

Delft-FEWS – Testing the PI Web Service locally

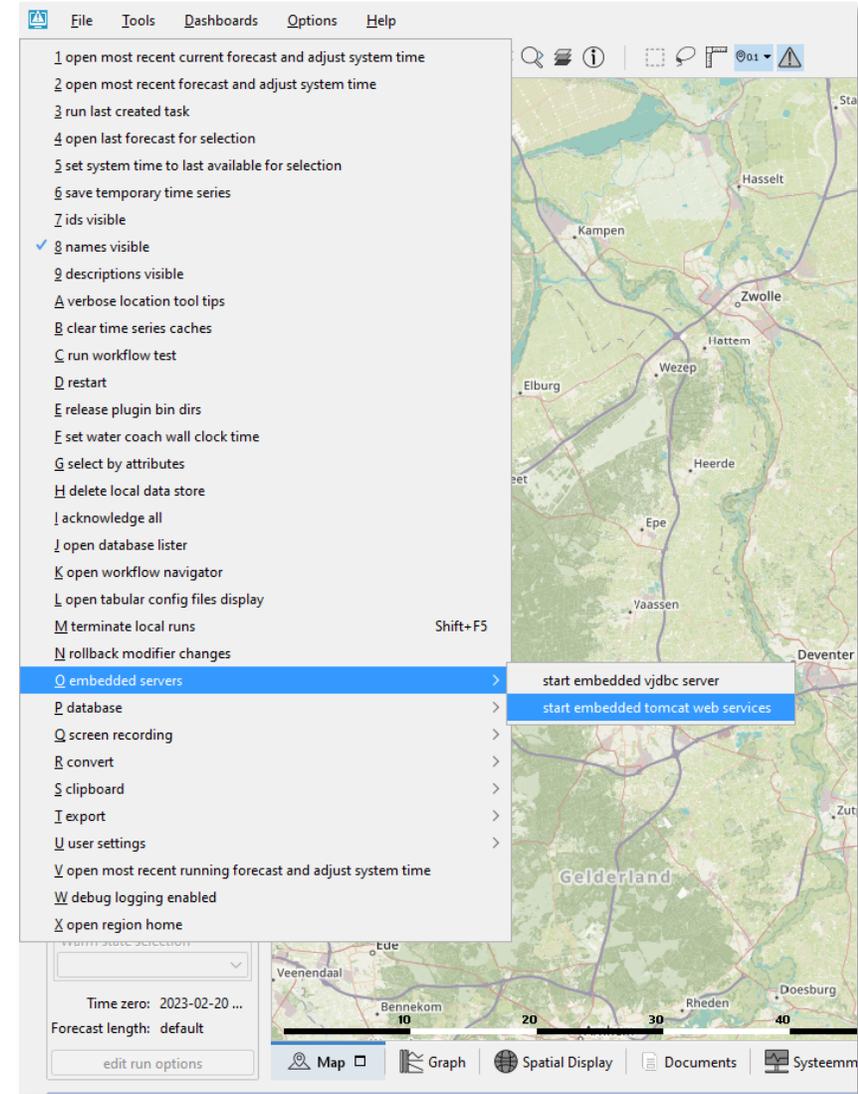
New features & enhancements in Delft-FEWS 2022.02

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



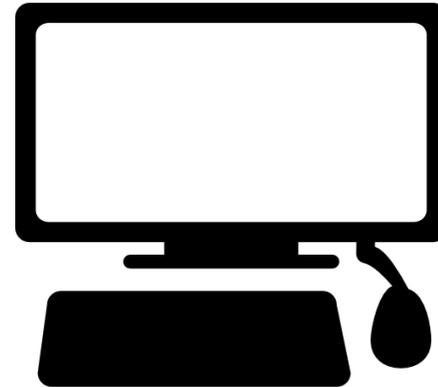
Introduction

- 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.



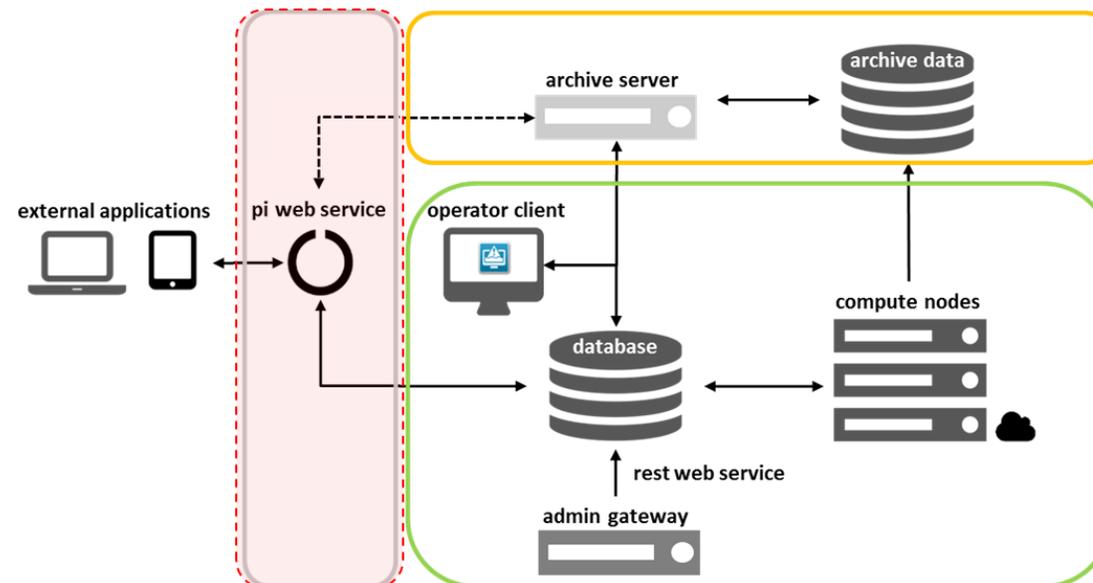
What is a web service...?

- 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 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

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

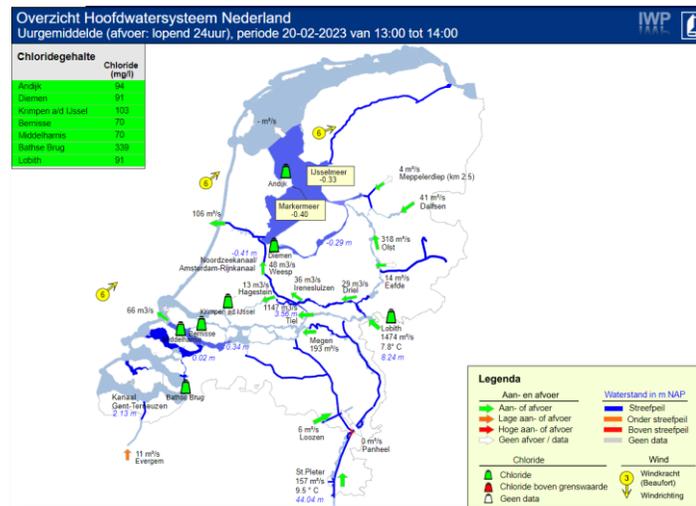
PI-JSON

Available FEWS web services...

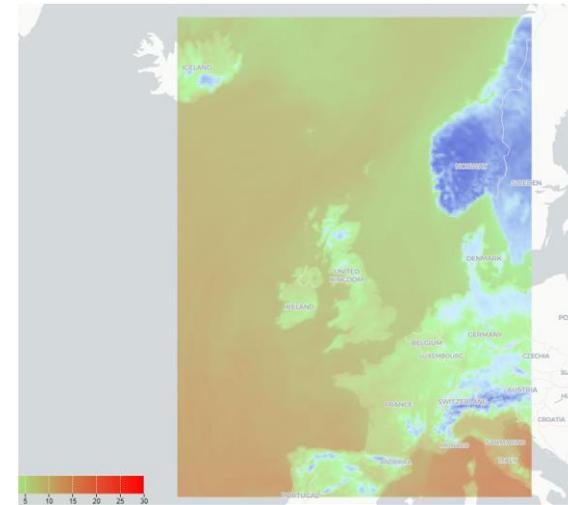
The Delft-FEWS Web Service offers **different types** of data exchange interfaces

- 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

The screenshot shows the configuration for webServices. The **general** section includes various filters and conversion settings. The **wmsService** section includes **wmsAllowedGridPlotGroupIds** with the value **ECMWF**.

timeseries

Filters.xml

The screenshot shows the configuration for filters. A table lists the filters:

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

The **webservice** filter (id 4) is highlighted in blue. A red arrow points from this filter to the **timeseries** label in the Webservices.xml section.

spatial data

The screenshot shows the configuration for gridDisplay. A table lists the gridPlotGroups:

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

The **ECMWF** gridPlotGroup (id 4) is highlighted in blue. A red arrow points from this group to the **spatial data** label in the Webservices.xml section.

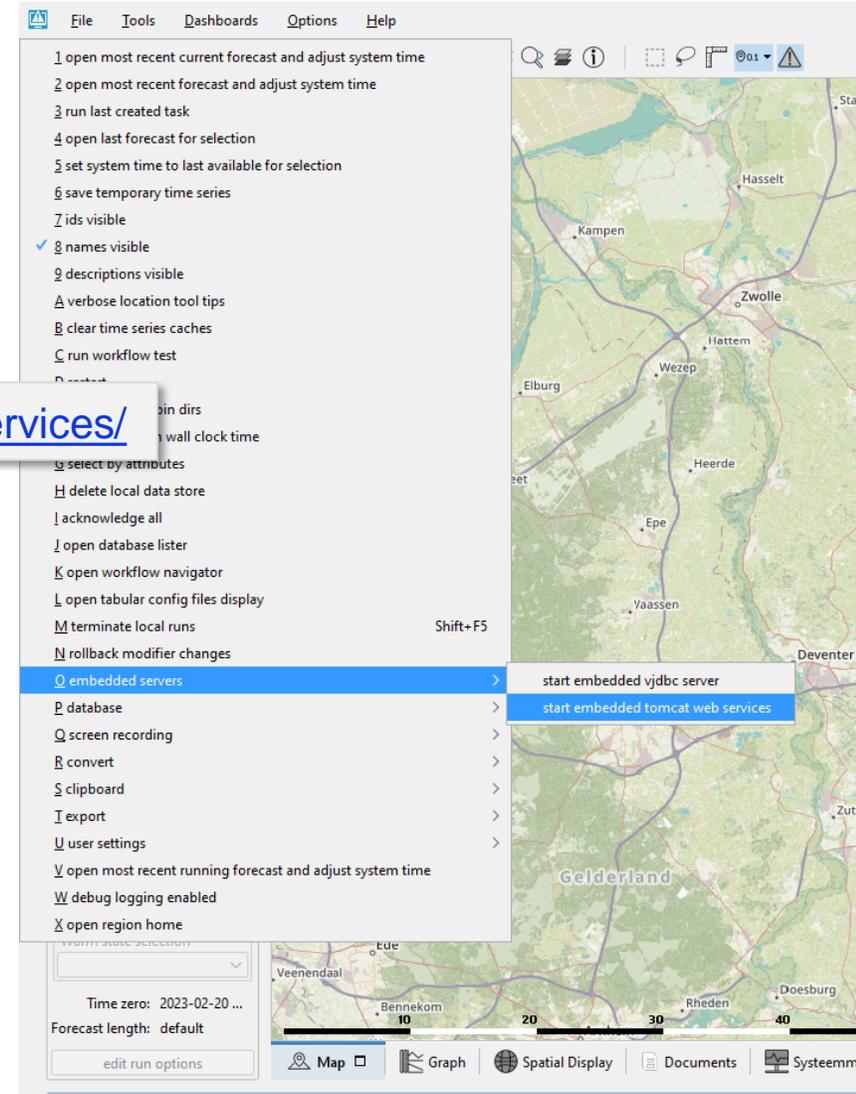
GridDisplay.xml

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**.

The screenshot shows a web browser window with the URL `localhost:8080/FewsWebServices/`. The page header includes 'Delft-FEWS Web Services' and navigation links for 'PI REST', 'WMS-T', 'SSD', 'WaterML', 'Digital Delta', and 'Operating Request'. The main content area features a blue header with the Delft-FEWS logo and title. Below this, four service cards are displayed, each with a title, a brief description, and a set of action buttons. The 'PI REST Web Service' card includes buttons for 'Test page', 'Documentation', 'Open API documentation page', and 'Open API 3 model'. The 'Web Mapping Service with time support (WMS-T)' card includes buttons for 'Test page', 'Documentation', 'Open API documentation page', and 'Open API 3 model'. The 'Schematic Status Display Service' card includes buttons for 'Test page', 'Documentation', 'Open API documentation page', and 'Open API 3 model'. The 'WaterML Web Service' card includes buttons for 'Test page' and 'Documentation'.

FEWS PI Web service test page: REST Web Service

Delft-FEWS Web Services

Delft-FEWS PI REST Web Service

Get filters that are a subfilter of the default filter. An existing subfilter of the default filter id can be specified as well.

   GET <http://localhost:8080/FewsWebServices/rest/fewspiservice/v1/filters>

Method parameters		Description
filterId	GET filters	An existing subfilter of the default filter id
documentFormat	GET filters	Document format of the response
documentVersion	GET locations	Document version

- GET filters
- GET filters
- GET locations
- GET parameters
- GET parameters/nodes
- GET timeseries
- GET timeseries/displaygroups
- POST timeseries
- GET import/status
- GET taskruns
- GET moduleruntimes
- GET timeseries/grid
- GET qualifiers
- GET taskrunstatus
- POST runtask
- GET timeseriesmodifiers
- GET modifiers
- POST modifiers
- GET workflows
- GET samples
- GET processdata

Testpage: Request AND Response

Via the GUI



Via the Webservice

Get filters that are a subfilter of the default filter. An existing subfilter of the default filter id can be specified as well.

GET <http://localhost:8080/FewsWebServices/rest/fewspiservice/v1/filters?filterId=Overzichten>

Method parameter

filterid	
documentFormat	
documentVersion	

Response

```
<?xml version="1.0" encoding="UTF-8"?>
<filters xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.wldelft.nl/fews/PI" xsi:schemaLocation="http://www.wldelft.nl/fews/PI http://www.wldelft.nl/fews/PI">
  <filter id="Overzichten">
    <name>Overzichten</name>
    <description></description>
    <child id="OverzichtWaterstanden">
      <name>Waterstanden</name>
      <description></description>
    </child>
    <child id="OverzichtNeerslag">
      <name>Neerslag</name>
      <description></description>
    </child>
  </filter>
</filters>
```

Get Timeseries...

The screenshot displays the 'Data Viewer' application interface. On the left, a tree view shows the hierarchy of data sources. A central plot shows a time-series of water level data (Waterstand [m] in MAP) with an 'Alarm' threshold line. On the right, a 'Data Viewer' window shows a detailed view of the selected data sources. Three blue callout boxes with red arrows point to specific elements in the interface:

- filterId**: Points to the 'OverzichtWaterstanden (Waterstanden)' folder in the tree view.
- locationId**: Points to the 'ST_08_37.43_boven (013-Veeneleiding Russendijk boven)' data source in the detailed view.
- parameterId**: Points to the 'H.meting (Gemeten waterstand)' data source in the detailed view.

The detailed view on the right shows the following data sources:

- webservice (webservice)
 - Overzichten (Overzichten)
 - OverzichtWaterstanden (Waterstanden)
 - OverzichtNeerslag (Neerslag)
 - Metingen (Meetlocaties)
 - KunstwerkenSelectie (Waterstanden (selectie))
 - KunstwerkenAllen (Hydraulische geg.(allen))
 - Neerslag (Neerslag)
 - wiwb (WIWB)
 - MPI (Model Performance Index)
 - Deelgebieden (Deelgebieden)
 - SystemMetrics (System Metrics)
- ST_01_86.10 (010-Archem Beneden Regge)
- ST_08_37.43 (013-Veeneleiding Russendijk)
 - ST_08_37.43_boven (013-Veeneleiding Russendijk boven)
- ST_14_21.75 (016-Mariastuw verdeelw. Loolee/Weezbk)
 - ST_14_21.75_boven (016-Mariastuw verdeelw. Loolee/Weezbk bov)
- ST_02_134.80 (018-Regge Notter)
- ST_08_0.07 (023-Verdeelwerk Vroomshoop Zwolsekanaal)
- ST_03_99.12 (078-Regge Deltaplast-Goor)
- ST_21_35.05 (112-Vleerboersweg (reageert op hoogpeil Middensloot))
- ST_11_19.10 (120-Stuw Sumpel bov.onderleider Twentekan.)

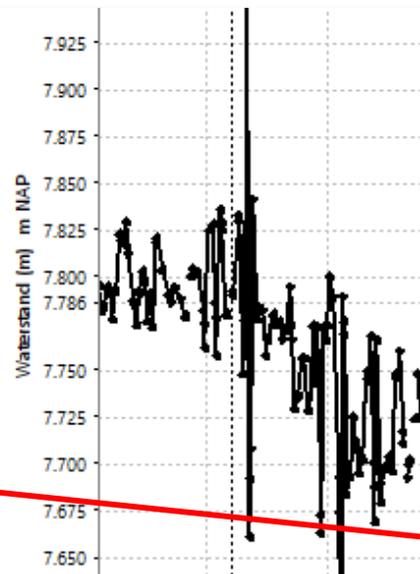


Get timeseries that are part of the default filter.

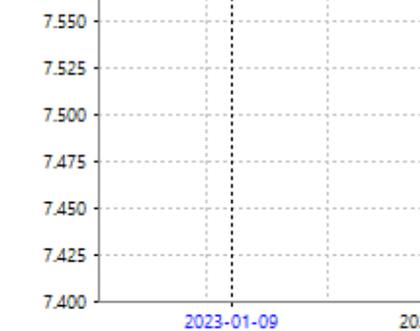
GET http://localhost:8080/FewsWebServices/rest/fewspiservice/v1/timeseries?filterId=OverzichtWaterstanden&locationIds=ST_08_37.43_boven¶meterIds=H.meting&startTime=2023-01-09T00%3A00%3A00Z&endTime=2023-01-10T00%3A00%3A00Z

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-

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

```

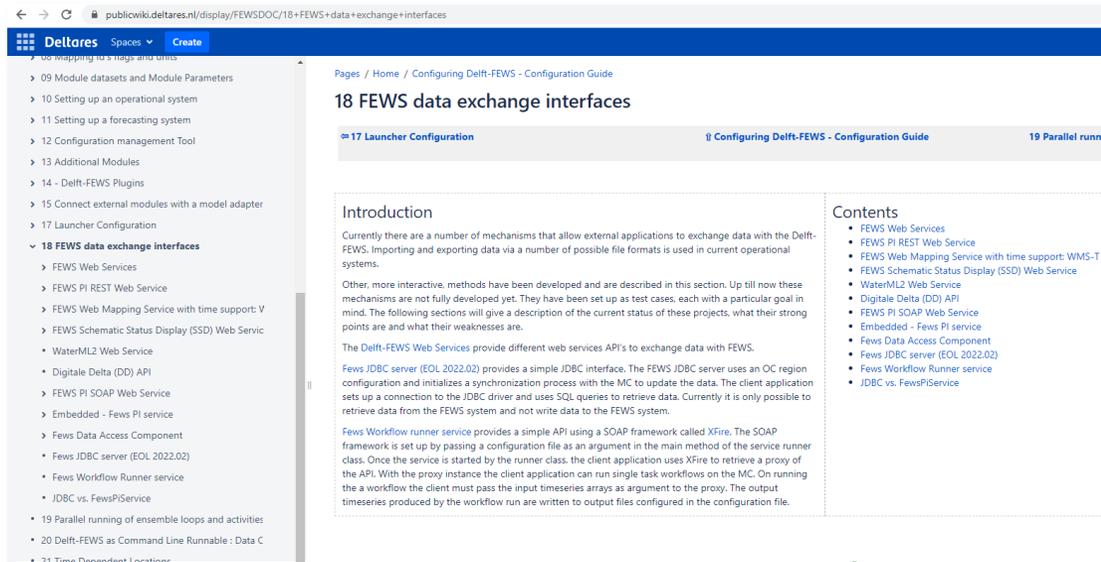
<qualifierId>NAP</qualifierId>
<qualifierId>WATHTE</qualifierId>
<qualifierId>OW</qualifierId>
<qualifierId>Waterhoogte [m] [NAP] [OW]</qualifierId>
<timeStep unit="second" multiplier="1200"/>
<startDate date="2023-01-09" time="00:00:00"/>
<endDate date="2023-01-10" time="00:00:00"/>
<missVal>-999.0</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"/>
<event date="2023-01-09" time="03:40:00" value="7.797" flag="2"/>

```

Close

Links to more info (WIKI and FEWSDOCS)

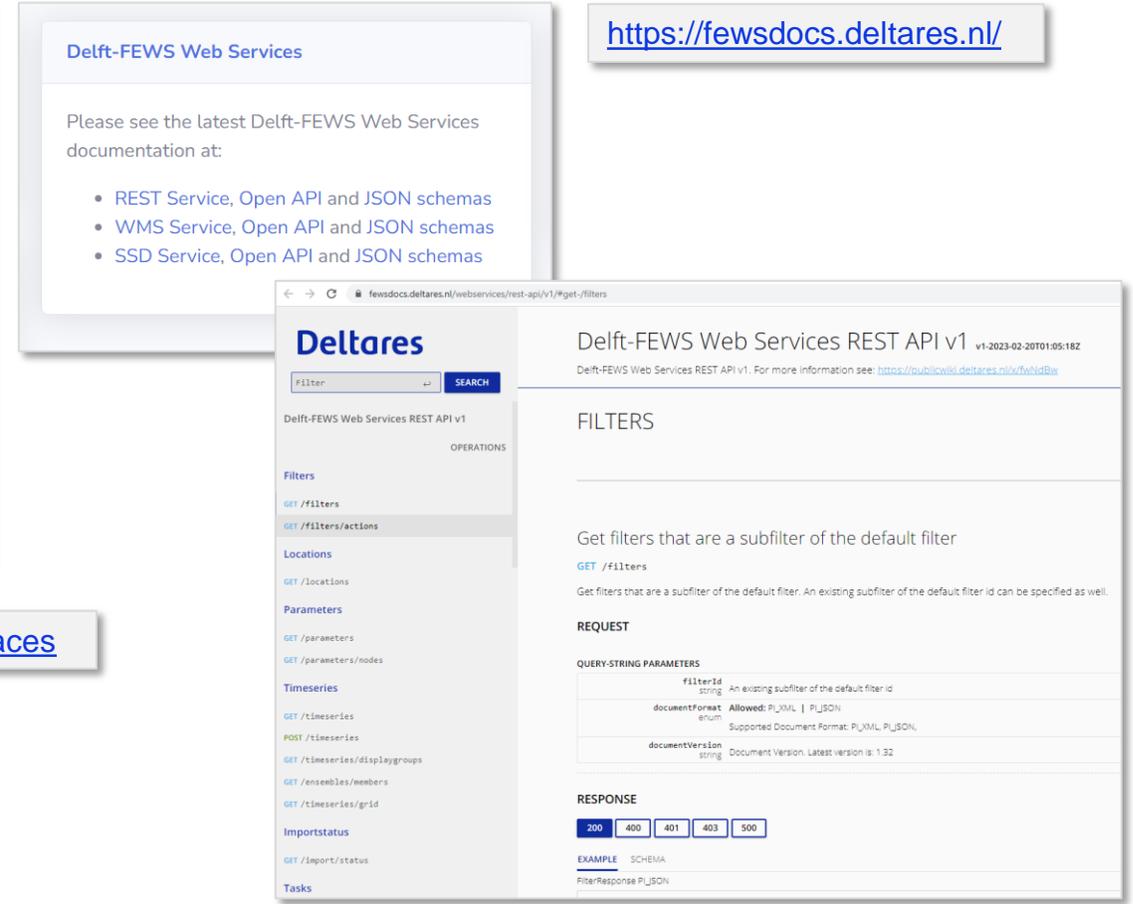
Everything about the FEWS Web Services



The screenshot shows a Wiki page with a navigation sidebar on the left containing various menu items like '09 Module datasets and Module Parameters' and '18 FEWS data exchange interfaces'. The main content area is titled '18 FEWS data exchange interfaces' and includes an 'Introduction' section with text about data exchange mechanisms and a 'Contents' table of contents listing various services like 'FEWS Web Services', 'FEWS PI REST Web Service', and 'FEWS Web Mapping Service'.

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

Technical (OpenAPI formatted) documentation



This block contains two screenshots of technical documentation. The top screenshot is a landing page titled 'Delt-FEWS Web Services' with a URL <https://fewsdocs.deltares.nl/> and a list of services: REST Service, WMS Service, and SSD Service, each with Open API and JSON schemas. The bottom screenshot shows the OpenAPI specification for 'Delt-FEWS Web Services REST API v1', including a search bar, a table of endpoints (Filters, Locations, Parameters, Timeseries, Importstatus, Tasks), and a detailed view of the 'GET /filters' endpoint with its request parameters and response schema.

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

Contact

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