

Collaborative authoring and polypublication of cartographic content

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Background and objectives

The double motivation of this project starts from the observation that there is an increasing number of producers and consumers of maps. Even, the term of «prosumer» has a growing acceptance to illustrate this phenomena [1] which is driven by the GeoWeb technologies.

Nonetheless, linked to this democratization of mapping techniques and usages, many experts address the question of credibility and quality of maps due to poor cartographic design [2]. This question initiates the first objective of this project which is about the experimentation of a collaborative authoring of cartographic content.

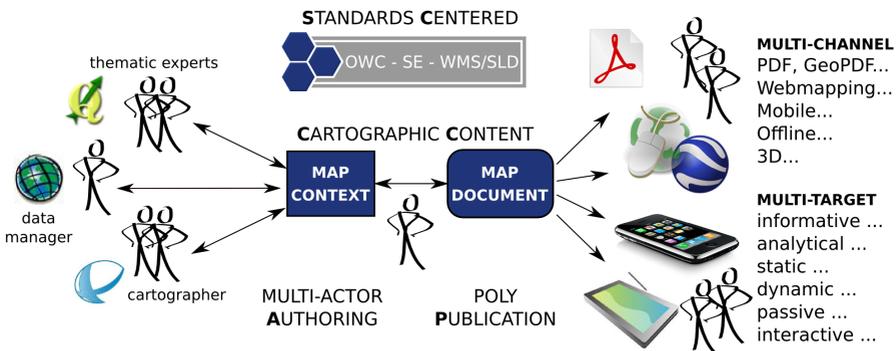
Moreover, map media for the masses is growing up. The use of maps within information content become a usual practice, again facilitated by GeoWeb technologies. This trend comes with a changing context concerning final user needs and diversity of diffusion channels. Thus, the second objective is

to experiment a multi-target and multi-channel platform for polypublication of cartographic content.

These two objectives, both dedicated to cartographic content and based on open standards, are illustrated below (Figure 1).

FIGURE 1

Standard Centered Authoring and Publication of Cartographic Content



Collaborative authoring

The Web 2.0 evolution contributes to bring to reality the initial purpose of the web pioneers to make it a collaborative space where people can interact [3]. In this regard, the purpose is to build a collaborative system for the authoring of cartographic content, so as to allow all actors of the creation process to avail its own skills at fair value (data manager, thematic expert, cartographer). The hypothesis is that a collaborative context is a way to reinforce the quality of maps thanks to the combining of skills within the teamwork.

The present distributed approach relies on the interoperability between cartographic authoring tools regardless of the used platform. Thus, each actor has the choice to keep her/his favorite tool. Thus, the actor in charge of cartography within the teamwork is then able to concentrate on the cartographic aspects so as to guarantee the quality of the cartographic message.

Standards for the interoperability of cartographic content is required to realize such an environment. Especially portrayal interoperability which concerns the possibility to share cartographic descriptions between tools while, of course, keeping exactly the same cartographic rendering. Since 2000, the Open Geospatial Consortium (OGC) has designed such a standardized symbology model which is known as the Symbology Encoding specification (SE 1.1) [4]. Such a specification has to be able to describe a large range of cartographic representations, but the current state is quite poor to give a complete answer to this. Therefore, the present project contributed to restart activities within the OGC Symbology Encoding Standard Working Group [5]. By leading the standardization work and combining several Change Requests, there is now a draft specification for a next release of the standard. The symbology model includes new possibilities for cartographic representations: compound strokes, composite graphics, symbol charts like pie charts and histograms, absolute units of measure etc. In parallel to the enrichment of the rendering capabilities, the project has contributed to push an experimental addition to the symbology model which is about semantic [6].

Finally, the second stage for a collaborative authoring environment concerns the sharing itself by the creation of a common repository of maps to share within the teamwork. Such a sharing point is relevant so as to put oil in the collaborative gears, including: a web API with the usual operations (creation, retrieving, update and deletion of a map context) and a comments system with automatic notification to support the interaction between the actors during the creation process, just like a blog or a forum would offer.

Polypublication of cartographic content

We call the result of the cartographic authoring a map context, which has a final destination defined by different user needs and different publication channels. This introduces the second purpose of the project: the polypublication of cartographic content on the base of a unique standardized map document. The hypothesis is that a publication platform natively designed for polypublication will help to rationalize and improve the publication.

Polypublication is first about multi-target publication which means a map document can be published in different ways according to the needs of the targeted user (informative for the reader, analytical for the decision-maker). The publication can vary and conform according to a layout (e.g. a corporate presentation template) or «functionalities» depending on the user skills. Secondly, polypublication is about multi-channel which means to adapt a map document to the diversified characteristics of the final medium of diffusion like a paper or screen size, a resolution and the level of interactivity. The multiplication of the users profiles and these medium characteristics explains why it might make sense to adopt a polypublication approach from the start of a cartographic communication project.

Given that publication work is a set of tasks reserved to an expert of the domain, a new actor has to be introduced within the teamwork, we call it the cartopublisher role which requires above all to be aware of publication constraints. Moderation of the cartographic content under authoring is the first task for this role. The actor interacts with the teamwork to check whether all information are described within a map context: a title, a relevant map legend, authors, etc. The second task is about enrichment of the map context with more multimedia content (more text, articles, photos, diagrams, hyperlinks, etc) to back up the understanding of the cartographic message. The cartopublisher uses its own publication tools to accomplish the preparation work for publication. As soon as done with these tasks, the map context can be considered as a map document ready for polypublication.

For the publication of the map document, this project experiments a new way to design a platform by taking into account the polypublication concepts detailed above. Indeed, current platforms are rarely designed with polypublication in mind from the start. Often these are composed of a set of lazy coupled and juxtaposed technologies trying to adapt the content on a case by case basis without a global design strategy. Therefore, the present approach is rather designed through a publication model composed of nested levels based on channel-independent components, we call them «target components».

The first level defines components in charge of cartographic «functionalities». The various possibilities of combining components allow to bring answers to various users profiles.

Examples of components:

- MAPSHORTCUT: it offers shortcuts to the user to navigate to predefined map views (parameters: one bounding box per predefined view)
- INFOLAYER: the user is able to get information about the features of a map layer (parameters: the feature properties and the title of each property to present)

The approach is then completed by a second level which is to decline the appropriate adaptation for each medium considering its native characteristics, taking advantages of ones and reducing drawbacks of others.

Examples of adaptations:

- for MAPSHORTCUT: given an interactive channel, the main map view is changed on each selection of a shortcut on the user interface; given paper medium, the publication is composed of several map view instances, one for each shortcut.
- for INFOLAYER: given an interactive channel, each click on the map displays the usual «bubble information» (parameters: search radius around the location of click or touch); given paper medium, a data table is presented within the document including a solution for the user to be able to match each line of the table with the right feature on the map, e.g. through the addition of identification labels on the map (parameters: the property to use as a label).

Finally, we understand that there are «global» target parameters and «specific» channel parameters, which is exactly a consequence of the nested approach (Figure 2).

FIGURE 2

A nesting and configurable approach of polypublication

```
name: Publication générique
description: Publication générique
modules:
```

```
  mapView:
    baseLayer: none
  layerSwitcher:
    layerPlan: multiple
    transparency: 1
```

«target components» to combine to create a publication type for a given final user type (includes the setting of global parameters)

```
channels:
```

```
  webMap:
    # in apps/frontend/templates
    template: webmapGenericTemplate
    modules:
      mapView:
        # in data/smarty/templates
        template: webMapGenericTemplate
        navigation: true
        navigationUi: false
      layerSwitcher:
        # in data/smarty/templates
        template: webMapGenericLayerSwitcherTemplate
        transparencyUi: true
```

Nesting: for each channel, the target component has an appropriate and parametrable adaptation

```
pdf:
```

```
  # in apps/frontend/templates
  template: pdfGenericTemplate
  modules:
    mapView:
      # in data/smarty/templates
      template: pdfGenericTemplate
    layerSwitcher:
      # in data/smarty/templates
      template: pdfGenericLayerSwitcherTemplate
      tableOfContentLinks: true
```

Nesting: for each channel, the target component has an appropriate and parametrable adaptation e.g. for PDF output, a table of content with hyperlinks

The aim of the project is not to reinvent the wheel and the technologies in link with publication of cartographic content. Instead, it is to adopt a strategy oriented from the start towards polypublication through the abstraction of a target level (target components).

Results and future

The strong focus on standards allows at one side the required interoperability to share cartographic content. At the other side, it allows to build a polypublication engine based on a unique and standardized source. Also, it helps to rationalize software development without technology dependency. The polypublication experimentations based on a nested publication design have been able to bring a proof of the concept with promising results. A prototype implementation has been started using the open source Symfony framework [7].

From the start, the team project has shown one's willingness to contribute to standardization activities. The aim was to reactivate an upcoming major topic at the OGC and to boost dissemination of the research work results. Given the innovation requirements to push forward the OGC SE specification, the development of a reference implementation has been initiated with OrbisGIS [8] to support these activities and to which other implementations can be evaluated. The openness of the open source OrbisGIS software is helpful to ensure maximum transparency of the specification.

Finally, collaborative authoring is a typical use case of OGC SE standard, but due to spatial data infrastructure rules and directives which are set up from local to global (LGéo in Switzerland [9], INSPIRE in Europe[10]), we state that standardization still requires more involvement of academic bodies to progress.

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