



# INSPIRE compliant geoservices for topographic databases of the Lombardy Region in Italy



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## Abstract

Aim of the work is the implementation of geo-services compliant with the INSPIRE (Infrastructure for Spatial Information in the European Community) Directive for distributing Lombardy Region geo-topographic databases at scale 1:2000.

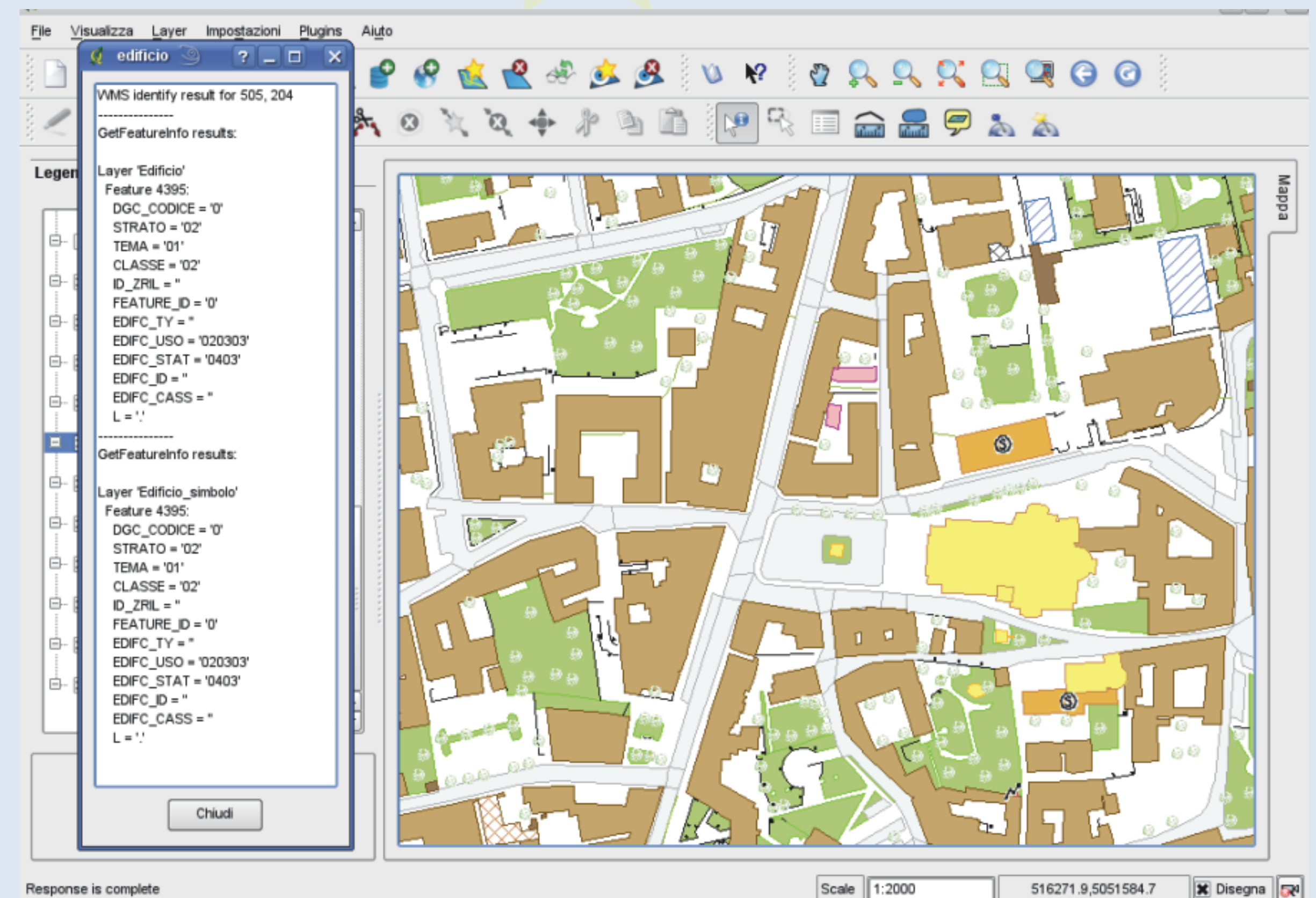
The services are based on OpenGIS Catalogue Service Implementation Specification (CS-W 2.0.1) and OpenGIS Web Map Service (WMS 1.3.0) Implementation Specification as required by the Directive itself. They were implemented with Open Source Software: UMN Mapserver for WMS service and Geonetwork for metadata handling (CS-W). Test data used for the prototype are compliant with the Standard for modelling geographic data recently approved by the Lombardy Region (February 2008). The infrastructure is freely available for all Municipalities who adopted such model for their geo-database. A website with a demo version is already online (<http://ows.como.polimi.it>).

## The Lombard context

The Lombardy map production's state of art presents, like other Italian Regions, an extremely fragmentary and poorly updated situation, specifically referring to small scale maps.

With the purpose of solving this situation, for the last five years Lombardy Region has been co-funding Municipalities in acquiring new geo-topographic databases at scales 1:1000 and 1:2000. In the meanwhile the availability of such geodatabases allows the Region, by means of a generalisation process, to create also the new regional 1:10000 map.

We used the GeoNetwork opensource to realize the Catalogue service. First of all we translated the GUI in Italian and later we adapted the software schemas, as templates and style-sheets, in order to permit the publication of metadata according to the scheme proposed by CNIPA, introducing hierarchy of data according to the levels: series, dataset and section.



## The data consultation service

We implemented the service, as specified in the rules for implementation of INSPIRE, realizing a Web Map Service (WMS); to do that we used the UMN MapServer. UMN MapServer is able to directly access the shapefiles that are de facto standards for the small scale geo-databases of the Lombardy Region.

The geo-database itself is organized in 119 different layers and therefore each layer is described separately in the mapfile; for each layer symbols and fonts almost compliant with the requirements described in the "Graphic representation of Lombardy maps at various scales" document were specified. Unfortunately it was impossible to comply all such specifications because the document refers to hard copy maps (a new version for online maps is still now missing) and some graphical element is not suitable for digital representation by means of raster file.

Some items are provided only at certain scale, the significance of case studies on the thicknesses of lines is poor, because the quantization error introduced by the size of each pixel with respect to the nominal scale is difficult to reproduce in representations often asymmetric and belonging to a specific context.



## Catalog service

INSPIRE implementing rules force the various levels of government in Europe to use the Open Geospatial Catalogue Service for the Web for metadata sharing. In Italy CNIPA, which is the Public Administration Information Technology National Centre in charge also for standardisation of geographic information, published a localized profile of ISO 19115 (Metadata) describing the minimum Italian subset of metadata (Core Metadata).

GRAPHICAL ELEMENT : CTR at SCALE 1:2.000			
LAYER: VEGETATION			
DESCRIPTION	SYMBOL CODE	GRAPHIC	SPECIFICATIONS AND NOTES (mm)
Fir forest	05020101		Thickness perimeter 0.18 Outline R 92, G 137, B 68 Step 10. Height 2 symbol Dot: height 1.5 Step 6 Background R 140, G 189, B 140 Transparency 40%

## Conclusions

We create for three Lombardy Region Municipalities an open infrastructure which at the same time is compliant with INSPIRE directive and with national standards for the a discover and view services. The infrastructure is free and immediately usable for all small scale geo-databases compliant with the new specification for Lombardy.