

Deltares

Delft-FEWS AnwenderTreffen

New Features

Highlights 2022.02 and 2023.01

Delft-FEWS Product Management

June 2023

Introduction...

- Welcome
- Highlights in 2022.02
- What's new in 2023.01?
- Outlook to 2023.02

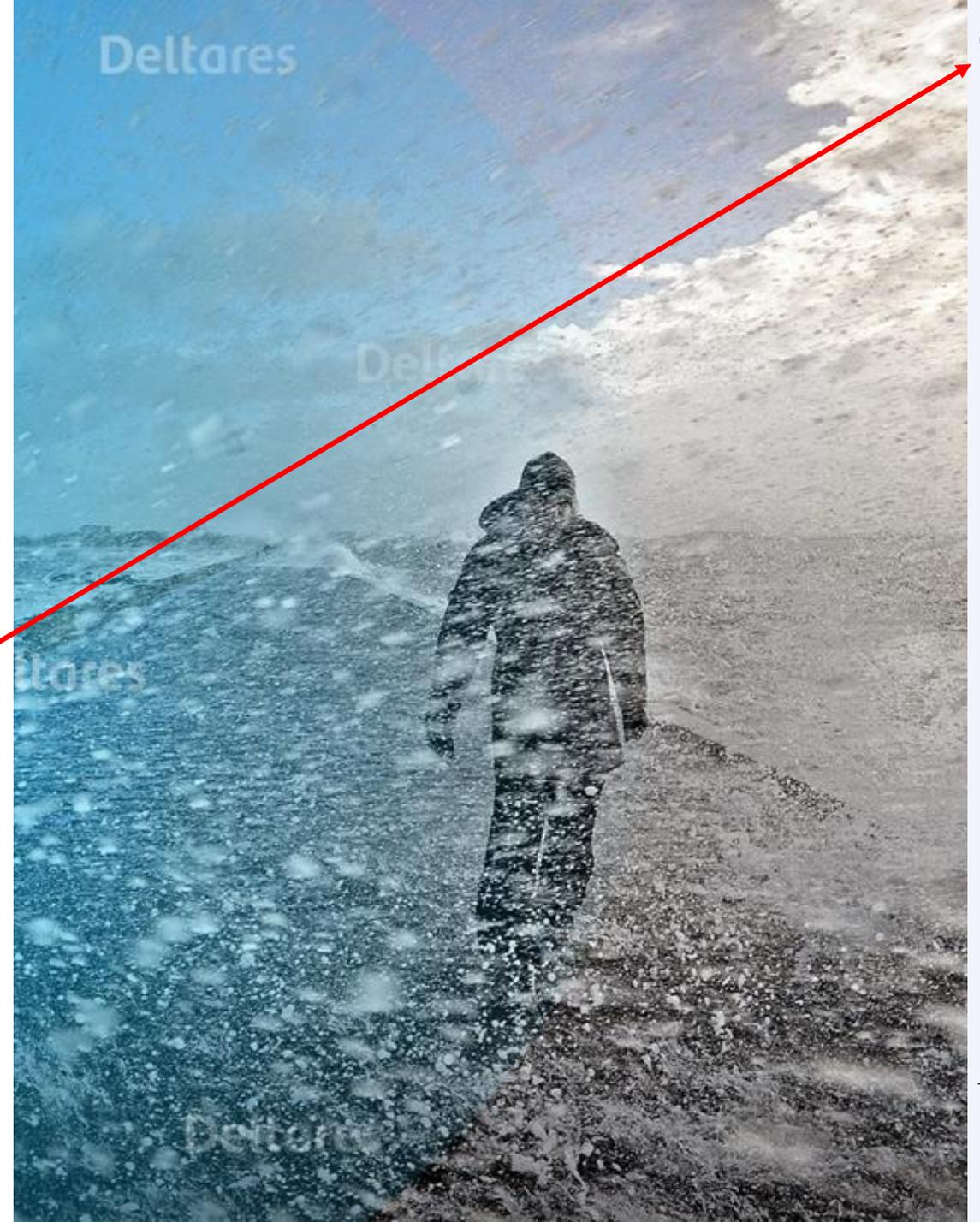
As usual: [Links for more info](#)

Links to WIKI
or other URL's

Link to WIKI
(module, display)

 try it out...

Deltares





Delft-FEWS 2022.02 Benchmarks



±120 new features



211 bugs reported/**202** fixed (release date)



7 new import modules



10 new features in FEWS-webservices



5 improvements to the admin interface



10 new features in timeseries display



Web OC components testable on OC/SA



Graphical editing & Scatterplot improvements



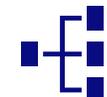
4 new export modules



8 improvements to the open archive



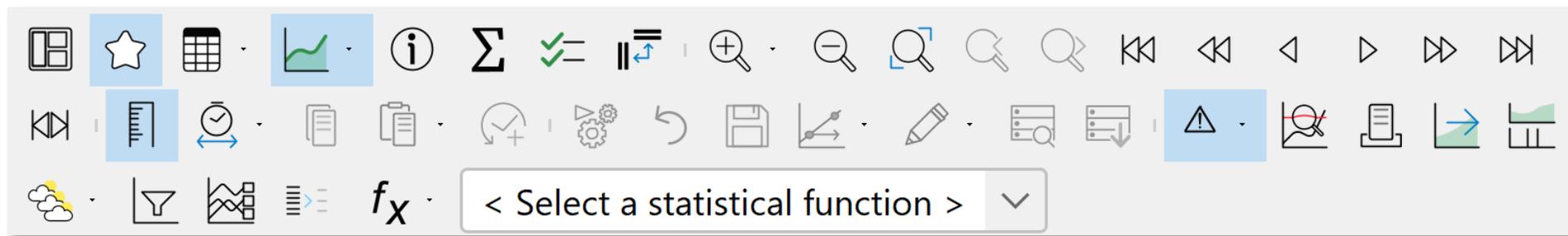
600+ new (scalable) icons in the GUI



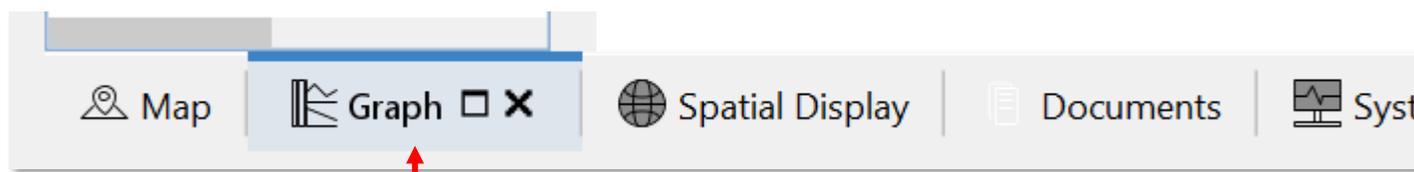
numerous improvements to What-if functionality

GUI improvements

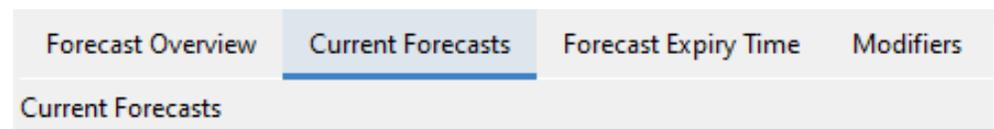
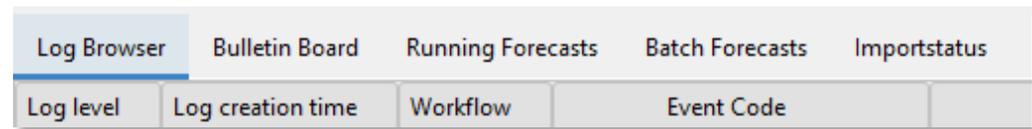
- New icons
 - **500-600** icons replaced
 - All **SVG**-based → scalable without losing quality (4K monitors)



- GUI **scalable** to 300% (was: 200%)
- **Selected tab** indication (main displays) now consistent with selected tab within multi-tab displays



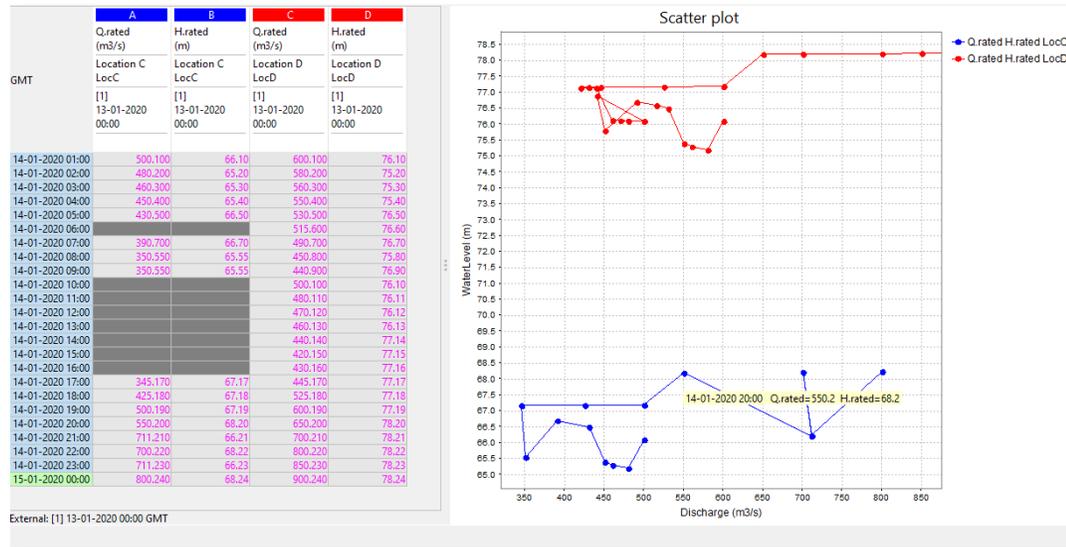
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Display improvements

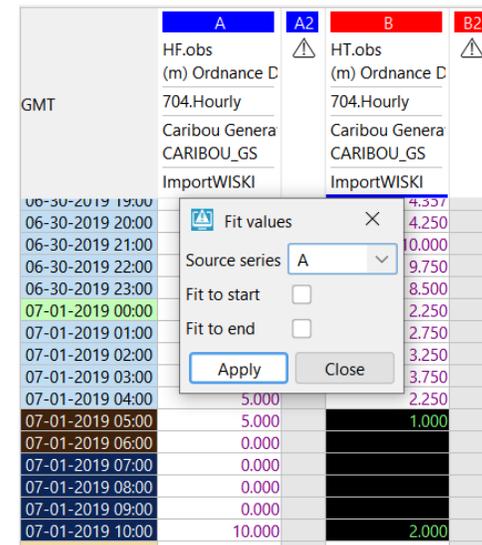
? Scatterplot

- Autoscale to available data
- Table shows full information (values and header)
- Tooltip



? Graphical Editing

- New function in data editor to enable user to fit values from one time series into another
- Selecting "fit to start" and/or "fit to end" data from the source series will be linearly transformed to be equal to the start and/or end of the selected part of the target time series



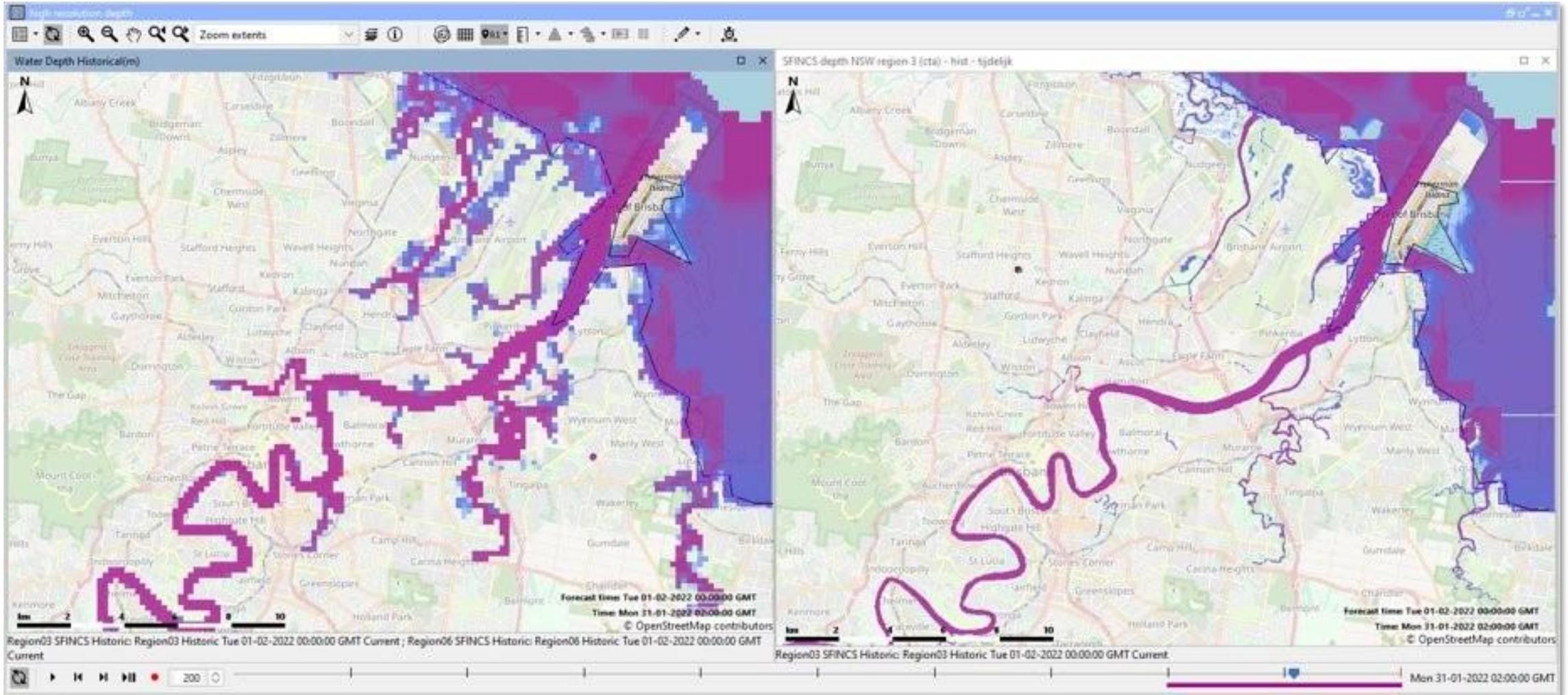
Grid transformations (for e.g. supporting flood inundation calculations)

- **GridToPolygons** transformation supports now **DEM*/CTA* layers**
- The grid is first converted to a **high resolution grid** based on the resolution of the DEM/CTA layer.
- Then it is converted to a time series of polygons
- Warning: **high memory setting** of several GBs is required to perform the transformation in most cases.

```
<transformation id="gridToPolygon">
  <interpolationSpatial>
    <gridToPolygons>
      <inputVariable>
        <timeSeriesSet>
          <moduleInstanceId>SpatialInterpolationGridToPolygonsCtaTest</moduleInstanceId>
          <valueType>grid</valueType>
          <parameterId>T.historical</parameterId>
          <locationId>ECMWF</locationId>
          <timeSeriesType>external historical</timeSeriesType>
          <timeStep unit="day"/>
          <relativeViewPeriod unit="day" start="0" end="0"/>
          <readWriteMode>add originals</readWriteMode>
        </timeSeriesSet>
      </inputVariable>
      <polygonValue>7</polygonValue>
      <polygonValue>8</polygonValue>
      <polygonValue>9</polygonValue>
      <areaOfInterestLocationId>triangle</areaOfInterestLocationId>
      <localDatumCoverageTileArchiveFile>dem.cta</localDatumCoverageTileArchiveFile>
      <zoomLevel>5</zoomLevel>
    </outputVariable>
    <timeSeriesSet>
      <moduleInstanceId>SpatialInterpolationGridToPolygonsCtaTest</moduleInstanceId>
      <valueType>polygon</valueType>
      <parameterId>T.historical</parameterId>
      <locationId>polygonLocation2</locationId>
      <timeSeriesType>external historical</timeSeriesType>
      <timeStep unit="day"/>
      <relativeViewPeriod unit="day" start="0" end="10"/>
      <readWriteMode>add originals</readWriteMode>
    </timeSeriesSet>
  </outputVariable>
</gridToPolygons>
</interpolationSpatial>
</transformation>
</transformationModule>
```

* DEM: Digital Elevation Model
CTA: Coverage Tile Archive

Grid transformations (for e.g. supporting flood inundation calculations)





Open Archive

The screenshot shows the HyFS-SA (FEWS-2021.01-1.0.0) interface. A red box highlights the 'create a new event' button in the top toolbar. Below it, the 'Event properties' form is visible, with fields for area (RWSOS), start time (Wed 29-06-2022 20:00:00), end time (Thu 30-06-2022 20:00:00), name (example event), and description (example event). The event type is set to 'Flood Watch Event'. A table below the form lists the created event:

name	description	creation time	start time	end time	area	event type
example event	example event	Tue 08-11-2022 20:01:22	Wed 29-06-2022 20:00:00	Thu 30-06-2022 20:00:00	RWSOS	Flood Watch Event

The interface also includes a 'Data Viewer' sidebar with a tree view of locations and filters, and a 'Summary of archive data' panel on the right. The bottom status bar shows system time (Thu 30-06-2022 20:00 AEST), GMT (09:01:39), and archive information (Archive: test archief 2022.02).

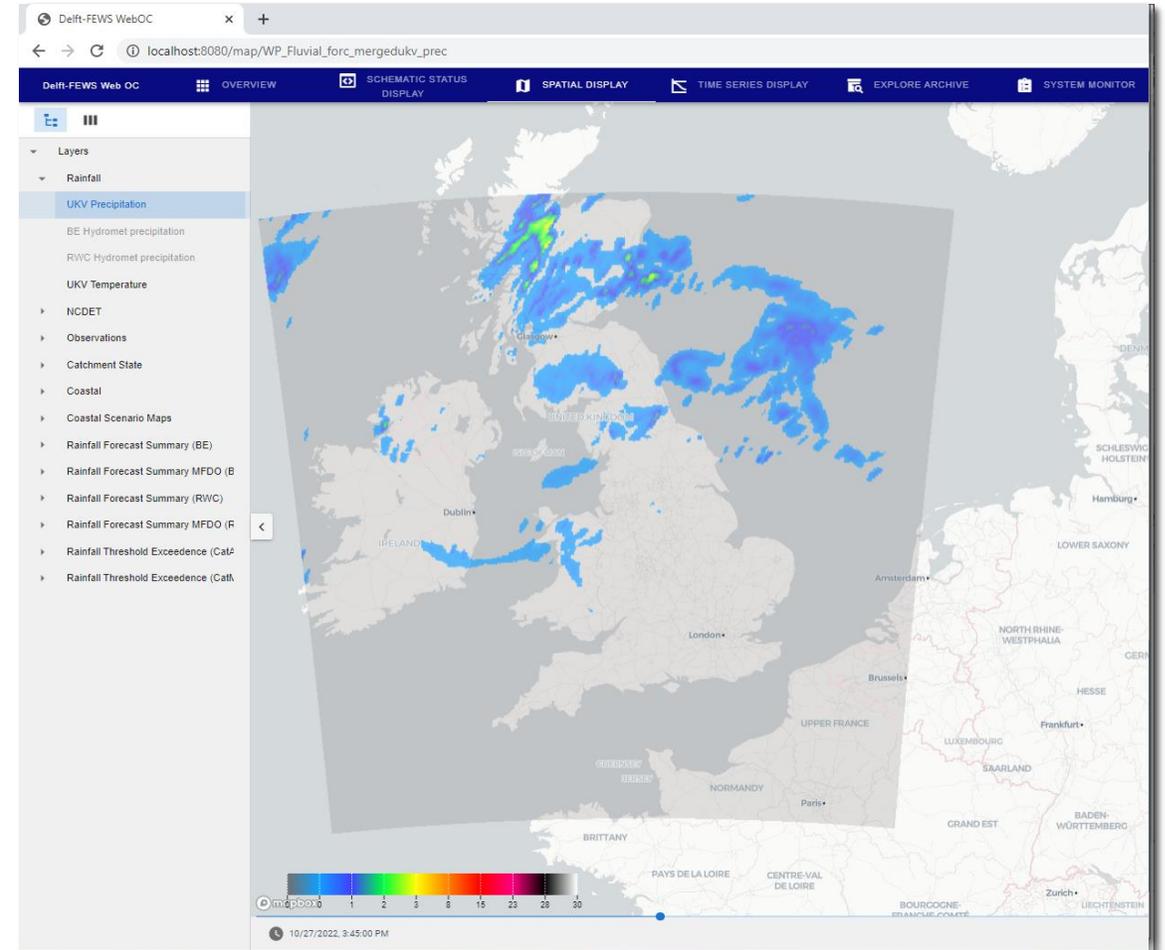
Open Archive

The screenshot shows the HyFS-SA (FEWS-2021.01-1.0.0) interface. The 'Upload data to Archive' dialog is open, with the 'area' set to 'tweed' and the time series range from 'Thu 23-06-2016 20:00:00' to 'Fri 26-06-2026 20:00:00'. The 'Upload to archive' button is highlighted. Below the dialog is a table of data points.

Location ^	Parameter	Qualifiers	Time step	Edited values	Period in archive
Bilambil Heights (Marana Reservoir) ...	Observed Rainfall (P.obs)	15m	15 minutes	0	--
Binna Burra Alert - H040845-00	Observed Rainfall (P.obs)	15m	15 minutes	0	--
Bray Park (Water Treatment Plant) - ...	Observed Rainfall (P.obs)	15m	15 minutes	0	--
Brays Creek (Misty Mountain) - H058...	Observed Rainfall (P.obs)	15m	15 minutes	0	--
Burringbar - H558083-01	Observed Rainfall (P.obs)	15m	15 minutes	0	Fri 13-05-2022 10:00:00 - Wed 01-06-2022 09:45:00
Clarrie Hall Dam (Doon Doon Creek)...	Observed Rainfall (P.obs)	15m	15 minutes	0	

Launch & test the FEWS web services easily

- **Embedded web services** can run on SA (OC)
 - Logging provide useful URL's
- **Testing / developing using FEWS webservice**
 - <http://localhost:8080/FewsWebServices>
- **Testing the Web Operator Client**
 - <http://localhost:8080>



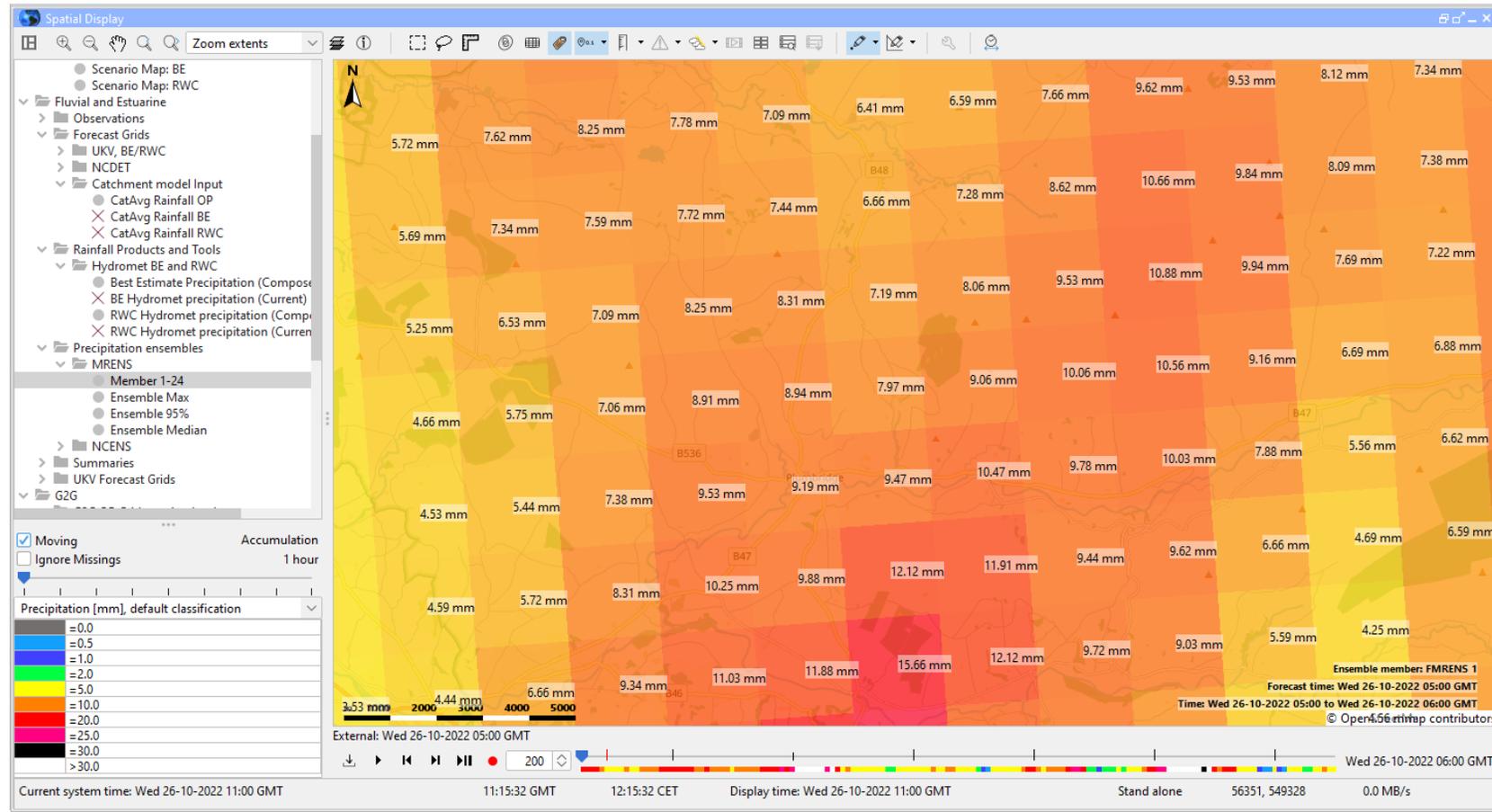
Digital Delta Web Service

The Digital Delta Web Service provides a HTTP based interface to Delft-FEWS and can be accessed by the REST protocol over HTTP(S).

[Test page version 2.0 »](#)

Grid Display

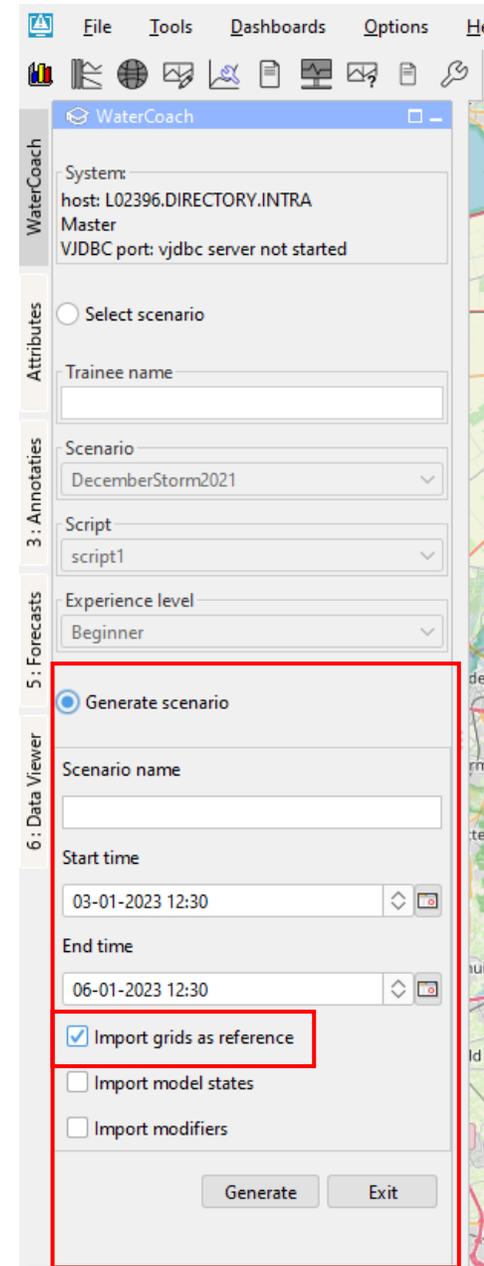
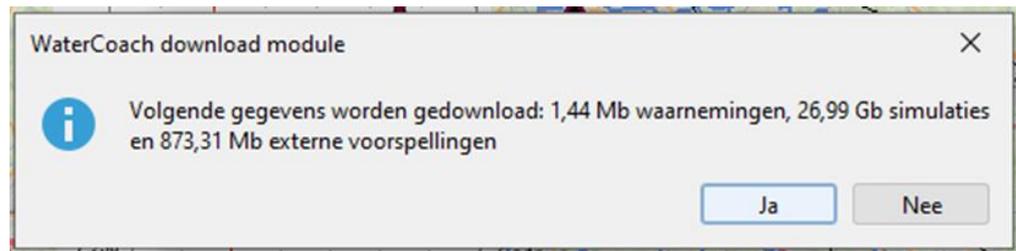
- Add **labels** to grid-values (+display while zooming)



Water Coach

'Training mode' of Delft-FEWS

- Water Coach on-the-fly:
 - Easy way to generate a watercoach scenario database
- Option: Import “grids as reference” (to minimize datastore size)
 - Grids are stored separately (central location)
 - Only when needed, the grids are imported, opened.
- Downloading the latest configuration in chosen period
- Show total download size before downloading





Delft-FEWS 2023.01 Benchmarks



±115 new features



± 150 bugs reported (100+ fixed)



11 new import modules



13 new features in FEWS-webservices



WFS as a new service



Tomcat 10 migration



Web OC configuration



Migrated to **Java 17**



Many new and updated 3rd party libraries



10+ improvements to the open archive



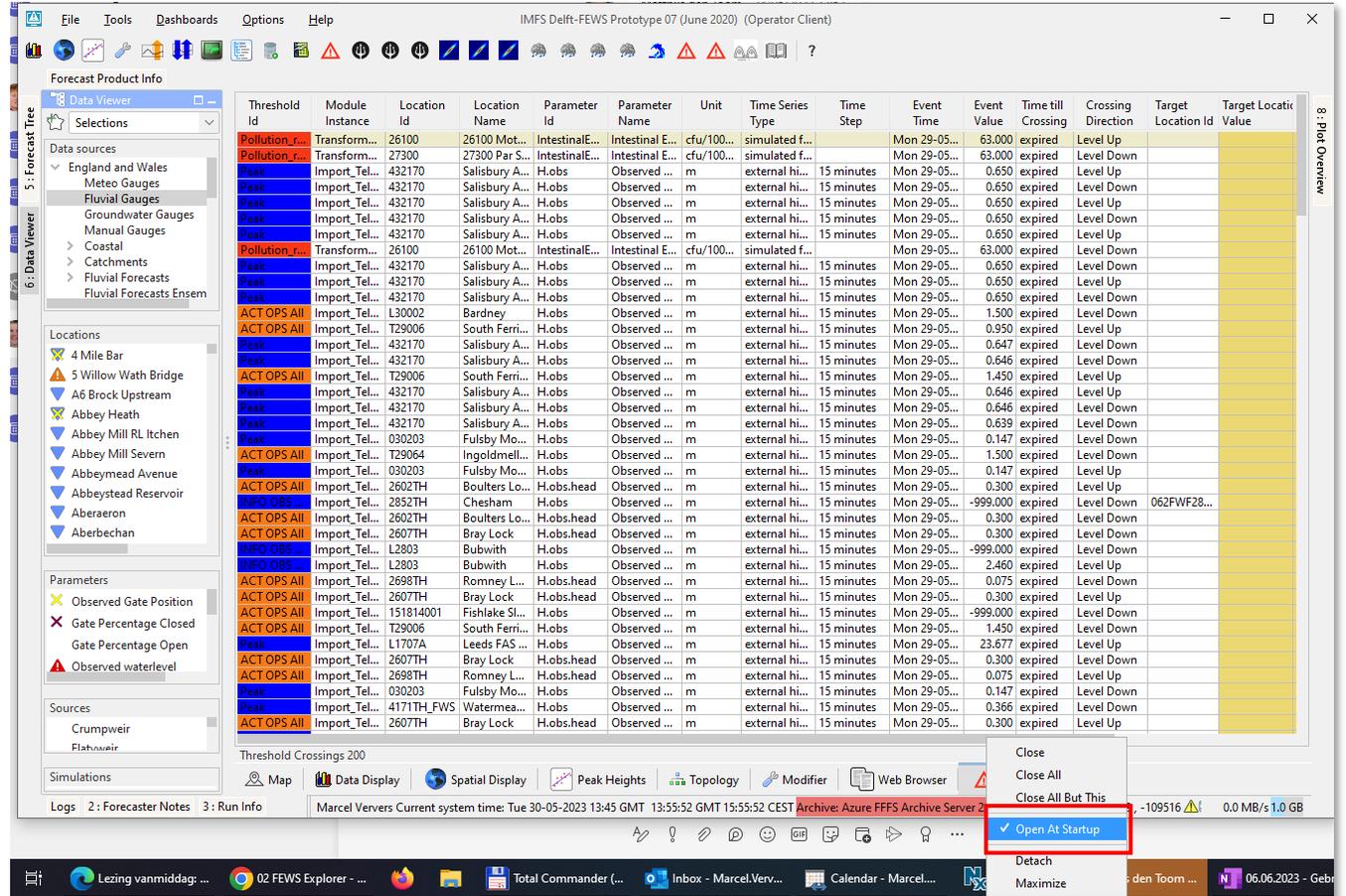
Integration with Azure DevOps



continuous improvements to what-if functionality

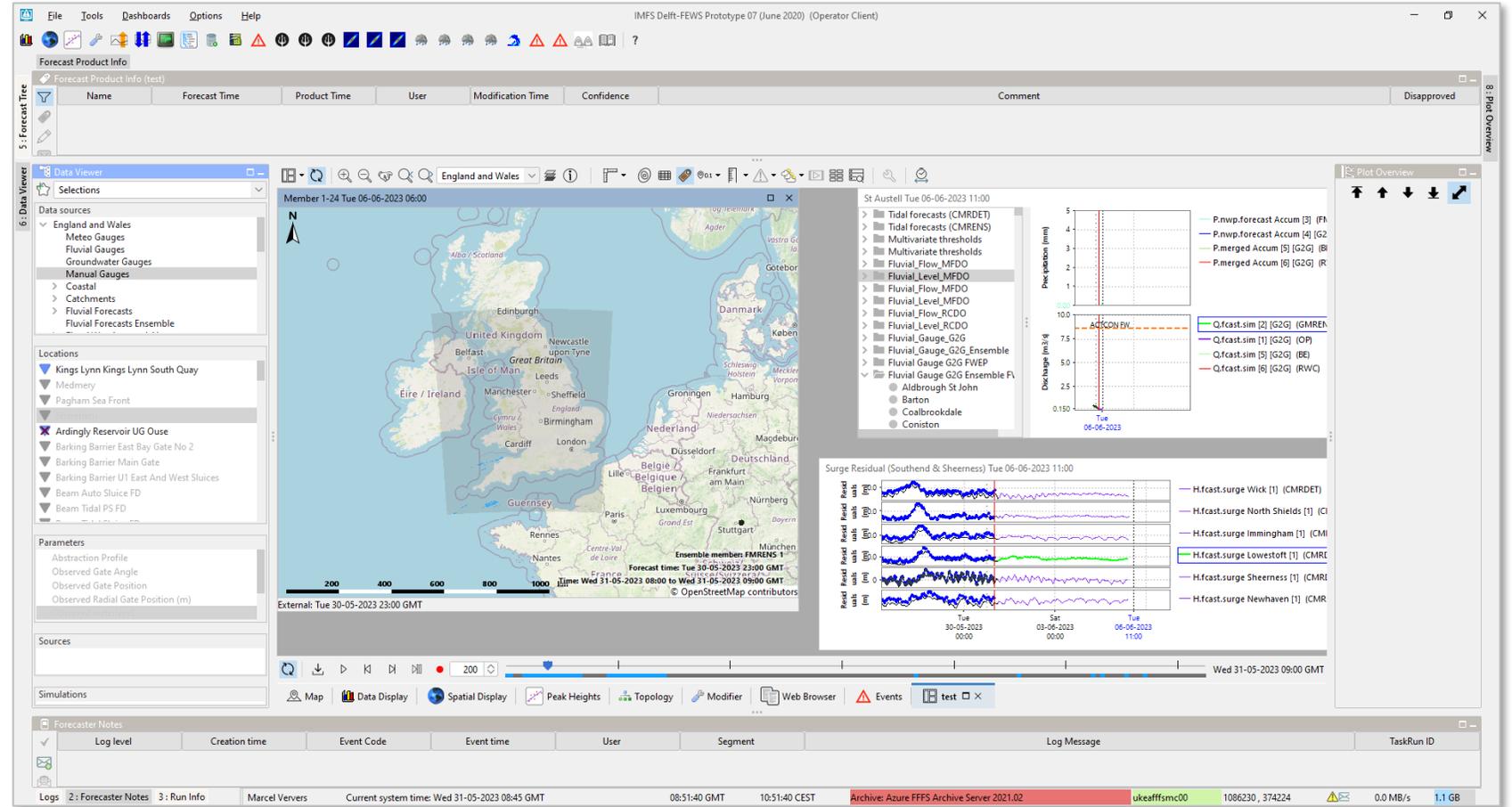
Explorer

- Open "At Startup" menu item
- Only available when not already opened at start-up
- Last selected tab also saved in user settings



Dashboard Display

- 'powerpoint' approach for aligning
- 'Shift + space' will toggle between free dragging / resizing and fixed steps





Workflow navigator

The screenshot displays the Workflow Navigator interface for the file `ModuleConfigFiles/LSTM_Vecht_Prep_Forecast.xml`. The interface includes a top toolbar with `Next difference`, `Previous difference`, and `Switch split` buttons. On the left, a sidebar shows a `Forecast Tree` and a `Data Viewer`. The main area is split into two panels: `Configured` and `Resolved`. Both panels show XML code with line numbers 14 through 47. The `Resolved` panel shows the code after transformations, such as the replacement of `$MODULE_INSTANCE_IDS` with `LSTM_Vecht_Prep_Forecast`. A `Close` button is located at the bottom right of the window.

```
14 <data monthofYear="September" value="3"/>
15 <data monthofYear="October" value="2"/>
16 <data monthofYear="November" value="1"/>
17 <data monthofYear="December" value="0.2"/>
18 </inputProfile>
19 <type>cyclic</type>
20 <outputVariable>
21 <timeSeriesSet>
22 <moduleInstanceld>$MODULE_INSTANCE_IDS</moduleInstanceld>
23 <valueType>scalar</valueType>
24 <parameterId>E.profile</parameterId>
25 <locationId>N_Backup</locationId>
26 <timeSeriesType>temporary</timeSeriesType>
27 <timeStep unit="day" timeZone="GMT+1"/>
28 <relativeViewPeriod unit="day" start="-365" end="35"/>
29 <readWriteMode>add originals</readWriteMode>
30 </timeSeriesSet>
31 </outputVariable>
32 </timeSeries>
33 </profile>
34 </transformation>
35 <transformation id="interpolate typical profil evap">
36 <interpolationSerial>
37 <linear>
38 <inputVariable>
39 <timeSeriesSet>
40 <moduleInstanceld>$MODULE_INSTANCE_IDS</moduleInstanceld>
41 <valueType>scalar</valueType>
42 <parameterId>E.profile</parameterId>
43 <locationId>N_Backup</locationId>
44 <timeSeriesType>temporary</timeSeriesType>
45 <timeStep unit="day" timeZone="GMT+1"/>
46 <relativeViewPeriod unit="day" start="-365" end="35"/>
47 <readWriteMode>add originals</readWriteMode>
```

Open Archive

- Area selection automatically
- History of data edits in archive
- Import grids as references

HyFS-SA (FEWS-2021.01-1.0.0) (Stand alone)

search and download datasets | create a new event | search and download events | Upload to Archive

Upload data to Archive

time series is between

Tue 07-02-2023 02:45:00

Fri 17-02-2023 02:45:00

Location	Area	Parameter	Qualifiers	Time step	Edited values	Period in archive
Boat Harbour (Rous River) - H058204	tweed, NSW	Calculated Discharge (Q,rated)		15m		
Chillingham - H058011	tweed, NSW	Calculated Discharge (Q,rated)		15m		
Kynnumboon - H558051	tweed, NSW	Calculated Discharge (Q,rated)		15m		

search and download datasets | create a new event | search and download events | Upload to Archive

Search for events

area: test | start time: 12-31-1899 18:00:00 | end time: 07-13-2018 09:00:00 | thresholds: No threshold selected

import grids as references

Summary of archive data

- simulated data: --
- observed data: --
- parameters in observed data: --
- locations in observed data: --
- external forecast data: --
- messages files: --
- rating curves files: --
- configuration files: --
- report files: --
- snapshots: --

name	description	creation time	start time	end time	area	event type
anotherTest	anotherTest	04-24-2021 13:01:17	07-12-2018 09:00:00	07-13-2018 09:00:00	test	Review event



Open Archive – Seamless Integration

Search and select forecasts

search period start time end time

nr of recent forecasts

include historical run

persist selection

search in archive

<input type="checkbox"/> Select all	workflow	time	description	dispatch time	status
<input type="checkbox"/>	Calculate_RateOfRise	Fri 02-06-2023 09:45	Rate of Rise on Observed Levels	Fri 02-06-2023 09:45	
<input type="checkbox"/>	Calculate_RateOfRise	Fri 02-06-2023 09:30	Rate of Rise on Observed Levels	Fri 02-06-2023 09:30	
<input type="checkbox"/>	UK_MeteoProcessing_Nowcast	Fri 02-06-2023 09:30	Nowcast rainfall processing	Fri 02-06-2023 09:46	
<input type="checkbox"/>	Calculate_RateOfRise	Fri 02-06-2023 09:15	Rate of Rise on Observed Levels	Fri 02-06-2023 09:15	
<input type="checkbox"/>	UK_MeteoProcessing_Nowcast	Fri 02-06-2023 09:15	Nowcast rainfall processing	Fri 02-06-2023 09:31	
<input type="checkbox"/>	UK_MeteoProcessing_Nowcast	Fri 02-06-2023 09:00	Nowcast rainfall processing	Fri 02-06-2023 09:21	
<input type="checkbox"/>	Calculate_RateOfRise	Fri 02-06-2023 09:00	Rate of Rise on Observed Levels	Fri 02-06-2023 09:00	
<input type="checkbox"/>	UK_MeteoProcessing_Nowcast	Fri 02-06-2023 08:45	Nowcast rainfall processing	Fri 02-06-2023 09:06	
<input type="checkbox"/>	Calculate_RateOfRise	Fri 02-06-2023 08:45	Rate of Rise on Observed Levels	Fri 02-06-2023 08:45	
<input type="checkbox"/>	UK_MeteoProcessing_Nowcast	Fri 02-06-2023 08:30	Nowcast rainfall processing	Fri 02-06-2023 08:46	
<input type="checkbox"/>	External	Fri 02-06-2023 06:00	-	-	
<input type="checkbox"/>	External	Fri 02-06-2023 03:00	-	-	
<input type="checkbox"/>	External	Fri 02-06-2023 00:00	-	-	
<input type="checkbox"/>	External	Thu 01-06-2023 21:00	-	-	
<input type="checkbox"/>	External	Thu 01-06-2023 18:00	-	-	

Time zero: Fri 02-06-2023 10:00
Forecast length: default

edit run options

- Felton UG Coquet
- Fenay Bridge
- Fence Bridge Gate RL
- Fender Lateral Wirral
- Fenny Bridges

Map | Data Display | Spatial Display | Peak Heights | Topology | Modifier | Web Browser | Events

Transformations

- New transformation to write values to output series when threshold values are crossed on input series
- Use case: threshold crossing one location should lead to warnings for another location
- Multi-valued attributes consisting of different output locationId's and different threshold levels

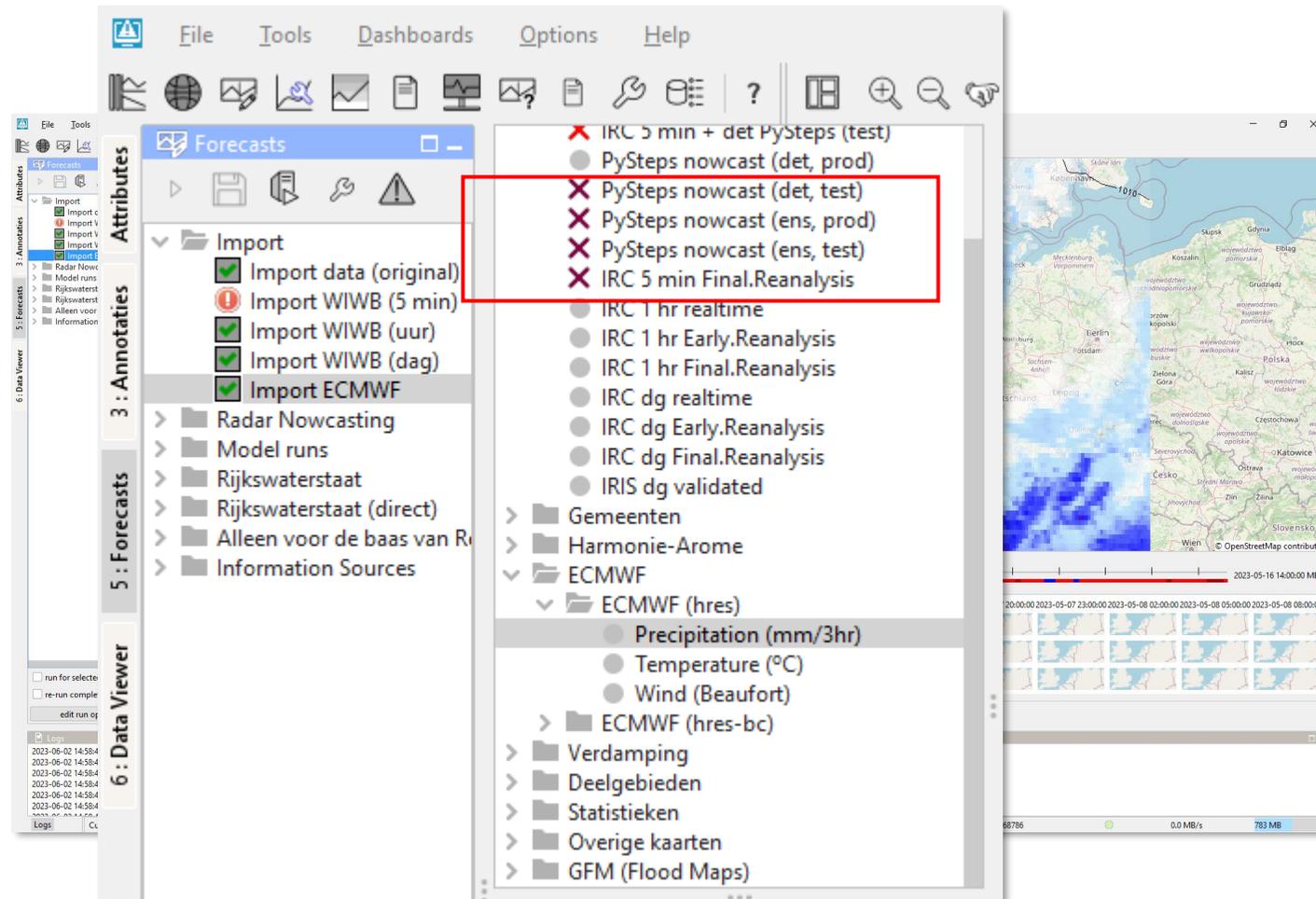
```
<transformation id="MultipleOutputLocationThresholdsDown">
  <multipleLocationAttributes>
    <multipleOutputLocationThresholds>
      <inputVariable>
        <variableId>input</variableId>
      </inputVariable>
      <thresholdValueAttributeId>thresholdValue</thresholdValueAttributeId>
      <crossingDirection>down</crossingDirection>
      <filterAttribute id="filter" value="include"/>
      <outputValue>1</outputValue>
      <outputLocationAttributeId>outputId</outputLocationAttributeId>
      <outputVariable>
        <variableId>output</variableId>
      </outputVariable>
    </multipleOutputLocationThresholds>
  </multipleLocationAttributes>
</transformation>
```

IFD - Topology

- From the **Topology** you can open a **Spatial Display** and select a specific **groupId** and **plotId** from the tree.
- **<gridDisplaySelection>** element

Node in Topology.xml:

```
<node id="node-id" name="Node Name">  
  <workflowId>workflow</workflowId>  
  <gridDisplaySelection>  
    <groupId>group name</groupId>  
    <plotId>plot name</plotId>  
  </gridDisplaySelection>  
</node>
```



IFD - Topology

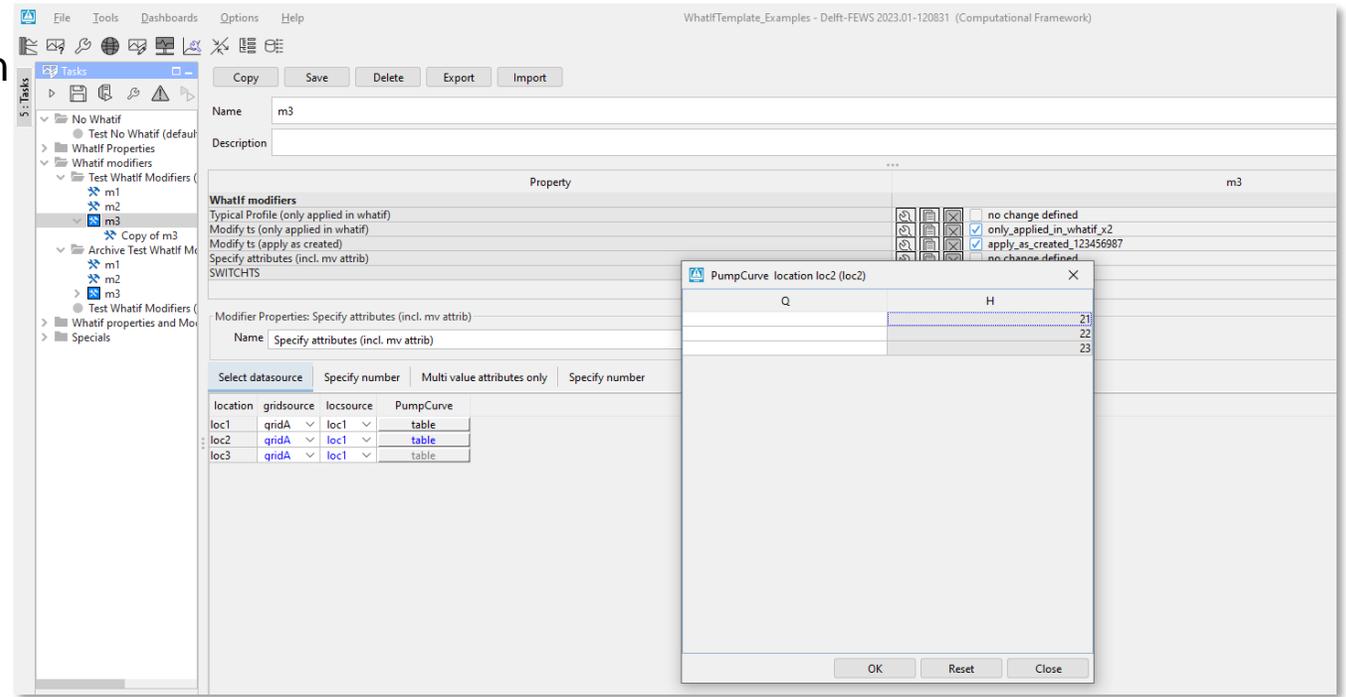
- From the **Topology** you can open a **Spatial Display** and select a specific groupId and plotId from the tree.
- **<gridDisplaySelection>** element
- **Fixed** coldstate start time/date

The screenshot shows the 'Forecast Tree' window with a tree view on the left and a 'Node: Save Barron' configuration panel on the right. The tree view shows a folder structure: 'Import and Process', 'Reporting', and 'Barron URBS model'. Under 'Barron URBS model', there are several items, with 'Save Barron' selected. Below the tree, there are fields for 'Cold state selection' with a 'Start' date of '27-02-2023 18:00:00' and a checked checkbox labeled 'Keep cold state at current selecti'. The 'Node: Save Barron' panel shows a table with columns 'Mod type', 'Name', and 'Summary'. The first row is 'fixed cold state', 'coldStateModifier', and 'coldStateDatetime=27-02-2023'. Below the table, there are sections for 'URBS model parameters' and 'Modifier Properties: URBS model parameters' with a 'Name' field containing 'URBS model parameters'. At the bottom, there are navigation buttons for 'Map', 'Plots', 'Spatial', and 'Modifiers'.

Mod type	Name	Summary
fixed cold state	coldStateModifier	coldStateDatetime=27-02-2023

WhatIf Editor (Scenarios)

- New WhatIf **ModifierType**
 - “apply according to creation method”
 - Modifier created in ModifierDisplay → apply in regular forecast workflow only
 - Modifier created in Whatif Editor → apply in what-if workflows only
- The **Import button** is now always enabled in the What-if editor
- Improvements:
 - Robustness (general)
 - Consistency (icons)
 - Logic (automatic re-run of sub workflows)
 - Visibility of modifiers (type of node)
 - [Documentation](#)

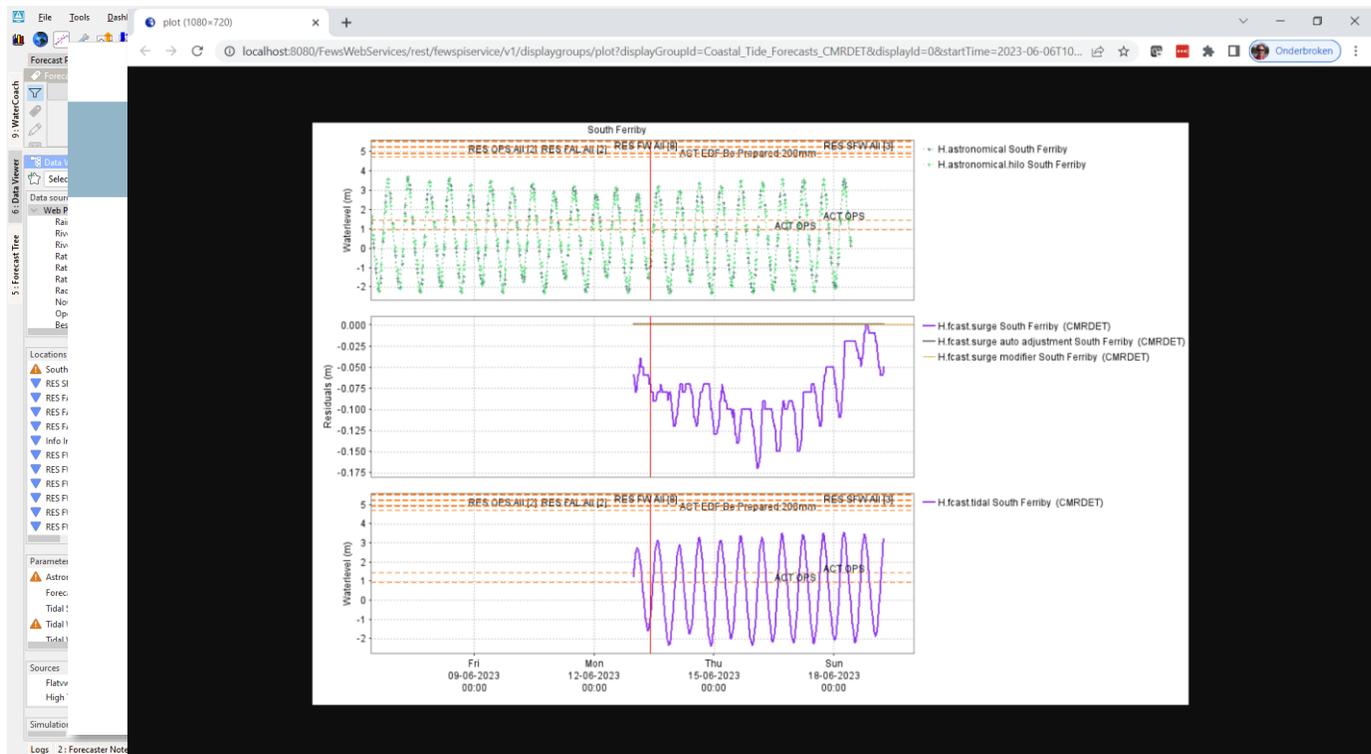
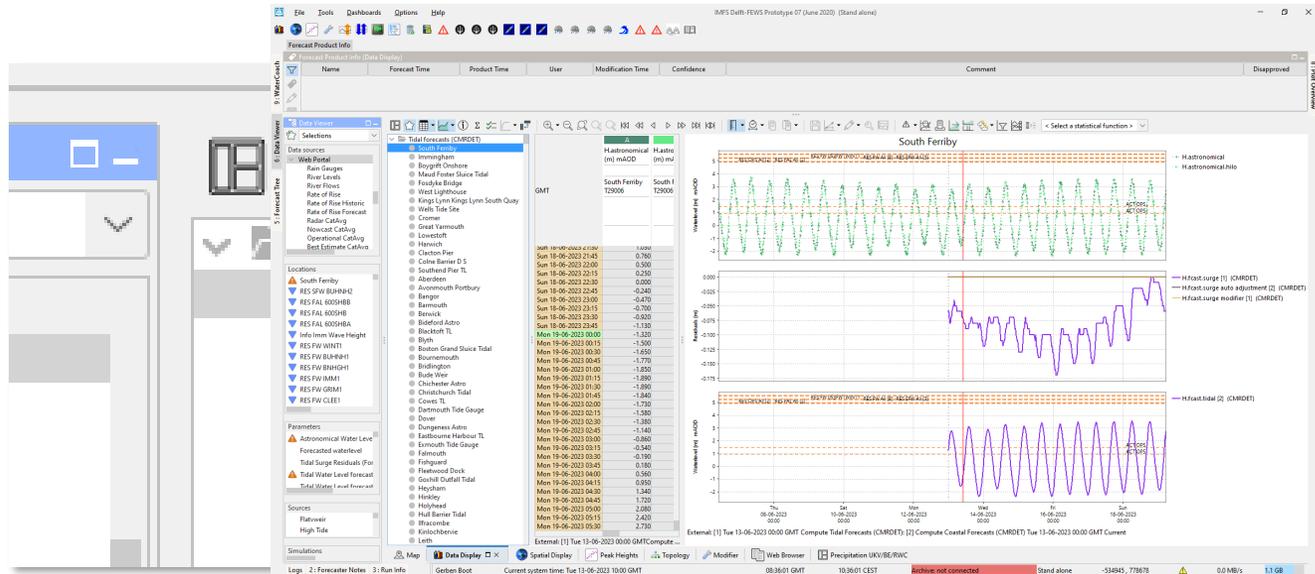


try it out...

FEWS Web services

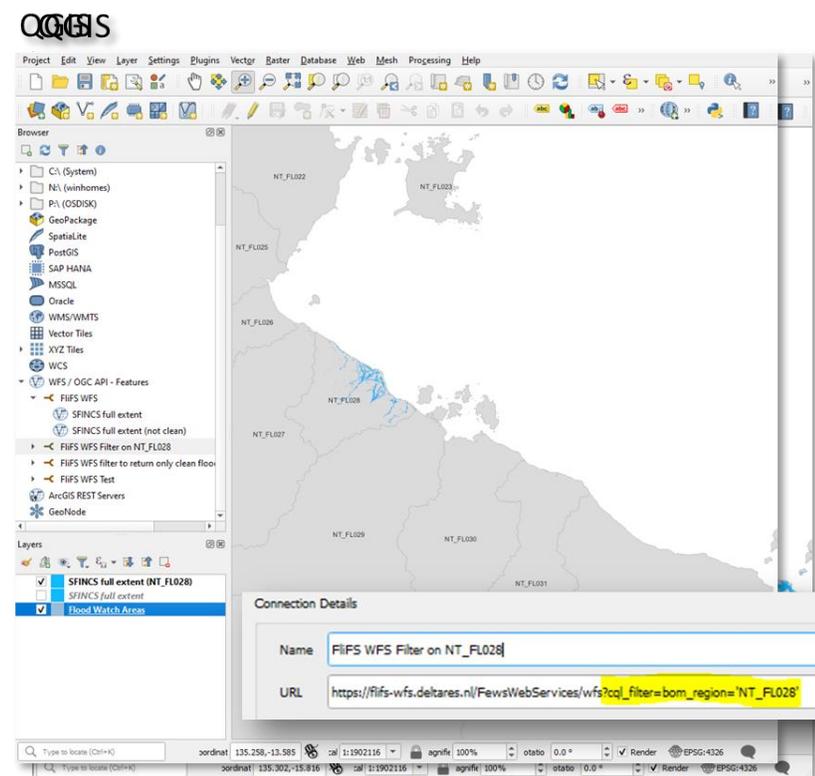
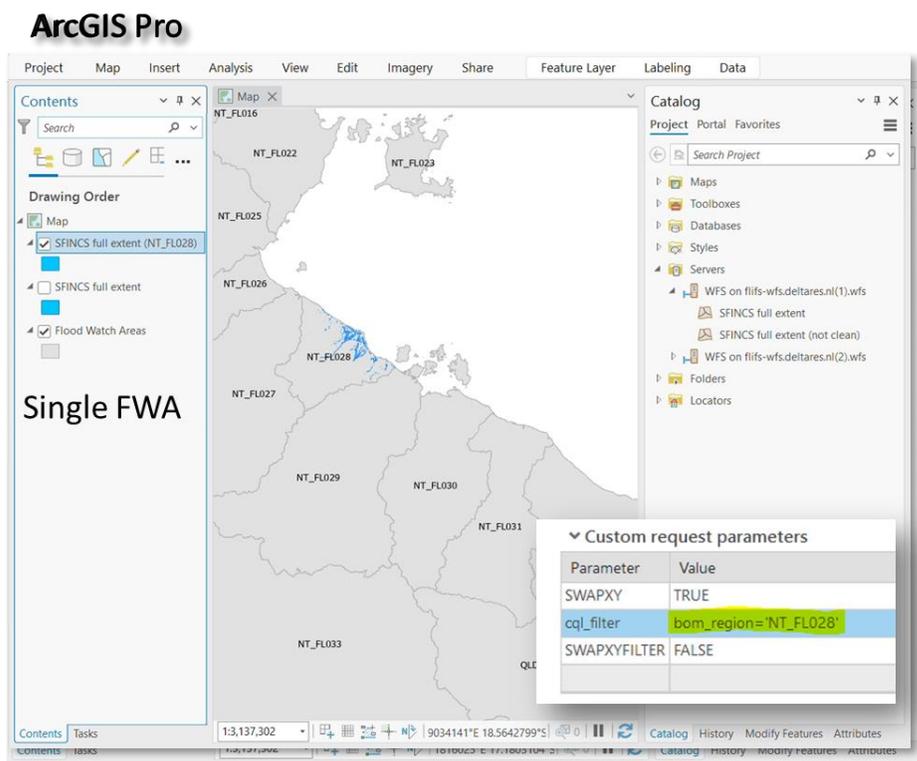
- Web Feature Service (WFS) 1.0
- Locations endpoint: get GeoJSON file for associated polygons
- Get **plot** directly in PNG (thumbnails)
- **Rating Curve** endpoints
 - Convert values (POST)
 - Add key-value pairs (for recognizability)
 - Retrieve headers only
- **EnsembleMemberIds** endpoint
- SOAP → REST migration (NWS)
 - GetLastModificationTime
 - Get timeseries in binary format
 - Get Cold/Warm States
 - Enabling UnitConversions
 - Get GUI selections

Deltares



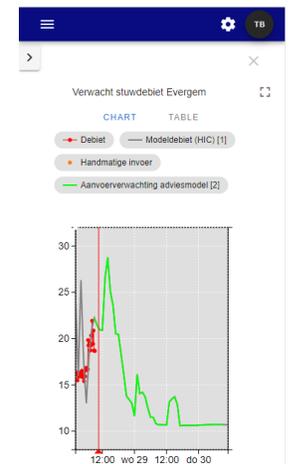
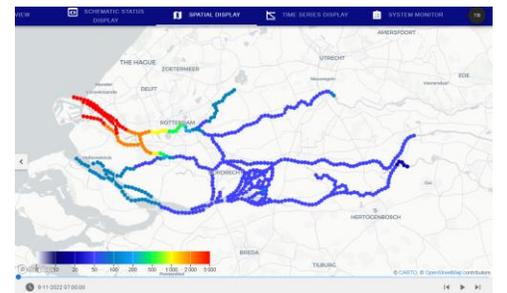
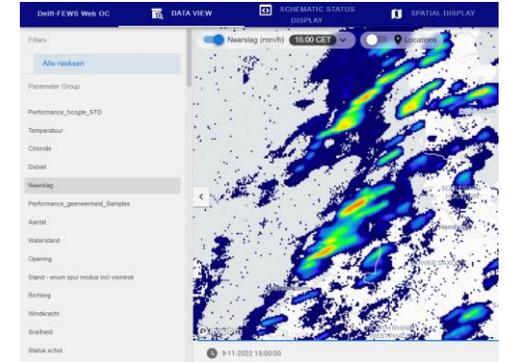
Web Feature Service (WFS) 1.0

- The FEWS Web Feature is the Delft-FEWS implementation of the **OpenGIS WFS 2.0 OGC** standard
- WFS complimentary to WMS service to provide **underlying vector data**
- It allows requesting **GML3** or **GeoJSON** data for plots that have been configured in the FEWS grid display.

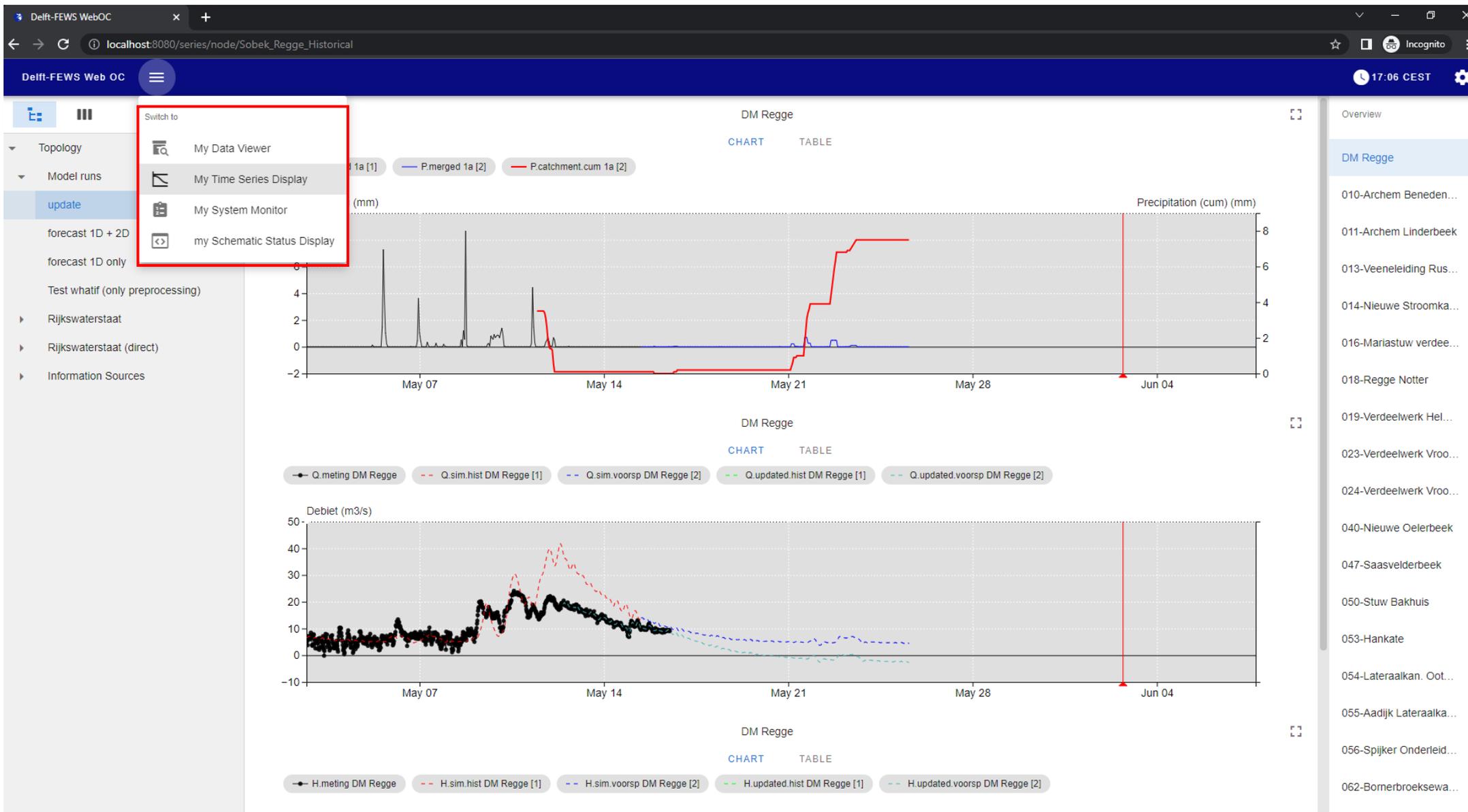


Web based Operator Client (why & what)

- **Easier deployment** (compared to Desktop OC)
- Increased **mobility** (fast access through browser, also from mobile devices)
- Improvements to **performance and security of Delft-FEWS web-services** in consequence of the development of a secure and performant Web OC
- The Web OC will serve **expert users, but a larger target audience than OCs in a organization**
- For the foreseeable future, the **Web OC and Desktop OC will be developed and used in parallel**. Data-viewing mainly, exploring data-editing possibilities
- The **Web OC can be hosted anywhere**, dependent on the client's preference (on-premise, the cloud, ...)
- The Web OC will become an **integral part of the overall Delft-FEWS product**.
- An **open source, closed community** license model will apply (at least initially).

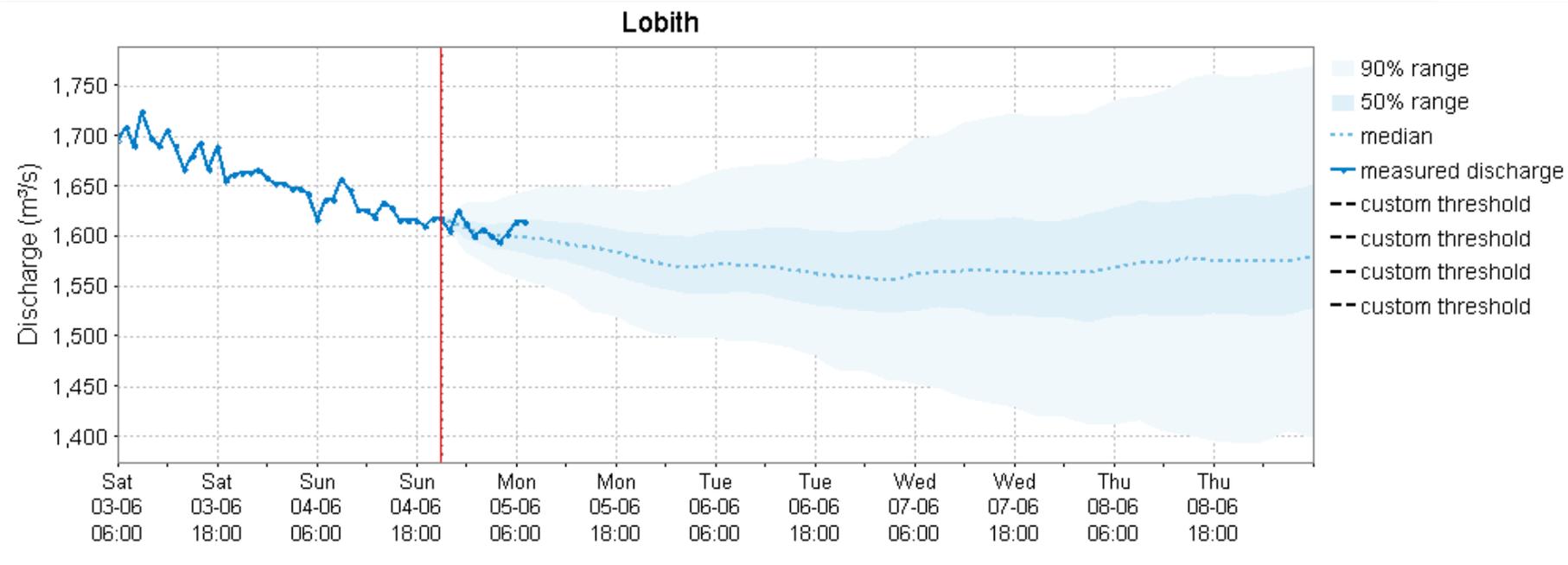


Web OC



Report Module

- [THRESHOLDCROSSINGLABEL](#) function added → add threshold crossing information for the specific threshold.
- Add [custom class](#) to “RowPerLocation” table to define style/appearance
- [Legend](#) improved for ensemble series



Data Imports/Exports

- [EFAS SOS Server](#) (DWD ICON, COSMO-LEPS, ECMWF-HRES & ECMWF-ENS)
- Extension of [Landsat-HDF5](#) (parameter: DSSF-TOT)
- Extension of [Radolan](#) (Parameter YW + grid dimensions dynamically)
- Extension of [MeteoCanadaWCS](#) (authentication added and visualize hidden layers)
- Improved [GeoTIFF](#) import (support for all possible floats, integer and byte values)
- Import module now [ModuleInstance](#) aware.
- Improved [PI REST](#) import: chunking of URL path to avoid exceedance



try it out...



Community & (online) events

- Delft-FEWS User Days ([programmes and presentations](#))
 - Gebruikersdag Netherlands/Belgium: 6th of June 2023 (Delft, NL)
 - Anwendertreffen: 15th +16th of June 2023 (Aachen, D)
 - Australia: 23rd - 25th of August 2023 (Brisbane, QLD)
 - International Delft-FEWS User Days: 8th+9th of November 2023 (Delft, NL)
- Courses
 - Around User events
 - [Schedule](#)
- Online events (recordings via [portal](#))
 - Community Talks: next: 8th of June
 - Webinar: next: 14th of September



**Community
Talk**

#4

WIS systems



2023.01 features

Documentation, Tips & Tricks and Videos

- [Delft-FEWS WIKI](#) configuration, user guide (& client-server installation guide → login required)
- [FEWS Docs](#): automatically generated documentation ([schemas](#), [release notes](#), [APIs](#) etc)
- **NEW**: [Tips & Tricks](#) for ‘beginners’ (new configurators)
- Video/recordings overview

Webinar	Date	Topics + video link
Delft-FEWS in the cloud	07.02.2022	Delft-FEWS in the cloud
2021.01 Features	25.04.2022	How to apply auto-calibration (with OpenDA) . (click breakpoint at 5:53) How to improve and polish your output in spatial/timeseries plots / how to make attractive GUI icons . (click breakpoint at 16:16) Spotlight: the Import module . (click breakpoint at 30:19) e.g. grids as reference!!
2022.01 Features	13.10.2022	Spatial Display and Spatial Transformations (click breakpoint at 6:45) Map and Explorer improvements (click breakpoint at 19:15) Spotlight on the Schematic Status Display (click breakpoint at 40:08)
2022.02 Features	23.03.2023	Running Workflows from Spatial Display (click breakpoint at 5:12) Running the FEWS web services locally (click breakpoint at 16:10) Delft-FEWS and the links to GIS systems (click breakpoint at 30: 48)

Outlook Developments 2023.02

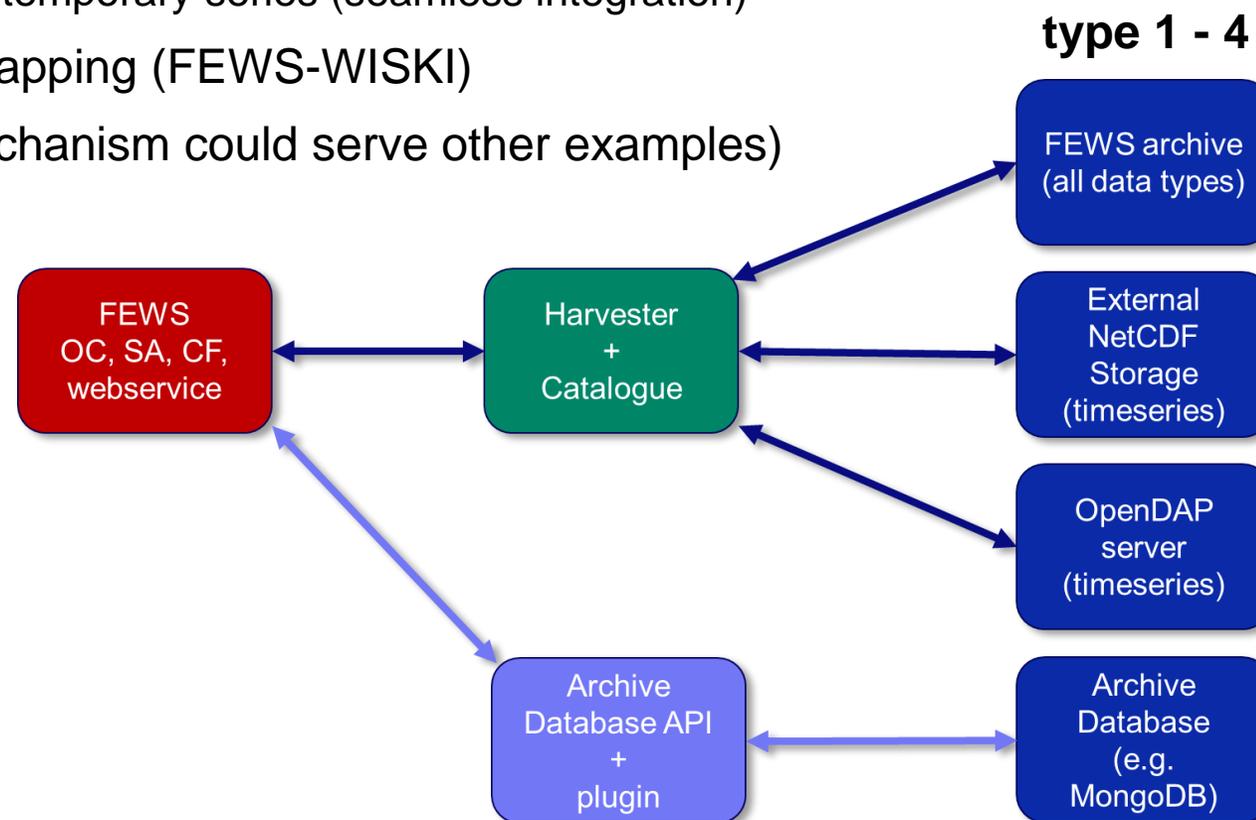
- **Web OC MVP** (1) + enabling data edits (2)
- **Flood Warnings & Thresholds**: Generation AND dissemination (AUS)
- **Metadata** management tool (AUS)
- **Open Archive**: Create separate Vision (together with CSB)
- **Cloud**: High availability of the MasterController (without using dual MC)
- Make **web service patchable** (postponed from 2023.01)
- **Seamless integration** with (different, external) web services, like WISKI
- Improve **Import status page** and add **Export status page** to Admin Interface
- Improved **NetCDF** for **non-equidistant** timeseries (basis is already in 2023.01)
- **Co-creation** activity on **Scaling** of Forecasting Shell Servers.
- And more...(in proposals for GO-FEWS, RWS etc)





Seamless integration with WISKI web service

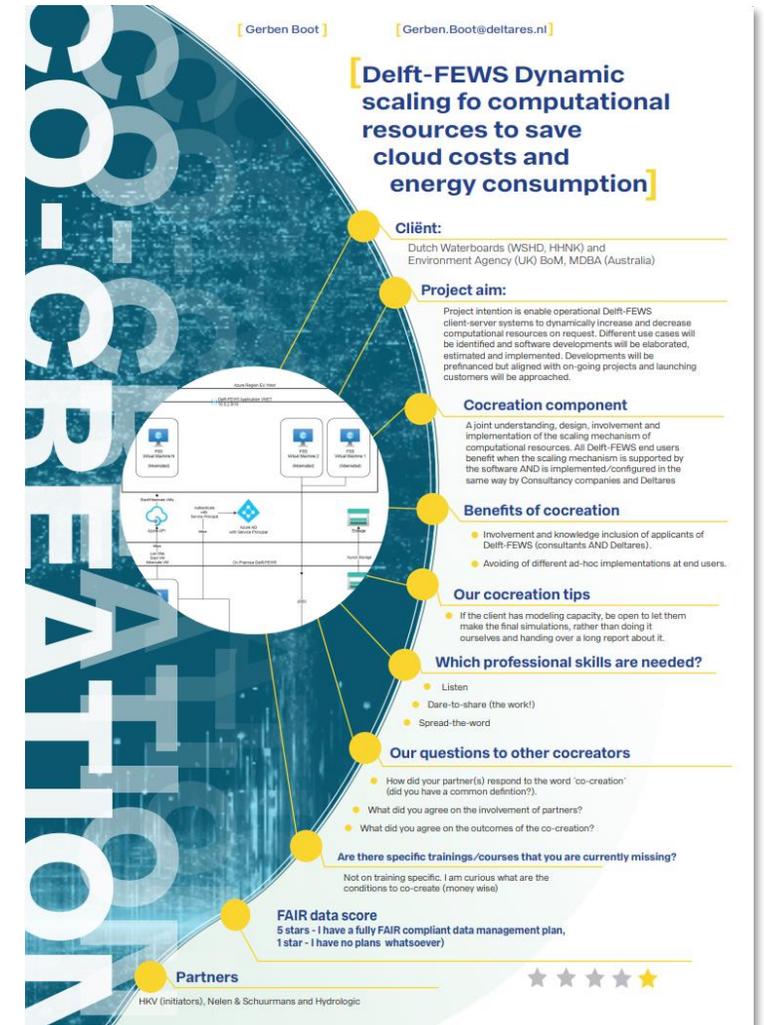
- WISKI web service (KiWIS) as “a source of archived data” (5th type)
 - Know what data is in that source, but leave it at the source
 - Display (in Delft-FEWS) on request as temporary series (seamless integration)
- Pre-configured time series sets + idMapping (FEWS-WISKI)
- Plugin-structure for *web services* (mechanism could serve other examples)





Design principles – FSS Scaling

- **Use case 1: Main concept change: new FSS status “hibernate”**
- Pre defined FSS (group) specs (VM)
- FSS group in ‘hibernate’
- Workflow – FSS mapping enables to run only specific workflows on specific FSS groups
- Allocate/de-allocate principle (Azure)
- Cloud costs
 - Only storage costs when in ‘hibernate’
 - Pay as you go (running workflows) → cpu costs
- Use-case 2: “One-off FSS” (Kubernetes)
- Co-creation with consultants, launching customers

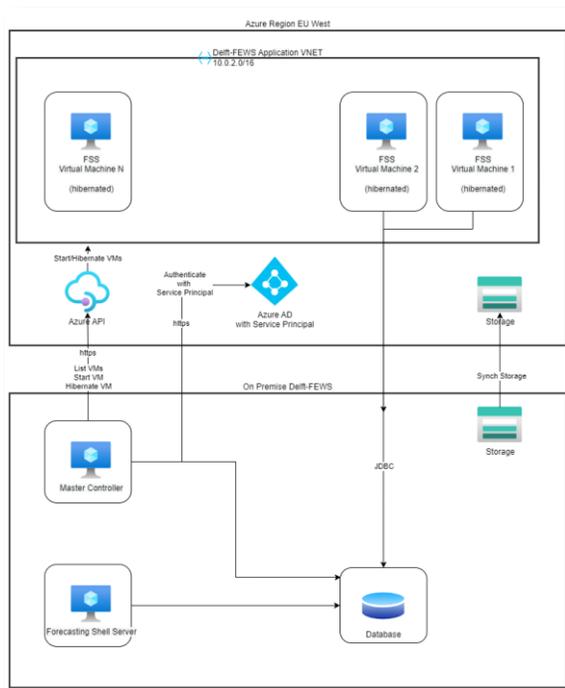




First implementation: FSS Scaling (Azure)

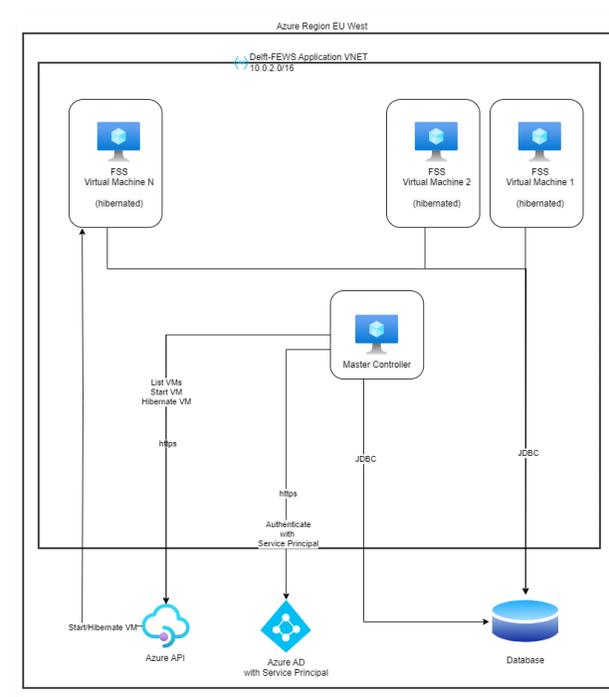
Main system on-premise, scale to cloud

- Typical use-case:
 - calculation intensive (CPU) workflows
 - Limited data usage



Main system in cloud AND scale to (same) cloud

- Typical use-case
 - Data intensive (I/O) workflows
 - Data is already in cloud (and stays there)



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