# CSW2WxS
Chaining OGC Catalogs to Map and Feature Services

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CSW2WxS is a Web Service that takes an OGC CSW compliant catalog search and returns the result as a valid Web Map Service or Web Feature Service response. As such, it can be seen as a utility service that makes chaining a CSW to a WMS or WFS a simple one–step process.

CSW2WxS originated in the prototype of the 3rd edition of the National Atlas of the Netherlands (see Kraak et al., 2009). In this prototype we provide the users with the possibility to search within the "Nationaal Georegister", the official metadata catalog for the Dutch National Geodata Infrastructure. The results of this search are shown as hyperlinked footprints in the map interface of the Flash web-client. Figure 1 shows screenshots of this prototype, and you can try it yourself on the National Atlas prototype site (`http://www.nationaleatlas.nl/`, in Dutch).
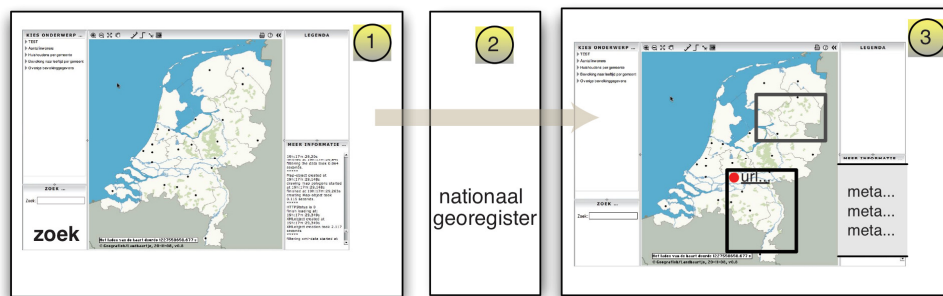

Figure 1: Screenshots of a catalog search in the "Nationaal Georegister", using the prototype of the 3rd edition of the National Atlas of the Netherlands (from Kraak et al., 2009).

This first test of the chaining of catalog services with a map client we called the NatAtlas CSWreflector. Its general usefulness is limited, mainly because it of its *tight coupling*: On the catalog end it is dependent on the particular setup of the "Nationaal Georegister" catalog service. And similarly on the user interface end, there is a close relation to the specific National Atlas client (a Flash application), because the communication between the user interface and the Java Servlet that powers the reflector is very simple and limited, with most of the CSW and other parameters hardcoded in the service interface. In Figure 2 a UML sequence diagram of a search using the original CSWreflector is shown.
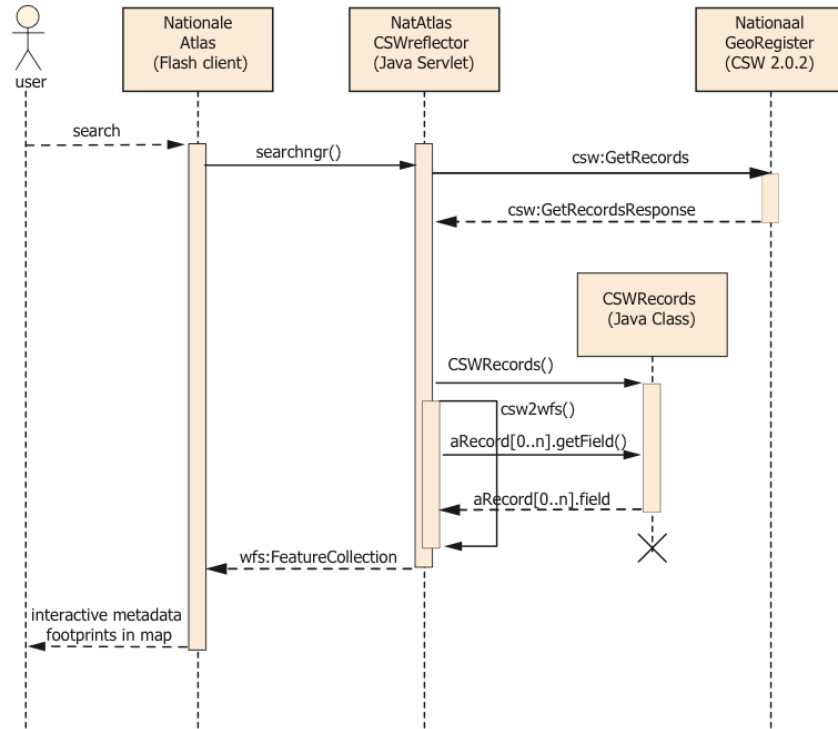
Figure 2: Sequence diagram of the original CSWreflector, tightly coupled with the National Atlas Flash client and the "Nationaal Georegister", the official metadata catalog for the Dutch National Geodata Infrastructure.

We figured that the utility service of the *NatAtlas CSWreflector* could be useful in a broader context, and set about making the system more loosely coupled, and therefore more generally useable. The first step was generalising the CSW connection, which was achieved by removing all hardcoded input and instead retrieving the relevant parameters from the requesting client and forwarding these to the CSW service (whose online resource URL also should be provided by the client). Secondly, we had to implement some basic version negotiation, as the system currently only can handle CSW service output according to the current version of the protocol (2.0.2). In case the CSW involved can not provide version 2.0.2 compliant output, it should of course gracefully exit, providing a sensible error message. Next, we needed to generate a more generally useable output then the one specific for the National Atlas client. For this we use MapServer, the Open Source geographic data rendering engine originally developed by the University of Minnesota and now a project of OSGeo (http://mapserver.org/). It can deliver both WMS maps and WFS data streams. The output is either a WMS map graphic, or a WFS FeatureCollection, i.e. a GML data stream with the geometries of the datasets found in the catalog search, with the rest of the metadata encoded as feature attributes. In the former case, the output is less rich in content, as the WMS interface does not provide for inclusion of feature attributes directly in the WMS GetMap response. In Figure 3 we show the UML sequence diagram of these searches using the current CSW2WxS system. Note how this differs from the earlier system in figure 2, in that the lighter parts are not part of the actual CSW2WxS system. They can be, respectively, any http-enabled client that is able to generate CSW compliant requests, and any CSW compliant catalog.
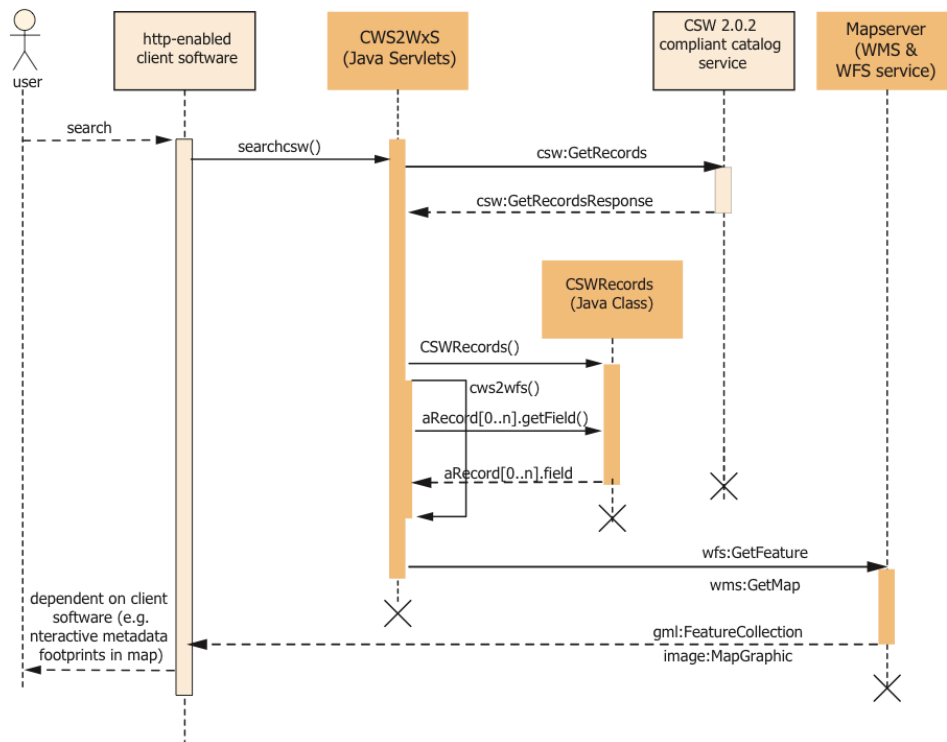
Figure 3: Sequence diagram of a search using the CWS2WxS system. Note that only the darker elements are parts of the actual CWS2WxS system, loosely coupled with the other (lighter) parts, which can be any http-enabled client and any CSW compliant catalog service.

What the user can actually do with the output, does of course depend on the client software: In the simplest setup one can use a Web Form to formulate a metadata search, and the system can be used to respond with a simple map output through the WMS interface, resulting in a map with metadata footprints. Using a desktop GIS such as the open source QuantumGIS (`http://qgis.org/`), the WFS output could be loaded and the footprints of the data would be available as a map layer, whose attributes contain the metadata information. Similar functionality can also be achieved with a somewhat 'richer' or more intelligent client HTML client, such as the demo we provide on our webpages. This demo was constructed using the OpenLayers Javascript API (`http://openlayers.org/`). Here, one can make use of the WMS GetFeatureInfo interface, through which a client can retrieve the attributes connected to a WMS map object.

The current version of CWS2WxS is available as a working service on the website `http://geoserver.itc.nl/NatAtlas/csw2wxs/`. We've included both a simple web form for retrieving the WMS and WFS output, as well as the OpenLayers demo client mentioned above. We also provide the code of the Java Servlet and the configuration files for MapServer, together with some explanation on how to set up the system for yourself.

BIBLIOGRAPHY

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