

Dewesoft Historian Manual



APPLICATION USER MANUAL

Dewesoft Historian V24-1



Table of contents

Table of contents	2
1. System overview	3
2. Installation and configuration	6
2.1 DewesoftX Historian Client plugin	6
2.2 Dewesoft Historian (server) Installation	12
2.2.1. Docker platform installation on a PC	12
2.2.2. Docker platform installation on a Server (own or 3rd party)	13
Firewall considerations	14
MQTT settings	14
2.2.3 Dewesoft Historian License	16
2.2.4 Grafana web client configuration	16
2.2.4.1 Grafana - displaying data	18
2.2.4.2 Grafana - working with dashboards and panels	21
2.2.4.3 Grafana plugins setup	22
2.3. Dewesoft-X-Historian-View-Client Installation	25
2.3.1 Dewesoft-X-Historian-Client	25
2.3.2 Historian Importer	25
Installation	25
How to import data	25
2.4. Database	29
2.4.1 Data retention policies	29
3. MQTT message description	31
3.1 Structure of data	31
A note on Dewesoft “sampling” property	34
3.2 Structure of metadata	34
About this document	40
Legend	40
Warranty information	40
Calibration	40
Support	41
Service/repair	41
Restricted Rights	41
Printing History	41
Copyright	41
Trademarks	41
Safety instructions	42
Safety symbols in the manual	42
General Safety Instructions	42
Environmental Considerations	42
Product End-of-Life Handling	42
System and Components Recycling	42
General safety and hazard warnings for all Dewesoft systems	42
Documentation version history	46

1. System overview

Dewesoft Historian is a software solution that enables continuous measurement and storing into a database from Dewesoft Measurement Units as well as the access to the database using a web browser or DewesoftX software. Dewesoft Historian consists of several software components that usually run on different systems (measurement units, servers, client PCs).

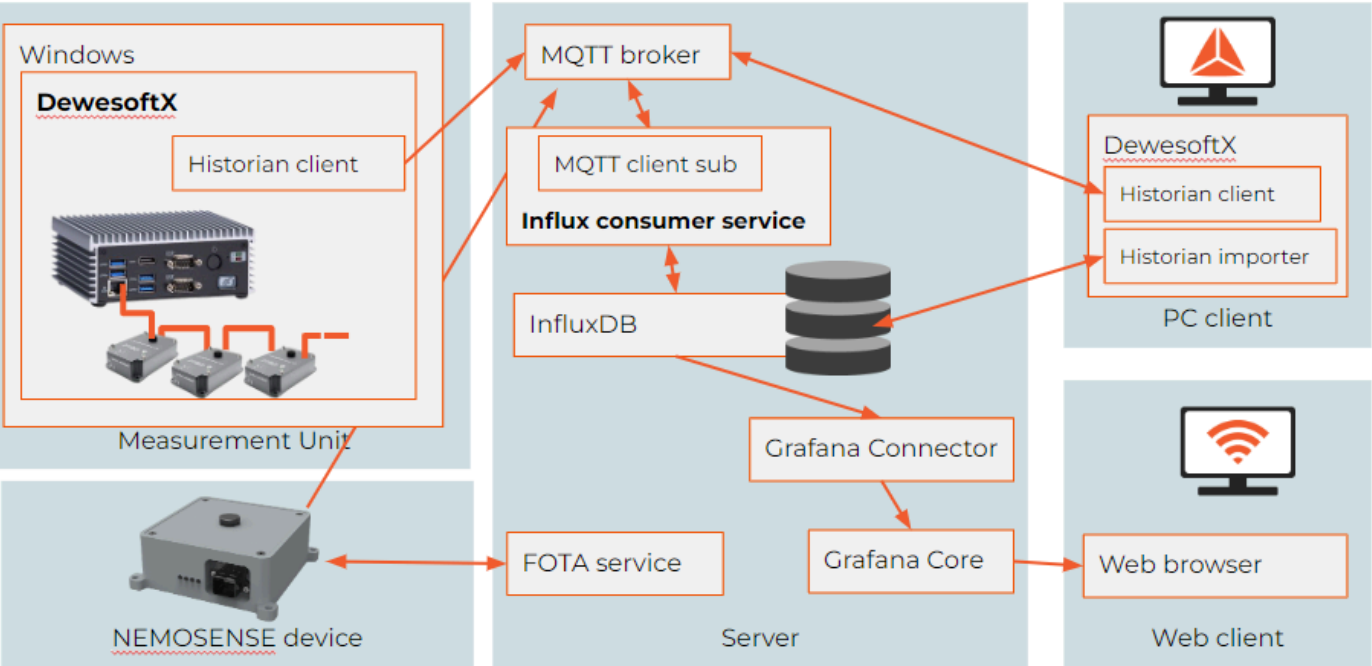
Measurement Units, databases and clients within the Dewesoft Historian system communicate over the MQTT protocol which enables each component to run on a separate computing system at any location with internet access.

Figure below shows the principal purpose of Dewesoft Historian: providing an environment that allows continuous storage of measurement data and access to that data from any location.



Principal purpose of Dewesoft Historian

To achieve the functionality described above several software components need to be used. The figure below shows the key components of Dewesoft Historian.



Key components of Dewesoft Historian. InfluxDB and Grafana are open source projects used within the Dewesoft Historian software solution

Dewesoft Historian solution is composed of the following licenses and subcomponents:

License	Components
Dewesoft-X-Historian-Client	DewesoftX Historian Client plugin
Dewesoft-Historian	Docker package consisting of: MQTT broker Influx consumer service InfluxDB database Grafana Connector Grafana Core Grafana GUI
Dewesoft-X-Historian-View-client	DewesoftX Historian Client plugin DewesoftX Historian Importer plugin

Dewesoft-Historian works with any of the following systems:

- **Measurement Units** (industrial PC) running instances of DewesoftX software with **DewesoftX Historian client** plugin installed
- **Dewesoft NEMOSENSE** devices



Note: 3rd party systems running MQTT client can, upon request, be connected to the MQTT broker. Please contact Dewesoft local support for further information.

Measurement Units typically perform calculations on raw data and only reduced data is sent over the Historian client plugin to be published on the MQTT broker.

Historian client is a Dewesoft X instance plugin running on a measurement unit. It is used to publish or subscribe the data, using the MQTT protocol, to/from the MQTT broker.

MQTT broker is the central component that temporarily holds the data published by Historian clients running on the Measurement units and serves the data either to the MQTT client subscribers that can be either Influx consumer service or Historian clients (Dewesoft X instances).

Influx consumer service subscribes to the MQTT broker and sends the data to the InfluxDB database, where the data is permanently stored.

InfluxDB time series database permanently stores the data. InfluxDB is a leading time series database solution designed with measurement applications in mind. Its open source version is used within the Dewesoft Historian solution.

DewesoftX Historian View Client is an instance of Dewesoft software that runs on client PCs and includes two plugins: **Historian Client** and **Historian Importer**. Historian Client plugin operates in Dewesoft's Measure mode and has the role of displaying live data from the measurement units.

Historian Importer plugin operates in Dewesoft's Analysis mode and allows the user to load historical data from the database into a Dewesoft .dxd data file for analysis

Grafana GUI is a visualization platform for measurement data that runs in a web browser. Its open source version is used within the Dewesoft Historian software solution. In its simplest form it only requires the **Grafana Core** installation running on the server which allows users from any web browser to connect to and visualize the data from the database. However, Dewesoft Historian license package includes the following enhancements of the solution:

- **Dewesoft Grafana Connector** which dramatically shortens the time it takes for Grafana to load long term historical data
- **Dewesoft Grafana plugins** which provide user interfaces not available in a standard Grafana such as 2D graph (called Vector) to display FFTs and similar data channels

2. Installation and configuration

This section will provide a guide to install and configure each of the Dewesoft Historian components.

2.1 DewesoftX Historian Client plugin

Installation

To stream the data from Dewesoft X software, the DewesoftX Historian Client plugin is required.

As of version 2023.3 onwards, the Dewesoft X installer already includes the aforementioned plugin.

In older Dewesoft X versions the plugin is NOT supported.

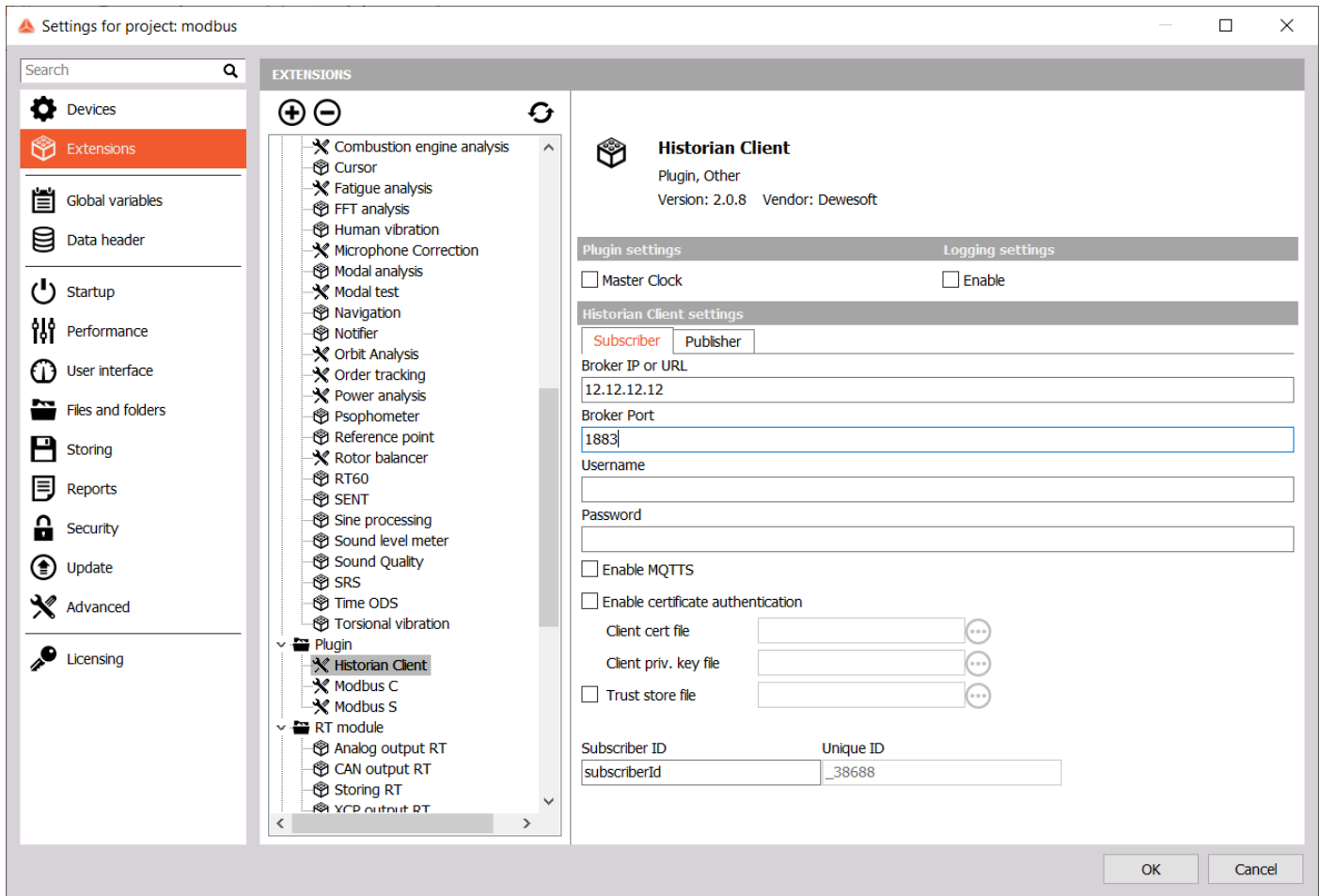
Configuration

Go to Options/Settings/Extensions and select Historian client

Clock mode

Master clock is only used when the plugin will subscribe to synchronous data and will be the clock master in DewesoftX, which means no other synchronous hardware can be connected to DewesoftX at the same time. Most of the user cases should NOT use the *Master clock* option.

Historian Client plugin includes both an Historian Subscriber client and an Historian Publisher client. Both operate individually within the same plugin and can in principle be connected to different brokers.



Subscriber tab in Settings screen configures the Historian Subscriber.

Master Clock: only used if the Subscriber is connected directly to a hardware device. Leave this option off for standard operation.

Logging settings

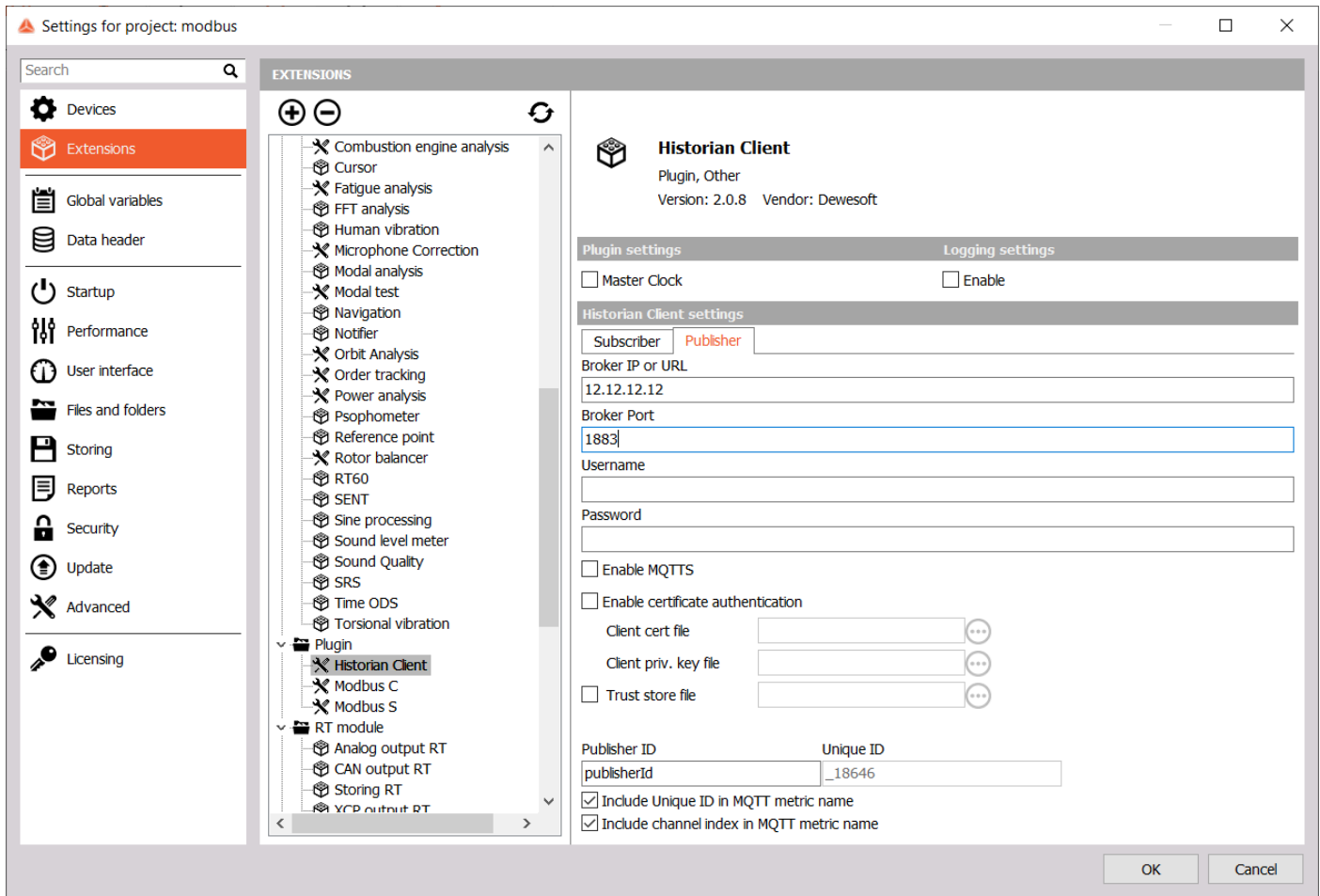
IP: IP address or URL of the MQTT broker

Port: port on the broker to which the client connects

If the MQTT broker requires the *Username* and *Password*, they can be set in their respective text fields.

Subscriber ID must always be unique, otherwise clients are mixed up on the MQTT broker. The initial part is user-settable, while the second part is software-generated. Each time the plugin is enabled in Dewesoft, the Unique ID changes (for example, when creating a new project).

MQTTs - secure connection - see the description of the settings in the following pages under Publisher settings. They are the same for Publisher and Subscriber.



Publisher tab in Settings screen configures the Historian Publisher.

Master Clock: only used if the Subscriber is connected directly to a hardware device. Leave this option off for standard operation.

IP: IP address or URL of the MQTT broker

Port: port on the broker to which the client connects

If the MQTT broker requires the *Username* and *Password*, they can be set in their respective text fields.

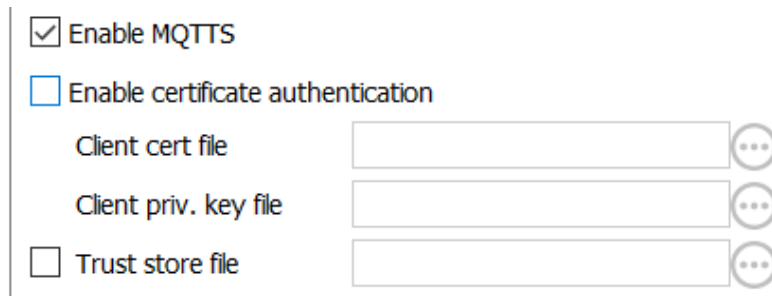
Publisher ID must always be unique, otherwise clients are mixed up on the MQTT broker. The initial part is user-settable, while the second part is software-generated.

It is possible to omit the *Unique ID* in MQTT metric name, which means that *Unique ID* will not be seen in the database. In such case it is especially important that the *Publisher IDs* are unique for each Publisher.

It is also possible to omit the *channel index* in the MQTT metric name. In such case it is important that all published channels have unique names, otherwise they will get mixed up in the database.

MQTTS - secure connection

Historian Client has a possibility to connect to Historian server using a secure, encrypted connection (MQTTS). To use the MQTTS, the checkbox MQTTS needs to be checked in plugin settings (for Subscriber and Publisher separately). Typically port 8883 is used for MQTTS, which is different to 1883 for unencrypted MQTT. Therefore the port might need to be changed when using MQTTS. The meaning of all the options is described below.



The image shows a configuration form for MQTTS. It contains four items: a checked checkbox for 'Enable MQTTS', an unchecked checkbox for 'Enable certificate authentication', and three text input fields with file selection icons (three dots in a circle) to the right. The first two input fields are labeled 'Client cert file' and 'Client priv. key file'. The third input field is preceded by an unchecked checkbox and labeled 'Trust store file'.

<input checked="" type="checkbox"/> Enable MQTTS	
<input type="checkbox"/> Enable certificate authentication	
Client cert file	<input type="text"/>
Client priv. key file	<input type="text"/>
<input type="checkbox"/> Trust store file	<input type="text"/>

MQTTS - enables basic MQTTS, which means that the communication between client and server is encrypted. No certificates are required on the client, as only the server (broker) certificate is needed for encryption. The broker might allow this connection, or it might also require client certificates (see next option).

Client certificate authentication - if the broker requires client authentication, client certificates need to be loaded. This prevents unauthenticated clients from connecting to the broker. Client certificates must be signed by the server certificate.

Trust store file - required if the client wants to verify the authenticity and validity of the server's public certificate. A trust store file containing the trusted Certificate Authority certificate needs to be provided in order to verify the server's public certificate.

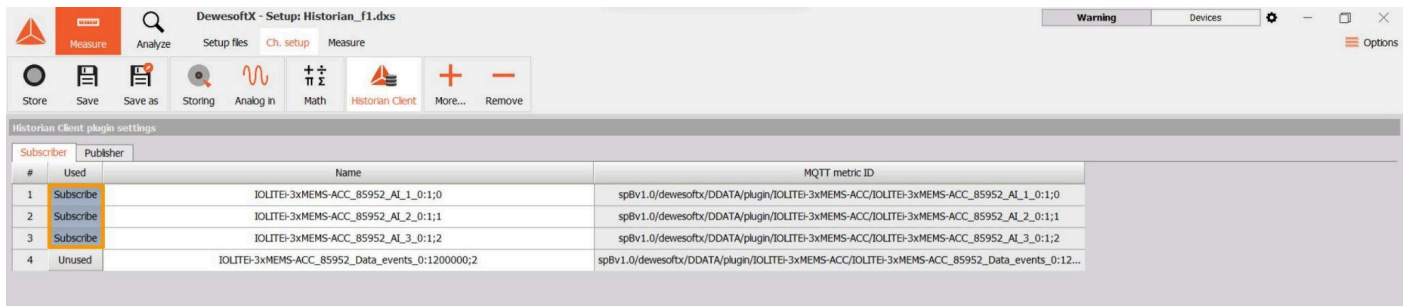
To enable MQTTS in Dewesoft Historian (server), the settings of the docker package might need to be modified as explained in the [Historian section](#).

Once the Historian Client plugin is enabled the Historian client icon should appear in Channel Setup.

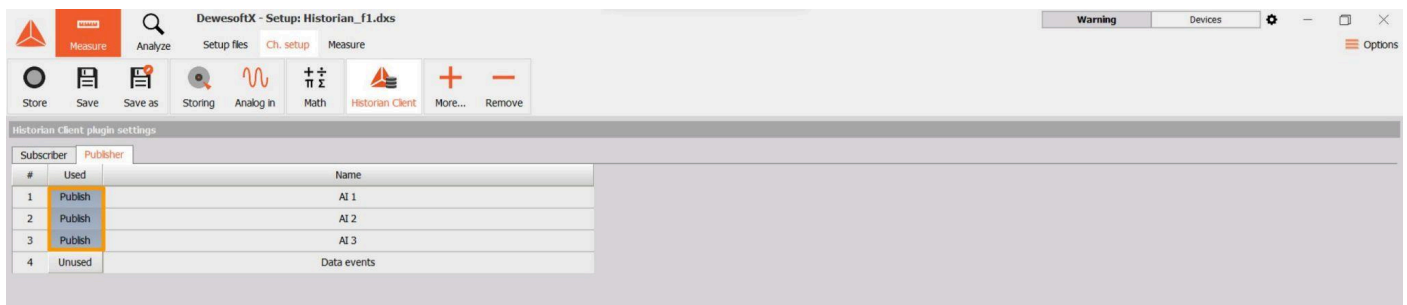


Note: to make the Historian client successfully connect to the broker, you will need to set up **Dewesoft Historian** on the server by and running the Docker compose package - see the section Dewesoft Historian Installation

Before entering the Historian client, some channels need to be Used in order to show up under Historian Client. In the example below we have an IOLITEi-3xMEMS-ACC module connected. We selected AI 1 and AI 2.

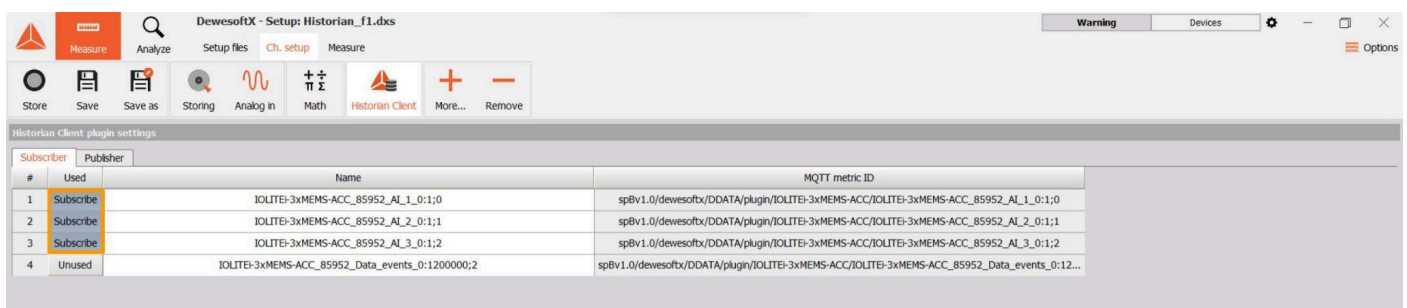


Open the Historian client and under the Publisher Tab, the AI 1 and AI 2 will be visible. Select them to be published.



To start publishing, go to measure mode. The data will be sent to the broker on the IP and port specified in the settings.

If we go again into the Historian client setup, the channels we published should now also be seen under the Subscriber tab as below:



Select them to be Used and go to Measure mode. Published channels should now be available next to the “original” AI 1 and AI 2 analog input channels.



2.2 Dewesoft Historian (server) Installation

As described in the previous section Dewesoft Historian consists of several components running on the same system using Docker, a set of platform as a service products that use OS-level virtualization to deliver software in packages called containers. Each Historian software element is stored in a separate container.

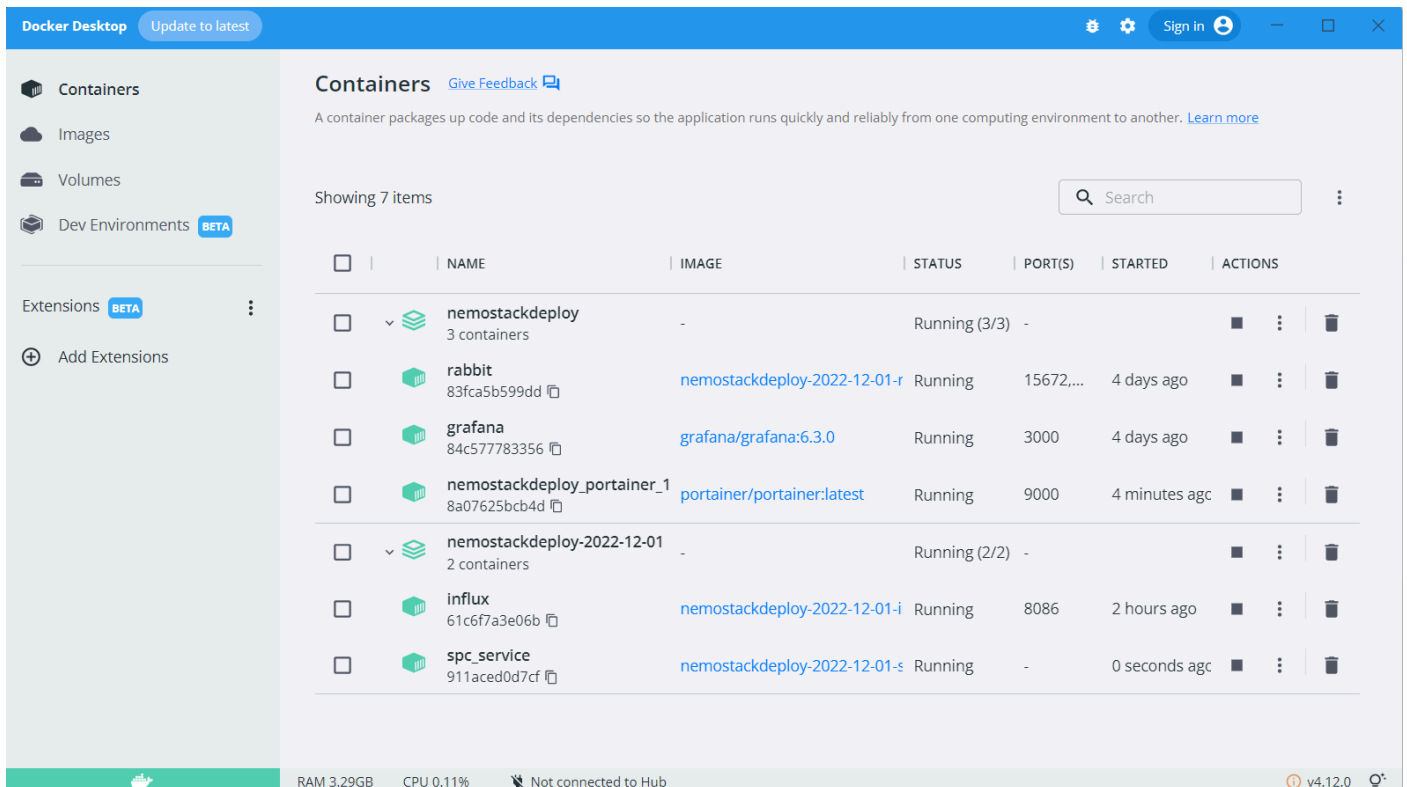
A typical installation hosts Docker, with all the Historian software elements, on the same system, normally on a Linux server. But they could also all run on a measurement unit, or each of them on different systems.

In general every component of Dewesoft Historian can reside on its own system/server/PC if there are sufficient connections available to the other components: TCP/IP access, static IP and appropriate ports open on the router.

2.2.1. Docker platform installation on a PC

[Download the package here](#) and unzip the files.

Please follow all the installation details by reading the README file. Once you installed Docker, please run the corresponding script for running the stack as described in the README file. You can verify the docker installation and deploy with the Docker Desktop application. After you run the Docker, the containers need to be colored green.



The screenshot shows the Docker Desktop application window. The left sidebar contains navigation options: Containers, Images, Volumes, Dev Environments (marked BETA), and Extensions (marked BETA). The main area is titled 'Containers' and shows a list of 7 items. The containers are listed in a table with columns: NAME, IMAGE, STATUS, PORT(S), STARTED, and ACTIONS. The containers are: nemostackdeploy (3 containers), rabbit (83fca5b599dd), grafana (84c577783356), nemostackdeploy_portainer_1 (8a07625bcb4d), nemostackdeploy-2022-12-01 (2 containers), influx (61c6f7a3e06b), and spc_service (911aced0d7cf). All containers are in a 'Running' state. The bottom status bar shows RAM usage at 3.29GB, CPU usage at 0.11%, and a note 'Not connected to Hub'.

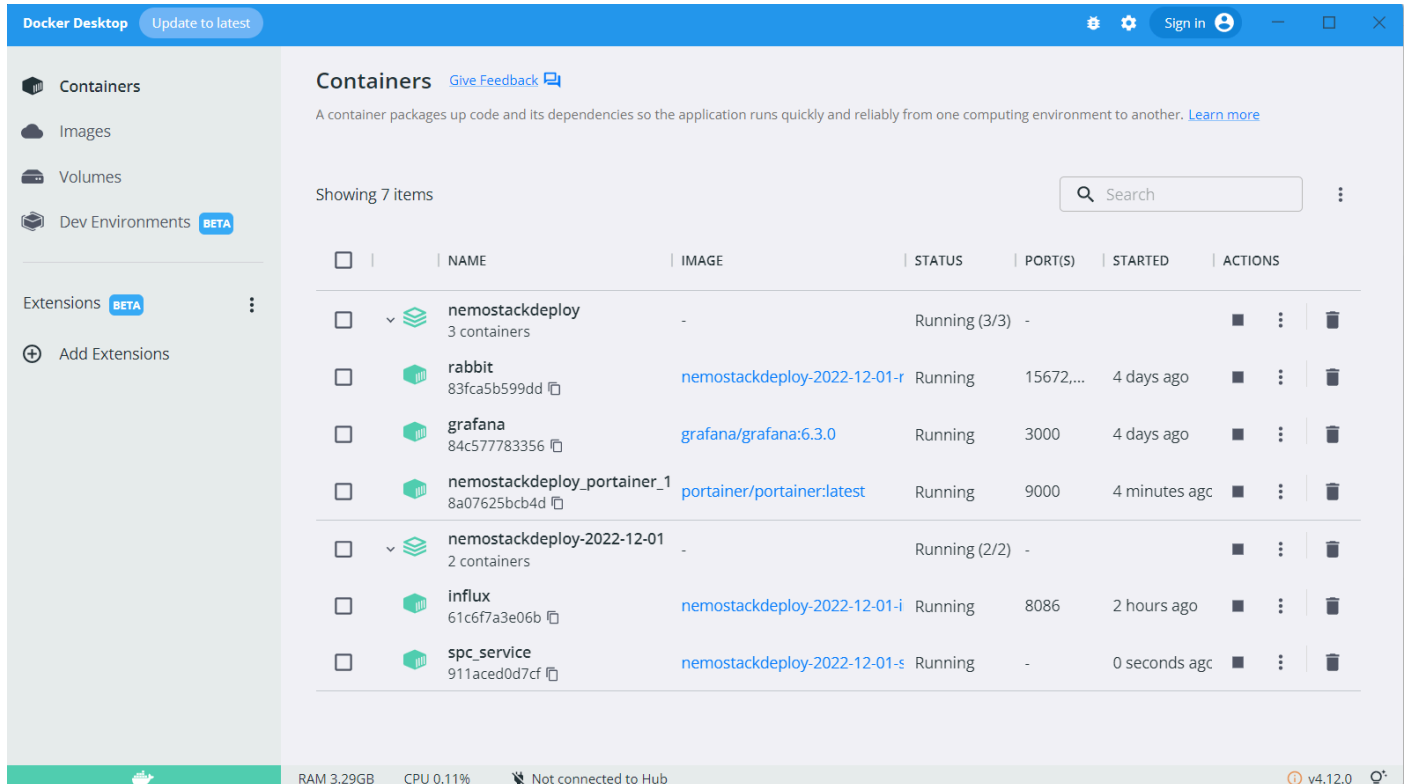
NAME	IMAGE	STATUS	PORT(S)	STARTED	ACTIONS
nemostackdeploy 3 containers	-	Running (3/3)	-	-	[Stop] [Refresh] [Delete]
rabbit 83fca5b599dd	nemostackdeploy-2022-12-01-r	Running	15672,...	4 days ago	[Stop] [Refresh] [Delete]
grafana 84c577783356	grafana/grafana:6.3.0	Running	3000	4 days ago	[Stop] [Refresh] [Delete]
nemostackdeploy_portainer_1 8a07625bcb4d	portainer/portainer:latest	Running	9000	4 minutes ago	[Stop] [Refresh] [Delete]
nemostackdeploy-2022-12-01 2 containers	-	Running (2/2)	-	-	[Stop] [Refresh] [Delete]
influx 61c6f7a3e06b	nemostackdeploy-2022-12-01-i	Running	8086	2 hours ago	[Stop] [Refresh] [Delete]
spc_service 911aced0d7cf	nemostackdeploy-2022-12-01-s	Running	-	0 seconds ago	[Stop] [Refresh] [Delete]

RAM 3.29GB CPU 0.11% Not connected to Hub v4.12.0

2.2.2. Docker platform installation on a Server (own or 3rd party)

[Download the package here](#) and unzip the files.

Please follow all the installation details by reading the README file. Once you installed docker, please run the corresponding script for running the stack as described in the README file. You can verify the docker installation and deploy with the docker desktop application. After you run the Docker, the containers need to be colored green.



Firewall considerations

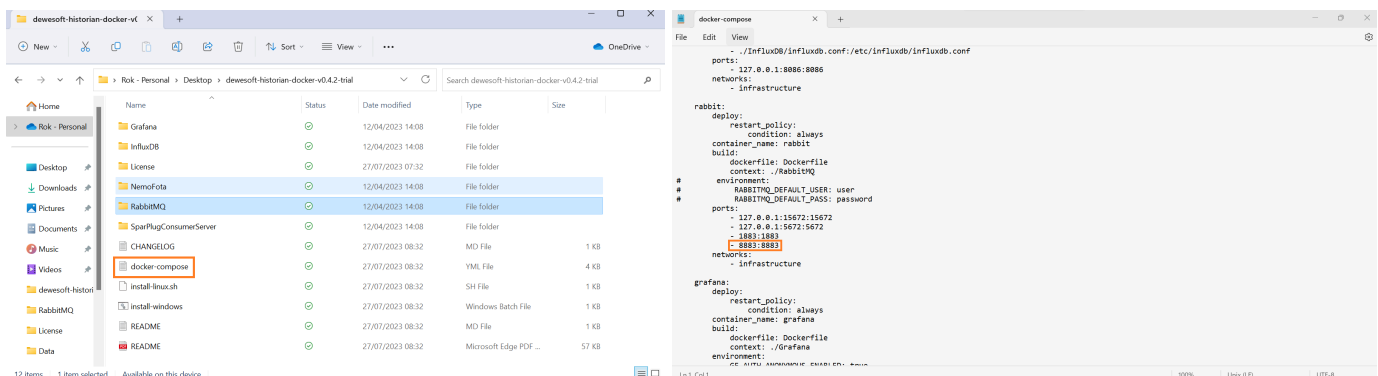
Before installing make sure that the port mappings in **docker-compose.yml** file are set according to your desired policy. A default configuration below shows the ports 1883 and 3000 bound to the same PC ports. In case of using firewall software such as *ufw* those ports will be bypassing the firewall unless they are bound to the loopback interface (127.0.0.1) like the other ports in the example below.

```
rabbit:
  deploy:
    restart_policy:
      condition: always
  container_name: rabbit
  build:
    dockerfile: Dockerfile
    context: ./RabbitMQ
  ports:
    - 127.0.0.1:15672:15672
    - 127.0.0.1:5672:5672
    - 1883:1883
  networks:
    - infrastructure

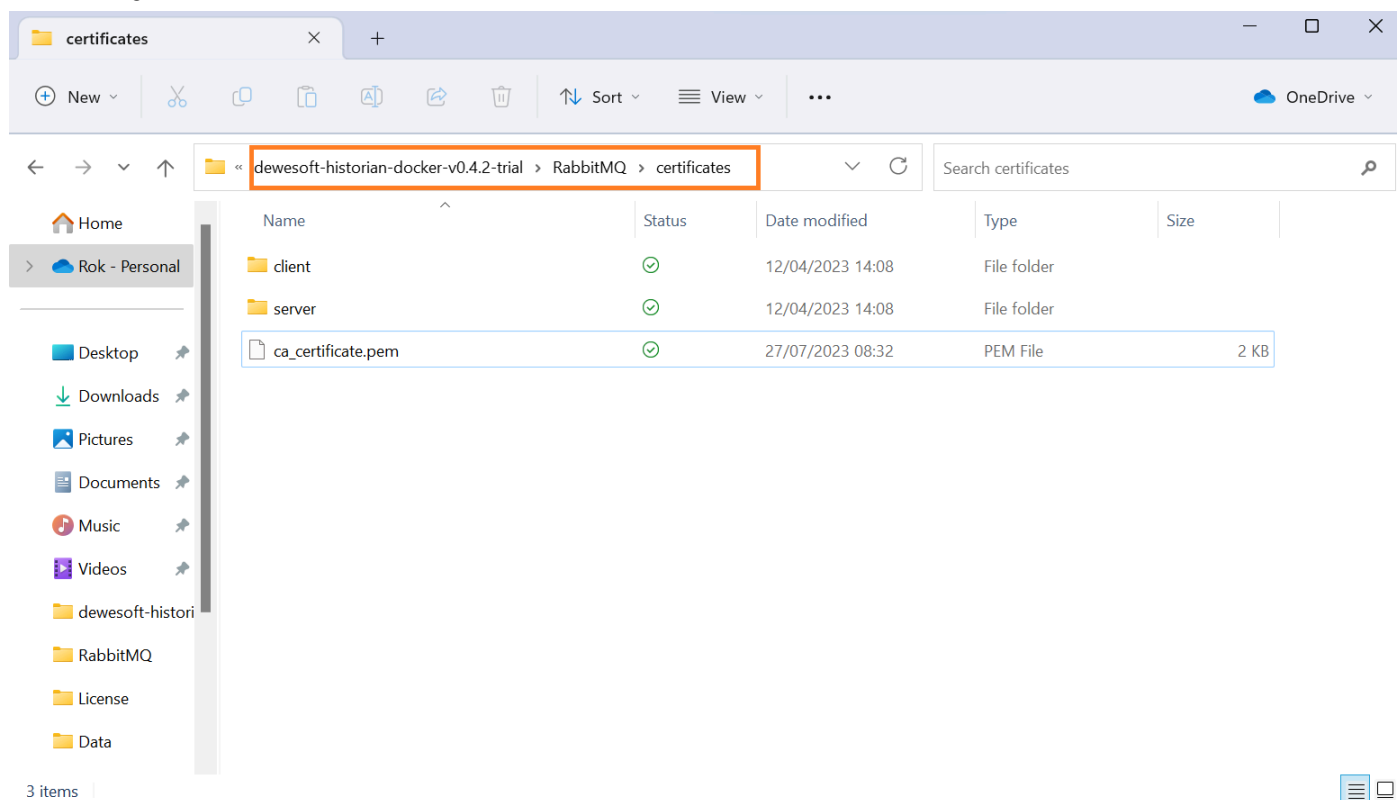
grafana:
  deploy:
    restart_policy:
      condition: always
  container_name: grafana
  image: grafana/grafana:6.3.0
  volumes:
    - grafana-data:/var/lib/grafana
  ports:
    - 3000:3000
  networks:
    - infrastructure
```

MQTT settings

To enable the MQTT functionality the port mapping 8883:8883 needs to be added under the port section of RabbitMQ (in docker-compose.yml).



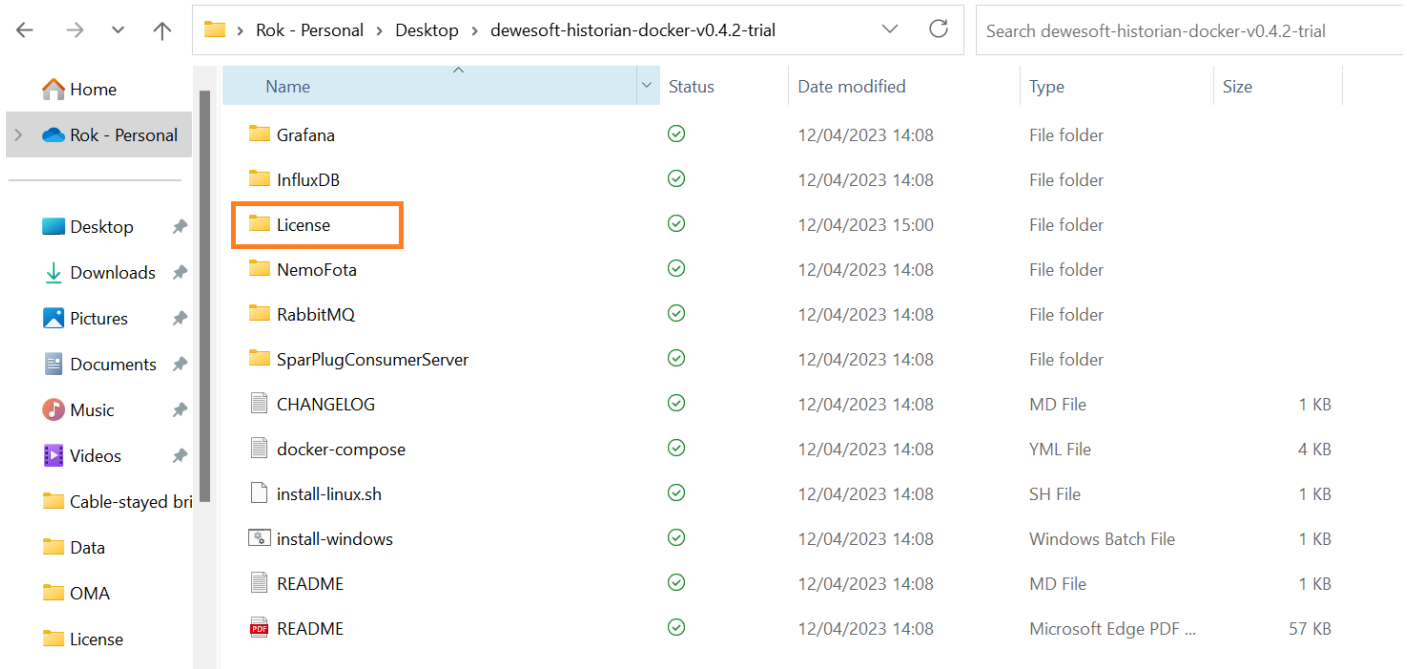
The default certificates used by the MQTT broker can be found under the installation folder RabbitMQ/certificates.



Detailed settings are available in rabbit.conf file. By default the RabbitMQ is configured to require client certificate authentication in MQTTS mode.

2.2.3 Dewesoft Historian License

Once purchased the Dewesoft Historian you will get a license file (license.lic). To authenticate your software you need to copy the license file into the License folder (the older file will be replaced) in your Dewesoft Historian Docker package like shown below:



Name	Status	Date modified	Type	Size
Grafana	✓	12/04/2023 14:08	File folder	
InfluxDB	✓	12/04/2023 14:08	File folder	
License	✓	12/04/2023 15:00	File folder	
NemoFota	✓	12/04/2023 14:08	File folder	
RabbitMQ	✓	12/04/2023 14:08	File folder	
SparPlugConsumerServer	✓	12/04/2023 14:08	File folder	
CHANGELOG	✓	12/04/2023 14:08	MD File	1 KB
docker-compose	✓	12/04/2023 14:08	YML File	4 KB
install-linux.sh	✓	12/04/2023 14:08	SH File	1 KB
install-windows	✓	12/04/2023 14:08	Windows Batch File	1 KB
README	✓	12/04/2023 14:08	MD File	1 KB
README	✓	12/04/2023 14:08	Microsoft Edge PDF ...	57 KB

2.2.4 Grafana web client configuration

Grafana web client within Dewesoft Historian consists of three software packages that are automatically deployed if the docker package installation described in the previous section was successful:

- Grafana Connector (developed by Dewesoft)
- Grafana (open source project)
- Grafana plugins (developed by Dewesoft)

To access Grafana, visit the following URL using a web browser:

http://<serverIP>:3000

<serverIP> is the IP address of the server where Grafana is hosted. If you deployed the docker package on your PC, the *serverIP* is *localhost*.

Grafana will prompt for username and password. Initially, the default login is:

User: admin

Password: admin

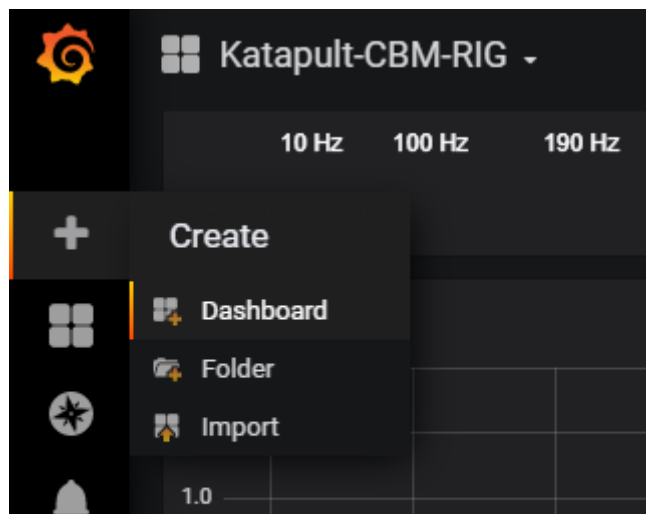
You are required to change it for security reasons.



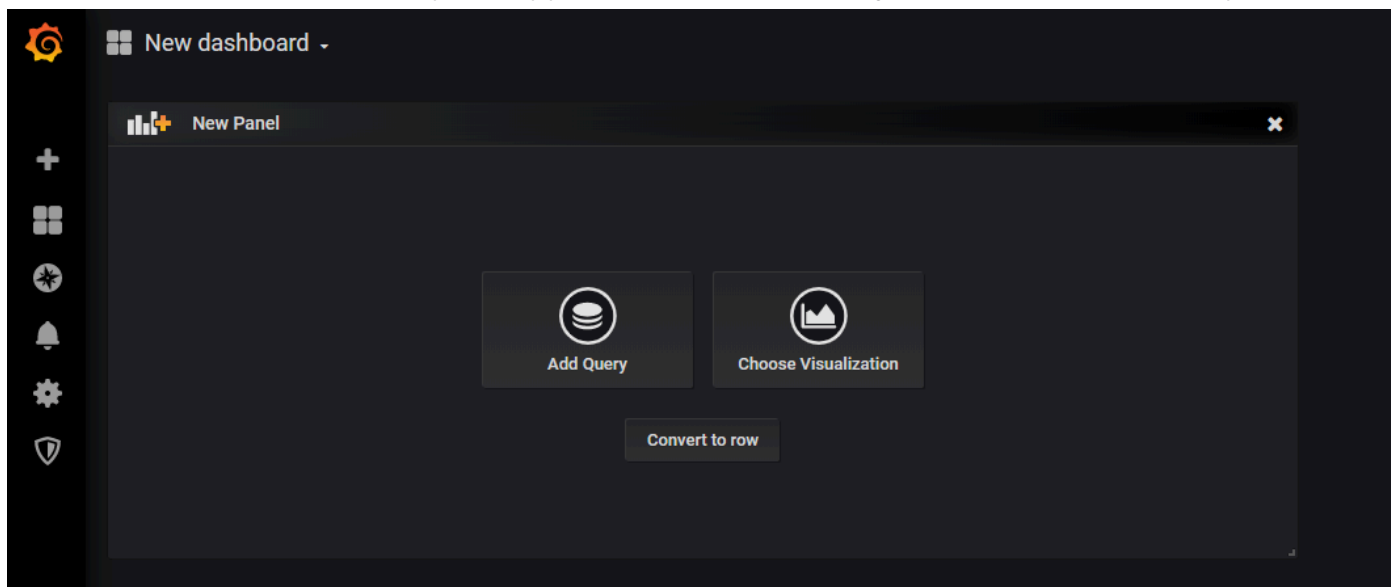
Important: forgotten admin password cannot be recovered. If you forget the password, you will need to install Grafana again and you will lose the work done (configured dashboards, added users etc.)

2.2.4.1 Grafana - displaying data

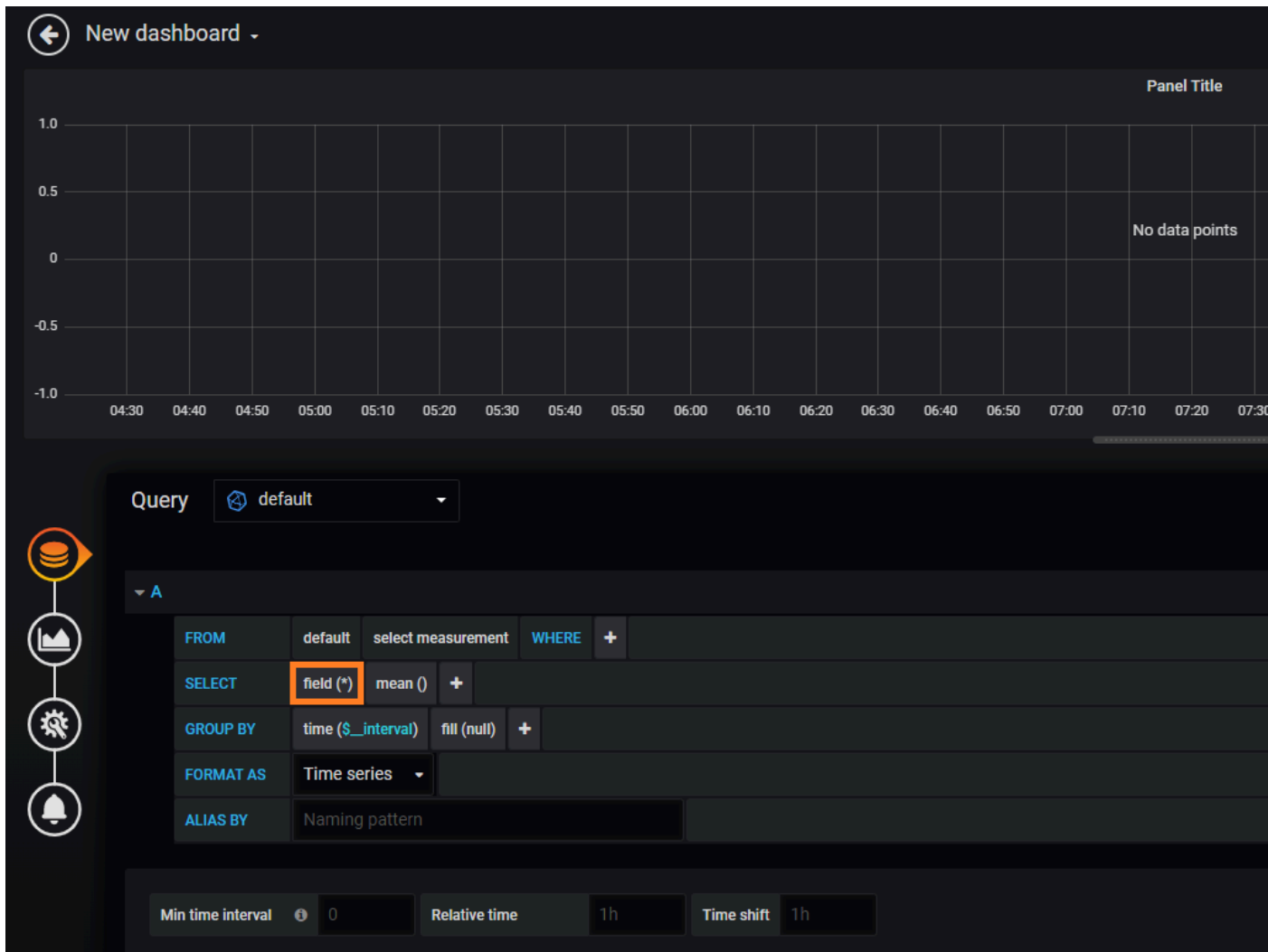
To display the data a dashboard needs to be created and a panel added to it. A dashboard is added by clicking the plus button in the menu:



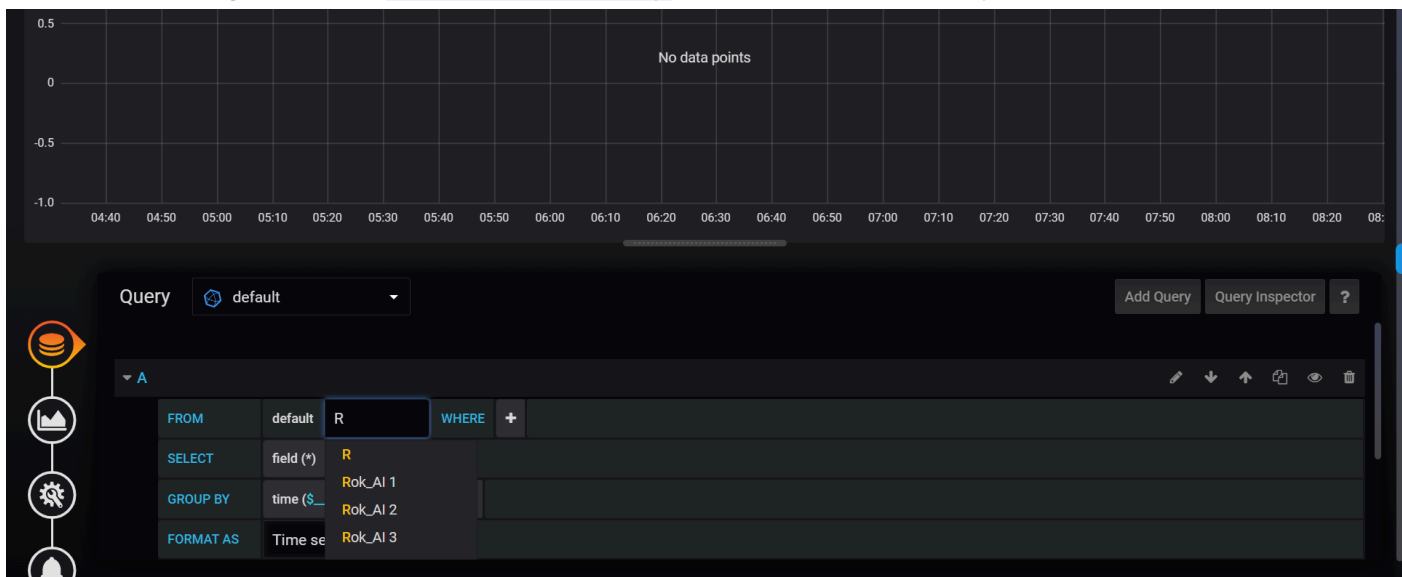
A new dashboard with an initial panel appears. Click on Add Query to add some data to the panel:



The following view appears:



Go to **select measurement**. A list of all channels ready to be displayed will be listed (name of the channel was assigned in the [Historian client setup](#) under the Publisher ID).





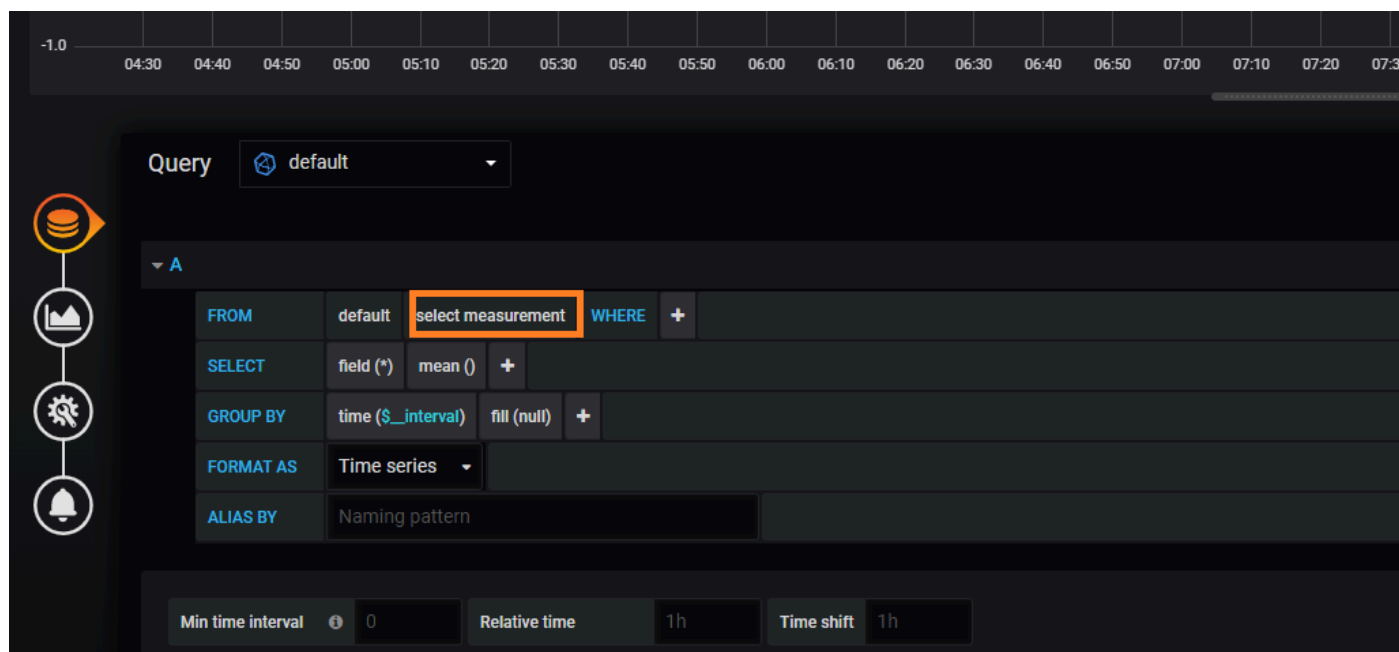
Important: pay attention to the formatting of the query A in the figure above:

FROM default **select measurement** *WHERE*

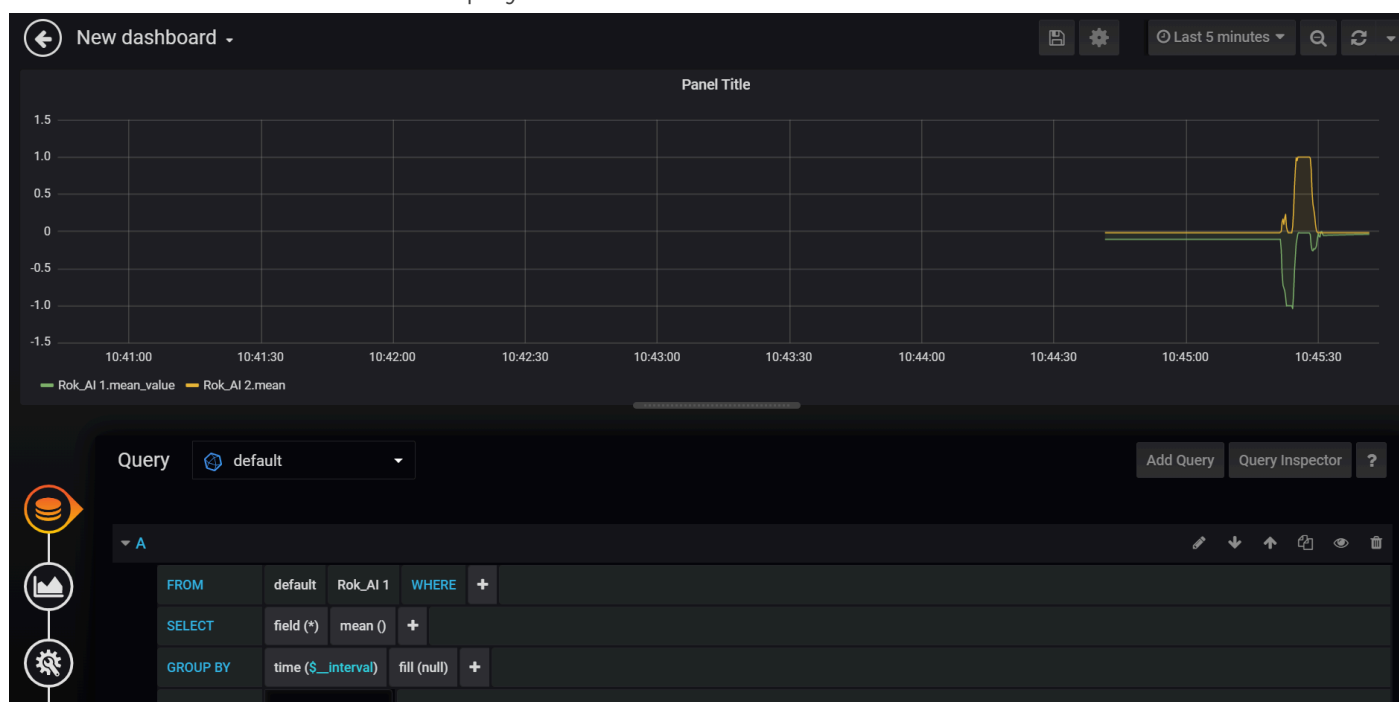
SELECT **field(*)** **mean()**

GROUP BY time(\$_interval) fill(null)

It is important to use **field(*)** selector when accessing the database through Grafana Connector.
Other parts of the query can be left as default.



A stream of data will start to be displayed.



Additional channels can be added to the same panel by clicking the *Add Query* button.

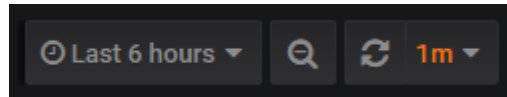
Remember to save the dashboard by clicking Ctrl+S after making changes.

2.2.4.2 Grafana - working with dashboards and panels

Grafana offers many possibilities of displaying and working with data. For a comprehensive guide on using Grafana its [official documentation](#) should be used. In this manual we will only show a few hints on how to work with measurement data typically used in Dewesoft Historian applications.

Time axis

Time axis settings and screen refresh rate are set in the top right corner of the screen using the following three controls:



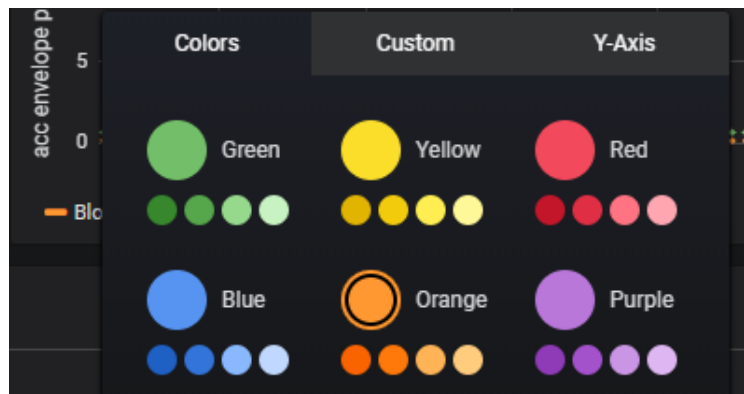
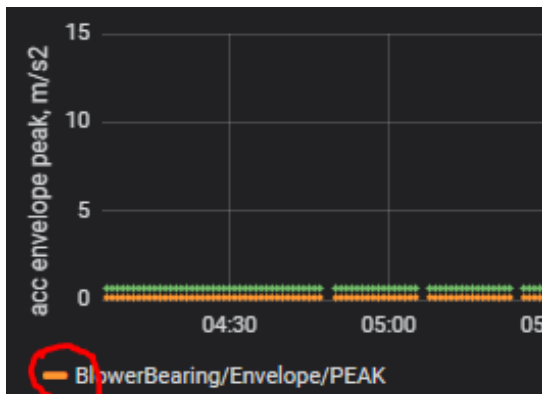
Clicking on the refresh button (the far right button) will refresh the screen while the dropdown can be used to change the automatic refresh rate.

X axis (time) interval is controlled by the far left button (last 5 minute, last 1 hour, last 6 hours, last 24 hours etc.).

You can zoom-in by click-and-drag gesture on the recorders, similar to how it is done in Dewesoft. Zooming out needs to be done by clicking the middle button or choosing the desired time interval using the far left button.

Changing the color of the plot

Click on the colored line next to the channel name in the legend on the bottom of the recorder displays and different colors will appear. Custom tab can be chosen to select custom colors.



Using the secondary Y-axis

Similarly to how you change the color, click on the colored line next to the channel name in the legend on the bottom of the recorder displays and then navigate to the Y-axis tab and enable the Y-axis for the selected channel.

2.2.4.3 Grafana plugins setup

This section will describe how to add plugins to Grafana to enable features like displaying an FFT in Grafana.

Vector plugin setup

Vector plugin was developed by Dewesoft and enables the display of vector channels in Grafana. Typical vector channels are FFTs and Scope Math channels. It plays a similar role to what 2D graph has in DewesoftX software. Vector plugin comes pre-installed in the Dewesoft Historian docker package.

Query setup

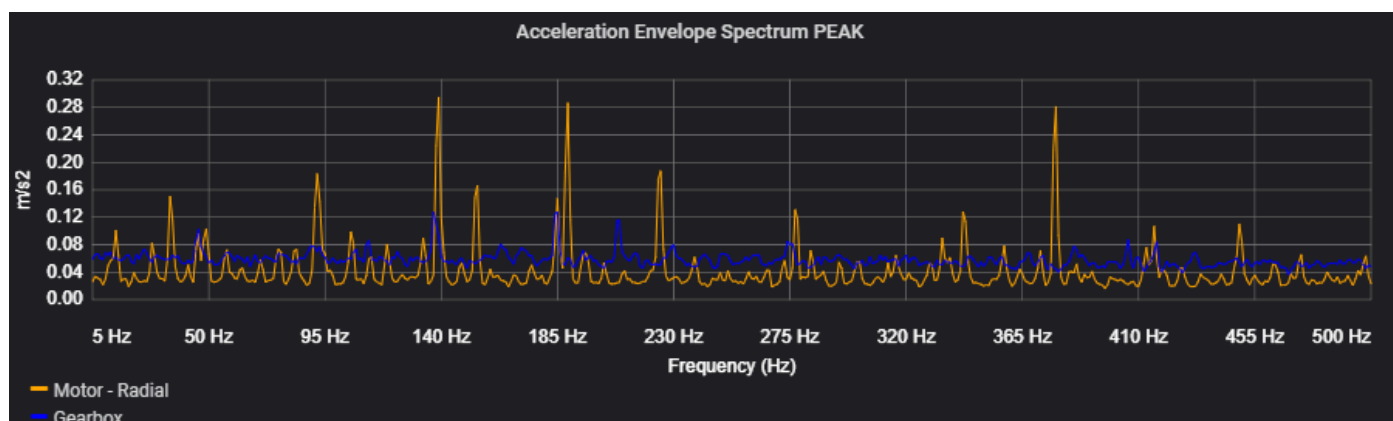
To display vector channels in a dashboard, add a new panel and choose the “Vector” as visualization type. Assign one of the vector channels from the database and set up the query exactly like shown in the picture below:

The screenshot shows the Grafana query editor with the following configuration:

- FROM:** default 103_AI 1/Integral/IIR filter/AmplFFT
- WHERE:** +
- SELECT:** field (*) last () +
- GROUP BY:** +
- FORMAT AS:** Time series
- ALIAS BY:** 103_AI 1/Integral/IIR filter/AmplFFT

Take care that the GROUP BY field is empty and that the ALIAS BY field contains exactly the same string as the name of the channel. If you wish to modify the display name on the graph this can be done in the Visualization menu for each series under the Label property.

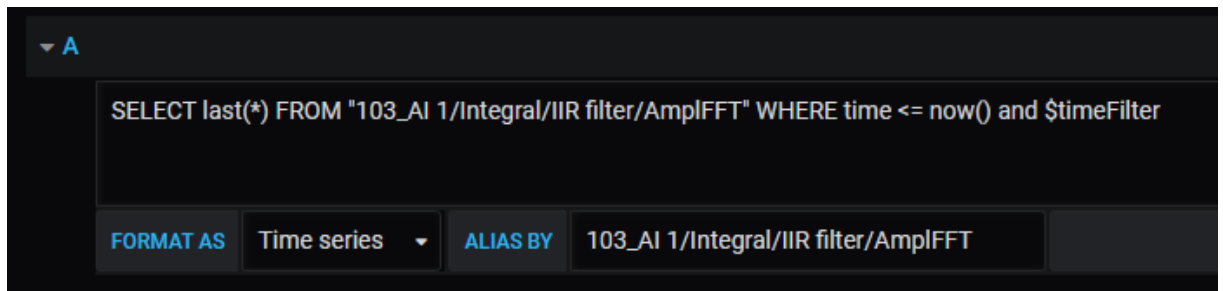
If the query is set correctly, the vector plugin visualization should look like seen below.





Note: in some cases an issue with loading the vector data from the database has been observed in case the database includes data with timestamps in the future (time > now()). In that case the Vector plugin might not display the data. However, the Grafana query can be modified to prevent this:

- Instead of defining the query in the default form, click on the edit button (pencil) and modify the query manually by adding the **time <= now()** statement. It must be placed immediately after the WHERE word:

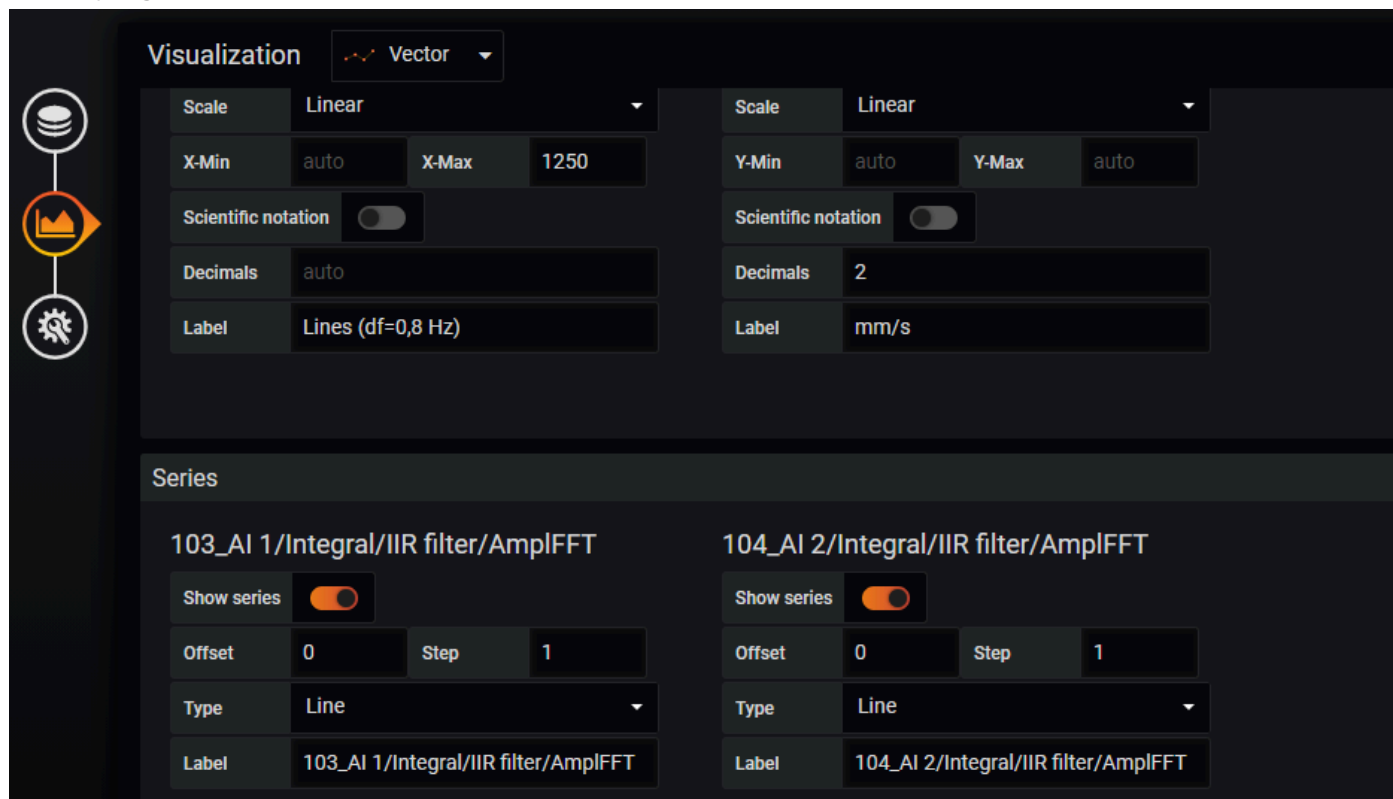


- The correct query is: **SELECT last(*) FROM "ch_name" WHERE time <= now() and \$timeFilter**
ch_name is the name of the channel in the database that is to be displayed

Visualization options

The display name of the channel on the graph can be modified by changing the *Label* property.

X axis tick values can be scaled by using the *Offset* and *Step* properties. *Step* represents line resolution in case of an FFT, for example. See the picture below that sets properties for two series shown on the same vector plugin visualization.



Visualization Vector

Scale	Linear	Scale	Linear
X-Min	auto	X-Min	auto
X-Max	1250	Y-Max	auto
Scientific notation	<input type="checkbox"/>	Scientific notation	<input type="checkbox"/>
Decimals	auto	Decimals	2
Label	Lines (df=0,8 Hz)	Label	mm/s

Series

103_AI 1/Integral/IIR filter/AmplFFT	104_AI 2/Integral/IIR filter/AmplFFT
Show series <input checked="" type="checkbox"/>	Show series <input checked="" type="checkbox"/>
Offset 0 Step 1	Offset 0 Step 1
Type Line	Type Line
Label 103_AI 1/Integral/IIR filter/AmplFFT	Label 104_AI 2/Integral/IIR filter/AmplFFT

2.3. Dewesoft-X-Historian-View-Client Installation

2.3.1 Dewesoft-X-Historian-Client

Described under section 2.1

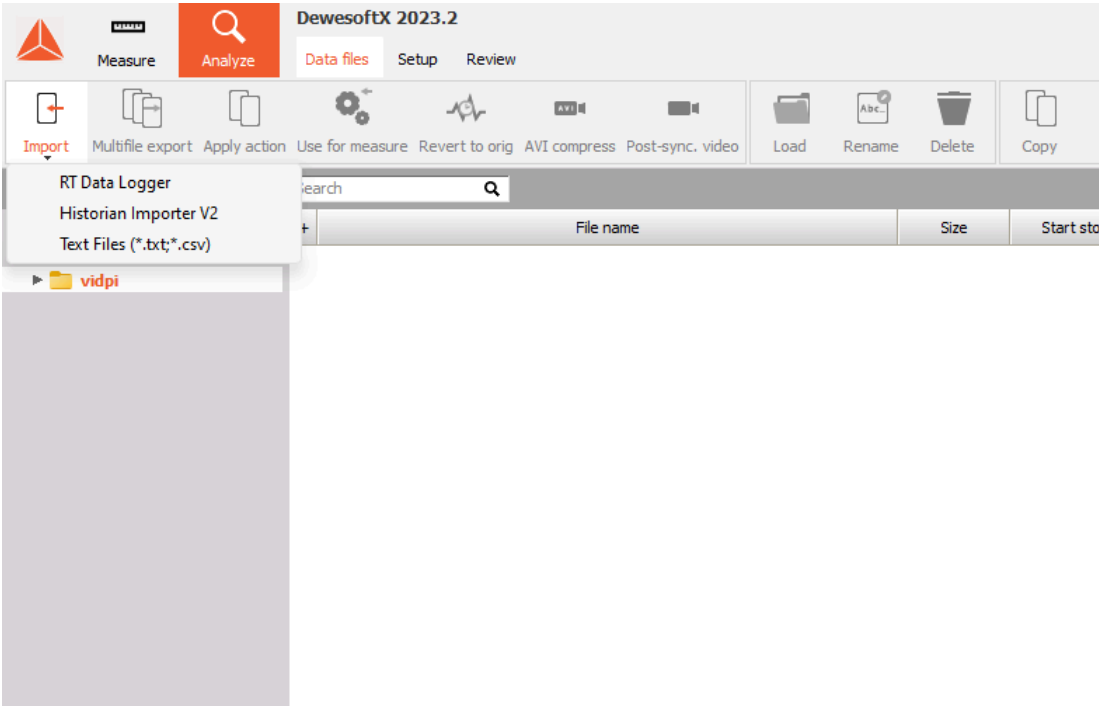
2.3.2 Historian Importer

Installation

To install the Historian importer use the DewesoftX 2023.4 installer or newer.
If you downloaded the plugin .zip file separately, copy the contents of the .zip file into the DewesoftX\Bin64\Addons64 folder.
The plugin will be enabled automatically after launching Dewesoft X.

How to import data

To import data using the Historian Importer, Dewesoft X has to be in Analyze mode.
After clicking on the Import icon a drop-down menu will appear. There you can select the Historian Importer.



After selecting the Historian Importer the Historian Importer window will appear. In this window you will find the importing options:

Historian Importer V2

Dewesoft data file name
Historian Importer V2-230721_113118

Folder
C:\Users\Public\Documents\Dewesoft\Data\

Importing options

Historian server
38.242.244.61:8081 Connect Ok Status

Start time
2023-07-07 13:30:52

End time
2023-07-07 13:30:52 Local time

+	#	Name	Color	Rate	Data structure	Data type	Import
+	1	HplaptopPub_ComplexAsync1		10.000000 Hz	Scalar	ComplexDouble	Import
+	2	HplaptopPub_ComplexSingleValue1		10.000000 Hz	Scalar	ComplexDouble	Import
+	3	HplaptopPub_ComplexSync1		100.000000 Hz	Scalar	ComplexDouble	Import
+	4	HplaptopPub_Formula_1_AmplFFT		3.906250 Hz	Vector(128)	Single	Import
+	5	HplaptopPub_MatrixAsyncComplex1		10.000000 Hz	Vector(6)	ComplexDouble	Import
+	6	HplaptopPub_MatrixAsyncReal1		100.000000 Hz	Vector(6)	Single	Import
+	7	HplaptopPub_MatrixSingleValueComplex1		100.000000 Hz	Matrix(2,3)	Double	Import
+	8	HplaptopPub_ScalarRealSingleValue1		100.000000 Hz	Scalar	Double	Import
+	9	HplaptopPub_SquareAsync1		100.000000 Hz	Scalar	Single	Import
+	10	HplaptopPub_SquareSync1_AVE		10.000000 Hz	Scalar	Single	Import
+	11	HplaptopPub_SquareSync1		100.000000 Hz	Scalar	Double	Import
+	12	HplaptopPub_VectorAsyncComplex1		10.000000 Hz	Vector(2)	ComplexDouble	Import
+	13	HplaptopPub_VectorAsyncReal1		100.000000 Hz	Vector(2)	Single	Import
+	14	HplaptopPub_VectorSingleValueComplex1		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	15	HplaptopPub_VectorSingleValueComplex2		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	16	HplaptopPub_VectorSingleValueComplex3		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	17	Konrad_99239_AI_1		4000.000000 Hz	Scalar	Single	Import
+	18	RCA_49194_AI_1_0:1;0		100.000000 Hz	Scalar	Single	Import
+	19	RCA_49194_AI_2_0:1;1		100.000000 Hz	Scalar	Single	Import

Cancel Import...

- **Historian server:** the IP and port of the Dewesoft Historian instance (database software). 8081 port is used by default if it has not been changed by the user.
- **Status:** after typing in the Historian server IP an clicking Connect green **Ok** letters will appear if the connection to the database was successful.
- **Start time:** select the start time and date of the data you want to import.
- **End time:** select the end time and date of the data you want to import.

Historian Importer V2

Dewesoft data file name

Historian Importer V2-230721_121704

Folder

C:\Users\Public\Documents\Dewesoft\Data\

Importing options

Historian server

38.242.244.61:8081

Connect

Ok

Status

Ok

Start time

2023-07-07 09:30:51

End time

2023-07-07 09:30:51

Local time

Local time

+	#	Name	Color	Rate	Data structure	Data type	Import
+	44	pakoTest_42596_VectorAsyncComplex1		10.000000 Hz	Vector(2)	ComplexDouble	Import
+	45	pakoTest_42596_VectorSingleValueComplex1		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	46	pakoTest_42596_VectorSingleValueComplex2		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	47	pakoTest_42596_VectorSingleValueComplex3		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	48	pubHIS_15951_AI_A-1_0;1;0		1000.000000 Hz	Scalar	SmallInt	Import
+	49	pubHIS_15951_AI_A-1_AmplFFT_0;7000;0;0;1		0.488281 Hz	Vector(1024)	Single	Import
+	50	pubHIS_15951_AI_B-2_0;1;3		1000.000000 Hz	Scalar	SmallInt	Import
+	51	pubHIS_15951_AI_B-2_AmplFFT_0;7000;0;2;1		0.488281 Hz	Vector(1024)	Single	Import
+	52	pubHIS_15951_AI_C-1_0;1;10		1000.000000 Hz	Scalar	SmallInt	Import
+	53	pubHIS_15951_AI_C-1_AmplFFT_0;7000;0;1;1		0.488281 Hz	Vector(1024)	Single	Import
+	54	testHistorianPub_AI_1		100.000000 Hz	Scalar	SmallInt	Import
+	55	testHistorianPub_AI_2		100.000000 Hz	Scalar	SmallInt	Import
+	56	testHistorianPub_AI_3		100.000000 Hz	Scalar	SmallInt	Import
+	57	testHistorianPub_AI_4		100.000000 Hz	Scalar	SmallInt	Import
+	58	testHistorianPub_AI_5		100.000000 Hz	Scalar	SmallInt	Import
+	59	testHistorianPub_AI_6		100.000000 Hz	Scalar	SmallInt	Import
+	60	testHistorianPub_AI_7		100.000000 Hz	Scalar	SmallInt	Import
+	61	testHistorianPub_AI_8		100.000000 Hz	Scalar	SmallInt	Import

Cancel

Import...

After configuring the Importing options select the channels you'd like to import from the database. This can be found in the table below the Importing options. The table contains the name, rate, data structure and data type of all the channels stored in the database.

To select a channel click on the Import button in the in the right most column of the channel you'd like to select.



Note: after selecting the channel you who'd like to import the Start time will jump tho the time when the the acquisition of the channel started.

Historian Importer V2

Dewesoft data file name
Historian Importer V2-230721_121704

Folder
C:\Users\Public\Documents\Dewesoft\Data\

Importing options

Historian server
38.242.244.61:8081

Status
Connect Ok

Start time
2023-07-07 09:30:51

End time
2023-07-07 09:30:51 Local time

+	#	Name	Color	Rate	Data structure	Data type	Import
+	44	pakoTest_42596_VectorAsyncComplex1		10.000000 Hz	Vector(2)	ComplexDouble	Import
+	45	pakoTest_42596_VectorSingleValueComplex1		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	46	pakoTest_42596_VectorSingleValueComplex2		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	47	pakoTest_42596_VectorSingleValueComplex3		100.000000 Hz	Vector(2)	ComplexDouble	Import
+	48	pubHIS_15951_AI_A-1_0;1;0		1000.000000 Hz	Scalar	SmallInt	Import
+	49	pubHIS_15951_AI_A-1_AmplFFT_0:7000;0;0;1		0.488281 Hz	Vector(1024)	Single	Import
+	50	pubHIS_15951_AI_B-2_0;1;3		1000.000000 Hz	Scalar	SmallInt	Import
+	51	pubHIS_15951_AI_B-2_AmplFFT_0:7000;0;2;1		0.488281 Hz	Vector(1024)	Single	Import
+	52	pubHIS_15951_AI_C-1_0;1;10		1000.000000 Hz	Scalar	SmallInt	Import
+	53	pubHIS_15951_AI_C-1_AmplFFT_0:7000;0;1;1		0.488281 Hz	Vector(1024)	Single	Import
+	54	testHistorianPub_AI_1		100.000000 Hz	Scalar	SmallInt	Import
+	55	testHistorianPub_AI_2		100.000000 Hz	Scalar	SmallInt	Import
+	56	testHistorianPub_AI_3		100.000000 Hz	Scalar	SmallInt	Import
+	57	testHistorianPub_AI_4		100.000000 Hz	Scalar	SmallInt	Import
+	58	testHistorianPub_AI_5		100.000000 Hz	Scalar	SmallInt	Import
+	59	testHistorianPub_AI_6		100.000000 Hz	Scalar	SmallInt	Import
+	60	testHistorianPub_AI_7		100.000000 Hz	Scalar	SmallInt	Import
+	61	testHistorianPub_AI_8		100.000000 Hz	Scalar	SmallInt	Import

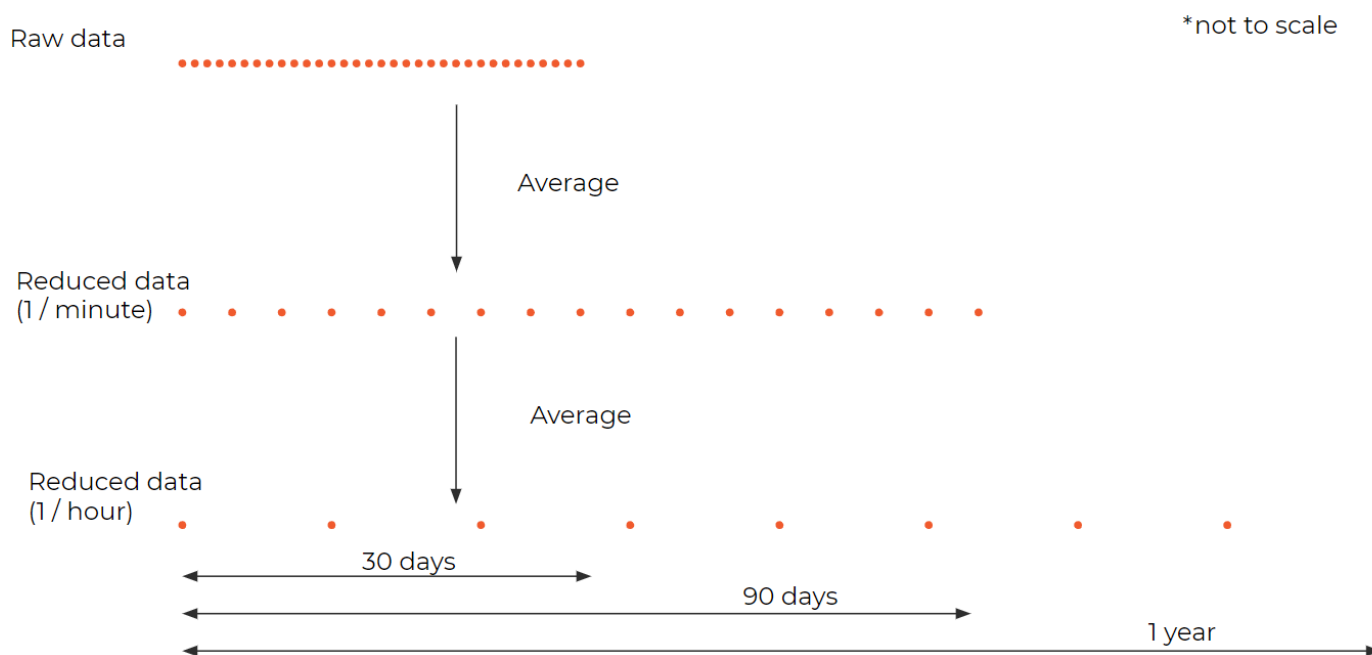
Cancel
Import...

After you have selected the channels you'd like to import, click on the Import button. A new data file containing the data from the selected channels will be created.

2.4. Database

2.4.1 Data retention policies

InfluxDB database includes an automatic procedure that can reduce the amount of data in the database after a certain amount of time. For example, the data can be originally uploaded to the database at 10 S/s, but after 1 month every 10 samples of data are averaged and the data rate is reduced to only 1 S/s. The figure below shows the data reduction graphically.



Dewesoft Historian presets the data retention strategy for the user and no further setup is needed if the following default settings are suitable for the user:

Retention policy name	Duration	Data rate
autogen	30 days	Original upload rate*
hstrp_1s	30 days	1 S/s
hstrp_10s	90 days	0.1 S/s
hstrp_1m	180 days	1 S/min
hstrp_10m	360 days	0.1 S/min
hstrp_1h	infinite	1 S/h
hstrp_1d	infinite	1 S/d
hstrp_cnt	Infinite	N/A (internal use)

**autogen* retention policy holds all the data that is uploaded to the database with its original data rates, that can vary from channel to channel and are dependent on the actual sample rate of the channel on the measurement unit. This data expires after 30 days.

The duration of each retention policies can be changed by modifying the *InfluxDbCreationScript.sql* file when creating a new database. The data rates and names of the retention policies should not be changed as this can impact other functions of Dewesoft Historian. It is advisable to contact Dewesoft support in case of special needs regarding the data retention strategy.

Data retention policies - details

On the level of InfluxDB this is achieved using two important features:

- Retention policies
A retention policy (RP) can be seen as a data buffer that holds data. A retention policy is defined by its duration and continuous queries that write data to it.
- Continuous queries
A continuous query is an operation that continuously copies the data from one retention policy to another one, effectively bringing data to the RP. A retention policy has no data in it if there is no continuous query set up that copies the data to it.



Example: a retention policy called *hstrp_30d* with a duration of 30 days has a continuous query assigned to it which averages raw data to the sample rate of 1 Hz and copies it to the *hstrp_30d*. This means that the *hstrp_30d* will hold the 1 S/s data for 30 days. After this period the data will be deleted.

The retention policies and continuous queries are created using the *InfluxDbCreationScript.sql* file when creating a new database, for example:

```
CREATE RETENTION POLICY "hstrp_1s" on "dbName" duration 30d replication 1 shard duration 1h
```

```
CREATE CONTINUOUS QUERY "hstcq_1s" ON "dbName" resample every 10s for 15s BEGIN select  
time, mean(value) as mean_value into hstrp_1s::MEASUREMENT from ./ where time <= now()  
group by time(1s) end
```

Retention policies and continuous queries can also be changed after there is already data in the database. However, special care needs to be taken on how the data is handled to prevent data loss. Other components of Dewesoft Historian are dependent on the names and data rates of the retention policies therefore some functionality could be changed by changing the retention policies and continuous queries.

3. MQTT message description

The MQTT message composes of a topic and payload. For the definition of those two the definition provided by [SparkPlug](#) specification is used. All channels sent over MQTT are of the type Sparkplug DataSet. For exact definition the Sparkplug specification should be consulted, however, we want to explain the main motivation to use the dataset.

3.1 Structure of data

As mentioned all the payload data is sent over Sparkplug DataSet. Dataset send data is in the form of tables (columns and row). One dataset is one table. Each row represents one sample in time. The table can have as many columns as needed to accomodate the sample type. For example, Scalar dataset will have only two columns: Timestamp and Value. Vector(N) will have N+1 columns: Timestamp and N components of the vector.

The first column is always Timestamp (UInt64, UNIX time, nanoseconds). *Timestamp* is **not** the timestamp of the MQTT message, which is automatically included in MQTT messages. *Timestamp* is the actual absolute time at which the *Value* was acquired.

Value can in principle be of any data type (Int32, Float32, double etc.), this is defined by the birth certificate of the metric according to Sparkplug definition. In most cases the *Value* will be Float32 ("Single" precision in DewesoftX).

In case multiple samples of the same channel are sent in the same message, this is represented by sending multiple rows of the table at once. This will become evident in the definition of each dataset in next sections of the document.

The rules in the table below will be used to translate DewesoftX channels to Sparkplug datasets. Detailed explanation of each dataset follows.

DewesoftX structure	DewesoftX sampling	DewesoftX data type	MQTT Sparkplug dataset	Comment
Scalar	Sync, Async, Single value	Real number (Single, Double)	Dataset: Timestamp, Value	
Vector(N)	Sync, Async, Single value	Real number (Single, Double)	Dataset: Timestamp, Vector(N)	
Matrix(1xN)	Sync, Async, Single value	Real number (Single, Double)	Dataset: Timestamp, Vector(N)	
Matrix(NxM), where N and M > 1	Single value	Real number (Single, Double)	Dataset: Timestamp, .(N*M)	
Scalar	Sync, Async, Single value	Complex (Single, Double)	Dataset: Timestamp, Vector(2)	
Vector(N)	Sync, Async, Single value	Complex (Single or double)	Dataset: Timestamp, Vector(2N)	

Matrix(1xN)	Sync, Async, Single value	Complex (Single or double)	Dataset: Timestamp, Vector(2N)	
Matrix(NxM), where N and M > 1	Single value	Complex (Single or double)	Dataset: Timestamp, Vector(2N*2M)	

Scalar

The data included in the data set is a pair of two numbers (two columns). The first number represents the precise timestamp of acquisition and the second value represents the actual measurement.

Example:

Timestamp	Value
1655984340	1.45

In case the data type of the samples in DewesoftX is Complex, two columns are needed, for example:

Timestamp	Value_Re	Value_Im
1655984340	1.45	0.23

Multiple samples in the same message would be sent as a column with multiple rows. Example with 4 samples per message:

Timestamp	Value
1655984340	1.45
1655984345	1.43
1655984350	1.56
1655984355	1.34

Vector(N)

The data includes a timestamp column followed by N samples.

Example:

timestamp	V_1	V_2	V_n
1655984340	2.5	4.5		1.45

In case the data type of the samples in DewesoftX is Complex, two columns are needed for each sample:

Timestamp	V_1_Re	V_1_Im	V_2_Re	V_2_Im	V_n_Re	V_n_Im
1655984340	2.5	1.55	4.5	9.39		1.45	-3.22

Multiple samples in the same message are sent as multiple columns, an example with 4 samples is given:

Timestamp	V_1	V_2	...	V_n
1655984340	2.5	4.5		1.45
1655984345	1.43	4.55		3.88
1655984350	1.56	2.49		9.35
1655984355	1.34	2.90		2.95

Matrix(1xM)

Matrix with one dimension of 1 is treated the same as a vector.

Matrix (NxM) where N and M > 1:

Timestamp column is followed by M elements of N columns

Timestamp	V_1_1	V_1_2	...	V_1_n	V_2_1	V_2_2	...	V_n_1	V_n_2	...		V_n_m
1655984340	2.5											

Timestamp will therefore represent the time at which the snapshot of the matrix is taken by the MQTT plugin in DewesoftX.

In the application in question the most common use of the NxM matrix is a cascade plot (Order x RPM), which has a "Single value" sampling type and is updated line by line as the RPM changes. It will be possible to set a period (like 1s, 10s, 60s) at which the MQTT plugin will send the matrix to the broker. One possible option is also to send the matrix "on change", but the minimum period would still have to be defined in order not to take too much available bandwidth.

A note on Dewesoft “sampling” property

Each DewesoftX channel needs to have a “sampling” property defined. This has nothing to do with the structure (scalar, vector, matrix) or data type (real, complex, single, double). There are three options for “sampling”:

Sync

Equidistant sampling is assumed. Timestamp for each sample is defined only by the timestamp of the first sample at the start of measurement, the sample rate and the sample number. This reduces overhead as the samples can only consist of the values, timestamps are not necessary. However, the MQTT Sparkplug plugin will always carry timestamps for each sample as defined by a Dataset, even if the channel is of Sync sampling type in DewesoftX.

Async

Sample rate is not known, sampling is not assumed to be equidistant in time. Each sample value is accompanied by a timestamp.
Some math analysis (like Orbit) cannot be done on Async channels.

SingleValue

No time history is available. If the channel value changes over time, it is overwritten. In a data file of any length there is only one value of a SingleValue channel, which is the last value it was set to before the file was terminated.

For *Single Value* channels, a parameter will be added in DewesoftX MQTT Sparkplug plugin that will define how often the channel should be sent over MQTT (update period).

3.2 Structure of metadata

Each channel is initiated as a Sparkplug metric and needs to be introduced in the device birth certificates as per Sparkplug specification. The birth certificates also include metadata. In the metadata section a more detailed description of the payload can be found. The description must comply to DewesoftX xml setup channel definition.

Two examples are given below. *Note that examples are represented as JSON, but the actual SparkPlug is using google protobufs to serialize the payload into a binary format to save payload space.*

Metric with name “Direct”, Scalar data structure:

```
{
  "timestamp": 1655984340,
  "metrics": [
    {
      "name": "Direct",
      "alias": 0,
      "timestamp": 1655984340,
      "dataType": "DataSet",
      "hasMetadata": true,
      "metadata": {
```

```
        "contentType": "xml",
        "description": "<OutputChannel>...</OutputChannel>"
    "dataset": {
        "numOfColumns": 2,
        "columns": [
            "Timestamp",
            "Value"
        ],
        "types": [
            "Long",
            "Float"
        ],
        "rows": [
            1655984340,
            1.45
        ]
    }
},
"seq": 22
}
```

Metric with name "Spectrum/FFT", Vector(N) data structure:

```
{
    "timestamp": 1655984340,
    "metrics": [
        {
            "name": "Spectrum/FFT",
            "alias": 9,
            "timestamp": 1655984340,
            "dataType": "DataSet",
            "hasMetadata": true,
            "metadata": {
                "contentType": "xml",
                "description": "<OutputChannel>...</OutputChannel>"
            },
            "dataset": {
                "numOfColumns": N+1, // N is the number of values
                "columns": [
                    "Timestamp",
```



```

        "V_1",
        "V_2",
        ...
        "V_n"
    ],
    "types": [
        "Long",
        "Float",
        ...
        "Float"
    ],
    "rows": [
        1655984340,
        1.45,
        2.33,
        ...
        3.45
    ]
    }
}
],
"seq": 33
}

```

In metrics/metadata/description there must be a minimal description of the channel in xml format. As a minimum the parameters should include the following:

<OutputChannel>	
<dataType>5</dataType>	#see below
<timebase>1</timebase>	#see below
<expectedAsyncSr>2500</expectedAsyncSr>	#approximate rate if timebase=1
</OutputChannel>	

An example of a more detailed DewesoftX channel description (vector channel with 3 elements) is shown below. In principle more channel info can be provided by Sparkplug metric and DewesoftX MQTT client will translate it to its channels, such as DisplayColor, Unit etc.

```

<OutputChannel>
  <channelName>MatrixSingleValueComplex1</channelName>
  <indexString>0:7000;11;0</indexString>
  <userScaleMin>-inf</userScaleMin>
  <userScaleMax>inf</userScaleMax>

```

```

<expectedAsyncSr>100.000000</expectedAsyncSr>
<srDiv>1</srDiv>
<calcSrDiv>1</calcSrDiv>
<dataType>7</dataType>
<timebase>2</timebase>
<currentSR>20000.0000000000000000</currentSR>
<setupSR>20000.0000000000000000</setupSR>
<measurementSR>100.0000000000000000</measurementSR>
<scale>1.0000000000000000</scale>
<offset>0.0000000000000000</offset>
<calcDataScale>1.0000000000000000</calcDataScale>
<calcDataOffset>0.0000000000000000</calcDataOffset>
<isArray>True</isArray>
<arrayDimensionCount>2</arrayDimensionCount>
<rowCount>2</rowCount>
<rowName></rowName>
<rowPercision>0</rowPercision>
<rowType>2</rowType>
<rowUnit></rowUnit>
<rowStep>1.0000000000000000</rowStep>
<rowStart>0.0000000000000000</rowStart>
<columnCount>3</columnCount>
<columnName>Channel name</columnName>
<columnPercision>0</columnPercision>
<columnType>0</columnType>
<columnUnit></columnUnit>
</OutputChannel>

```

The channels to which DewesoftX MQTT Sparkplug plugin is subscribed to will have the channel name in DewesoftX defined as follows: **<DeviceID>_<MetricName>**

DeviceID could be the serial number of the DAQ card.

Tag name	Description
<i>channelName</i>	String value for name of channel
<i>indexString</i>	Reserved. It is for internal use. Setting this value won't take any effect.
<i>expectedAsyncSr</i>	This is the sample rate that is used for Async channels. This can be ignored as you have only SYNC channels. Float value.
<i>currentSR</i>	Reserved. It is for internal use. Setting this value won't take any effect.
<i>measurementSR</i>	This value is used to set the sample rate of measurement.
<i>setupSR</i>	Reserved. It is for internal use. Setting this value

	won't take any effect.																																																				
srDiv	Reserved. It is for internal use. Setting this value won't take any effect.																																																				
dataType	<p>The datatype that the channel needs to be created with in DewesoftX. Integer value.</p> <table><tr><th>Data Type</th><th>Channel Datatype Value see Channel Datatype</th><th>Storage size (Bytes)</th><th>Range</th></tr><tr><td>Byte</td><td>0</td><td>1</td><td>0 to 255</td></tr><tr><td>ShortInt</td><td>1</td><td>2</td><td>-127 to 127</td></tr><tr><td>Word</td><td>3</td><td>2</td><td>0 to 65,535</td></tr><tr><td>SmallInt</td><td>2</td><td>2</td><td>-32,768 to 32,767</td></tr><tr><td>Longword</td><td>8</td><td>4</td><td>0 to 4,294,967,295</td></tr><tr><td>Integer</td><td>4</td><td>4</td><td>-2,147,483,648 to 2,147,483,647</td></tr><tr><td>Int64</td><td>6</td><td>8</td><td>-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807</td></tr><tr><td>Single</td><td>5</td><td>4</td><td>7 significant digits, exponent -38 to +38</td></tr><tr><td>Double</td><td>7</td><td>8</td><td>15 significant digits, exponent -308 to +308</td></tr><tr><td>ComplexSingle</td><td>9</td><td>8</td><td>complex number real and imaginary part are variables of type Single</td></tr><tr><td>ComplexDouble</td><td>10</td><td>16</td><td>complex number real and imaginary part are variables of type Double</td></tr><tr><td>Text</td><td>11</td><td>-</td><td>see also Textual Channels</td></tr></table>	Data Type	Channel Datatype Value see Channel Datatype	Storage size (Bytes)	Range	Byte	0	1	0 to 255	ShortInt	1	2	-127 to 127	Word	3	2	0 to 65,535	SmallInt	2	2	-32,768 to 32,767	Longword	8	4	0 to 4,294,967,295	Integer	4	4	-2,147,483,648 to 2,147,483,647	Int64	6	8	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807	Single	5	4	7 significant digits, exponent -38 to +38	Double	7	8	15 significant digits, exponent -308 to +308	ComplexSingle	9	8	complex number real and imaginary part are variables of type Single	ComplexDouble	10	16	complex number real and imaginary part are variables of type Double	Text	11	-	see also Textual Channels
Data Type	Channel Datatype Value see Channel Datatype	Storage size (Bytes)	Range																																																		
Byte	0	1	0 to 255																																																		
ShortInt	1	2	-127 to 127																																																		
Word	3	2	0 to 65,535																																																		
SmallInt	2	2	-32,768 to 32,767																																																		
Longword	8	4	0 to 4,294,967,295																																																		
Integer	4	4	-2,147,483,648 to 2,147,483,647																																																		
Int64	6	8	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807																																																		
Single	5	4	7 significant digits, exponent -38 to +38																																																		
Double	7	8	15 significant digits, exponent -308 to +308																																																		
ComplexSingle	9	8	complex number real and imaginary part are variables of type Single																																																		
ComplexDouble	10	16	complex number real and imaginary part are variables of type Double																																																		
Text	11	-	see also Textual Channels																																																		
timebase	<p>This are the channel timebase selection Values:</p> <ul style="list-style-type: none">- 0 (synchronous),- 1 (asynchronous),- 2 (singleValue).																																																				
isArray	<p>This tag determines if the channel is of data structure array. Values:</p> <ul style="list-style-type: none">- true- false <p>If this value is set to true. The belowe parameters are accepted.</p>																																																				
arrayDimensionCount	<p>The dimensions for vector data structure. Values:</p> <ul style="list-style-type: none">- 1 (vector)- 2(matrix)																																																				
rowCount	Integer value for describing the length of the first dimension of vector.																																																				
rowName	String value for name of the first dimension.																																																				
rowUnit	String value for the first dimensions unit.																																																				
rowType	Integer value to determine the row value type. Values:																																																				
rowPercision	Float value to determine the precision of the row values.																																																				
rowStep	Float value for describing the steps for display.																																																				
rowStart	The start position from which to show data.																																																				
columnCount	Integer value for describing the length of the																																																				

	second dimension of vector.
<i>columnName</i>	String value for name of the second dimension.
<i>columnUnit</i>	String value for the second dimensions unit.
<i>columnType</i>	Integer value to determine the column value type. Values:
<i>columnPrecision</i>	Float value to determine the precision of the column values.
<i>columnStep</i>	Float value for describing the steps for display.
<i>calcDataScale</i>	Reserved. It is for internal use. Setting this value won't take any effect.
<i>calcDataOffset</i>	Reserved. It is for internal use. Setting this value won't take any effect.
<i>isMetadataSaved</i>	Reserved. It is for internal use. Setting this value won't take any effect.
<i>channelType</i>	Reserved. It is for internal use. Setting this value won't take any effect.

About this document

This is the user manual for Dewesoft Historian module.

Legend

The following symbols and formats will be used throughout the document.



Important

It gives you important information about the subject.
Please read carefully!



Hint

It gives you a hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

Warranty information

Notice

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Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300
Web: <http://www.dewesoft.com>
Email: Support@dewesoft.com

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

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Safety instructions

Your safety is our primary concern! Please be safe!

Safety symbols in the manual



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

General Safety Instructions



Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

Environmental Considerations

Information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com



Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.

- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class I equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange noises. The system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).

- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from [this link](#).
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

Documentation version history

Version	Date	Notes
0.1	11.4.2020	Initial version, does not include Historian Client, Historian Importer, Grafana
1.0	4.7.2020	Initial release
1.1	4.9.2020	Updated software links to Dewesoft X 2020.2
1.2	11.9.2020	Updated InfluxDB link
1.3	20.10.2020	Added NTP sync info Updated Dewesoft and plugin versions
1.4	19.11.2020	Updated Grafana Connector
1.5	19.11.2020	Added Grafana Vector plugin
1.6	8.12.2020	Updated links to Dewesoft 2020.2 release version Historian Importer: added Historian Client as prerequisite Grafana Vector plugin: added alternative custom query
1.7	03.02.2021	Added note on Windows Time service on Measurement Unit Update Grafana vector plugin setup
1.8	26.02.2021	Added retention policy description to database setup and Grafana connector setup
1.9	07.06.2021	New influxdb.conf file and .bat scripts for starting influxd
V21-1	16.11.2021	Updated versions of software Updated images (from Dewesoft X3 SP12 to DewesoftX) Updated links for download center
V22-1	19.07.2022	3.2. Historian Service setup → Updated versions of software Updated links for download center
V23-1	13.01.2023	Migrated to MQTT
V23-2	1.2.2023	Added note that MQTT is supported from 2023.2 onwards
V23-3	1.6.2023	Added Dewesoft historian license authentication Added note that Historian client plugin is included in Dewesoft X from 2023.3 onwards
V23-4	15.6.2023	Updated Historian Client screenshots
V23-5	23.6.2023	Updated Historian Docker download links for new webpage
V23-6	24.7.2023	Added Historian Importer manual
V23-7	31.7.2023	Added MQTTS description for client and docker
V24-1	15.2.2024	Added MQTT payload description.