Augmenting Thematic Maps with Data Driven Graphics by Integrating Open APIs and Mapping Platforms

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Agenda

● Background
● Research question
● Case study- PxWEB and data visualizations on Oskari
● Visualization Results
● Conclusion
Background

Web technologies are improving and displacing desktop application. Web has evolved from simple web pages (Read-Only) to web applications (Read/Write). Organizations exposed their resources over the web (Build together) Now Web is a collaborative medium.
Geo-enabled Web and Infovis

**Geo-enabled Web**: Spatial data infrastructures as a cloud term; Standards (OGC Web Services), Technologies (OSGEO and others), Policies (INSPIRE and others) to promote geoenable and interoperable web.

**Information Visualization Method**
Visualization seeking mantra and Multiple views system

"The greatest value of a picture is when it forces us to notice what we never expected to see."
—John W. Tukey

The first way to think about the future is to know about the present!

-Hans Rosling
Research Question

How to improve mapping platform by benefiting SDIs, web API, infovis and open source technologies?

- How to integrate web services to mapping platforms to enhance thematic maps?
- Different visualizations that support current implementation of thematic maps?
- What kinds of design principles should be followed and applied when creating interactive visualizations for mapping platform?

With the help of case study solutions are found.
Implementation of Case Study

PXWeb Helsinki on Oskari
Data source: PxWeb API (Statistical API)

A programmatic way to access Px Web database.

- Get request for metadata and tables
- Post request for querying with parameters

Data available from different organizations over the world.
Development Platform - Oskari

Oskari is a tool:

for building multipurpose web mapping applications benefitting distributed Spatial Data Infrastructures

For creating Embedded map clients onto other websites very efficiently

For setting up Geoportals or Web GIS systems

For setting up advanced web-based tools, such as decision making support services and data analysis tools

Multilingual – English & Finnish full coverage, 15 other languages with partial coverage

Open source (MIT & EUPL) 

source: NLS
Browser-based Applications with Maps

Embedded Maps
Oskari

Proprietary interface
Standard interface
Standard interface
Standard interface

Statistical data
INSPIRE data
ELF data
Raster
Metadata
GML

Source: NLS
Pros and Cons

Pros:
- Most popular web platform for professionals, decision makers and any other people interested with spatial data especially in Finland.
- Many organizations adapted their own version (http://oskari.org/examples/).
- It is easy to have complete application by following guidelines.
- Start by forking and follow documentation.
- Any PxWeb statistical data source can be integrated now

Cons:
- It is not so easy to develop new functionalities.
- Thematic maps were under construction.
Solutions for Problems

- Backend development: Server side plugin (request and transformation) had to be created for data integration that use server side mashup technique.

- Frontend development: Creating bundles (functionality containers) to provide a functionality for an application. This bundle use data visualization library to show data in suitable graphs.

- Use design principles for multiple view system and visualization seeking mantra.
Results of Visualization
Indicators, Filters, Regions and Comparison
Graphs and Thematic Maps

Bar, Line, Point Graphs and Different regions
StatsGraph

- Bar Chart
- Line Chart
- Point Chart

![Graph showing data for different locations]

<table>
<thead>
<tr>
<th>Location</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outunkylä</td>
<td>9500</td>
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<tr>
<td>Länsi-pakila</td>
<td>2300</td>
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<tr>
<td>Vaalila</td>
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<tr>
<td>Laajasalo</td>
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<tr>
<td>Kallio</td>
<td>15000</td>
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<tr>
<td>Varilojylä</td>
<td>10700</td>
</tr>
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</table>

Helsingin asuntorakentamisessa vaalimustavan asuinrakennusten kerrosalan (m²) ennuste Vuosi:
Visual-Seeking Mantra with Multiple Views

Overview
Zoom and Filter
Details on demand
View Relationships
+ Highlight
Sort
Overview and Sorted values
Zoom and Filter
Social assistance recipients aged 25-64, as % of total population of same age: male; year 1991.
Details on Demand
StatsGraph

Bar Chart  Line Chart  Point Chart

**Somero**

- Social assistance recipients aged 25-64, as % of total population of same age sex: male year: 1991 4.3

**Värö**

- Social assistance recipients aged 25-64, as % of total population of same age sex: male year: 1991
View Relationships
Highlight on Click
Conclusion

- Data is meaningless if it doesn’t bring information, knowledge or wisdom with help of tools and processes.
- GIS community has the chance to harness the sources of data from the web with visualization and analysis to enlighten people and decision makers.
- Geospatial service integration platform can be improved by implementing correctly designed statistical exploration tools with open statistical APIs.
- Using mashup techniques and understanding technologies and design principles can ease to implement statistical exploration tools.