

Delft-FEWS Stable Release 2023.02

Release Notes



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Release Notes

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Summary

This document contains the release notes for Delft-FEWS Stable Release 2023.02

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1 Introduction

1.1 General

This document is the overall Release Notes Document for the Delft-FEWS Stable 2023.02 version which was released **on 22th of December 2023**.

This release contains around **100+ new features** (paid by implementation projects, clients with a support contract, internal funding etc) for 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, the changes started in the 2022.01 Release Notes document are continued. Separate chapters are available for: the Delft-FEWS Vision 2025/Roadmap (2023), Security aspects and Documentation.

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

From now on, all new features are being published online (per version) on the [Release Notes page](#). Please visit this [page](#) to select the version of your choice. Be aware that some features might get backported to previous versions and will be visible later on in these overviews as well. These online release notes are generated once a day.

The complete overview of fixed bugs can be found in appendix A.

2 Delft-FEWS 2023.02: Highlights of the new features and solved bugs

2.1 New features

The following new features are the most relevant or important highlights of this release (ordered by component). All new features can be found [here](#). New features for the server side, web services and open archive can be found in other chapters.

JIRA reference	Component	Description - Explanation
FEWS-29730	TimeSeriesDisplay	Interaction Scatter Plot as new plot type
FEWS-28629	General adapter Model adapter	New Integrated Reservoir Model
FEWS-29097 FEWS-29098	Historic Events	Historic events can be plotted on both left and right axis Multiple historic events can be plotted at the same time
FEWS-29490	TimeSeries Export	External Location Name function added
FEWS-28965	Admin Interface	Export Status Information
FEWS-28969	Tabular Config Files	Metadata Manager Solution

2.2 Solved Bugs

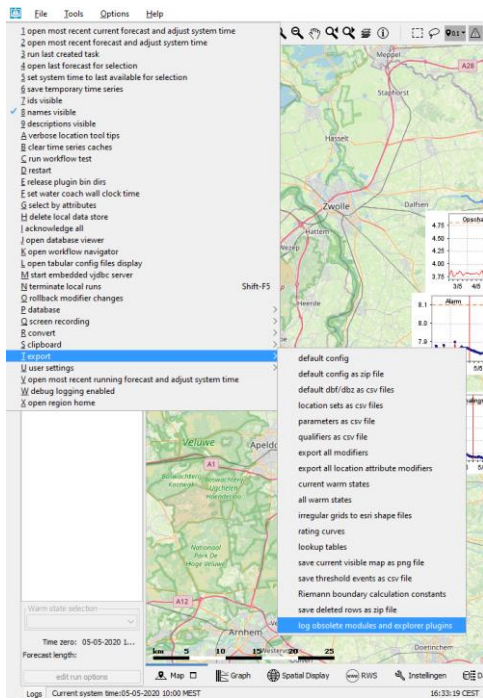
This selection of bugs is constructed based on an analysis of the commit and comment activities in our issue tracking system (in JIRA). The main selection criterium is the impact of the solved bug.

JIRA reference	Component	Description - Explanation

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

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 2023

3.1 Introduction

This Delft-FEWS version contains several features that have been implemented as part of the Delft-FEWS Vision 2025. This 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](#).

2023 is the fourth (yearly) roadmap of implementing the Delft-FEWS 2025 Vision. Use the links above to review the original storylines, plans and ideas in this vision. This year's focus has been on the continuation of the major roadmap themes: Code quality and code clean-up. In the theme around security and cloud we have taken the next steps and we have established our OWASP procedure and we have been co-creating around (automatic) up and downscaling of Forecasting Shell Servers. A new roadmap theme will be shaped around integrating Python into Delft-FEWS.

The sections below give an overview of the progress in 2023.

3.2 Roadmap 2023 plans per theme

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

3.2.1 Code clean-up

A continuation of code clean-up activities have taken place in 2023. The list containing functionalities which will be removed is kept up-to-date on this [page](#). Please check your configuration using the <F12> option to verify if you need to replace or upgrade configuration files. If you need support, please reach out to fews.support@deltares.nl

The main changes of the code cleanup activities compared to 2022.2 are that the End of Live date of some displays and modules has been extended from 2024.01 to 2025.01. This will give some organisations more time to convert the end of live modules to the new modules. This concerns the following Delft-FEWS modules:

- What-If display: extended to 2025.01.
- Old Transformation Module: extended to 2025.01. Not all existing functions have been migrated to the new transformation module. If we do not receive any more requests in 2023, this module will be removed from the Delft-FEWS code in 2025.01.
- Performance Indicator Module: This module is still used by many Delft-FEWS users. The functions in this module have not been moved to the new transformation module yet.

We request Delft-FEWS users again to check their Delft-FEWS configuration with the F12 – Code clean-up functionality and send their logs to Deltares.

Additional to the Delft-FEWS code cleanup functionality there is also functionality developed for configuration clean-up. See the WIKI [page](#).

3.2.2 Code quality

SonarQube is monitoring our code commits on a daily basis. Since its introduction in May 2020 we adopted the approach to only add 'clean code', making sure all *traffic lights* on SonarQube's dashboard are green (bugs, security hotspots, code-smells). At the same time, we try to work our way back through the complete code base, repair and improve the code when fixing bugs and increase the unit test coverage continuously.

The table below presents the situation of early December with respect to New Code (committed since May 2020)

Components	Bugs (#)	Vulnerabilities (#)	Code Smells (#)	Coverage (%)	Dupl. (%)	Lines (K)
Delft-FEWS Webservice	0	0	437	75.0%	1.4%	21
Delft-FEWS Admin Interface	0	0	151	45.6%	2.5%	6.6
Delft-FEWS GUI Desktop	0	0	1900	16.9%	2.9%	78
Delft-FEWS Workflows	0	0	448	62.0%	1.9%	13
Delft-FEWS General Java Utils	0	0	555	65.1%	5.6%	35
Delft-FEWS Commons	0	0	308	49.8%	2.4%	19
Delft-FEWS SQL	0	0	67	43.4%	1.7%	6.5
Delft-FEWS Datastore	0	0	772	63.6%	1.4%	47
Delft-FEWS Import-Export	0	0	766	59.0%	6.0%	25
Delft-FEWS Transformation Module	0	0	381	78.7%	13.9%	10
Delft-FEWS Master Controller	0	0	100	49.7%	1.7%	5
Delft-FEWS Open Archive	0	0	571	73.9%	1.2%	22

The table below presents the situation of early December with respect to Overall Code.

Components	Bugs (#)	Vulnerabilities (#)	Code Smells (#)	Coverage (%)	Dupl. (%)	Lines (K)
Delft-FEWS Webservice	0	0	680	72.3%	2.2%	34
Delft-FEWS Admin Interface	0	0	251	46.3%	1.3%	17
Delft-FEWS GUI Desktop	0	0	9600	18.7%	3.3%	261
Delft-FEWS Workflows	0	0	3300	59.3%	3.0%	59
Delft-FEWS General Java Utils	0	0	2600	64.1%	8.4%	116
Delft-FEWS Commons	0	0	664	53.2%	1.9%	35
Delft-FEWS SQL	0	0	205	44.4%	3.1%	19
Delft-FEWS Datastore	0	0	1800	66.3%	2.7%	143
Delft-FEWS Import-Export	0	0	3700	64.4%	4.8%	87
Delft-FEWS Transformation Module	0	0	2400	73.8%	6.4%	47
Delft-FEWS Master Controller	0	0	165	48.3%	1.4%	8
Delft-FEWS Open Archive	0	0	961	74.3%	1.7%	35

We are intensifying the use of the SonarQube tool. Besides that we actively maintain the (newly structured) [Delft-FEWS hard and software requirements page](#) and have launched 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.

3.2.3 Third party library upgrades

Issue	file	description
FEWS-29361	mongodb/archive-database-1.2.jar	Updated, to Configure how FEWS archive folder structure is applied
FEWS-29496	guava/guava-32.0.1-jre.jar	OWASP CVE-2023-2976
FEWS-29582	myswing/myswing-20070720p.jar	Patched, to implement Incremental search.
FEWS-29644	spring-security/*.jar	OWASP CVE-2023-34034
FEWS-28221	commons-codec/commons-codec-1.16.0.jar	Updated, to restore SOAP webservice in older branch
FEWS-29488	jemp/jep-4.1.1.jar jep.dll libjep.so	Java Embedded Python
FEWS-29724	hdf-java/*.jar *.dll *.so	Updated, HDF-Java version was very old (2010)
FEWS-29778	netCDF/grib-5.5.2.jar	Patched to fix a bug
FEWS-29853	postgresql/postgresql-42.6.0.jar	Update Postgresql driver to postgresql-42.6.0.jar
FEWS-29853	oracle/ojdbc11-23.2.0.0.jar	Update Oracle driver to ojdbc11-23.2.0.0.jar
FEWS-29853	firebird/jaybird-5.0.2.java11.jar	Update Firebird driver to jaybird-5.0.2.java11.jar
FEWS-29853	mssql-jdbc/mssql-jdbc-12.4.1.jre11.jar	Update SQLServer driver to mssql-jdbc-12.4.1.jre11.jar
FEWS-28974	azure/*.jar	Azure Keyvault Integration from Delft-FEWS components
	reactive-streams/*.jar	
FEWS-29518	azure/azure-core-http-okhttp-1.11.13.jar	SQL server Azure Active Directory integration
	azure/azure-json-1.1.0.jar	
	kotlin/kotlin-stdlib-1.9.10.jar	
	nimbusds/content-type-2.2.jar	
	okhttp/okhttp-4.11.0-sources.jar	
	okio/okio-3.6.0.jar	
FEWS-24788	reactor/reactor-core-3.5.10.jar	
FEWS-24788	tomcat-embedded/*.jar	OWASP CVE-2023-41080
FEWS-24788	xmlgraphics-commons/xmlgraphics-commons-2.9.jar	OWASP CVE-2021-37533
FEWS-30018	azure/azure-identity-1.10.3.jar	OWASP CVE-2023-36414

3.2.4 Security and cloud

This year we have improved the OWASP security scan reporting all security warnings for third party libraries with CVE level 6 ('medium') or higher on all supported software versions. All reported vulnerabilities are evaluated. When severity is high, we will launch a pro-active communication campaign. In many cases the resolution to a vulnerability will be an updated library. This will be implemented in the relevant supported software versions and distributed in the form of a patch or, if necessary, in a new basebuild. In other cases, a (temporary) resolution to a vulnerability could be to implement some extra safety measures. That will be communicated as part of our mitigation plan. For less urgent vulnerabilities a separate WIKI [page](#) is maintained.

The security matrix and descriptive documents are ready and are available on request. Our end user organizations can contact Delft-FEWS product management to discuss the details and impact described in this security matrix. Furthermore, the release-based Connectivity Guide and Admin Guide will contain additional information on the how-to create a secure Delft-FEWS environment.

Recently carried out penetration test results have been shared with the development team and led to several security improvements. More security information can be found in chapter 4.

3.2.5 Release Test Automation

This year we have started a pilot to explore different options to improve automatic testing of Graphical User Interfaces (GUI). One of the results was a successful implementation of a framework for automatic GUI tests. As a follow-up we have defined a strategy for the implementation of automatic tests for GUIs in the form of a two-step approach; first separate the business logic from the GUI layer, make the GUI layer as 'thin' as possible and implement

Unit tests for the business logic. The second step is to make use of the testing framework for further GUI Tests automation. With the 2023.02 release we will apply this method for the intervalStatistics module in Delft-FEWS.

3.2.6 Python integration

The goal was to implement the Java Embedded Python (JEP) package in Delft-FEWS and start with the General Adapter (GA) module first (to run Python scripts). A second objective was to incorporate this in the Transformation Module.

In the GA an *executePythonActivity* option was added. While researching and piloting the JEP we ran into a number of issues:

- Multi-threading issues (limitations on Python side)
- JEP needs to be compiled per OS and Python-version → create maintenance burden(!)
- Within one FEWS (JVM) session JEP can only use one Python version
- JEP has no standard way to switch between Python “virtual environments” (that may come with different modules in Delft-FEWS project)

Based on the above, our conclusion was that the added value of JEP is none (compared to running python from FEWS which is already possible). Therefore we removed the *executePythonActivity* again as GA configuration option (to set expectations). In 2024, we will focus on the transformation module (and limit flexibility on python-version side).

3.2.7 Other developments: Web OC

In 2023, a Minimum Viable Product (MVP) of the Delft-FEWS Web Operator Client will be released. This version has the following principles and main functionalities:

- Web OC configuration managed from Delft-FEWS configuration
- Use topology for navigation
- Visualization of data
 - Scalar time series from filters and display groups (graph and table) + data quality flags
 - Spatial data
 - Schematic Status Display + click-actions
- Visualization of monitoring information
 - Running tasks
 - Import status

All relevant information about the latest status and documentation can be found here: [Delft-FEWS Web OC documentation on GitHub](#)

3.2.8 Other developments: FSS Scaling

In Delft-FEWS 2023.02, the plumbing for FSS scaling is available but cannot be used operationally yet. The conceptual change that a FSS (group) can be set to “hibernate” is new. Specific (data intensive, calculation intensive) workflows are allowed to run on this FSS and only for that reason a FSS is woken up. In this way, only ‘awake’ FSSs will consume CPU time (and energy) and costs can be limited. In 2024 we will continue this roadmap theme by focusing on the use-cases together with HKV and Nelen & Schuurmans.

3.2.9 Archive Vision

A product vision for the Open Archive has been developed. See section 7.4 for more information.

3.2.10 Prepare for the next Delft-FEWS vision

Next year, 2024 will be the last year of the current Delft-FEWS vision. Q1/Q2 will be used to evaluate this current vision and start preparing a new one. Keep an eye on the [Delft-FEWS portal](#) for updates.

4 Delft-FEWS 2023.02: Security aspects

4.1 Introduction

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

In the second half of 2023, no major 'zero-day' vulnerabilities occurred.

Based on earlier occurrences (e.g. log4J, Spring4Shell) Delft-FEWS Product Management implemented a more pro-active approach by:

- Having a Delft-FEWS security matrix and description in place (see Roadmap theme, see previous chapter)
- Daily OWASP checks on the *build* environments on all supported branches
- Reporting on third party library vulnerability assessments
- Maintaining an Upgrade and Update strategy

Since 2023.02 it is possible to integrate Open ID Connect in most Delft-FEWS components. This setup has been tested with the Azure Entra ID implementation of Open ID Connect. More details can be found [here](#). And an initial version of integrating the Azure KeyVault for Client Secrets has been developed. Final delivery will be in 2024.01.

4.2 Daily OWASP checks, assessments and communication

On the TeamCity build & compile environments daily OWASP checks have been implemented for the Delft-FEWS branches: trunk, 2023.02, 2023.01, 2022.02, 2022.01 and 2021.02.

Outcomes will be discussed in the daily stand-up meetings and will result in actions and communications according to our procedures.

On a [dedicated CVE issues page](#) on our Delft-FEWS WIKI detected vulnerabilities, our analysis and status are reported.

This year we have improved the OWASP security scan reporting all security warnings for third party libraries with CVE level 6 ('medium') or higher on all supported software versions. All reported vulnerabilities are evaluated. When severity is high, we will launch a pro-active communication campaign. In many cases the resolution to a vulnerability will be an updated library. This will be implemented in the relevant supported software versions and distributed in the form of a patch or, if necessary, in a new basebuild. In other cases, a (temporary) resolution to a vulnerability could be to implement some extra safety measures. That will be communicated as part of our mitigation plan. For less urgent vulnerabilities a separate WIKI page is maintained.

4.3 Upgrade and update strategy

Delft-FEWS PM maintains [a password protected page](#) for detailing out the Delft-FEWS upgrade/update strategy - per release - with respect to:

- Supported versions of (central) databases: Oracle, PostgreSQL and SQLServer;
- Supported versions of operating systems (linux, Windows);
- Java JDK;

- Important middleware: Tomcat, OpenSearch, Thredds, JCEF;
- Important third party libraries (e.g. log4j);

On request Delft-FEWS PM can share this with end-users/organizations having a Support & Maintenance agreement in place. Please contact fews.support@deltares.nl.

4.4 Security Documents

Different security documents are available:

1. Security Matrix and Description
2. Admin Manuals
3. Connectivity Guide

See the table below for more information.

	Security Matrix + Description	Admin Manuals	Connectivity Guide
Location	Delft-FEWS PM one drive	Admin Manuals	Connectivity Guide
Available	Deltares (-USA) Clients (on request + discussion)	WIKI (login required)	WIKI (login required)
Status	Available	Available for: 2018.02 – 2023.01	Available for: 2018.02 – 2023.01
Topic / focus	What security aspects are relevant for Delft-FEWS systems? And where to solve them.	Recommended deployment steps + explanation on how to install in a secure way	Even more technical details on the how to install the Delft-FEWS components secure.
2023 update	First version	Security aspects added	Security aspects added

5 Delft-FEWS 2023.02 Client-Server System

5.1 Introduction

An installation of the 2023.02 version or an upgrade to 2023.02 follows – in general - the new and simplified [installation](#) or [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 2023.01 to 2023.02 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 [2023.02](#) in particular
- [Database release notes for Database Administrators](#)

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

- [Admin Manuals - 2023.02 version](#)
- [Connectivity Guides – 2023.02 version](#)

On request, Linux RPMs can be provided. Some instructions may be required (by Deltares ICT). For this version, for Windows, we are in the process of supporting installing Delft-FEWS components using PowerShell scripts. This is beta-functionality at this moment. Please contact us for more information on this topic (e-mail, see below). Rationale for this shift to PowerShell scripts is the EoL policy of MSI support by Microsoft.

RPMs are available for:

- Delft-FEWS Master Controller / FSS binaries (including launcher services). This RPM can also be used for installing the OC (remark: services can be left *disabled*)
- Tomcat10
- Delft-FEWS Admin Interface
- Delft-FEWS HTTPS Proxy
- Delft-FEWS Web services
- Delft-FEWS Open Archive

If you are interested in using RPMs (or), 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 2023.02 can be found [here](#)

5.3 Relevant new features and aspects

Below most relevant system improvements in this version are mentioned. All new features can be found [here](#).

JIRA references	Delft-FEWS server side component	Description – Explanation
-----------------	----------------------------------	---------------------------

FEWS-28965	Admin Interface	Export page added
FEWS-29912	Admin Interface	Download files from Files folder
FEWS-29650	Admin Interface	Enable/visualize Azure VM FSS groups
FEWS-29557	Forecasting Shell Server	Added hibernate status (beta status, for FSS scaling)
FEWS-29456	Master Controller	Enabled storing Azure subscription details
FEWS-29853	Central Database	All JDBC drivers updated

The used JRE version for the backend is: 17.0.9 (Amazon Corretto 17 TLS).

Based on this (extracted) JRE package of 300 Mb, an optimized subset is being created for both Linux and Windows Operating Systems (OS).

During compiling the Delft-FEWS binaries, this results in 62 Mb (unzipped) JRE folder for Linux and a 50 Mb JRE folder for Windows as part of the binaries. After uploading these binaries via the Admin Interface, only the relevant OS-specific binaries and JRE folders are downloaded to the components (FSS, OCs) of the Delft-FEWS client-server system. This optimization is implemented to avoid unnecessary downloads since there's no need for Linux SO files on Windows systems or Windows dll's on Linux servers.

More details on the hardware and software requirements for this version can be found [here](#).

6 Delft-FEWS 2023.02: 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](#)
- [FEWS WFS 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 new features and aspects

Around 13 new features have been implemented for the Delft-FEWS Web Services. Most relevant features are mentioned below.

JIRA references	Delft-FEWS Web Service	Description – Explanation
FEWS-29588	PI-REST	filterIds and grid display selection available in topology/nodes response
FEWS-29590	PI-REST	Configuration added to response of timeseries/grid? endpoint
FEWS-29636	PI-REST	Added comma separation of locations, parameters, etc for REST queries
FEWS-29780	WMS	unitSymbol added to dimension element (name=elevation) in getCapabilities

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 2023.02: 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;
- Delft-FEWS Archive Admin GUI;
- Harvester based on OpenSearch
- 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

There are some new points of attention for installing the Open Archive. Details can be found [here](#). From this version onwards, the Open Archive can be secured using Open ID Connect. [This page](#) explains how.

The hard and software requirements for the Open Archive can be found [here](#).

7.3 Relevant new features and aspects

Around 14 new features have been implemented in this version. Most relevant features are listed below.

JIRA references	Archive Component	Description – Explanation
FEWS-27912 FEWS-27919	Open Archive Display	Integration of Open ID Connect
FEWS-28917	MongoDB	Integrated Simulated Historical Data in seamless integration
FEWS-28337	Archive Export	New NetCDF format for non-equidistant series

7.4 Product Vision Open Archive

In Q4 of 2023, a new product vision for the open archive has been developed. As part of our roadmap in 2024, this product vision will be shared [here](#). At the moment of writing this release document, the product vision and the corresponding plans for implementation are not exactly known. However, it is certain that recommendations from this product vision will be implemented in the years to come, starting in 2024.

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](#)

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

A password protected wiki page is the [Delft-FEWS Upgrade Strategy page](#). This page is meant to provide a detailed insight about which third-party libraries, Operating System versions and Database versions are supported for which Delft-FEWS versions.

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 the 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](#)
- [Release Notes](#) for 2022.01 and higher
- [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 solved bugs

The list of solved bugs can be found [here](#).

Deltares is an independent institute for applied research in the field of water and subsurface. Throughout the world, we work on smart solutions for people, environment and society.

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