



# TERRITORIAL INTELLIGENCE

## caENTI



Coordination Action of the European Network of Territorial Intelligence  
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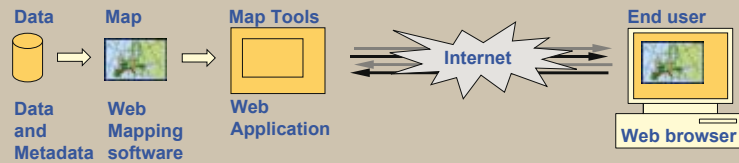
### ZRC-SAZU



## THE INTERACTIVE MAP FOR caENTI BUILT ON THE WEB MAPPING TECHNOLOGY

**Web Mapping Technology** is a technology to deliver interactive maps across the Internet. System architecture has 4 basic components: on server side Data, Web Mapping software (Map) and Web application (Map Tools), and on end-user's side Web browser. Basic features:

- \* It is dynamic tool. User can interact with it, it delivers dynamic maps, it provides supplemental information (text, images, attributes).
- \* It is highly visual tool, graphical presentation outperforms textual one.
- \* It is very simple to use, only basic computer skills are required.



**Data** are essential for successful application! Data were obtained from different sources (under coordination of C. Breuer):

- \* Geographical data: obtained by EuroGeographics (in the form of shapefiles; levels NUTS0 to NUTS3 and USE1 to USE6).
- \* Indicator data: obtained by Eurostat (statistical data for EU) and by local sources (statistical data for smaller level).

Statistical data were unified, and linked to geographical data based on NUTS code. Only 6 indicators were selected for map presentation.

Indicator	Level of detail				
	NUTS0	NUTS1	NUTS2	NUTS3	LAU2
Total population	EU+	EU+	EU+	EU+	Belgium Hungary (few units)
Density of population	EU+	EU+	EU+	EU+	Belgium
Active population	EU+	EU+	EU+	EU+	
Unemployment rate	EU+	EU+	EU+	EU+	Belgium Hungary (few units)
Net income available for household	EU, total for spatial unit	EU, total for spatial unit	EU, total for spatial unit		Belgium (few units)
Average size of household	EU (few units)				Belgium (few units)

Indicator data, that are presented on the map on different levels of detail (NUTS0 to LAU2).

**Metadata** are data about the data. Metadata gives qualitative parameters of the data itself. For the caENTI the set of metadata was selected, based on recommendations of two main specifications

- \* ISO 19115: Geographic information - metadata standard
- \* Dublin Core Metadata Initiative: initiative for interoperable metadata standards (IMDC)

Example of metadata display, as available on the map. Shown are metadata about indicator 'Density of population' for EU+ countries.

The Nomenclature of Territorial Units for Statistics (**NUTS**; for the French *nomenclature d'unités territoriales statistiques*) is a code standard for referencing the administrative divisions of countries for statistical purposes. The purpose is to have a single code for each administrative division, and to identify each administrative level. The standard covers only the member states of the EU in detail. The different levels are determined by minimum and maximum thresholds for the average size of regions. A NUTS code begins with a two-letter code referencing the country, which is identical to the ISO 3166-1 alpha-2 code (except UK instead of GB for the United Kingdom). There are four levels of NUTS defined, with two levels of local administrative units (LAU) below.

### Abstract:

Geographical information systems (GIS) are becoming a common tool in applications that involve spatial objects and relations. In the last years the internet technology is moving GIS towards web based applications, simplifying the interaction between users and GIS, and at the same time reducing the ownership and maintenance costs.

In the framework of caENTI we developed a web mapping solution to present six selected socio-economic indicators of European Union in the form of interactive map. Indicators are presented in different levels of detail (from NUTS0 to LAU2).

All presented data are extensively equipped with their metadata description, so as to enable delivery of exact information to the end user.

Among tested open source softwares we selected the following two: Map is built on web mapping software GeoServer, and map tools are build on the basis of JavaScript library OpenLayers with development of some additional proprietary tools.

Interactive map has a potential to become very powerful tool for technical teams of the caENTI member groups and the whole European community to get appropriate visual and contextual information, thus it can become very important aid for analysis and research.

### Key words:

web mapping, web GIS, cartography, open source software

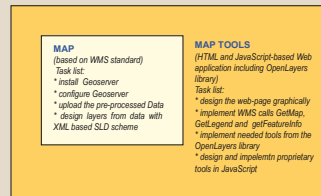
### Project team:

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The selection of the **Web Mapping software** has been focused to the so called open source solutions. In search for highly standardized solution we followed the recommendation, given by two main non-profit open-source geospatial organizations: The *Open Geospatial Consortium* (OGC) and The *Open Source Geospatial Foundation* (OSGeo). The most important standard for delivery of maps across the Internet is called *Web Map Service* interface standard (WMS). WMS provides a simple HTTP interface for requesting geo-registered map images from distributed geospatial databases.

Among the tested products the web mapping software *GeoServer* was selected. Rendering of data-layers within Geoserver was done by implementing OGC's XML-based coding scheme *Styled Layer Descriptor* (SLD). For every available combination of indicator and NUTSx/LAU2 level a separate layer was prepared.



**Web application** combines the Map with needed tools for exploring the Map and its data. For the mapping tools the open source JavaScript library OpenLayers was selected, with the following tools implemented: zoom and pan tools, cursor position, overview map, identify tools.

Additional proprietary tools were also designed in JavaScript. These are: selection of indicator and level of details NUTSx/LAU2 to be presented on the map, zoom to country, metadata service (displays available metadata for indicator as well as spatial datasets).



- 1 (main) Map
- 2 status bar
- 3 legend
- 4 toolbar
- 5 overview map
- 6 tool to select indicator and level of details
- 7 metadata service for indicator/geographical data

Interactive map is simple to use. **End user** needs just web browser, only basic computer skills are required.