

Groundwater Information Network
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Using GIN timeseries widget from external applications

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Revision history

Date	Release	Author	Description
2012-09-27	Draft	Eric Boisvert	First draft for comments
2013-05-23		Eric Boisvert	<ul style="list-style-type: none"> • Changed URL for SOS service • Removed reference to "profiles" since mediator now takes care of it. • Added GET request syntax
2014-03-24		Eric Boisvert	<ul style="list-style-type: none"> • Clarification in the introduction + minor changes
2014-07-17	Change URL	Eric Boisvert	<ul style="list-style-type: none"> • Changed ngwd-bdnes.cits.nrcan.gc.ca to gin.gw-info.net

Introduction

The time series widget is a tool created by Kisters (<http://www.kisters.de>) that displays time series graphs. The graph can be navigated (zoom in/ou) and the data can be extracted in various formats. The widget interact with a server side component, also developed by Kisters, that connects with various data sources to provide a federated view over a collection of monitoring stations managed by different authorities.

This document describes how an external application can use the GIN time series viewer with GIN supplied data. The viewer is embedded in a web page that can be invoked in two ways; as a OGC Web Mapping Service response, or as a parameterised page. When access through an OGC Web Mapping Service, any WMS client can visualise the location map and launch the time series viewer without any extra code. Since launching the application from WMS is essentially based on location of the click event, there is an alternate way to get to the data from the identifier of the station that can be extracted from another service. The latter method is also described in this document.

Note that the widget can only display data that is registered in the GIN network (gw-info.net) and cannot be used to display arbitrary dataset.

Service URL

Service Base URL : <http://gin.gw-info.net/service/gin/sos2/timeseries/natres>

Invocation options

The web page can be invoked in two ways:

- As a result of a regular WMS 1.1.1 **GetFeatureInfo**, which is a spatial query
- Using a station identifier, identifiers that can be extracted from a SOS 2.0 (Sensor Observation Service) **GetFeatureOfInterest** request

In a typical use scenario, it is expected that the user will be presented a map, where the features of interest (the monitoring stations) are displayed and the user will select one or more monitoring station to access the time series.

WMS invocation

This option is by far the easiest, because it uses WMS 1.1.1 (OGC 01-068r3, De La Beaujardière, 2002) that any client supporting this specification can use. The WMS service provides the feature of interest locations as an image and a mechanism to get to the time series through a spatial query. The WMS provides one layer per province (the information might actually come from a remote service, but this is transparent to the client)

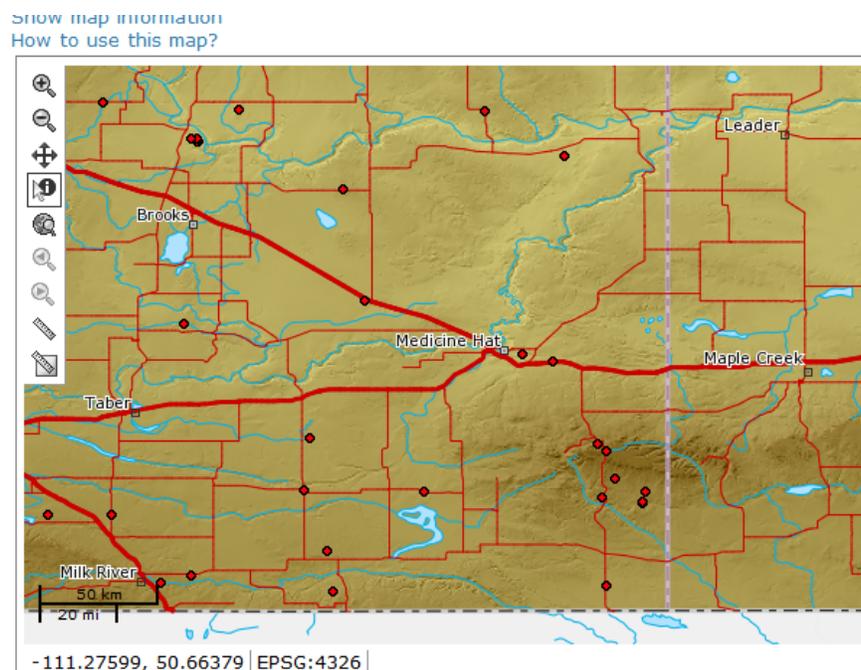


Figure 1: WMS layer showing Alberta Monitoring stations (shown as red dot over background layers from Toporama)

Figure 1 shows the layer displayed by a WMS client over some background layers. What the client receives from the service is an image of the monitoring station locations, not the data itself; therefore, the client has no prior knowledge of what is present on the map. To get information about a station requires the user to click on (or near enough) one of the point and use the location of the click event to query the service. This is the normal way WMS operates. This request is an HTTP GET operation, named "GetFeatureInfo" that invokes a web resource (here, a page) with a series of parameters.

http://gin.gw-info.net/service/gin/sos2/timeseries/natres?SRS=EPSG:4326&REQUEST=GetFeatureInfo&INFO_FORMAT=text/html&FORMAT=image/png&SERVICE=WMS&TRANSPARENT=TRUE&VERSION=1.1.1&QUERY_LAYER=Alberta&EXCEPTIONS=application/vnd.ogc.se_xml&LAYERS=Alberta&BBOX=-112.55,48.869888,-109.225,51.155112&HEIGHT=400&Y=358&STYLES=&WIDTH=582&X=93

The location of the click (expressed in X,Y in image coordinate, starting from upper left) is used to calculate the real world location (for this reason, it also needs the image size, the real world limits this image represents and the geographic projection) to extract the information from the database.

The parameters are describe in the following table

Parameter	Required / Option	Description
REQUEST	R	Must be "GetFeatureInfo"
SERVICE	R	Must be "WMS"
VERSION	R	Must be "1.1.1"
SRS	R	Projection code (using EPSG code).
QUERY_LAYER	R	Name of the layer that is queried (the name comes from the GetCapabilities)
INFO_FORMAT	R	Format of the information, must be "text/html"
LAYERS	O	Display layer. Not used
X,Y	R	Location (in pixel column and row) of the client. Note that the origin of the image (0,0) is on the top left and the Y axis is positive downward
WIDTH, HEIGHT	R	Size of the image
BBOX	R	Real world extent of the image (expressed in the coordinate system specified by the SRS parameter). Note that WMS 1.1.1 still uses the x,y axis order

Table 1: GetFeatureInfo parameter (from OGC 01-068r3, table 9, page 40)

The real location is figures out by the server with simple conversion of image location into real world location. In typical use scenario in a browser the query is normally launched in a new page or tab (using ``) to avoid loosing the current map/application window.

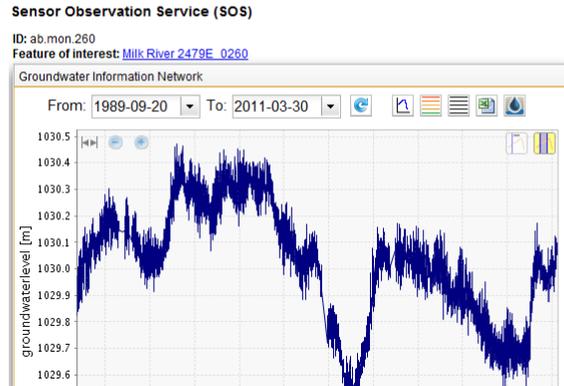


Figure 2 : Web page with time series widget

Because of the search tolerance radius used by the service, it is possible that more than one station might be selected. If this is the case, the web page will display a list of candidate stations. The client must then select one station before proceeding to the time series

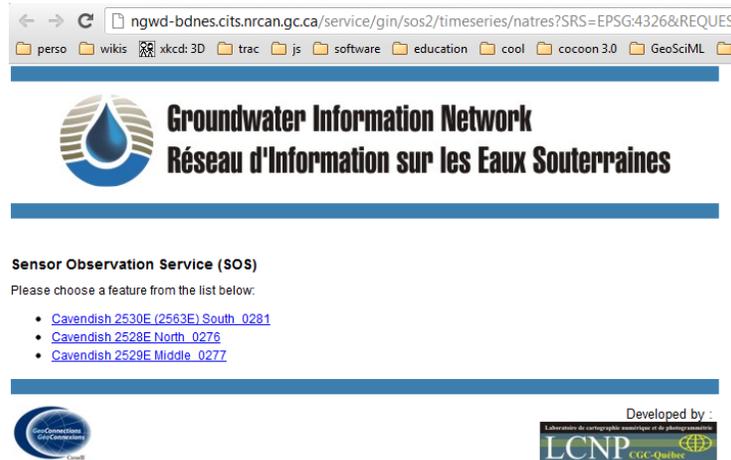


Figure 3: If more than one station is found, a list of station of provided to the user. Clicking on a link will reload the page with the time series

The links on this page actually are invocations of the second form, using station identifiers described below.

Direct invocation

If the id of the time series is known, the page can be directly invoked using this HTTP GET URL

URL structure: `http://gin.gw-info.net/service/gin/sos2/timeseries/natres?ID=<id>`

eg: <http://gin.gw-info.net/service/gin/sos2/timeseries/natres?ID=ab.mon.98>

It is possible to get a list of the stations in a given area by requesting them directly from the SOS 2.0 service. This involves sending SOS 2.0 GetFeatureOfInterest requests.

The following request must be sent through HTTP/Post (Content-Type = text/xml) . In this example, we use a BBOX large (highlighted) enough to insure to grab them all. They could also be request in smaller areas on demand to avoid worrying about synchronisation between the original dataset and a cached dataset.

```
<?xml version="1.0" encoding="UTF-8"?>
<!--=====
Example Request for GetFeatureOfInterest operation which contains a spatial filter and a
filter on the observable property.
=====-->
<sos:GetFeatureOfInterest xmlns="http://www.opengis.net/sos/2.0" service="SOS" version="2.0.0"
xmlns:sos="http://www.opengis.net/sos/2.0" xmlns:fes="http://www.opengis.net/fes/2.0"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:swe="http://www.opengis.net/swe/2.0"
xmlns:sams="http://www.opengis.net/spatialSampling/2.0"
xmlns:swes="http://www.opengis.net/swes/2.0" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/sos/2.0
http://schemas.opengis.net/sos/2.0/sos.xsd">
  <!--Features returned shall have property identified by this URN-->
  <observableProperty>urn:ogc:def:phenomenon:OGC:water_level</observableProperty>
  <!-- Features returned shall match the spatial filter defined in this request-->
  <spatialFilter>
    <fes:Intersects>
      <fes:ValueReference>sams:shape</fes:ValueReference>
      <gml:Envelope srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:lowerCorner>0 -180</gml:lowerCorner>
        <gml:upperCorner>90 0</gml:upperCorner>
      </gml:Envelope>
    </fes:Intersects>
  </spatialFilter>
</sos:GetFeatureOfInterest>
```

To this URL

<http://gin.gw-info.net/GinService/sos/gw>

Result example

```
<?xml version="1.0" encoding="UTF-8"?>
<sos:GetFeatureOfInterestResponse xmlns:sos="http://www.opengis.net/sos/2.0"
xmlns:sams="http://www.opengis.net/samplingSpatial/2.0"
xmlns:gml31="http://www.opengis.net/gml" xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:cinclude="http://apache.org/cocoon/include/1.0"
xmlns:h="http://apache.org/cocoon/request/2.0" xmlns:sf="http://www.opengis.net/sampling/2.0"
xmlns:proc="urn:x-lcnp:job" xmlns:swes="http://www.opengis.net/swes/2.0"
xmlns:fn="http://www.w3.org/2005/xpath-functions"
xmlns:sa="http://www.opengis.net/sampling/1.0" xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:sos1="http://www.opengis.net/sos/2.0" xmlns="urn:x-lcnp:job">
  <sos:featureMember>
    <sams:SF_SpatialSamplingFeature gml:id="ns.mon.772021">
      <gml:description>Observation well 772021 in Nova
Scotia</gml:description>
      <gml:identifier codeSpace="urn:gin">http://gin.gw-
info.net/Reference/uri-cgi/feature/gsc/waterwell/ca.ns.gov.wells.772021</gml:identifier>
      <sf:type xlink:href="http://www.opengis.net/def/samplingFeatureType/OGC-
OM/2.0/SF_SamplingPoint"/>
      <sf:sampledFeature xlink:href="urn:ogc:def:nil:OGC:unknown"/>
      <sams:shape>
```

```
                <gml:Point>
                    <gml:pos
srsName="urn:ogc:def:crs:EPSG::4326">45.0730387550453 -64.5548226141863</gml:pos>
                    </gml:Point>
                </sams:shape>
            </sams:SF_SpatialSamplingFeature>
        </sos:featureMember>
    </sos:GetFeatureOfInterestResponse>
```

The ID that is required for direct invocation is highlighted (ns.mon.772021), therefore

<http://gin.gw-info.net/service/gin/sos2/timeseries/natres?ID=ns.mon.772021>

will display the time series for feature of interest ns.mon.772021.

There is also a HTTP GET version of the request :

- [http://gin.gw-info.net/GinService/sos/gw?REQUEST=GetFeatureOfInterest&VERSION=2.0.0&SERVICE=SO&spatialFilter=om:featureOfInterest*/sams:shape._180,0,0,90&namespaces=xmlns\(sams,http://www.opengis.net/samplingSpatial/2.0\),xmlns\(om,http://www.opengis.net/om/2.0\)](http://gin.gw-info.net/GinService/sos/gw?REQUEST=GetFeatureOfInterest&VERSION=2.0.0&SERVICE=SO&spatialFilter=om:featureOfInterest*/sams:shape._180,0,0,90&namespaces=xmlns(sams,http://www.opengis.net/samplingSpatial/2.0),xmlns(om,http://www.opengis.net/om/2.0))

References

De la Beaujardière, J., 2002, Web Map Service Implementation Specification 1.1.1 , OGC Document # 01-068r3, Open GIS Consortium,
<http://portal.opengeospatial.org/files/?artifact_id=1081&version=1&format=pdf>