

# METANET - Distributed Interactive Knowledge Network

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META-D.O.N  
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# project introduction

- **METANET:** the technical aspect of a project of the **Meta-D.O.N Association:** investigation of sociocultural transformations in Serbia from scientific and artistic perspective - **New[B]Order** - <http://www.meta-don.org/newborder/>
- project on the topography of the centre-periphery-complex in post-socialist Eastern Europe using the example of Belgrade
- metastatic penetration of social spaces scientifically measured to create quantitative and qualitative indicators for social disintegration

# project introduction

- e.g. indicators
  - privatization aspects of companies in Serbia - **Freedom Fighters Activists** (<http://www.freedomfight.net/cms/>)
  - subversive signs of the periphery
  - turbo folk politics
- capture indicators cartographically with a link to a visual semantic database
- concept of an interactive geospatial **knowledge network**
- web application based on **free- and open source software components**

## project partners

- CK13, Novi Sad (SRB)
- Freedom Fight Activists (SRB)
- Kuda.org - New Media Center, Novi Sad (SRB)
- Museum Of Contemporary Art, Belgrade (SRB)
- Institute for Social- and Welfare Policy, JKU Linz (AT)
- Institute for Comprehensive Analysis of Economy, JKU Linz (AT)
- Editorial Collaboration: Radio FRO – Freies Radio Oberösterreich (AT)

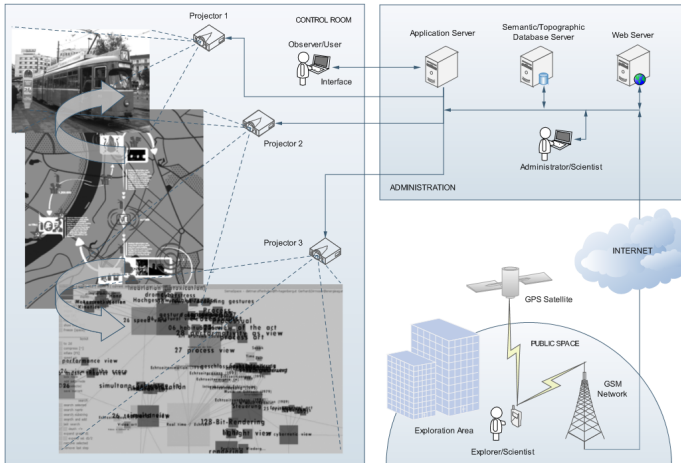
## project goal

- providing a tool for individuals and communities to get **connected to complex relationships of scientific measurement** with cartographical aspects
- receiving a better **overall view of knowledge related to public areas** which can be meaningful for exploring topics of interests by the user
- **flexibility in usage:** generic tool for scientific research projects
- **administration:** intuitive CMS interface for researchers
- smart algorithms for finding similarities/references between artifacts
- **usability:** advanced hardware and software interfaces to the user (e.g for exhibitions)

# project domains

- project consists of three **technical domains**
- **metablog - artifacts input:**
  - text, sound, images, an mm data through web-based CMS
  - mobile devices for geo-tagged content input
- **metamap:** 2D map for customized geographical representation of artifacts and transformation processes between them
- **metaspace:** 2D/3D semantic graph/subgraph associated with map artifacts for mapping the degree of connectivity between them

# project domains





## project challenges

- **metaspace hardware HCI** design and implementation for a seamless exploration of data in the semantic space - extension to keyboard and mouse
- **customization of map** design and implementation of interactive icons and transformations - extendable map APIs
- **intuitive administration** and performative web CMS interface for knowledge workers - ajax based server interaction
- **data consistency** between metamap and metaspace - network interface and structured graph datasets for synchronization
- **complex algorithms** for dependency calculation based on meta data and severity - generating an ontology of data

# project technologies

- **main aspect:** utilization of proved open-source/free tools for adapting them to our needs
- **dependencies on tools:**
  - **Semaspace** (<http://residence.aec.at/didi/FLweb/>)
  - **OpenStreetMap** aka OSM (<http://www.openstreetmap.org/>)
  - **Google Web Toolkit 2.0** aka GWT (<http://code.google.com/webtoolkit/>)
- **language:**
  - Java
  - Java Script

**Hannes Weingartner**



# knowledge networks theory

- **what are knowledge networks?**

- **network of people** with a high interest in learning, investigating, developing and improving the knowledge subject matter and share common work goals
- **enlarges the collective knowledge** of individuals (tacit knowledge)
- **community of practice (COP):** model for a learning process of self organized individuals connected within social communities sharing same interests (Jean Lave)
- activities of COP members usually bring **hidden and locked knowledge to light** that resides in our heads
- COP will enable members to leverage the knowledge that exists in a knowledge network more quickly

(<http://www.ewenger.com/theory/>)

# knowledge networks theory

- **community of interest (COI):** knowledge network which is 'looser' than COP - larger in membership - can significantly **assist the knowledge worker** in trying to obtain answers to knowledge needs
- **knowledge representation and visual interfaces**  
(<http://media.lbg.ac.at>)
  - **semantic networks** become readable if their structures are described through an ontology
  - **ontologies** are abstract knowledge models for describing used concepts and their possible relationships
  - interactive tools realize the generation of **smooth image of information** to take ambiguity and complexity into account

## semaspace outline

- **fast OpenGL accelerated graph editor and browser** for large knowledge networks with more than 10000 text-fields
- developed by **Dietmar Offenhuber and Gerhard Dirmoser** - Ludwig Boltzmann Institute for Media Art Research
- **interactive graph layout** in 2D and 3D
- 'semaspace fills the gap between complex tools for network analysis and simple graph editors or mind-mapping tools' (Dirmoser)
- Gerhard Dirmoser creates complex large-scale wall diagrams on topics like **25 years of ARS Electronica** (2003)

## semaspace outline

- possible to manually **define the nodes' overall shape** of the network by placing and subsequently locking the position of individual nodes
- **nodes** can incorporate data such as images, sound and text (added while navigating the graph)
- GUI for **web clients** and **exhibitions**
- **Java SWT** desktop application
- embedding into web clients with **virtools webplayer**

# semaspace dependencies

- **JOGL:** open source Java binding to OpenGL API from Sun (for hardware supported 3D graphics)
- **JFTGL:** java based lib for accessing TT fonts within OpenGL
- **Apache Batik SVG toolkit:** open source Java based toolkit for using images in the SVG format (XML based)
- **semaspace demo**



# semaspace extensions

- **video nodes**
- **remote graph access and manipulation** through network connection and tagged datasets
- research and implementation of **extending hardware interfaces** for...
  - **browsing (zoom, rotation)**

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  - **node distance**

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  - fog
  - freeze
  - node distance
  - **collapsing**

# OSM outline

- **OSM: open source map solution** for web clients
- everyone can extend the map
- collecting GPS coordinates
- like wikipedia for maps
- **no legal or technical restrictions** on their use - full creativity
- other implementations do not allow highly customized overlays

# OSM creating data

- **creating OSM data** with OSM map editors:
  - Java OSM (JOSM) - desktop app
  - Potlatch - flash
  - Merkaartor - for UNIX, WIN, MAC
- **adding tags** (node, linear, area) for OSM data to be rendered and uploaded
- **slippy map:** OSM default web interface for browsing rendered OSM data



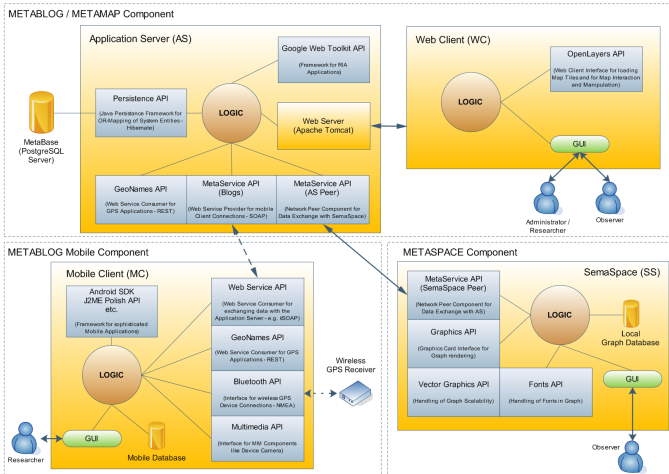
# OSM rendering

- **generating rendered graphics** by using tools:
  - **kosmos**: lightweight OSM map rendering platform for WIN
  - **osmarender**: rendering platform for generating SVG image for OSM data based on XSLT
  - **mapnik**: opensource toolkit in C++ and python, all OS platforms
    - default for OSM - mapnik renders 256 x 256 px tiles served from the OSM tile server
    - XML file holds rendering props like color, widths of lines, etc.
    - rendered tiles are referenced by URLs through JS from web client
    - raw OSM data can be downloaded for setting up an own tile server (e.g. planet.osm)
    - uses PostgreSQL / PostGIS as spatial database (osm2pgsql converter)

# OSM embedding

- **integration in web page** like Google, Yahoo maps by using JS libs for customizing the map and interface
  - **OpenLayers:** feature-rich, open source, most popular for OSM maps, BSD lic. ([www.openlayers.org](http://www.openlayers.org))
    - dynamic map for the web page
    - displays tiles and markers from any source
    - separation between tools and data
    - projects of Open Source Geospatial Foundation (OSGeo)
  - **Mapstraction:** JS lib wrapper for multiple implementations (e.g. OL, Google, etc.)
- several project on google code with topic OSM on android
- integration of OL in GWT through open source project **GWT-OpenLayers**  
(<http://sourceforge.net/projects/gwt-openlayers/>)

# realization architecture



## architecture interface

The screenshot shows the MetaSpace web application interface. At the top, there are navigation links: "Map", "SemaSpace", and "About". On the right, there are input fields for "user" and "password", and a "Login" button. The main content area displays a map of Belgrade, Serbia, with various icons and a "Workers Struggle" popup. The popup contains the text "METASPACE" and "Struggle in Belgrade 03.2008". The map features several icons, including a "No Return" symbol, a "No War" symbol, a "No Nuclear" symbol, and a "No Capitalism" symbol. A large black arrow points from the "No Return" icon to the "No War" icon. Another large black arrow points from the "No Nuclear" icon to the "No Capitalism" icon. A third large black arrow points from the "No Capitalism" icon to the "No War" icon. The map also shows a "No War" icon, a "No Nuclear" icon, and a "No Capitalism" icon. The bottom of the screen displays a "No Server Connection." error message.

# realization interface

Map
SemaSpace
Refresh
Logout

### Indicators

- Actions
  - Add
  - Remove
  - Edit
  - Search
- Symbols
- Researchers
- Reporting
- Settings

### Parameters

ID 0003  
Keys 105  
Docs 2  
Videos 0  
Audios 1  
Created 01.09.2009 07:06  
Creator Don 1

### Location Details

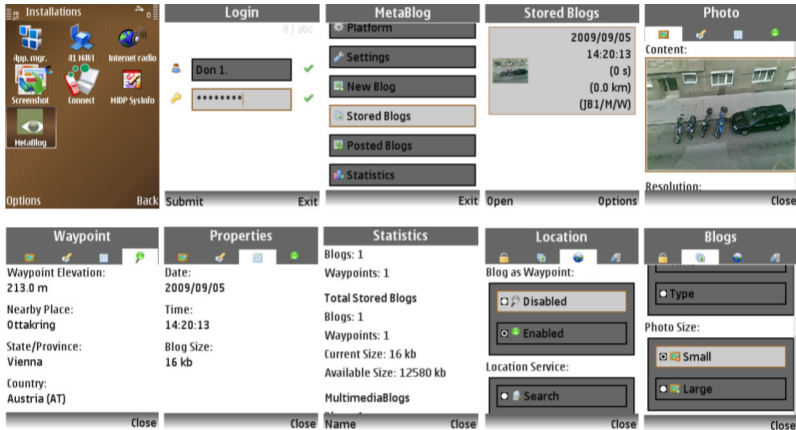
Country Serbia  
City Belgrade  
District Rakovica  
Latitude 44°49'14"  
Longitude 20°27'44"  
Altitude 116,75 m  
...

ID	Name	ICO	Researcher	Last Update	Category	Relatives	Location
0001	Indicator 01		Don 1	05.09.2009 20:56	Category 01	0	Belgrade
0002	Indicator 02		Don 2	05.09.2009 20:58	Category 02	1	Belgrade
0003	Indicator 03		Don 2	05.09.2009 21:06	Category 03	12	Belgrade
0004	Indicator 04		Don 1	05.09.2009 22:50	Category 01	23	Belgrade
0005	Indicator 05		Don 3	05.09.2009 22:58	Category 08	56	Belgrade
0006	Indicator 06		Don 1	05.09.2009 23:01	Category 12	0	Belgrade
0007	Indicator 07		Don 1	06.09.2009 00:09	Category 02	34	Belgrade

1566 Indicators found. Row 1-7 of 350

You are logged in as Administrator.

# realization interface



# Summary

## • METANET - Distributed Interactive Knowledge Network

- a project of **Meta-D.O.N**: sociocultural transformations in Serbia
- tool for individuals and communities to get a **smooth image of social spaces** for taking ambiguity and complexity into account
- utilization of proved open-source/free tools for adapting them to our needs (semaspace, OSM, GWT)
- reference project: **A geographic knowledge representation system for multimedia geospatial retrieval and analysis** (<http://www.springerlink.com/content/qkh8hyecby6glww5/>)

# Thank You.

For more information

<http://www.meta-don.org/newborder>  
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