Towards automated mapping in a services environment

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Until recently I was active in the two “old” GIP research themes: I worked on the SDI–light OSGEO software stack, implementing geowebservice components in a simple, stable and cost–effective setup, using an SDI software stack that is built out of free and open source components. Furthermore I was looking into spatio-temporal geo-webservices. The goal of this was extending WxS and other geo-webservices with time series data output as animated, interactive vector maps. Work was done in bringing the Open Source project RIMapperWMS further by integration of TimeMapper code it (see http://kartoweb.itc.nl/rimapper/).

The intention is to go forward with parts of these research matters within the new departmental reseach theme STAMP (Spatio–Temporal Analytics, Maps and Processing). I want to look further in facilitating the production of (animated) maps from spatio–temporal data to a format suitable for internet dissemination, automatically and directly. To achieve that, I want to look specifically into the possibilities of the loose coupling of distributed webservices with animated, interactive vector maps. By ‘direct’ I mean that the maps are generated on–the–fly from the data, without conversion or pre-processing needed. This is necessary because the map generation should fit in an interoperable Spatial Data Infrastructure. ‘Automatic’ in currents systems means that the maps are generated from the spatio-temporal data by the system “working by itself with little or no direct human control”. But this automation at present does not include the cartographic decisions as to what type of map to use for different data–types and data–instances. The link between data type and visualisation has to be made by a human (the cartographer in Figure 1), setting up the appropriate configuration parameters beforehand.

*Fig. 1.* Current practice of dissemination of maps in a webservices environment.
Fully automated mapping from data, with cartographic design decisions included, remains an interesting research challenge that I want to look into. I have discussed this issue in a GIP research meeting and at the EuroSDR WebCartography workshop. There seem to be several approaches for this problem, a promising one being the use of a formal map specification language. This would be a formalised specification (in the computer science sense) that defines the desired outcome using a declarative language. This language should have defined degrees of freedom (e.g. ranges of acceptable values) that allow for map creation in a controlled and consistent manner.

It could be used by a service compiler that creates a service configuration file (e.g. an SLD) based on the formal map specification, plus (meta–)data and user input. The possible set–up is sketched in Figure 2.

Fig. 2. The possible role of a formal map specification in a webservices environment.

Testing platforms for such a set–up could be the experimental 3rd edition of the National Atlas of the Netherlands (as use case) and the RIMapper/TImeMapper services (as prototype software environment).

The main research question could be formulated as “can we use a formal map specification language to facilitate, in a distributed webservices environment, the automatic generation of maps from spatio–temporal data in a format suitable for internet dissemination?”

Keywords: automated mapping; geo-webservices; formal map specification;