CO-117

# ONTOLOGY-BASED DISCOVERING OF GEOGRAPHIC DATABASES CONTENT

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## 1. OBJECTIVE

Mapping agencies usually produce and supply various geographic databases. All these databases represent the geographical space, but each of them with its own specification. The variety of data and the complexity of specifications may cause some difficulties for any user in assessing and understanding the content of these databases. Moreover, the rise of the Internet and associated technologies allows a growing accessibility to spatial data via web portals. Even if this allows users to better understand the available data, a number of information are not available through geoportals for a more knowledgeable user, who wishes to assess and compare the content of available databases with respect to her/his specific needs.

The objective of the system described in this paper is precisely to capitalize on existing ontologies, and to combine them with the latest web technologies in the field of dissemination of spatial data, via an application allowing a user to discover, in a simple way, databases which are the most appropriate to his/her needs. The purpose of this system is to provide, through a user-friendly interface, complex information on geographic data, previously not accessible or only accessible by reading the complex specification files.

## 2. APPROACH AND METHODS

### *2.1 Preliminary notions*

Our system requires a shared taxonomy of geographic concepts described in the studied databases. For our study, we use a bilingual (French/English) taxonomy of geographic terms encountered in several data specifications [2].

Our approach also relies on some local ontologies that formalize the content of the specifications of each considered geographic database. The methodology used to build these ontologies is described in [1].

### *2.2 System architecture*

Our system runs on a client-server architecture (Fig. 1), including a web mapping solution for data visualization in the client's side. It is composed of three important modules.

1. The search module guides the user, through an auto-completion solution, to express his/her query, i.e. to specify which data s/he is looking for using terms designating concepts in the topographic domain ontology.

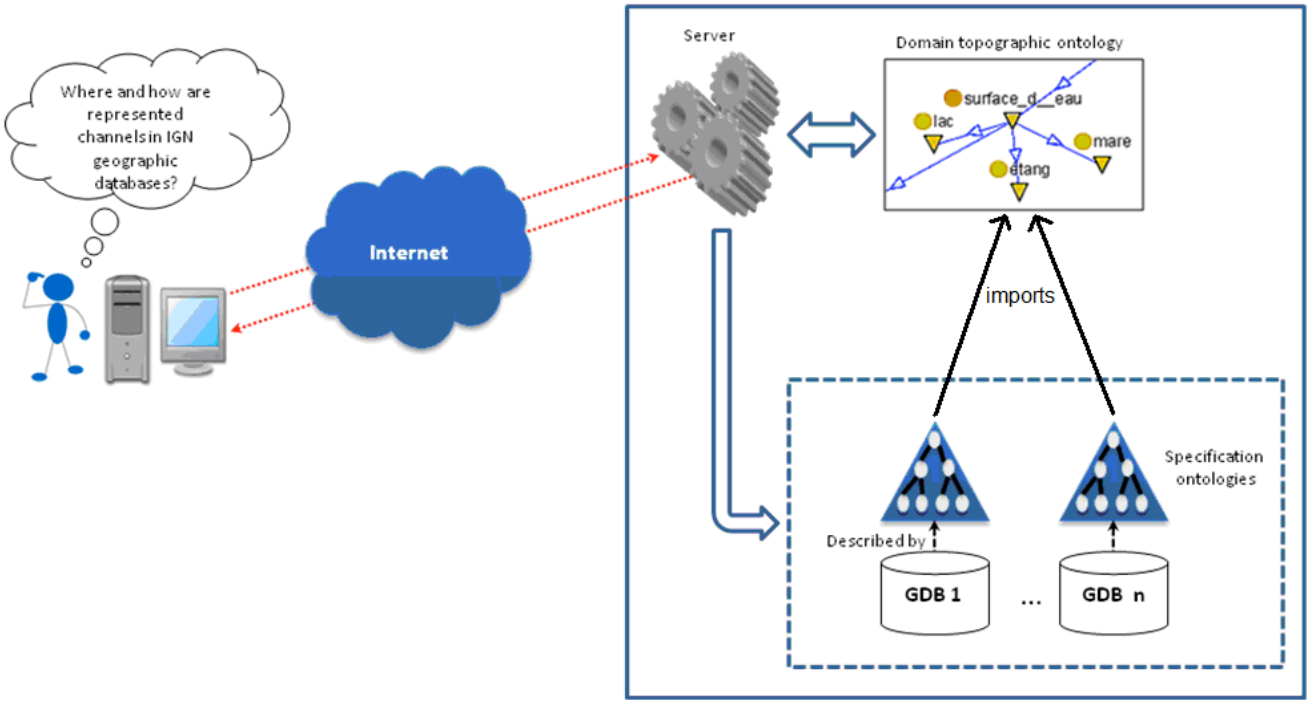

*Figure 1. System architecture*

2. The information extraction module extracts, from the local specification ontologies, information about the data referred to by this term. This piece of information, including definitions, geometries of represented objects etc., is sent to the user.

3. The cartographic module uses information obtained from the specification ontologies to retrieve data corresponding to the user's need in the different geographic databases.

**3 SYSTEM IMPLEMENTATION**

The proposed system is a web application allowing serving a large number of users. A prototype has been implemented using two specification ontologies associated with two IGN databases (BDTOPO and BDCARTO). These ontologies are represented in OWL 2 and are actually restricted to the hydrographic theme. Tools and languages used in our system are shown on Fig. 2.

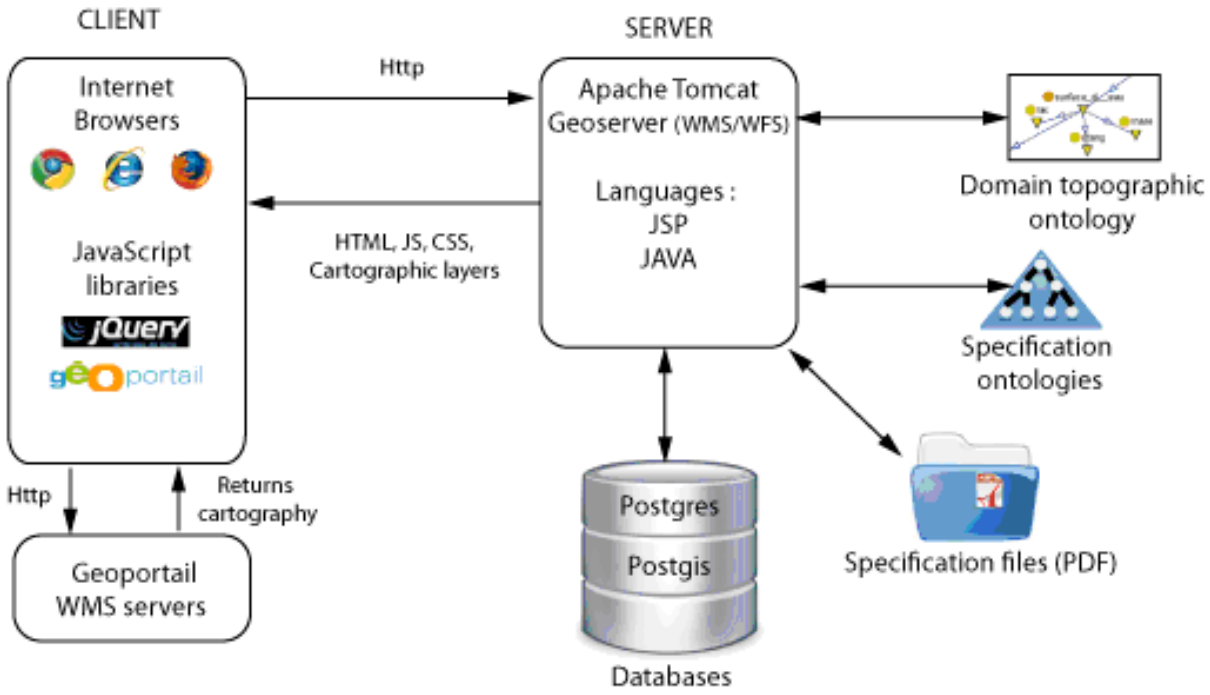


*Figure 2. Implementation of the system*

The web interface (Fig. 3) is composed of three parts: the first part consists in a text-field for entering the query as in a classical search engine. The second part (on the left) consists in a set of tabs; each tab corresponds to a database and provides information about data interesting the user in this database. The third part is the cartographic visualization of the data corresponding to the user's need in each database. When the user switches from one tab to another one, the cartographic visualization of the corresponding data is automatically updated.

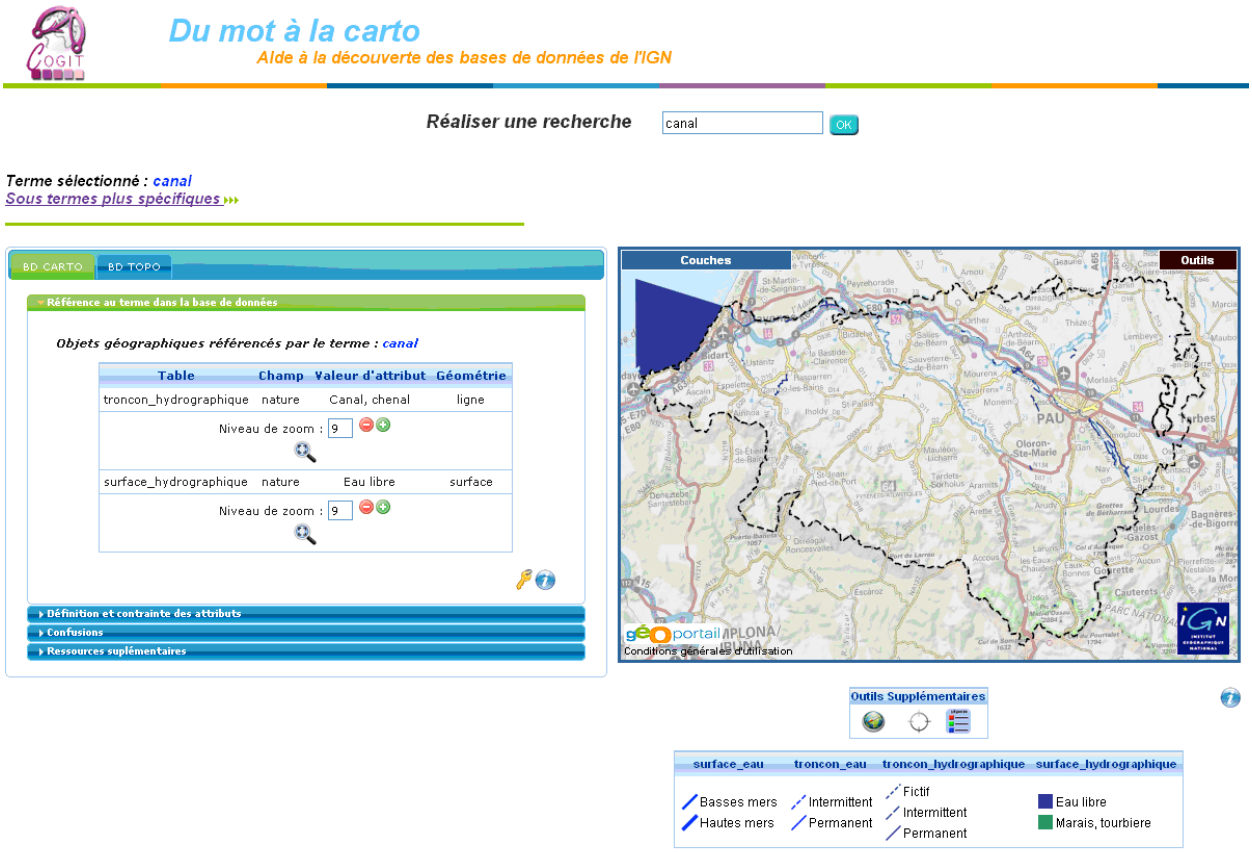


*Figure 3. The Web interface of the implemented system.*

## 4 CONCLUSION AND PERSPECTIVES

The proposed system allows a better comprehension of the geographic databases content, thanks to the formalization and an appropriate display of their specifications coupled with a web mapping solution. In the future, we plan to 1) allow the user to select more than one concept's name in order to compare data representing different geographic entities; 2) and extend the system to other geographic databases and other themes.

## ACKNOWLEDGEMENT

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## REFERENCES

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