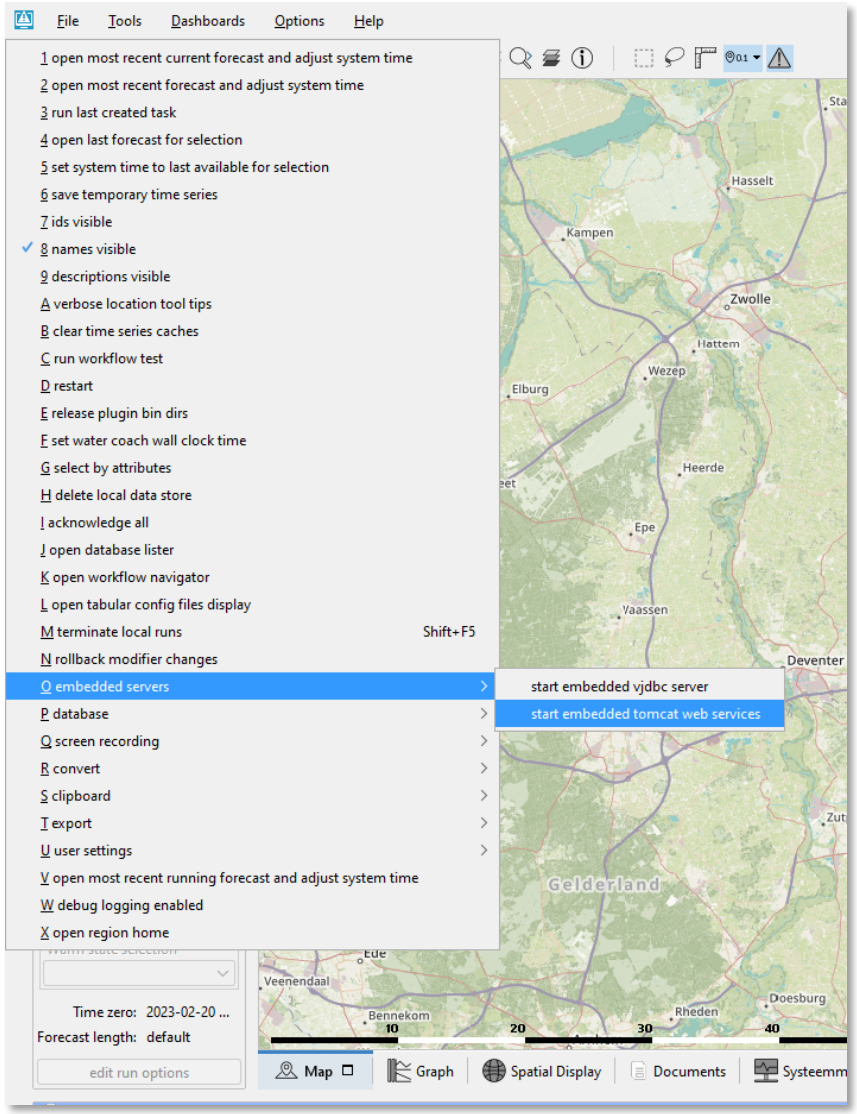
Delft-FEWS – Testing the PI Web Service locally

New features & enhancements in Delft-FEWS 2022.02

Video and voice-over by: **Gerben Boot**

Introduction

- What is a web service and why do I need it…?
- How does the FEWS web service work…?
- What types of FEWS web services are available?
- Relevant configuration files.
- Web service in action.
- Links to more information.

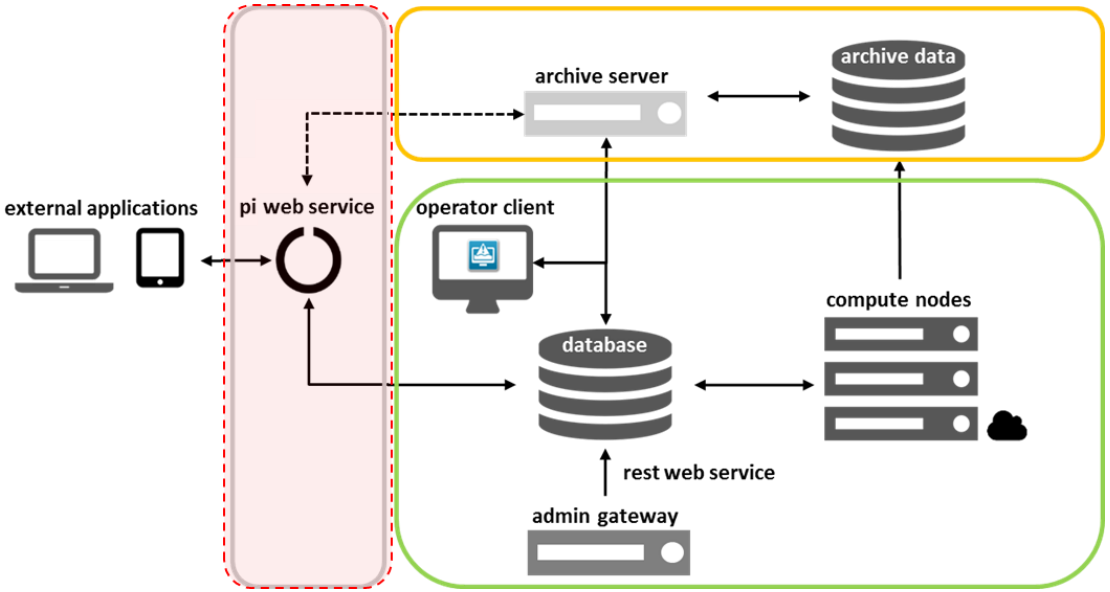


What is a web service...?

- A web service *facilitates* communication between two machines in a network.
- Computer-to-computer communication vs computer-to-human communication (GUI, keyboard).
- Delft-FEWS example: e.g. data in the central database is retrieved by an external web site.

Why do I need it…?

- The Delft-FEWS database contains numerous data of various sources; observations, historical data or forecasts but also maps and displays.
- Sometimes external (web) applications want to use this data for visualization purposes.
- The **Delft-FEWS PI Web Service** allows you to access the Delft-FEWS database using an API.
- API stands for *Application Programming Interface* and is a set of rules that allow programs to talk to each other through the internet.



How does a web service (API) work?

- In principle it is a ‘question’ & ‘reply’ game…
- In technical terms:
  - You submit a **request** to the API through a URL (will also work in your internet browser)
  - You receive a **response** from the API as **data** in a specific file format (i.e. pi-**xml** or pi-**json**)
- Example:
  - Request: http://localhost:8080/FewsWebServices/rest/fewspiservice/v1/parameters
  - Response:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<timeseriesparameters xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    <parameter id="T.obs.mean" parameterGroup="Temperature">
        <name>Observed Monthly Average Temperature</name>
        <parameterType>instantaneous</parameterType>
        <unit>oC</unit>
        <displayUnit>oC</displayUnit>
        <usesDatum>false</usesDatum>
    </parameter>
</timeseriesparameters>
```

PI-XML

```json
{
  "version" : "1.25",
  "timeSeriesParameters" : [ {
    "id" : "T.obs.mean",
    "name" : "Observed Monthly Average Temperature",
    "parameterType" : "instantaneous",
    "unit" : "oC",
    "displayUnit" : "oC",
    "usesDatum" : "false",
    "parameterGroup" : "Temperature"
  } ]
}
```

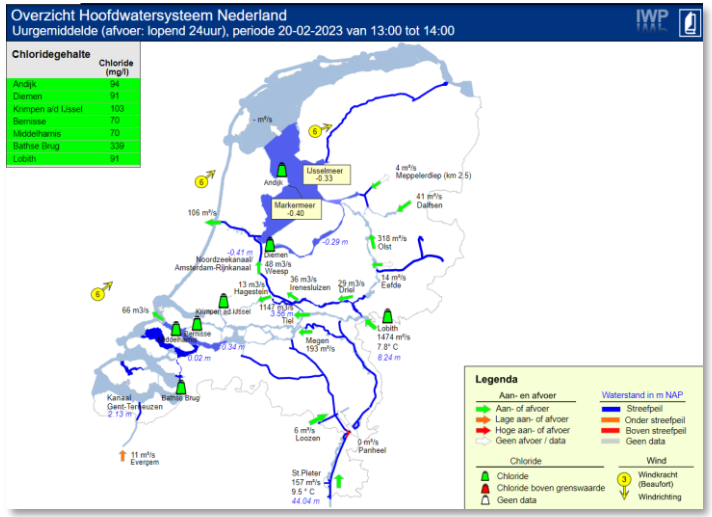
PI-JSON

Available FEWS web services…

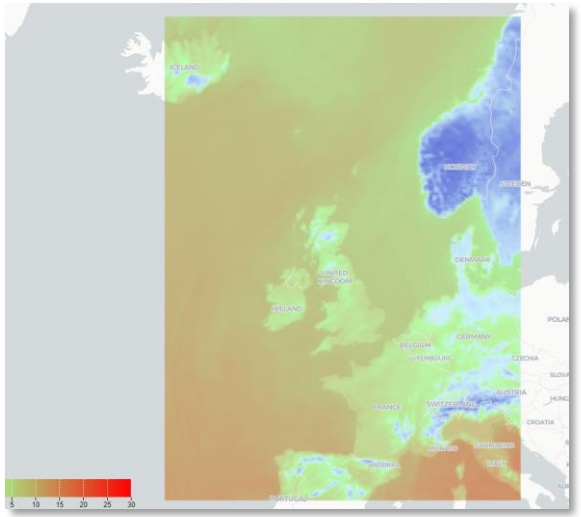
The Delft-FEWS Web Service offers **different types** of data exchange interfaces

- PI REST Web Service → querying filters, parameters, locations, **scalar timeseries**, rating curves etc.
- Web Mapping Service (WMS-T) → **gridded data**/spatial maps as images (source: Spatial Display)
- Schematic Status Display (SSD) Web Service → complete **Schematic Status Display images**
- And many more, check WIKI for a full list: 18 Data Exchange Interfaces

SSD



WMS



Relevant configuration…

Different **files** in your Delft-FEWS configuration folder are used to configure **what data is accessible** through (one of) the FEWS Webservices:

- PiServiceConfigFiles/WebServices.xml → for use in the pi web service
- RegionConfigFiles/Filters.xml → **scalar** series accessible to PI Web service
- DisplayConfigFiles/GridDisplay.xml → **gridded** series accessible to WMS service
- DisplayConfigFiles/ScadaDisplay_XXX.xml → **schematic status** displays accessible to SSD service
- IdMapFiles/IdMapping Files → map Delft-FEWS ids to something pretty

WebServices.xml

```
<?xml version="1.0" encoding="utf-8"?>
<webServices xmlns="http://www.wldelft.nl/fews" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.wldelft.nl/fews http://fews.wldelft.nl/schemas/version1.0/webServices.xsd">
    <general>
        <filters>
            <filterId>myFilterId</filterId>
        </filters>
        <testPageEnabled>true</testPageEnabled>
    </general>
</webServices>
```

Filter

Test Page

Relevant configuration…

Webservices.xml

XML

webServices

xmlns	http://www.wldelft.nl/fews
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance
xsi:schemaLoca...	http://www.wldelft.nl/fews http://fews.wldelft.nl/schemas/version1.0/webSe

general

filters

filterId	webservice
exportFlagConv...	export_flagconversions_id
exportUnitConv...	export_unitconversions_id
importUnitConv...	import_unitconversions_id
exportIdmapId	IdExport_UMAquo
importIdmapId	IdExport_UMAquo
missingValue	-999
omitMissingVal...	false
readonlyMode	false
testPageEnabled	true

wmsService

wmsAllowedGridPlotGroupIds

gridPlotGroupId	ECMWF

timeseries

spatial data

Filters.xml

XML

filters

version	1.1
xmlns	http://www.wldelft.nl/fews
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance
xsi:schemaLoca...	http://www.wldelft.nl/fews https://fewsdocs.deltares.nl/schemas/version1.0/filters.xsd
Comment	These are the actual filters
defaultFilterId	OverzichtWaterstanden

filter (4)

	id	name	viewPermission	child
1	Overzichten	Overzichten		child (2)
2	Metingen	Meetlocaties		child (5)
3	Deelgebieden	Deelgebieden		child (1)
4	webservice	webservice	administration	child (4)

child (4)

	foreignKey
1	Overzichten
2	Metingen
3	Deelgebieden
4	SystemMetrics

Comment	The sub filters

filter (18)

GridDisplay.xml

XML

gridDisplay

xmlns	http://www.wldelft.nl/fews
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance
xsi:schemaLoca...	http://www.wldelft.nl/fews https://fewsdocs.deltares.nl/schemas/version1.0/gridDisplay.xsd
title	Regge Radar display
exportShapeIdF...	@ID@

defaults (3)

gridPlotGroup (6)

	id	name	gridPlot	gridPlotGroup
1	IRC		gridPlot (14)	
2	Gemeenten	Gemeenten	gridPlot (19)	
3	Harmonie-Arome		gridPlot (4)	
4	ECMWF	ECMWF		gridPlotGroup (2)
5	Deelgebieden			gridPlotGroup (2)
6	Overige kaarten		gridPlot (8)	

gridPlotGroup (2)

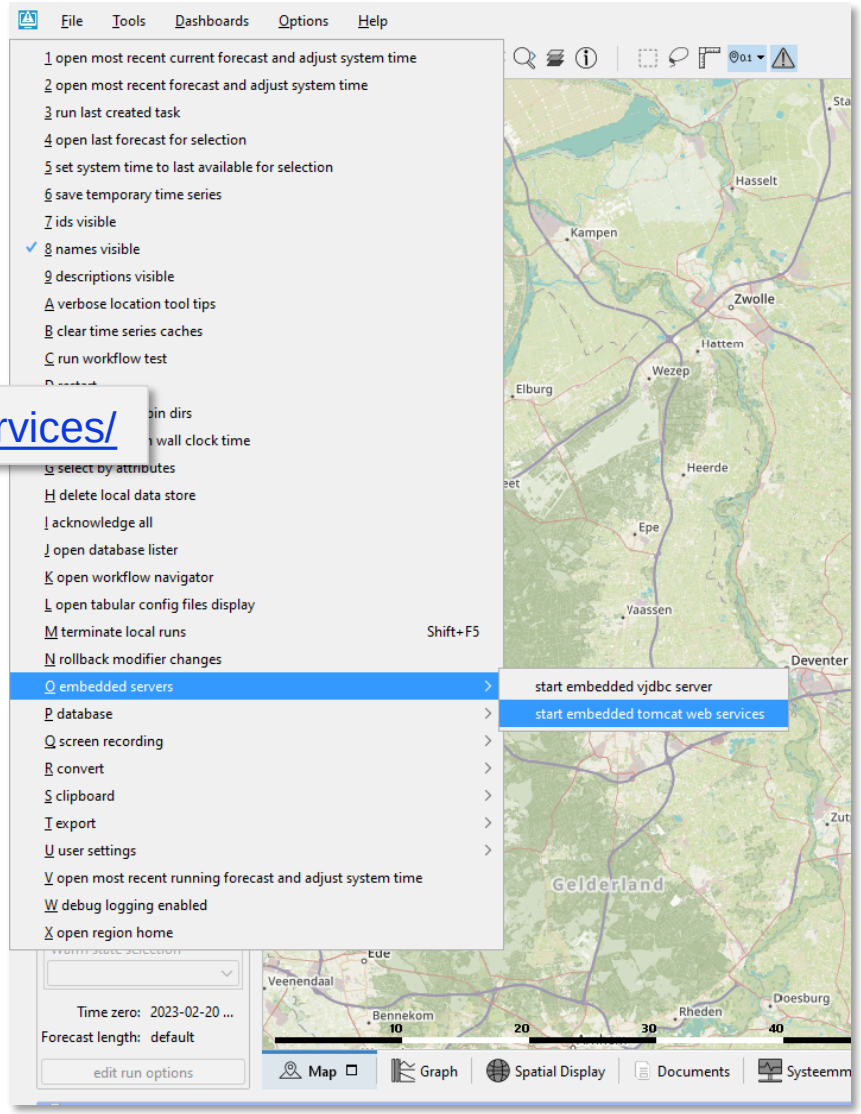
	id	name	gridPlot
1	ECMWF_hres	ECMWF (hres)	gridPlot (3)
2	ECMWF_hres_bc	ECMWF (hres-bc)	gridPlot (3)

FEWS PI Web service in action…

- New Feature in 2022.02 – starting the (embedded) web service on your Stand Alone
  - <F12> + O → **start embedded tomcat web service**
- From the log panel

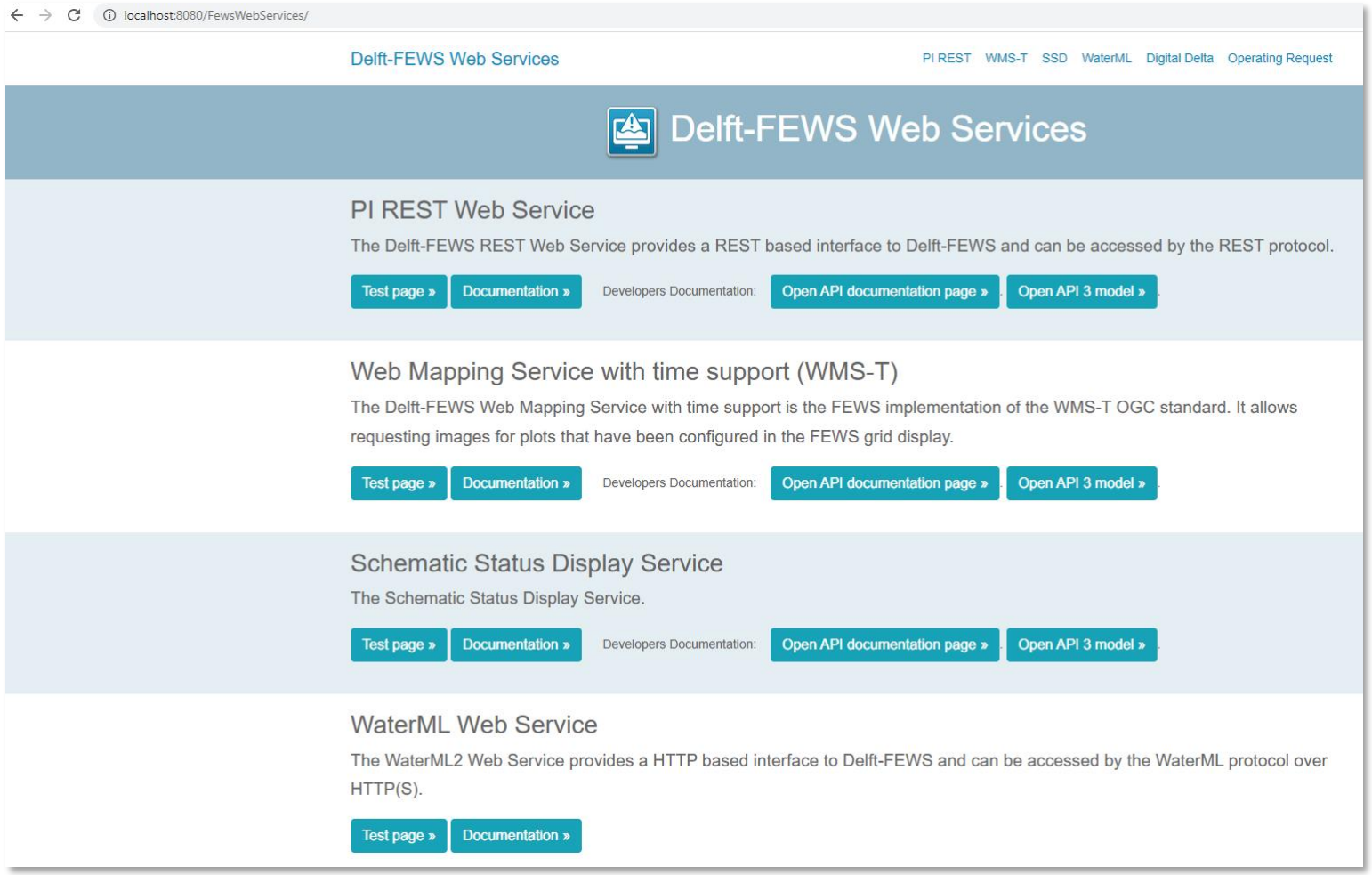
INFO - Started FewsWebServices: http://localhost:8080/FewsWebServices/

- Opening the Test page in your browser
- Submit requests AND get responses

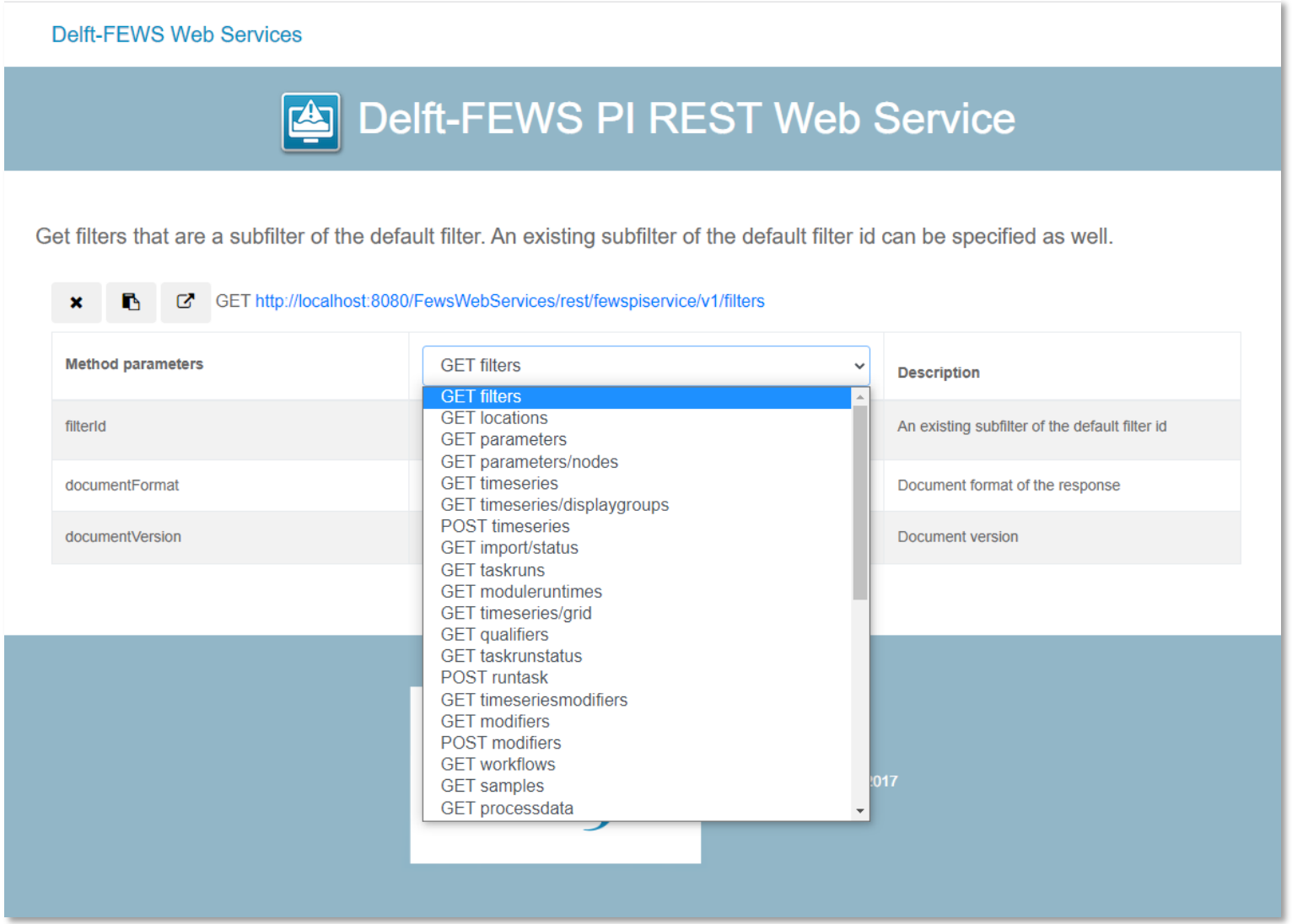


FEWS PI Web service test page

- Web page for testing **requests** and preview & understand the **responses.**

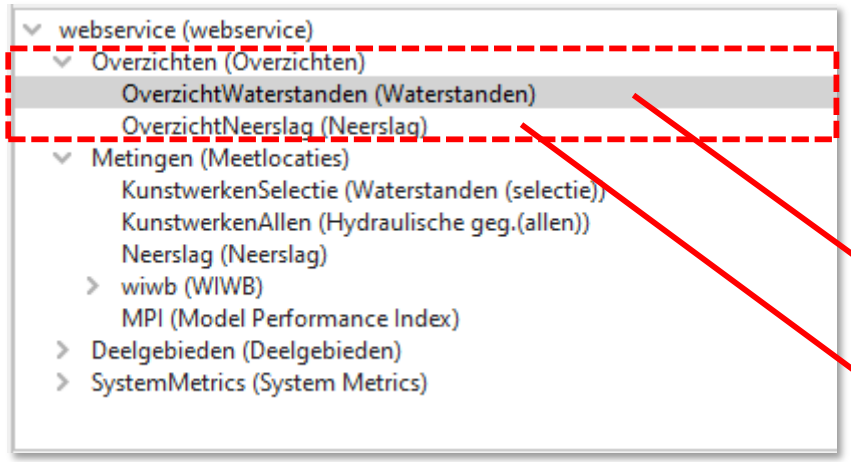


FEWS PI Web service test page: REST Web Service

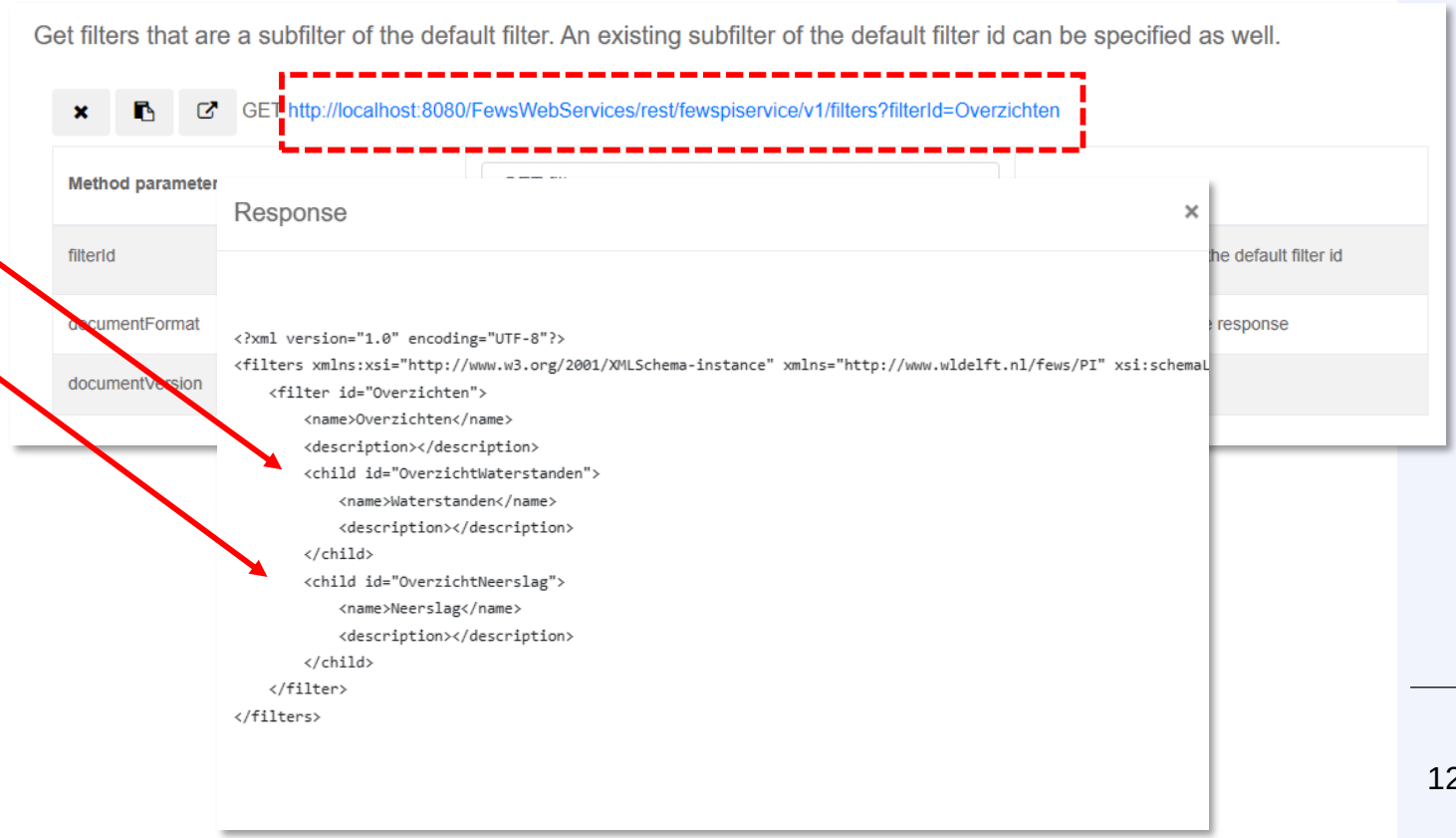


Testpage: Request AND Response

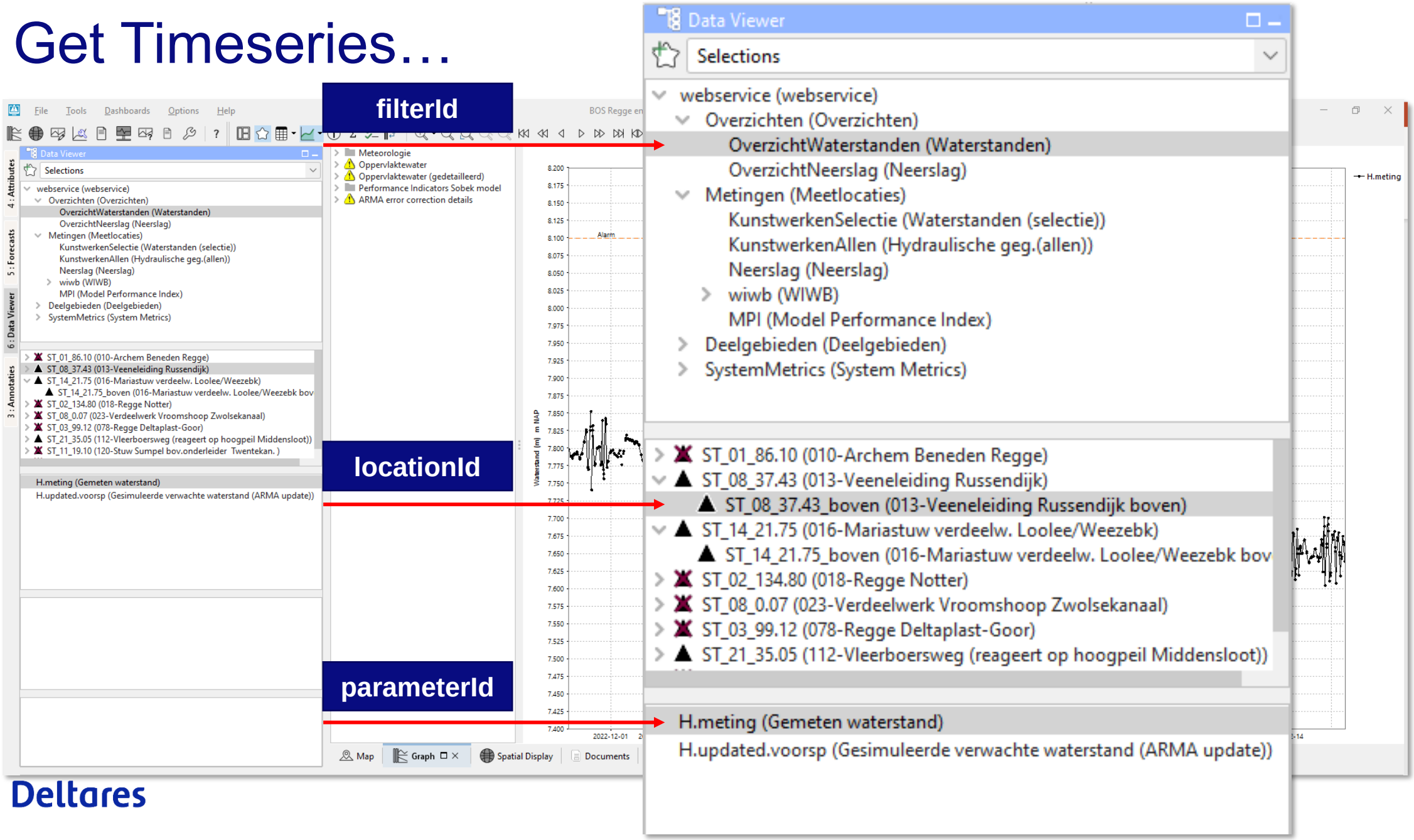
Via the GUI



Via the Webservice



Get Timeseries…



Delft-FEWS Web Services

Delft-FEWS PI REST Web Service

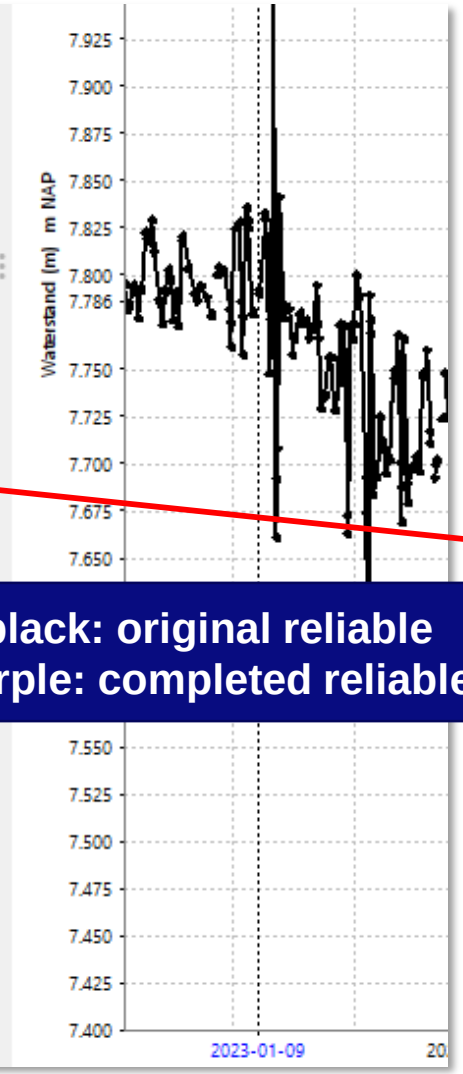
Get timeseries that are part of the default filter.

GET http://localhost:8080/FewsWebServices/rest/fewspiservice/v1/timeseries?filterId=OverzichtWaterstanden&locationIds=ST_08_37.43_boven&parameterIds=H.meting&startTime=2023-01-09T00%3A00%3A00Z&endTime=2023-01-10T00%3A00%3A00Z

Method parameters	GET timeseries	Description
filterId	OverzichtWaterstanden	An existing subfilter of the default filter id
locationIds	ST_08_37.43_boven	One or more location ids
parameterIds	H.meting	One or more parameter ids
moduleInstanceIds	moduleinstanceid1[;moduleinstanceid2;...;moduleinstanceidn]	One or more module instance ids
qualifierIds	qualifierId1[;qualifierId2;...;qualifierIdn]	One or more qualifier ids. Subset of qualifiers for which to retrieve time series. All time series that have any of the specified qualifierIds will be returned. To indicate that no qualifier is available, use qualifierIds: "none"
taskRunIds	taskRunId1[;taskRunId2;...;taskRunIdn]	One or more taskRunIds
startTime	2023-01-09T00:00:00Z	Start time of search period that looks for timeseries values that are within this period. If the startTime doesn't match a timestamp of the time series, the closest timestamp before the startTime, will also be returned. Format: yyyy-MM-ddTHH:mm:ssZ. Take note that if no startTime is specified, the start time of the requested period will be set to the current time minus one day.
endTime	2023-01-10T00:00:00Z	End time of search period that looks for timeseries values that are within this period. If the endTime doesn't match a timestamp of the time series, the closest timestamp after the endTime, will also be returned. Format: yyyy-MM-

Deltares

2023-01-08 20:00	7.779
2023-01-08 20:20	7.779
2023-01-08 20:40	7.780
2023-01-08 21:00	7.780
2023-01-08 21:20	
2023-01-08 21:40	
2023-01-08 22:00	
2023-01-08 22:20	
2023-01-08 22:40	
2023-01-08 23:00	7.781
2023-01-08 23:20	7.781
2023-01-08 23:40	7.780
2023-01-09 00:00	7.780
2023-01-09 00:20	7.782
2023-01-09 00:40	7.784
2023-01-09 01:00	7.786
2023-01-09 01:20	7.786
2023-01-09 01:40	7.786
2023-01-09 02:00	7.786
2023-01-09 02:20	7.788
2023-01-09 02:40	7.790
2023-01-09 03:00	7.792
2023-01-09 03:20	7.792
2023-01-09 03:40	7.793
2023-01-09 04:00	7.793
2023-01-09 04:20	7.795
2023-01-09 04:40	7.797
2023-01-09 05:00	7.799
2023-01-09 05:20	7.802
2023-01-09 05:40	7.805
2023-01-09 06:00	7.808
2023-01-09 06:20	7.812
2023-01-09 06:40	7.817
2023-01-09 07:00	7.821



black: original reliable
purple: completed reliable

Response

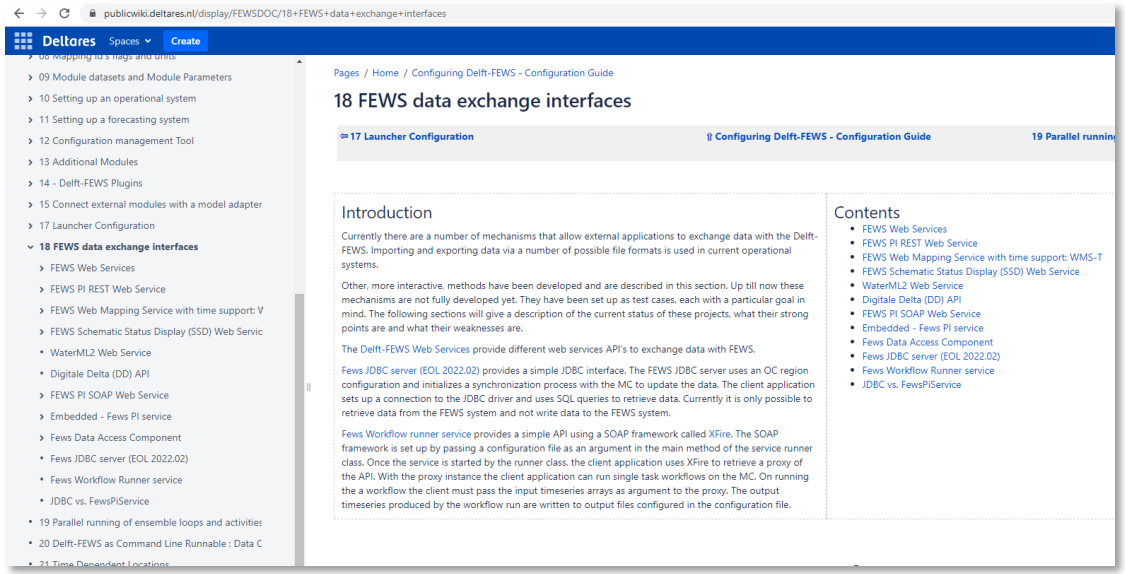
```
<qualifierId>NAP</qualifierId>
<qualifierId>WATHTE</qualifierId>
<qualifierId>OW</qualifierId>
<qualifierId>Waterhoogte [m] [NAP] [OW]</qualifierId>
<timeStep unit="second" multiplier="1200"/>
<startDate date="2023-01-09" time="00:00:00"/>
<endDate date="2023-01-10" time="00:00:00"/>
<missVal>-999.0</missVal>
<stationName>013-Veeneleiding Russendijk boven</stationName>
<lat>52.41900477867649</lat>
<lon>6.574805170945151</lon>
<x>235788.929</x>
<y>493017.363</y>
<units>m</units>
</header>
<event date="2023-01-09" time="00:00:00" value="7.786" flag="0"/>
<event date="2023-01-09" time="00:20:00" value="7.786" flag="2"/>
<event date="2023-01-09" time="00:40:00" value="7.786" flag="2"/>
<event date="2023-01-09" time="01:00:00" value="7.786" flag="0"/>
<event date="2023-01-09" time="01:20:00" value="7.788" flag="2"/>
<event date="2023-01-09" time="01:40:00" value="7.79" flag="2"/>
<event date="2023-01-09" time="02:00:00" value="7.792" flag="0"/>
<event date="2023-01-09" time="02:20:00" value="7.792" flag="2"/>
<event date="2023-01-09" time="02:40:00" value="7.793" flag="2"/>
<event date="2023-01-09" time="03:00:00" value="7.793" flag="0"/>
<event date="2023-01-09" time="03:20:00" value="7.795" flag="2"/>
```

Close

Deltares

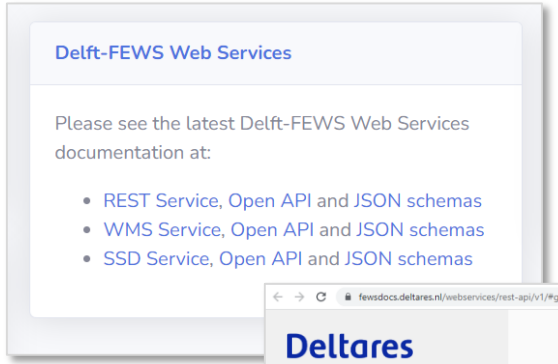
Links to more info (WIKI and FEWSDOCS)

Everything about the FEWS Web Services

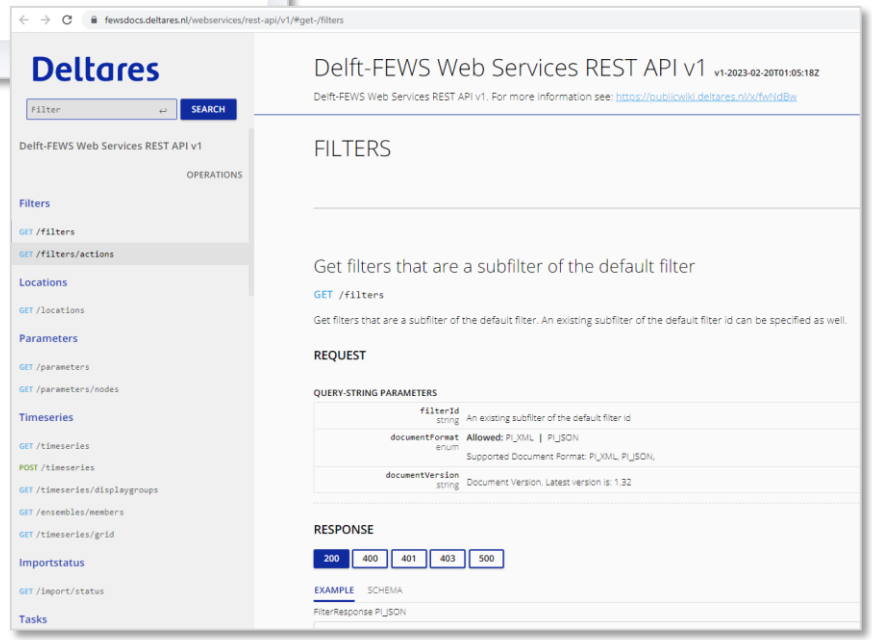


https://publicwiki.deltares.nl/display/FEWSDOC/18+FEWS+data+exchange+interfaces

Technical (OpenAPI formatted) documentation



https://fewsdocs.deltares.nl/



https://fewsdocs.deltares.nl/webservices/rest-api/v1/#get-/filters

Contact

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