

Delft-FEWS Stable Release 2022.01

Release Notes



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Release Notes

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Reference	Referenties
Keywords	Keywords

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Summary

This document contains the release notes for Delft-FEWS Stable Release 2022.01

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1 Introduction

1.1 General

This document is the overall Release Notes Document for the Delft-FEWS Stable 2022.01 version which was released on 11th of July 2022 (planned date).

This release contains around **106 new features** (paid by implementation projects, existing clients, internal funding etc) to the Delft-FEWS components: Operator Client, Forecasting Shell Server, Master Controller, Central database, Admin Interface as well as the Delft-FEWS webservices and the Open Archive.

1.2 Set-up of this document

Compared to previous versions of this (type of) document, a few changes/improvements have been made. There are separate chapters on: the Delft-FEWS Vision 2025/Roadmap (2022), Security aspects and Documentation.

Like in previous documents describing any new Delft-FEWS version, underlined (and working) references to (new) WIKI pages have been included, like the [installation page](#) and [upgrade page](#) for this software version.

The complete overview of new, implemented features and fixed bugs can be found in the appendices and on the [release notes](#) page on the Delft-FEWS WIKI.

2 Delft-FEWS 2022.01: Highlights of the new features and solved bugs

2.1 New features

Based on an internal inventory amongst the developers, the following new features are clear, relevant or important highlights of this release (ordered by component).

JIRA reference	Component	Title	Description - Explanation
FEWS-25757	Configuration	ModuleInstanceDescriptors can have attributes	Administration of metadata related to module-instance-descriptor-IDs is possible via CSV files
FEWS-26413	Database, Amalgamate	A single time series with more than 20164 time steps can now be stored in a single blob.	Extreme high compression is reached while amalgamating data e.g. for rainfall timeseries containing many 'zeroes'.
FEWS-26067	Forecast Product Info	A spell checker has been added to the entry box of the Forecast Product Info Panel	A spell check is applied to the entry box in the Forecast Product Info panel. Red lines appear when words are not recognized.
FEWS-26623 FEWS 26624	Map Display, Spatial Display	GeoJSON support for layers and for locationSets	References can be made to *.geojson files and visualize layers and/or use content of these files in your configuration
FEWS-23741	Spatial Display	Tracklayer improvements for visualizing particles	The tracklayer has been extended with extra config options to improve visualization of (individual) particles
FEWS-26388	Transformation	New spatial interpolation transformation to convert (regular) grid cells to polygons for certain class breaks	Create (and export) nice polygons shape files based on gridded data, e.g. flood extent. The polygons are created on the basis of class breaks which can be configured
FEWS-26477	Operator Client, Database	Allow multiple FEWS DB schemas in a single database	The user is prompted which 'client-server system' to start after starting just one shortcut.
FEWS-23921	FEWS Webservices	WMS Service GetCapabilities support for default time	The GetCapabilities request returns the last timestep as default time for external historical and external forecasting. Calling the getMap is now much easier with this default time.
FEWS-26115	FEWS Webservices	Support Open ID Connect to authorize API requests	Possibility to configure / integrate the FEWS Web Service with OIDC (Open ID Connect). It is also possible to integrate the Delft-FEWS Groups and Permissions configurations with OIDC.
FEWS-22054	Database – Datastore	Optimized memory tables	TableLocalModificationTimes table has been made a memory optimized table
	Documentation	Improved, version-based documentation pages	New version-based WIKI page structure for installation, upgrade and hardware/software requirements pages

FEWS-24309	DB Creation Scripts	SQL server script improved	Database creation script for SQL Server is more flexible and contains the option to install an Azure managed instance of SQL server
FEWS-26446	Modifiers	Introduction of a multi-value (location) attribute modifier	A multi-value attribute modifier is intended to modify multiple location attributes in one go. E.g. both 'head' and 'discharge' of a pump curve.
FEWS-25193	Schematic Status Display	SSD displays can contain thumbnail charts	Thumbnail charts with relevant y-axis parameter information can be added to SSD displays.
FEWS-25228	Third Party Libraries	Upgrade of the NetCDF library	The NetCDF libraries are upgraded to 5.5.2 and its supporting NetCDF-C library to 4.8
FEWS-26874	Third Party Libraries Web Browser Display	Updated JCEF package	For all (supported) Delft-FEWS versions you need the same (OS specific) updated JCEF version in case you want to use the Web Browser Display
FEWS-26335	Transformation	InterpolationSerial Linear transformation extended	Besides filling grid 'gaps' in time, you can also interpolate missing pixel values in a single grid (of one timestep)
FEWS-17991	Timeseries Display – Display groups Dataviewer	Doubleclick functionality	Doubleclicking on a location in the dataviewer will open the 'shortcuts' and the right display from that list.
FEWS-26579	Timeseries Export Module	New option 'exportChanges'	A new option in the export timeseries module to only export changes in a configured period.
FEWS-17000	Displays	Interactive Double Mass Display	New display to interact with (long term) series to discover relations and adjust by applying modifiers.

2.2 Solved bugs

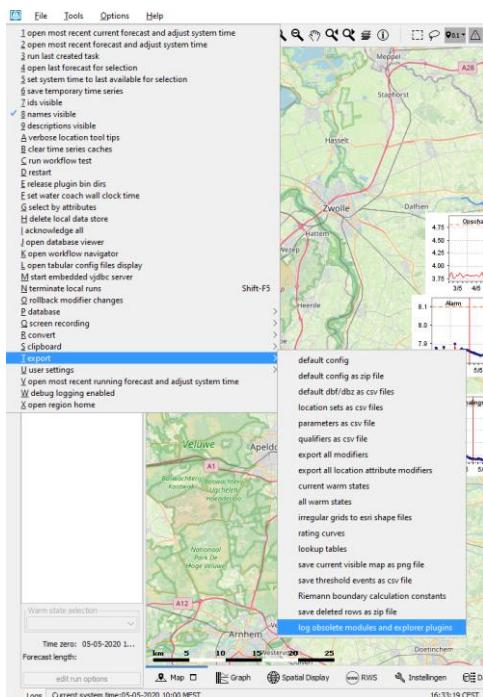
This selection of bugs is constructed based on the number of commits (10 or more) for issues classified as bugs (in JIRA). Besides the Spring4Shell vulnerability we experienced

JIRA reference	Component	Description - Explanation	Nr of commits
FEWS-26924	Open Archive	Spring4Shell Zero-Day Vulnerability	23
FEWS-26548	Master Controller	Synchronized MC does not restart after system reboot	20
FEWS-26911	Admin Interface	Spring4Shell Zero-Day Vulnerability	17
FEWS-27081	Database	extra touch localModificationTime does not work for transactions over 30 seconds	13

A complete list of solved bugs at time - of the release date – can be found in Appendix B.

2.3 Always recommended: Configuration check using <F12>

To assess if 'old' (outdated) or deprecated configuration is still applied in your configuration, it is strongly recommended to run the <F12> option under T + *Log obsolete modules and explorer plugins*. The log panel contains the findings of this analysis. Please have a look at this [wiki page](#) contains more explanation and details.



3 Delft-FEWS Vision 2025 – Roadmap 2022

3.1 Introduction

This Delft-FEWS version contains several features that have been implemented as part of the Delft-FEWS Vision 2025. This new vision is working with yearly roadmaps in which Delft-FEWS product management would like to include general improvements to the software and to its software development process which are of benefit to all our users. More information on the [Delft-FEWS Vision 2025](#) and the yearly roadmaps can be found on the [Delft-FEWS Community Portal](#).

3.2 Roadmap 2022 plans per theme

The highlights of the roadmap plans can be found [here](#).

3.2.1 Code clean-up

To keep the code clean and maintainable, we have identified outdated and end-of-life modules and displays. A first inventory was made in 2021 and we continue this process in 2022. Our approach is to inform all our end users in time about this removal and we will not remove any module or display without having a new or more modern alternative in place. Last year, functionality was introduced to validate a configuration to assess if any obsolete modules or displays are configured. This check will be updated regularly to match the latest insights. To avoid any surprises when using a new version of Delft-FEWS it is recommended to run this <F12> function while testing new Delft-FEWS releases. This will give all users enough time to resolve backwards compatibility issues with end-of-life modules and displays. A wiki page is kept up-to-date to share our latest plans (what components are removed by when) and our progress. The <F12> check in your application is aligned with this [WIKI page](#).

Expected effort in 2022: ±35 days

3.2.2 Code quality

Our code quality is constantly monitored using SonarQube and all code commits are checked against the latest java coding rules. Automated tests using the latest (Docker) technology are part of our stack now and in 2022 we continue the pilot for a complete DevOps pipeline. We expect that this will pave the path towards a more DevOps (CI/CD) approach for more Delft-FEWS components.

We are intensifying the use of the SonarQube tool and will select packages to focus on to reach the (self-imposed) target for a minimum code coverage / unit-tests coverage of 80%. Besides that we will actively maintain the (newly structured) [Delft-FEWS hard and software requirements page](#) and will launch a [Delft-FEWS update strategy page](#). The latter contains an overview of all supported versions of relevant operating systems, database types and third-party libraries, java and middleware like Tomcat per Delft-FEWS version and by when this will change.

Expected effort in 2022: ±40 days

3.2.3 Security

In 2021 a security matrix was created to visualize all security options per Delft-FEWS component. For all 10 components (Forecasting Shell Server, Master Controller, Database, Admin Interface, Operator Client, Configuration Manager, Archive Server, Database Proxy, FEWS Web Service and Data-feeds) security aspects with respect to 5 domains were assessed and visualized.

The aspects are:

- Network Security (Encrypted Network Traffic, Port Security, Access to Delft-FEWS component)
- Access Management (MFA, Role Based Access, Access User, OpenID Connect options)
- Threat Protection (Access Audit Trail, Change Audit Trail, Session Time-out)
- Information Protection
- Data (Encrypted Storage)

The outcome of the assessment is that the majority of security aspects is already covered by the latest release of Delft-FEWS. To cover the security aspects which did not fully pass the assessment, small developments are planned for 2022.

We also respond quickly to our daily checks with respect to OWASP messages (OWASP=Open Web Application Security Project) which runs on our build & test environment (TeamCity) using the [OWASP Dependency Check](#) and [ZAP](#) tools.

In 2022, we continue learning from our ongoing cloud (migration) projects. These projects are focusing on the up- and downscaling of computational cores using docker containers and switching components on/off from a financial perspective. These external parallel projects are not managed from a roadmap perspective, but they explicitly contribute to our cloud knowledge and expertise. From a knowledge sharing perspective we will capture these experiences in our documentation WIKI and we will complete the documentation based on the material(s) we previously shared in the "Delft-FEWS in the cloud" webinar (from January 2022).

Expected effort in 2022: ±40 days

3.2.4 Automated (release) testing

We are continuously improving our release process to deliver high quality and well-tested releases. By adding a product risk analysis (PRA) prior to testing, we identify areas of the code that should be addressed in upcoming release testing. A release retrospective will provide useful feedback for future releases. Test scripts are being improved to make them easier to transfer and reuse. Our portfolio of automated tests is extended with pilots for automated client-server tests using Docker, with continuous integration tests focused on performance. The aim is to increase automated tests even further to reduce the number of manual tests.

Separating GUI code and business logic is also on our radar this year and we will further complete our Master Test Plan to easily derive our Release Specific Test Plans.

Expected effort in 2022: ±20 days

3.2.5 Web Operator Client

End of 2021 and early 2022, a number of development & innovation sprints have been carried out. These sprints were meant to improve the underlying FEWS webservice, organize the development process and tooling and to investigate and experience how easily Web OC components for the Schematic Status Display and the Spatial Display could be integrated (in our test environment but also in other web-based systems).

Based on these results we continue our work in 2022. This year has one clear objective: to deliver a first prototype leading towards the MVP of the Delft-FEWS Web OC. Besides this focus, we will use this year to involve (potential and) interested end-users to be consulted for providing input for the Graphical User Interface (UI) and User Experience (UX) for the Web OC. The results of these interviews will be used to create a design and navigation aspects of the GUI. The development of this new component is really a collaborative effort in which we actively approach external partners for co-creation.

Expected effort in 2022: ±140 days

3.2.6 Computational Framework

The Computational Framework is the mode of Delft-FEWS to run scenarios which are not strictly connected to the 'here & now' like in operational forecasting systems. You can define and run scenarios in the (far) past or future, visualize, compare and manage them. These scenarios allow combination of properties with the existing modifiers concept to allow input changes in models, external boundary conditions, model/parameter settings etc. The scenarios are organized in the IFD-tree and can be managed in the new WhatIfEditor-display using the new what-if templates concept of Delft-FEWS. Scenario results can be viewed by selecting the scenario in the IFD-tree.

In 2022 we are focusing on the final developments creating, running and managing these scenarios, like:

Improved interaction of the Computation Framework with the Open Archive (to search and retrieve results-based scenario identification)

Exchange what-if scenarios between users

Extension of modifier options: multi-value attributes and typical profile modifier

Introducing this new what-if concept in a 'normal' operational, client-server forecasting system

Creation of configuration blueprints for Deltares models (Ribasim, wflow, delwaq) for quick integration into Delft-FEWS applications.

Expected effort in 2022: ±55 days

3.3 Third party library upgrades

In this release we have put in a substantial amount of effort upgrading our third-party libraries in use. Not only from a security perspective (see next chapter) also from an 'age' and 'functionality' perspective.

The following libraries have removed:

Removed library
activation
commons-lang-2.1
dom4j-1.6.1
jsr-275-1.0-beta-2
l2fprod-common-shared
serializer

Removed library
xalan
xercesImpl

The following libraries have been upgraded:

library	jar	Old version	Current version	JIRA reference
embedded jdbc drivers	jaybird	2.2.14	4.0.5	FEWS-21828
	derby	10.13.1.1	10.15.2	
	hsqldb	2.6.0	2.6.1	
flatlaf	flatlaf	1.6	2.0.1	FEWS-24266
Primefaces	Primefaces	5.0/8.0	10	FEWS-24730
SQLServer jdbc driver	azure-identity	1.1.3	1.4.3	FEWS-25197
	azure-security-keyvault-keys	4.2.1	4.3.6	
	msal4j	1.7.1	1.11.1	
	mssql-jdbc	9.2.1	10.2.1	
Oracle jdbc driver	ojdbc11	21.1.0.0	21.5	FEWS-25198
netCDF	guava	18.0	30.1	FEWS-25228
	netcdf	4.6.3	5.5.2	
jdom	jdom	2.0.2	2.0.6.1	FEWS-25545
tomcat-embed	tomcat-embed	9.0.50	9.0.59	FEWS-26049
netty	netty-all	4.1.48	4.1.74	FEWS-26050
geotools	commons-lang3	3.4	3.8.1	FEWS-26624, FEWS-27037
	Geotools	20.0	26.4	
	jts-core	1.16.0	1.18.2	
	si-quantity	0.7.1	2.0.1	
	si-units	0.7.1	2.0.1	
	systems-common	0.7.2	2.0.1	
	unit-api	1.0	2.0	
	uom-lib-common	1.0.2	2.0	
HttpComponents	httpmime	4.3.3	4.5.13	FEWS-26643
Elastic	lucene	7.4.0	8.11.1	FEWS-26646
Apache poi-scratchpad	commons-io	2.4	2.11.0	FEWS-26647, FEWS-26865
	poi	4.0.1	5.2.2	
	xmlbeans	3.0.2	5.0.3	
protobuf	protobuf-java	2.5.0	3.19.4	FEWS-26649
jackson	jackson	2.9.10	2.13.2	FEWS-26854
Spring-core	Spring	5.3.18	5.3.19	FEWS-27038

4 Delft-FEWS 2022.01: Security aspects

4.1 Introduction

The security aspects will be described in a more prominent place in the Release Notes document from now on.

End of 2021 and early 2022 we experienced a number of 'zero-day' vulnerabilities for which we had to act with respect to informing our clients and providing patches.

Without repeating the same texts, please find in the below mentioned sections relevant information and links.

4.2 Log4J vulnerability

We were alarmed via our OWASP server checks on the 10th of December 2021 about an issue regarding log4J 2. This vulnerability was logged as: CVE-2021-44228 This third-party library is used in several places for logging functionality in Delft-FEWS. The analysis, measures and communication around this vulnerability can be found on this [WIKI page](#).

4.3 Chromium JCEF vulnerability

We were alarmed on the 23th of March 2022 about a vulnerability issue regarding Chromium based browsers. This vulnerability was logged as: CVE-2022-1096 This third-party library is used in the Delft-FEWS component: Web Browser Display. The analysis, measures and communication around this vulnerability can be found on this [WIKI page](#).

4.4 Spring4shell vulnerability

We were alarmed via our OWASP server checks on the 29th of March 2022 about an issue regarding Spring4Shell. This vulnerability was logged as: CVE-2022-22965 This third-party library is used the Delft-FEWS components: Admin Interface and Open Archive (THREDDS/Elastic). The analysis, measures and communication around this vulnerability can be found on this [WIKI page](#).

5 Delft-FEWS 2022.01: Client-Server system

5.1 Introduction

An installation of or an upgrade to 2022.01 follows – in general - the new and simplified [installation](#) and [upgrade](#) steps described on the Delft-FEWS WIKI. Both procedures have a large overlap in terms of number/types of steps.

We strongly recommend following the special upgrade path pages (from a certain version to the next version). An overview can be found here: [Upgrade paths – overview](#).

For the specific upgrade from 2021.02 to 2022.01 you can directly go [here](#).

On the renewed [Delft-FEWS Upgrade page](#) you also find information (per version) about:

- [What's new in the Installation process](#) (general) and for [2022.01](#) in particular
- [Database release notes for Database Administrators](#)

Other relevant documentation (per version) can be found on the WIKI as well:

- [Admin Manuals](#)
- [Connectivity Guides](#)

On request, Linux RPMs or MS Windows MSIs can be provided. Some instructions may be required (by Deltares ICT). The following components are deployable via an RPM or MSI.

There are RPM and MSIs available for:

- Delft-FEWS Master Controller / FSS binaries (including launcher)

And RPMs available only for:

- Tomcat9
- Delft-FEWS Admin Interface
- Delft-FEWS HTTPS Proxy
- Delft-FEWS Web services
- Delft-FEWS Open Archive

If you are interested in using RPMs (or MSIs), please contact fews.support@deltares.nl or fews-pm@deltares.nl

5.2 What's new in the installation process

As mentioned in the introduction, the new steps in the installation process for Delft-FEWS 2022.01 can be found [here](#).

5.3 Relevant aspects (server side)

The used JDK/JRE version for the backend is: 11.0.15.9.1

Other hardware and software requirements for this version can be found [here](#).

6 Delft-FEWS 2022.01: Web services (API)

6.1 Introduction

The [Delft-FEWS Web Services](#) provide different webservice API's to exchange data with Delft-FEWS. Most commonly used variants are:

- [FEWS PI REST Web Service](#)
- [FEWS WMS Web Service](#)
- [FEWS SSD Web Service](#)
- [WaterML2 Web Service](#)

6.2 What's new in the installation process

The installation of the Delft-FEWS web services can be found [here](#).

6.3 Relevant aspects (Delft-FEWS web services)

Around 4 new features and 2 maintenance actions have been applied to the Delft-FEWS Web Services

JIRA references	Delft-FEWS Web Service	Description – Explanation
FEWS-26115 FEWS-18926	General	Support for Open ID Connect Testcases added for User and Group Permissions
FEWS-21144 FEWS-25699	PI-REST	Added limit symbols Improved response when no events present
FEWS-25792	WMS	New button for auto-downloading grids in Spatial Display
FEWS-26843	PI-SOAP	Code removed

Since 2021.02 The documentation about the Delft-FEWS web services is (also) provided in Open API specification format [here](#).

Other hardware and software requirements for this version of the Delft-FEWS webservices can be found [here](#).

7 Delft-FEWS 2022.01: Open Archive

7.1 Introduction

The Delft-FEWS Open Archive is the (optional) long term storage solution next to a Delft-FEWS Client-Server system. It consists of the following components

- Delft-FEWS Archive Server and
- Delft-FEWS Archive Admin GUI
- Harvester based on ElasticSearch
- Delft-FEWS Archive Display
- Delft-FEWS Archive Export and Import workflows

And the data can be in one or more of the below mentioned storages

- Delft-FEWS Open Archive file system
- External NetCDF Storage
- MongoDB database storage

The [landing page](#), [installation](#) and [upgrade](#) pages can be found by clicking the links.

7.2 What's new in the installation process

For this version, due to the log4J 2/log4Shell vulnerabilities, the installation/upgrade to Open Archive 2022.01 has slightly changed. This [page](#) describes the details.

7.3 Relevant aspects (Open Archive)

Around 12 new features and 2 maintenance issues have been implemented in this version.

JIRA references	Archive Component	Description – Explanation
FEWS-23669 FEWS-26870 FEWS-25059 FEWS-23695 FEWS-25839 FEWS-25840 FEWS-25811 FEWS-25810	Archive Server	Implemented seamless integration with Open Database REST API Improved message when removing data Improved message and file closing when exploring (rare occasions) Set up test automation Exporting simulated series in self-describing NetCDF files Importing simulated series from an External NetCDF storage Facilitate URL downloads without OpenDAP New endpoint: URLs to be imported by FSS
FEWS-23688 FEWS-22159	Archive Display	Extend archive display with additional features to retrieve data from the MongoDB (open archive database API) Search for what-if scenarios
FEWS-25978 FEWS-26749	Archive Export/Import	Treat all archive export runs equally (no matter if there are local or server runs) Enable import and export of multi-value location attribute modifiers.
FEWS-25886	Harvester	Harvester extended to enable harvesting simulated series from the External NetCDF Storage.
FEWS-25654	Archive Admin GUI	Allow scheduling of maintenance tasks

8 Documentation

8.1 Introduction

The Delft-FEWS WIKI is (still) growing and evolving and we are trying to keep it as up-to-date as possible. Main start page is [here](#).

8.2 System administrator documentation

Early 2022, we have re-arranged some pages in the (restricted) [System Installation Section](#). In several places we have introduced version specific installation or upgrade pages so that it is absolutely clear what needs to be done while installing or upgrading. This approach is available for:

- [Installing Delft-FEWS](#) (and many underlying steps)
- [What's new in the installation process?](#)
- [Upgrading paths for Delft-FEWS](#)

Also for the [Hardware and Software requirements page](#) this approach is chosen.

A new page (under construction) is the [Delft-FEWS Upgrade Strategy page](#). This page is meant to provide a detailed insight until what Delft-FEWS version certain third-party libraries, Operating System versions and Database versions are supported.

8.3 Feature documentation

Most new features mentioned in the appendices have a link to the WIKI where you can find more details about the background, usage and – if applicable – how to configure that features.

Another, publicly accessible (and growing) source of documentation can be found under <https://fewsdocs.deltares.nl/>

You can find the following here:

- [Latest XSD schemas](#)
- [Granted features future releases](#)
- Delft-FEWS Web service (Open API format)
 - [REST web service](#)
 - [WMS web service](#)
 - [SSD web service](#)
- [Admin Interface API](#)

A List of New Features in Delft-FEWS 2022.01

See: [New Features \(draft, in pdf\)](#)

B List of solved bugs in Delft-FEWS 2022.01

See: [Resolved Bugs \(draft, in pdf\)](#)

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