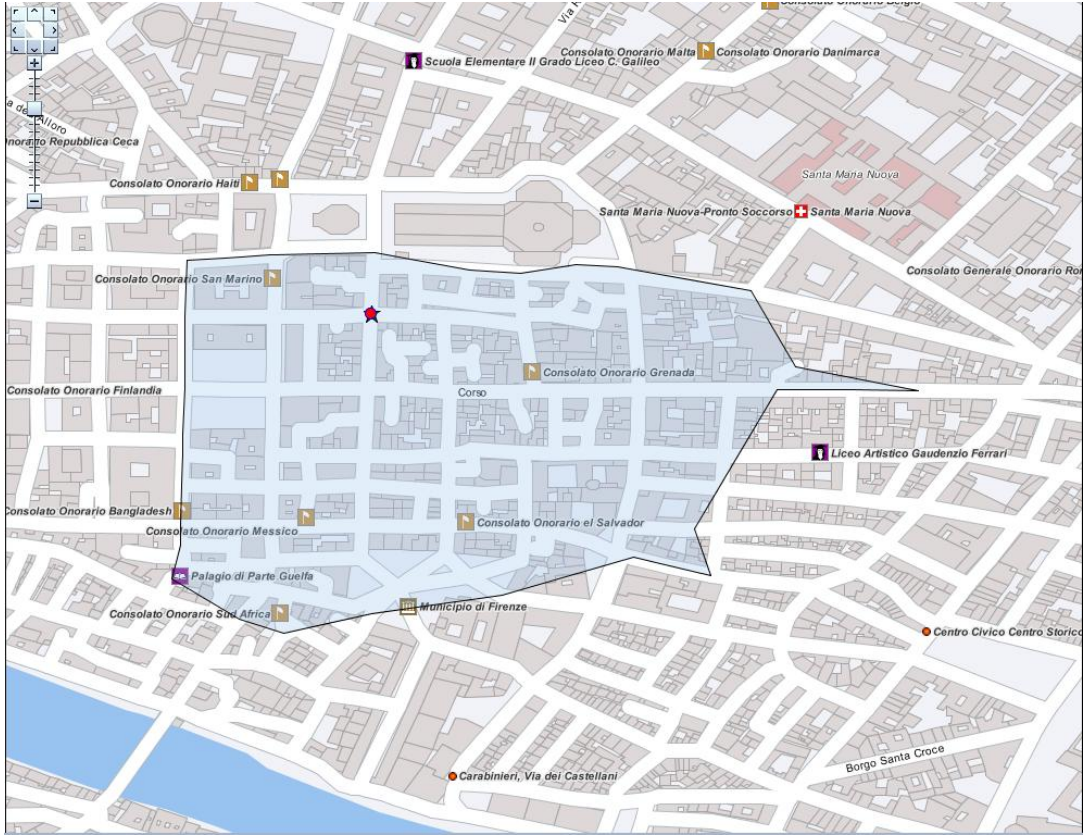
Tipologia di costo In metri - isodistanza

Direzione verso il punto

Mostra poligono concavo | Mostra poligono convesso

Scegli una operazione da effettuare Unione | Crea poligono

Analizza poligono concavo | Analizza poligono convesso



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Geomarketing Analysis

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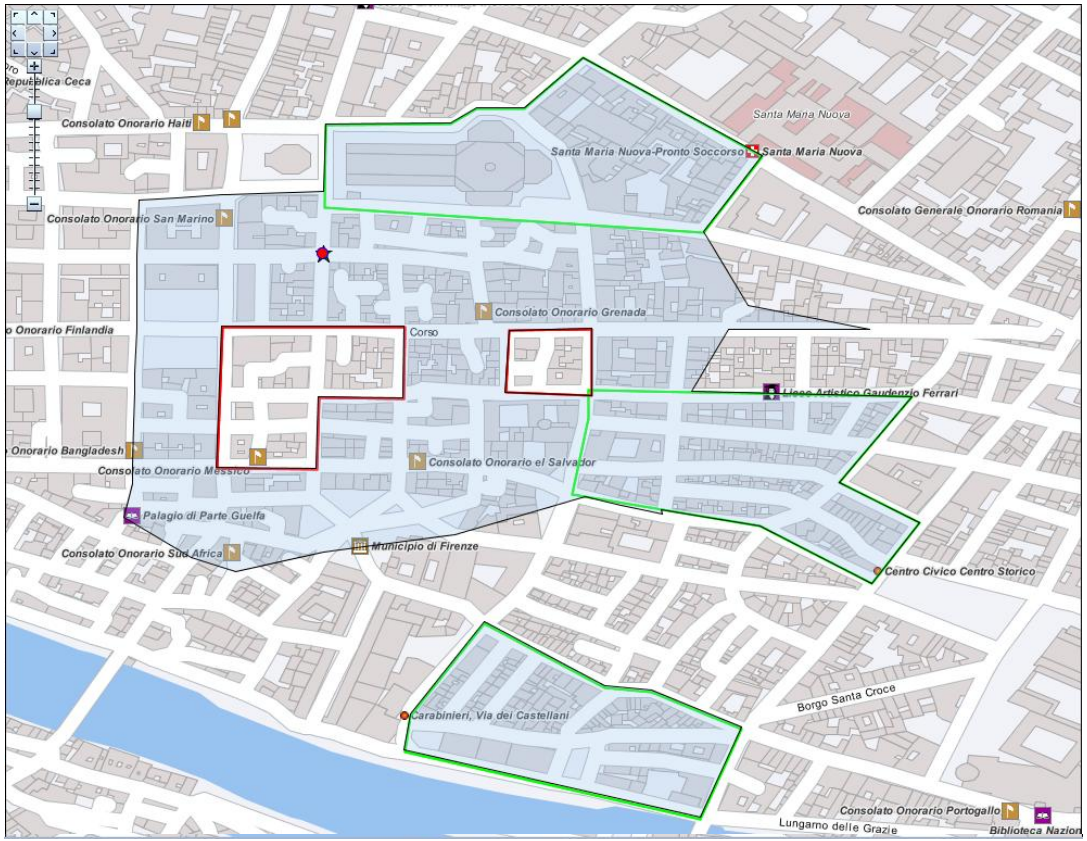

Geomarketing Analysis

DEMO

Available Data on Radials and Iso-analysis

- Member Consumers: active and total number
- Information on the competitor stores included in the analysis territory (dimensional attributes and sales)
- Information on Unicoop stores where the members who live in the analysis territory have made a purchase
- Information on the census area included in the analysis territory (types of consumption, resident population, pro capita income and consumption)

Program Agenda

1. Presentation
2. Functional Requirements
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4. Used Infrastructure
5. Developed Solution
6. Return on Investment

Used Infrastructure

- Oracle Exadata Quarter Rack
- Database EE 11.2.0.2.7
- Spatial Option (NDM, Geocoding, Sdo_Geom Package)
- Partitioning Option
- Obiee 11.1.1.5.0 on Windows 64bit (on Windows Server 2008 R2 Standard)
- Oracle Maps
- Nokia NavTeq Dataset, ODF (Oracle Data Format)

Program Agenda

1. Presentation
2. Functional Requirements
3. Demo live
4. Used Infrastructure
5. **Technical Details**
6. Return on Investment

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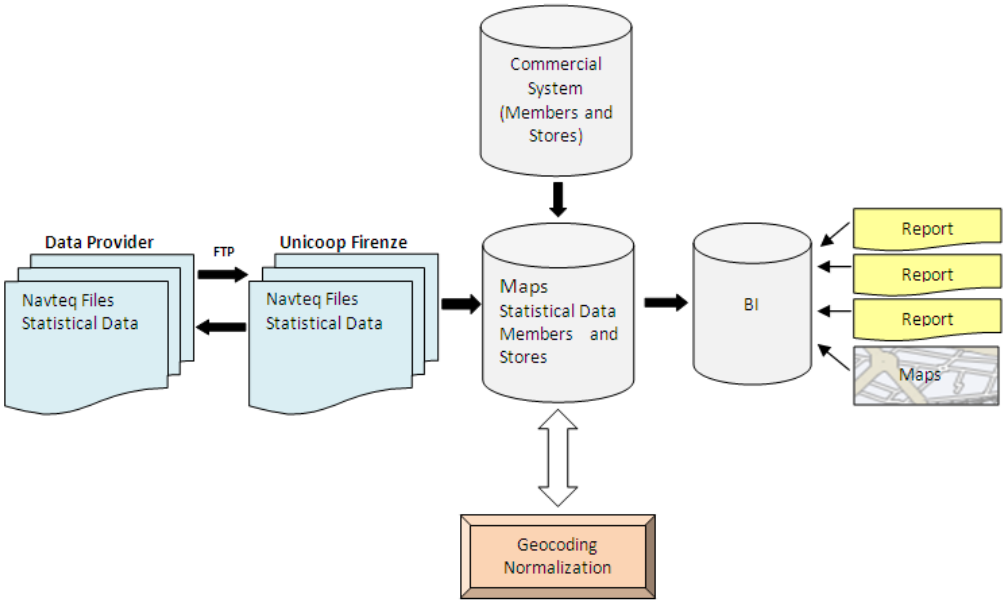
Technical Details

Geo-Process



- Geographic ELT
  - Geo Data Acquisition
  - Statistical Data Acquisition
  - Geocoding & Normalization
- Geo Datawarehousing
- Geo Data Access
  - Obiee Reporting
  - Bi Publisher Reporting
  - Java Integration

Technical Details

Geocoding & Normalization

- “Facts” Geolocation using postal addresses together with their administrative hierarchical structure
- Geocoding process using Sdo_Gcdr.Geocode_Addr function
- Addresses normalization: custom function exploiting geocoding matchcode approach

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Technical Details

Why is a Custom Normalization necessary?

- For example to correct the street name

```
DECLARE
    addr sdo_geo_addr;
BEGIN
     addr := sdo_geo_addr() ;
     addr.municipality    := 'FIRENZE';
     addr.settlement      := 'PONTE DI MEZZO' ;
     addr.postalcode      := '50127' ;
     addr.country         := 'ITALIA' ;
     addr.Streettype      := 'Via' ;
     addr.StreetName      := 'Ippolito Rosellini'; (Right )
     addr.housenumber := '10' ;
     addr.matchmode      := 'default' ;
SELECT  SDO_GCDR.GEOCODE_ADDR('GEO',addr)
    INTO addr
    FROM dual;
END;
```

ADDRESS MATCHCODE = 1

STREET MATCHVECTOR = 0

```
DECLARE
    addr sdo_geo_addr;
BEGIN
     addr := sdo_geo_addr() ;
     addr.municipality    := 'FIRENZE';
     addr.settlement      := 'PONTE DI MEZZO' ;
     addr.postalcode      := '50127‘ ;
     addr.country         := 'ITALIA' ;
     addr.Streettype      := 'Via' ;
     addr.StreetName      := 'I. Rosellini' ; (Wrong)
     addr.housenumber := '10' ;
     addr.matchmode      := 'default' ;
SELECT  SDO_GCDR.GEOCODE_ADDR('GEO',addr)
    INTO addr
    FROM dual;
END;
```

ADDRESS MATCHCODE = 4

STREET MATCHVECTOR = 3

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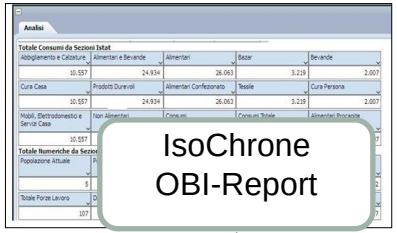
Geomarketing Analysis Architecture

Client
(browser)



Oracle WLS

J2EE Container

MapViewer

NDM
WithinCost
Analysis

Polygon
Editing
Jsp

Bi
Publisher

JDBC

Oracle DBMS 11.2

Bridge GeoBI Package

Sdo_Geom Package (Intersection, Union, Difference ..)

GeoDatawarehouse Schema Table

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Technical Details

How Bridge package calculates the final polygon

- IF P_Poly_Ord_001 IS NOT NULL
  THEN V_Sdo_poly_001 := '**(MDSYS.SDO_GEOMETRY(2003,8307,NULL,MDSYS.SDO_ELEM_INFO_ARRAY(1,1003,1), MDSYS.SDO_ORDINATE_ARRAY('||P_Poly_Ord_001||')))**';
  P_Query_Geo := V_Sdo_poly_001;
  ELSIF ((P_circle_cnX_001 IS NOT NULL)
  THEN V_Sdo_Circle_001 := '(MDSYS.SDO_UTIL.CIRCLE_POLYGON ('||P_circle_cnX_001||','|| P_circle_cnY_001||','||P_circle_rad_001||',0.05))';
  P_Query_Geo := V_Sdo_circle_001;
  END IF;
- IF P_Poly_Ord_002 IS NOT NULL
  THEN V_Sdo_poly_002 := '(MDSYS.SDO_GEOMETRY(2003,8307,NULL,MDSYS.SDO_ELEM_INFO_ARRAY(1,1003,1), MDSYS.SDO_ORDINATE_ARRAY('||P_Poly_Ord_002||')))';
  CASE P_Poly_Ope_002
  WHEN 'UNION' THEN V_Query_Geo_002 := '(sdo_geom.sdo_union('|| P_Query_Geo ||','||V_Sdo_poly_002||',0.05))';
  WHEN 'MINUS' THEN V_Query_Geo_002 := '(sdo_geom.sdo_difference('|| P_Query_Geo ||','|| V_Sdo_poly_002 ||',0.05))';
  WHEN 'INTERSECT' THEN V_Query_Geo_002 = '(sdo_geom.sdo_intersection('|| P_Query_Geo ||','|| V_Sdo_poly_002 ||',0.05))';
  END CASE;
  P_Query_Geo := V_Query_Geo_002 ;
  END IF;
- IF P_Poly_Ord_003 IS NOT NULL THEN ……..
- EXECUTE IMMEDIATE 'select '|| P_Query_Geo ||' from dual' INTO P_Sdo_Geom_Poly; (OUTPUT PARAMETER)

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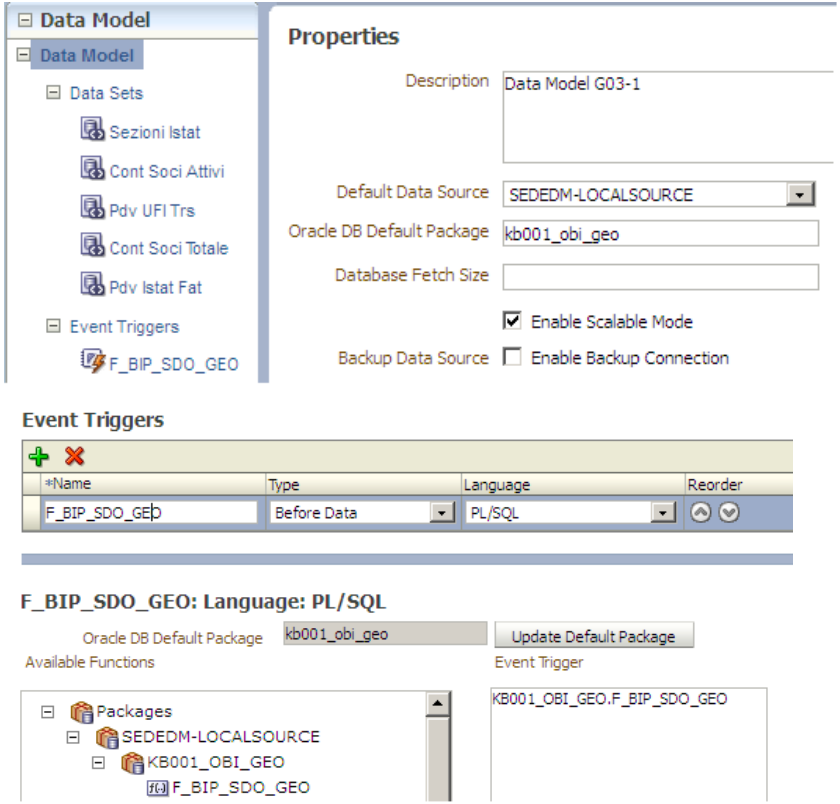
Technical Details

How Bi Publisher returns geo-data




```
SELECT td049.t_str                    Store,
       td049.t_adr                    Address,
       td049.t_mun                    Municipality,
       td049.c_cod_pst                Postal_Code,
       td049.n_sqr_mts                Square_Meters,
       tf043.i_fat_fod                Food_Amount,
       tf043.i_fat_no_fod             NoFood_Amount

FROM   td049_pdv_ist  td049,
       tf043_pdv_ist  tf043

WHERE  td049.td049_seq = tf043.td049_seq

AND    td049.c_pdv_ist  IN
      (SELECT  tg010.c_pdv_ist
       FROM    tg010_pdv_ist_spt  tg010
       WHERE  sdo_inside(tg010.c_geo,&P_Query_Geo) = TRUE')

AND    td049. n_sqr_mts >= :P_SQUARE_METERS

AND    tf043.n_ann_rif = :P_YEAR

order by  td049. t_str
```

Program Agenda

1. Presentation
2. Functional Requirements
3. Demo live
4. Used Infrastructure
5. Technical Details
6. Return on Investment

Return on Investment

Tangible benefits

- The previous “Geomarketing & Territorial Analysis” proprietary application had an annual fee of 66,000 euros
- Bridge Consulting solution is amortized over three years
- From the fourth year there is a saving of 75% compared to the previous proprietary application
- 35% immediate savings on operational costs of the people involved in the activity

Return on Investment

Business benefits

- Availability of a simple to use, standardized, complete and shared solution
- Ability to direct marketing and assortment policies of the stores
- Opportunity to explain the business events dependent on territorial characteristics
- Possibility to analyze the catchment area of a territory to locate new stores

Q&A