HOW-TO MAURORIBONIMX JAN 5, 2024 SIDEBAR ✓

IIoT: Use ctrlX CORE as a monitoring platform using InfluxDB and Grafana

The Goal

One of the most requested IIoT feature of a machine is the capability to manage, store and visualize data. There are many ways to achieve this result, one of the best ways to achieve this goal is to combine three apps:

- NodeRed: for connectivity
- InfluxDB: data storage
- Grafana: Simple and standard HMIs

Edit

It's now possible to use the official influxDB app with external me[illegible]. Scroll down to the end 🚀

Let's see together how we can setup a basic example.

ctrlX core InfluxDB and Grafana

Which data?

The data are coming usually from Ethecat, Opcua or third part devices here there is a brief list which will be updated:

- Collect data from Drives
- Collect data from Siemens S7 or an MLC using opcua (good for any opcua device)

- Any Ethercat device (including IO-LINK masters) can be used to harvest data an take them to ctrlX, just read the Ethercat Node!

Two ways

There are two possible configurations:

1. InfluxDB 2.x + Grafana + NodeRed
2. INfluxDB 1.8.3 + Grafana + NodeRed

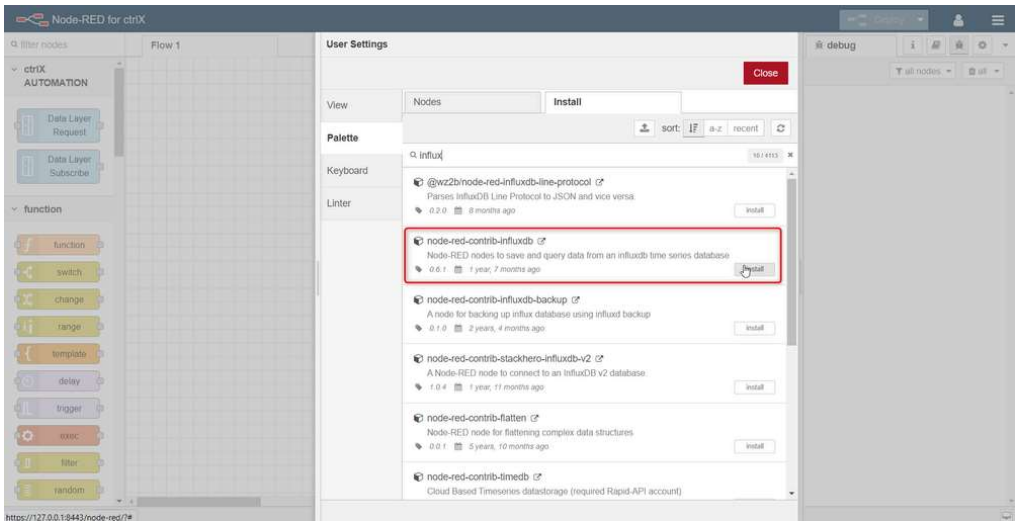
There are not many differences, InfluxDB 2.0 it's an official ctrlX AUTOMATION app equipped with all the safety and platform features needed to setup reliable IIoT system. The only advantage in using InfluxDB 1.8.3 is the possibility to use the Grafana Auto-

Completion features which can save some time. Chose the one you prefer. Be aware that only the number 1 is the full supported by Rexroth.

Step 0 - Valid for both solutions

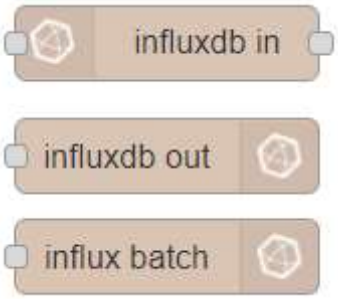
The first step in both cases is to setup NodeRed correctly how:

1. install NodeRed
2. connect ctrlX CORE to internet and check that the system clock is correctly set
3. download the InfluxDB palette as shown in the picture



ctrlX node-red-contrib grafana

If everything goes stright we should find these three new nodes on the left:

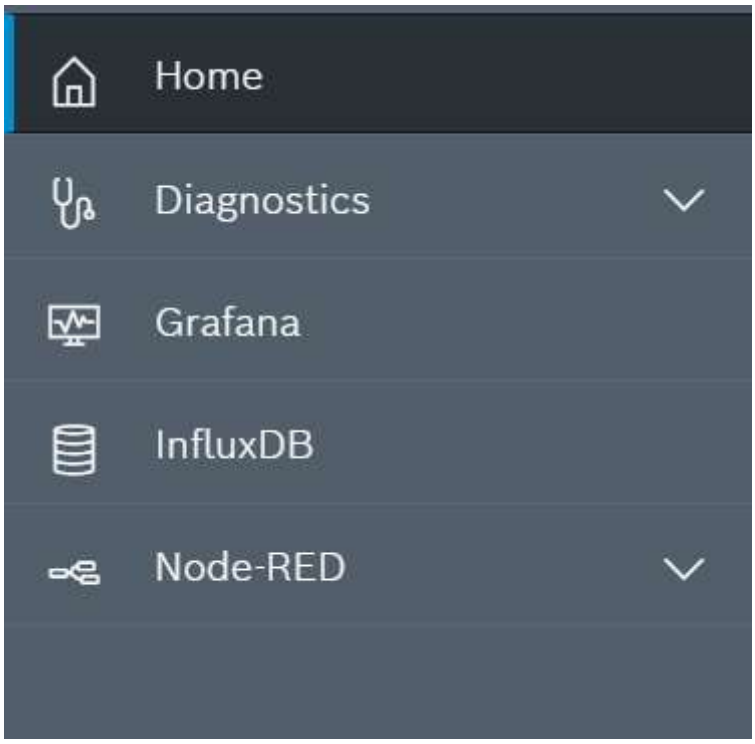


InfluxDB nodes

Setup 1 - Productivity

What we need to install is:

In the end the sideboard should look like this:

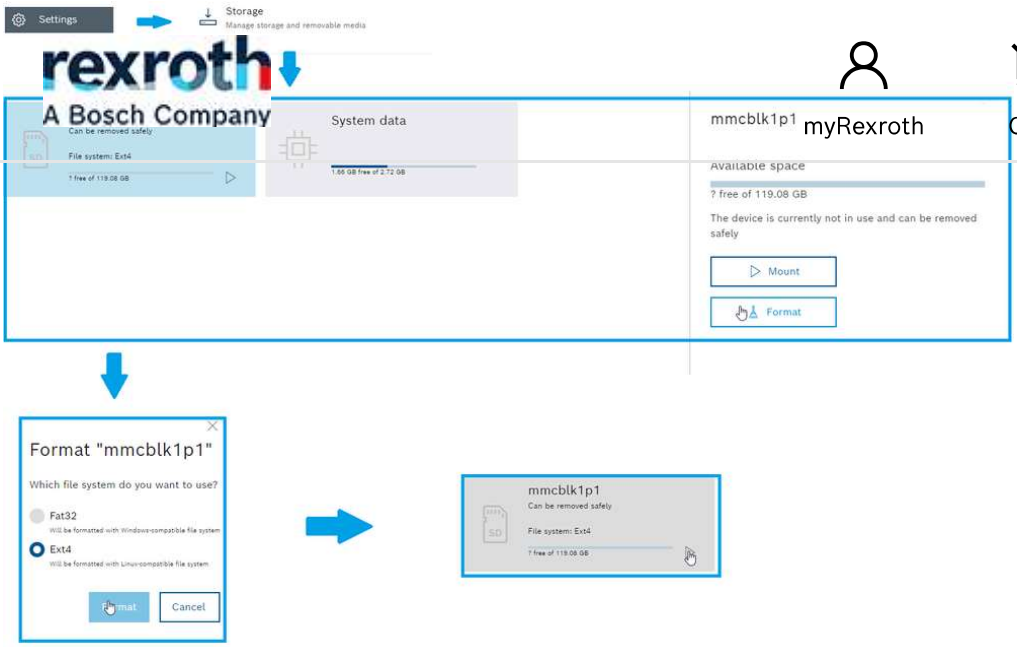


ctrlx InfluxDB node-red grafana

Step 0 - Use an external memory (Optional)

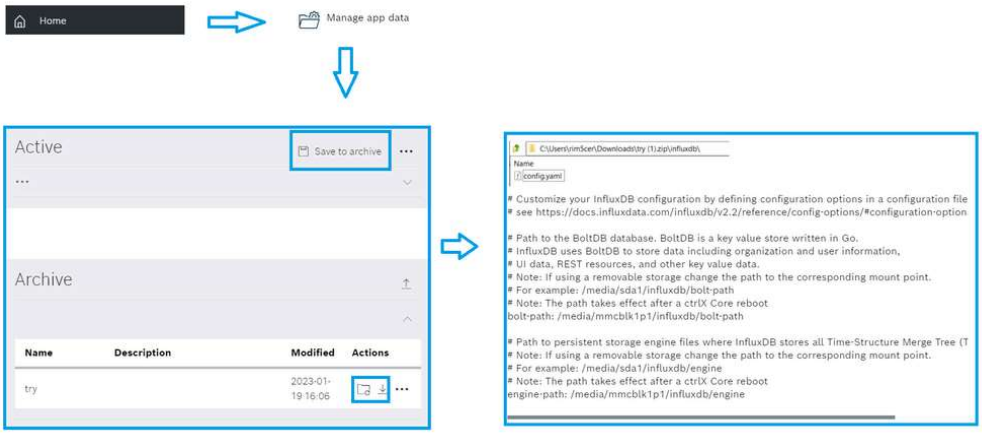
When the influxDB (and thus memory) workload is high it is necessary to use an external memory to save influxDB data. Here there are the steps we need to follow:

1. Navigate no setting ➡️ storage and locate youre device
2. Format the device as an Ext4 device otherwise it won't work correctly in the long term.
3. Mount it, it will be automatically mounted at boot



mount sd card ctrlx

Now we need to go to the "Manage app data" menu, save the archive and edit the influxdb config file. W need to change the bold path and engine path to use our device. Once the file is saved we just need to upload the configuration on the device and update it.



archive modification memory external

Here there is my file configuration example. usually mmcblk1p1 is for external microSD cards and sda1 stand for removable usb device.

```
# Path to the BoltDB database. BoltDB is a key value store written in Go.
# InfluxDB uses BoltDB to store data including organization and user information,
# UI                                                ther key value data.
# No                                                rage change the path to the corresponding mount point.
# Fo                                                xdb/bolt-path
# No                                                ter a ctrlX Core reboot
bolt-path: /media/mmcblk1p1/influxdb/bolt-path
```

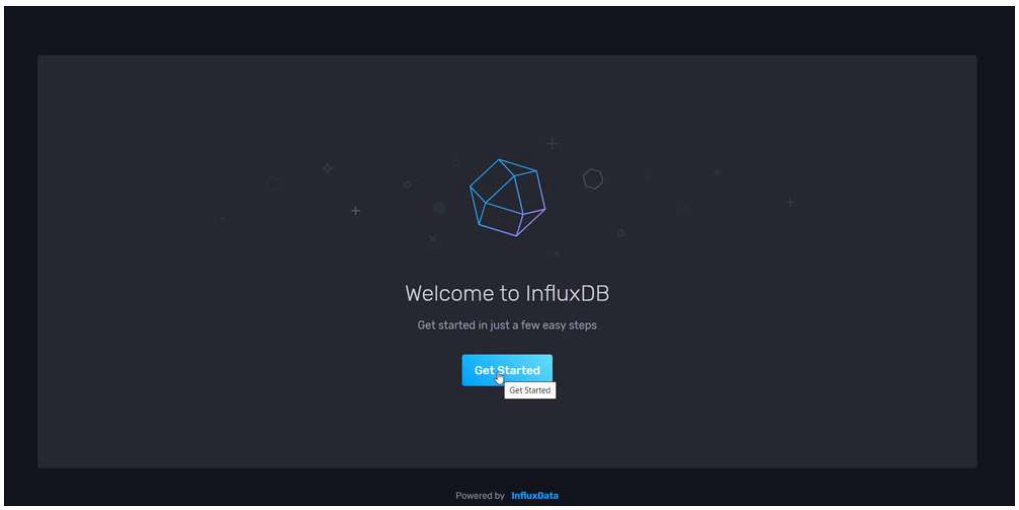
```
# Path to persistent storage engine files where InfluxDB stores all Time-Structure Merge Tree (TSM) data on disk.
# Note: If using a removable storage change the path to the corresponding mount point.
# For example: /media/sda1/influxdb/engine
# Note: The path takes effect after a ctrlX Core reboot
engine-path: /media/mmcblk1p1/influxdb/engine
```

Influxdb ctrlX external memory

NOW REBOOT!!!

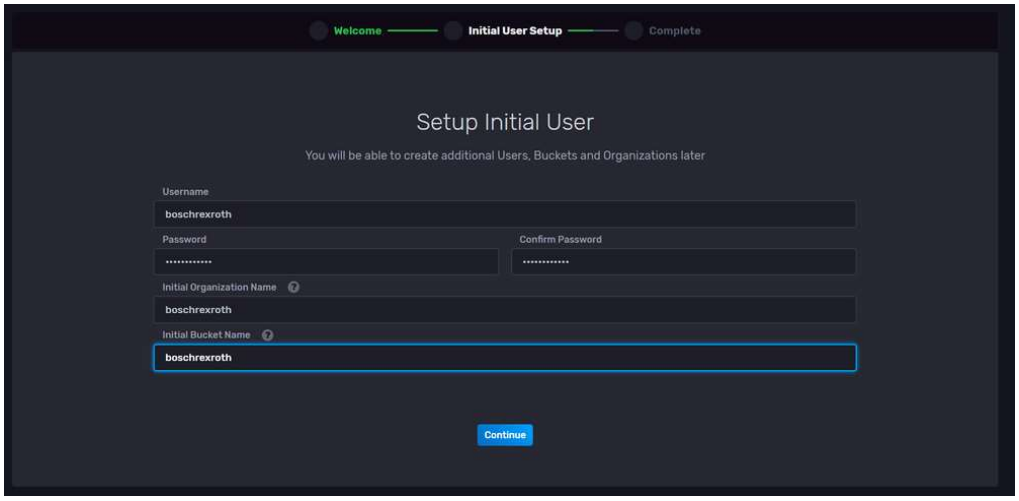
Step 1 - Setup influx

Go to the influx page clicking the icon on the left:

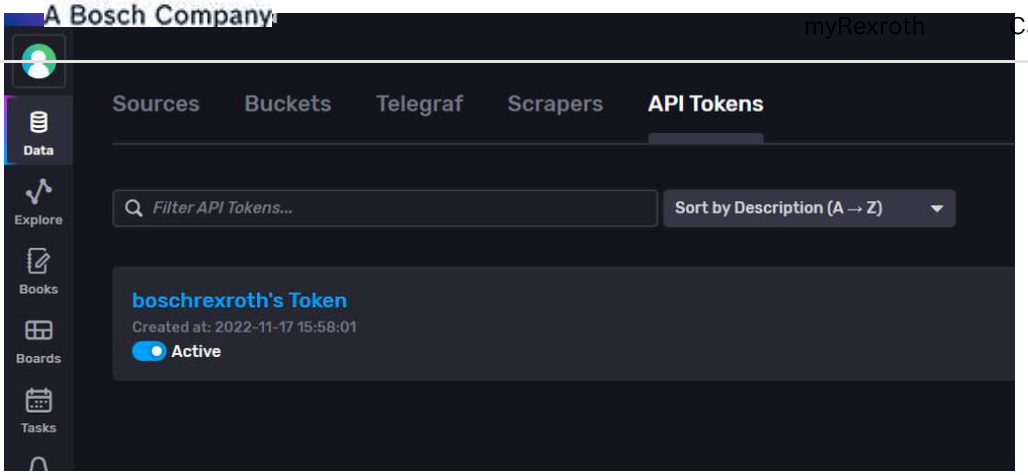


Welcome to InfluxDB

Setup the Initial use and the first Bucket, in this guide we just use boschrexroth as anything:

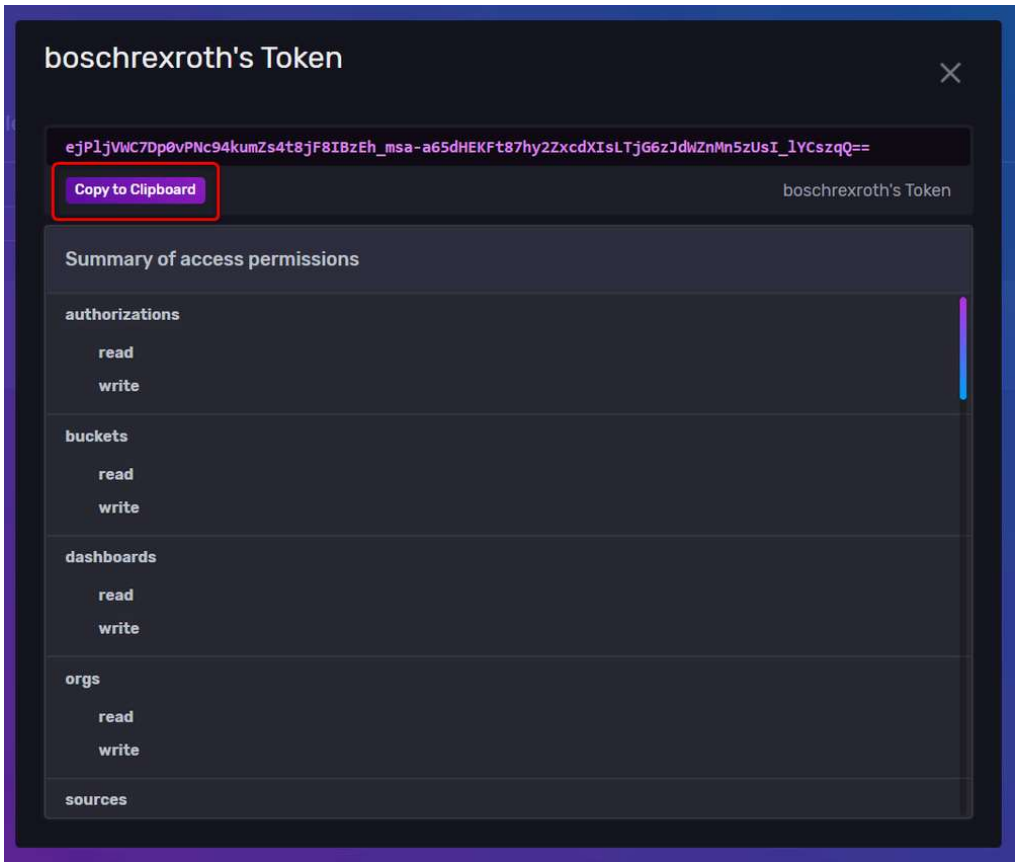


Setup initial user



API Tokens

Just copy and keep secret the autogenerated token:

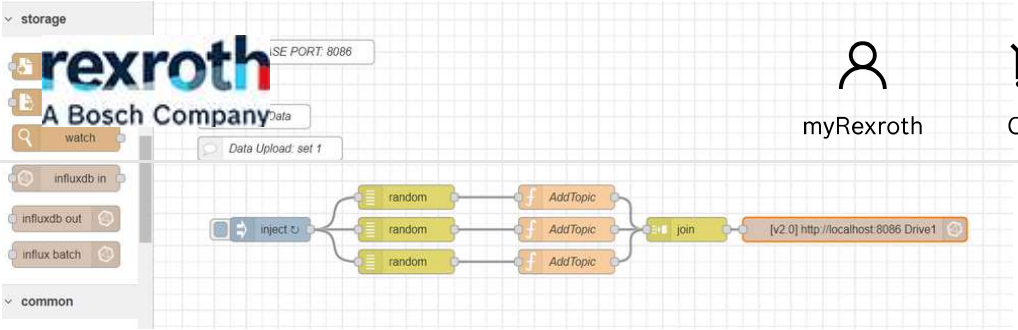


API Tokens

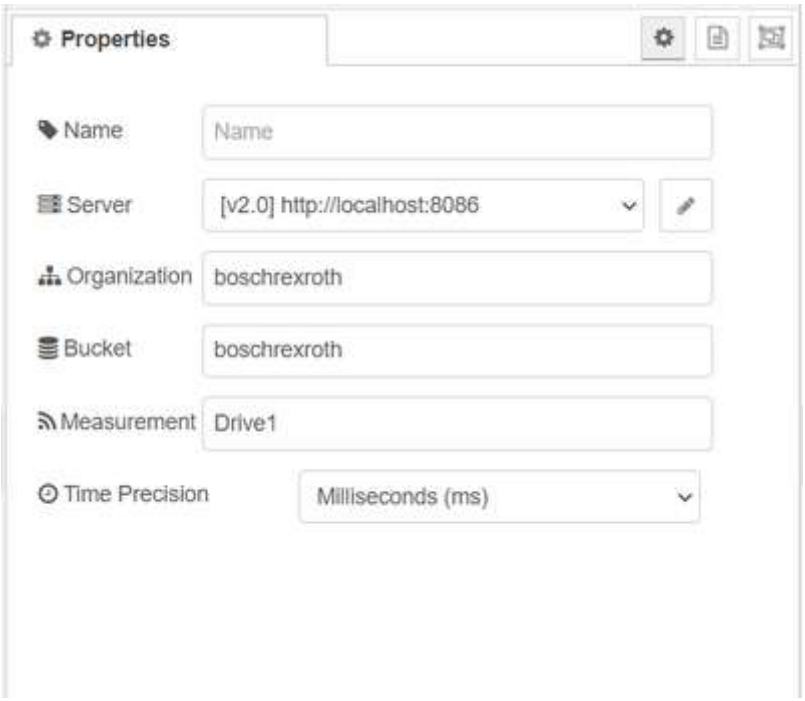
we're done here! Let's move forward!

Step 2 - Setup Node-Red

Load the example in NodeRed and open up the InfluxDB node!

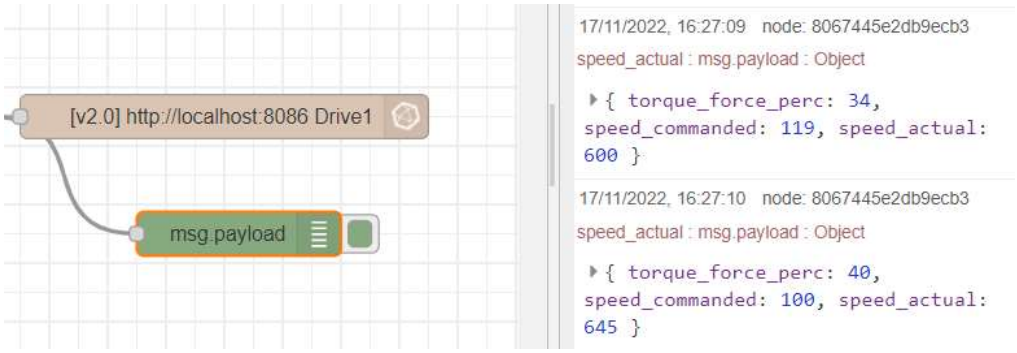


Be sure to parametrize the node as follow:

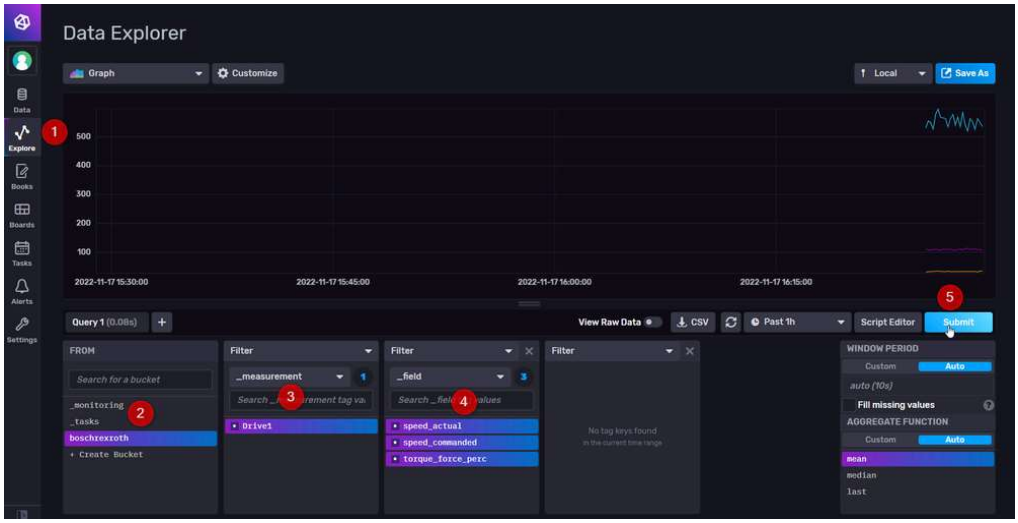


In the server configuration is important to insert the token created before and insert the right URL:

But What does this example do? It's simple, basically creates a set of random values that are then joined together to create a set of values loaded inside InfluxDB.



If we come back to InfluxDB and we select Explore, boschrexroth, Drive1 (the default measurement), all the fields and finally apply we can see the data flowing inside the database!! great no?

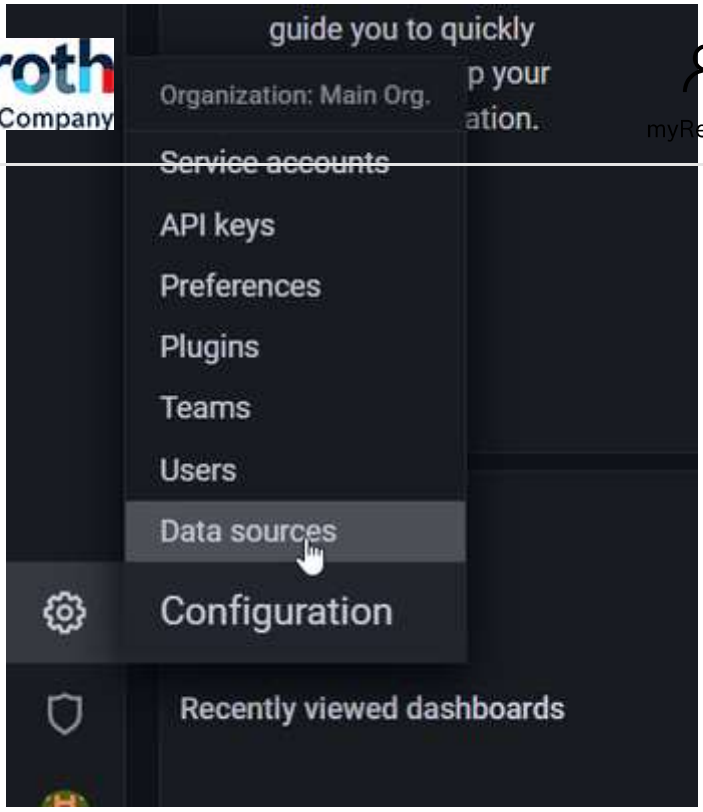


Data Explorer

Step 3 - Connect Grafana

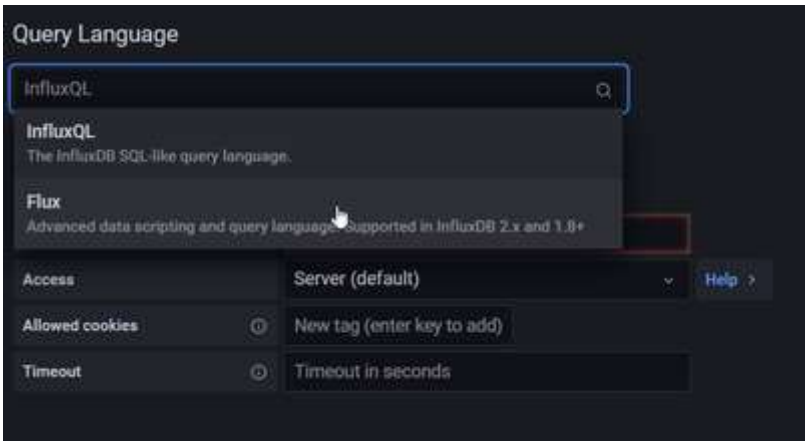
We're almost done, we just need to connect Grafana. Nothing more simple! Lets do it!

Just open up Grafana, login with **admin** as user and **admin** as password then move to settings and then Data sources:

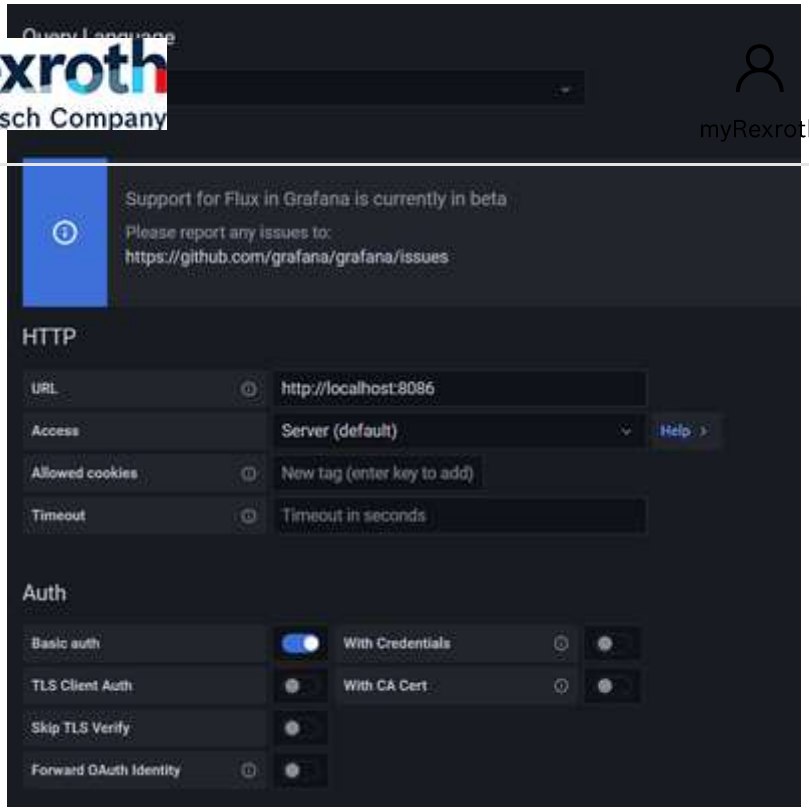


Data sources

Select obviously InfluxDB then in the configuration Flux as query language.

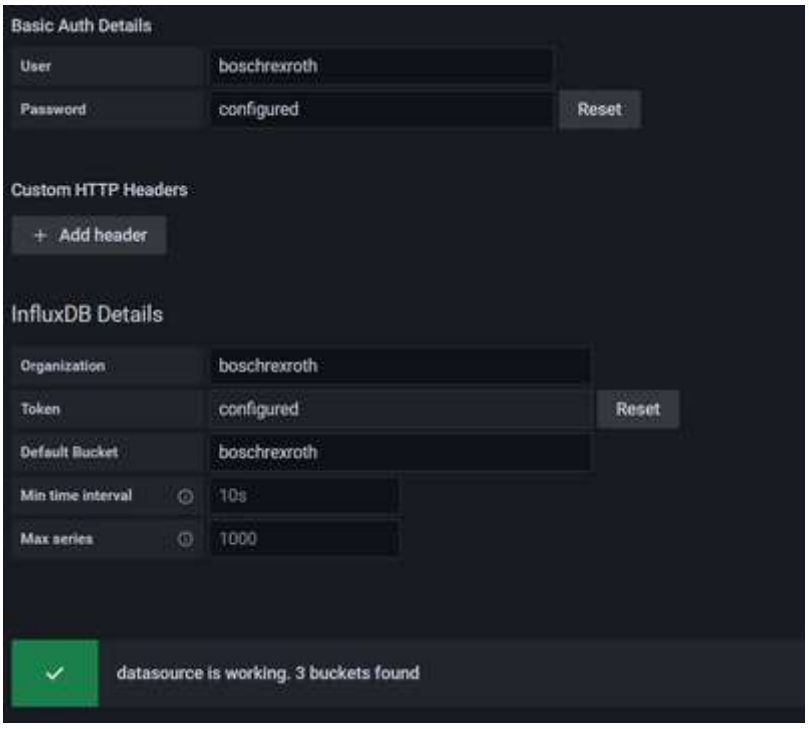


ctrlX setup ctrlx grafana flux



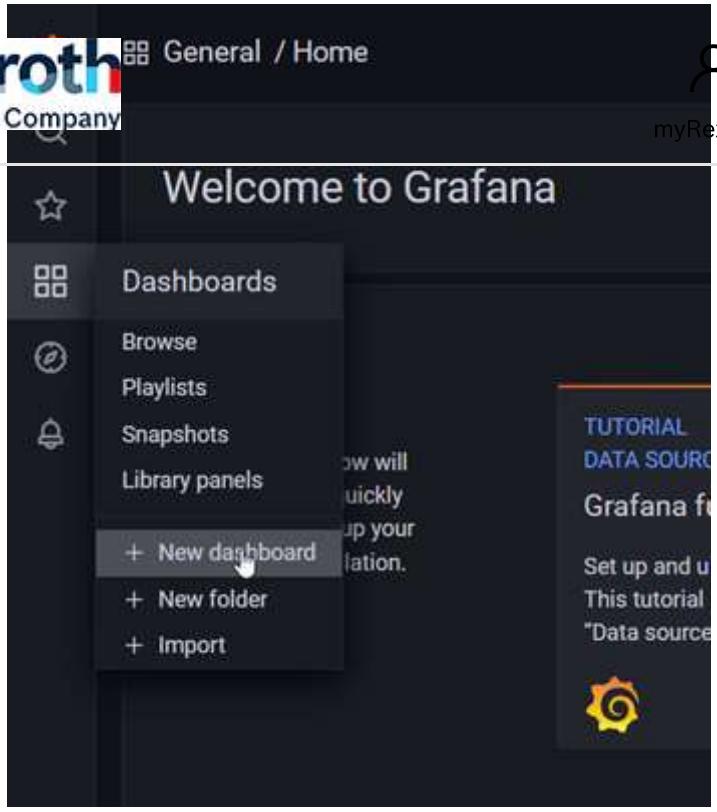
ctrlx setup grafana InfluxDB

The rest of the configuration is just like the NodeRed node! The click save and test!

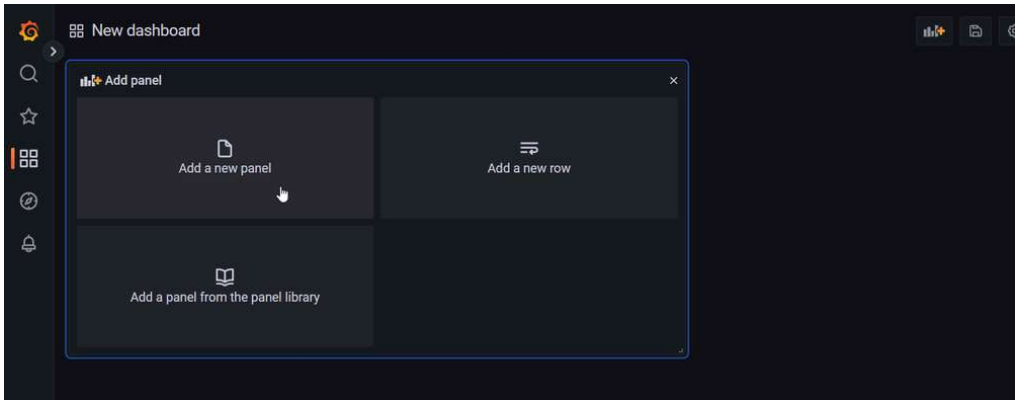


ctrlX setup grafana InfluxDB token

Ok almost done, create the first dashboard and then click the "add panel button":

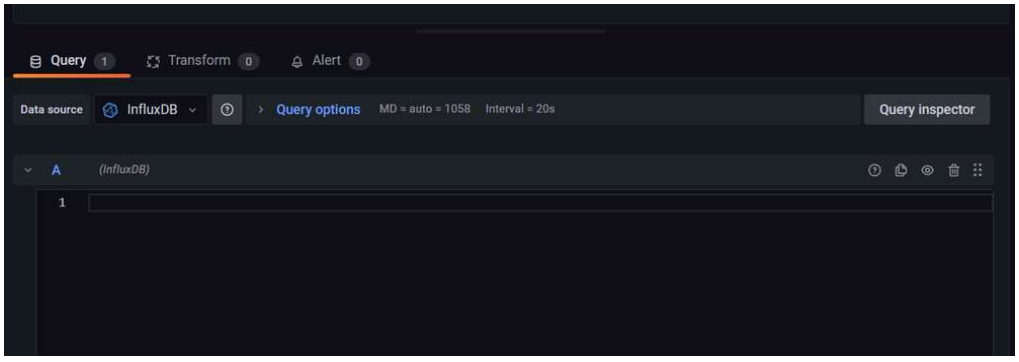


ctrlx grafana new dashboard



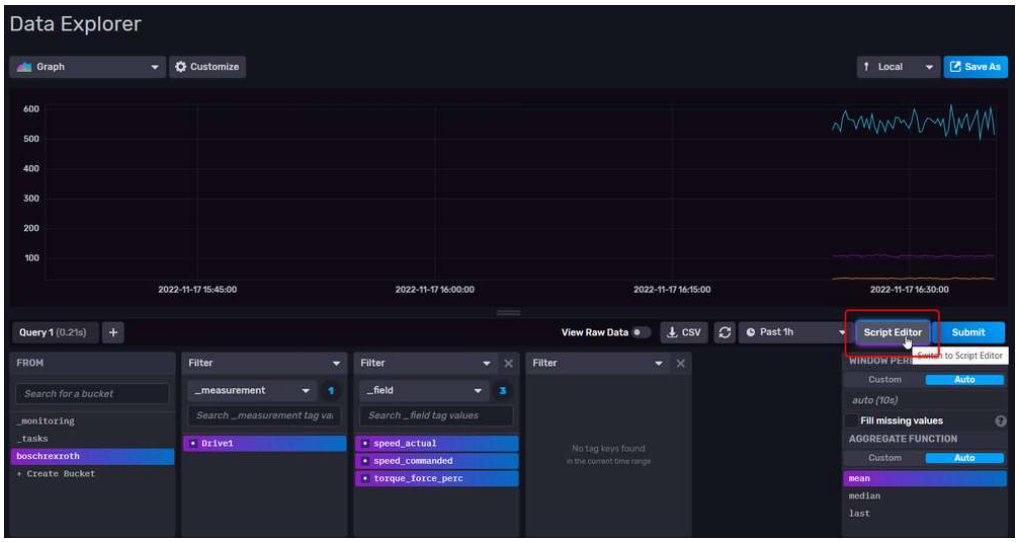
ctrlx grafana new dashboard

Ok now the panel asks for a query don't go mad.. Work smart not Hard!!

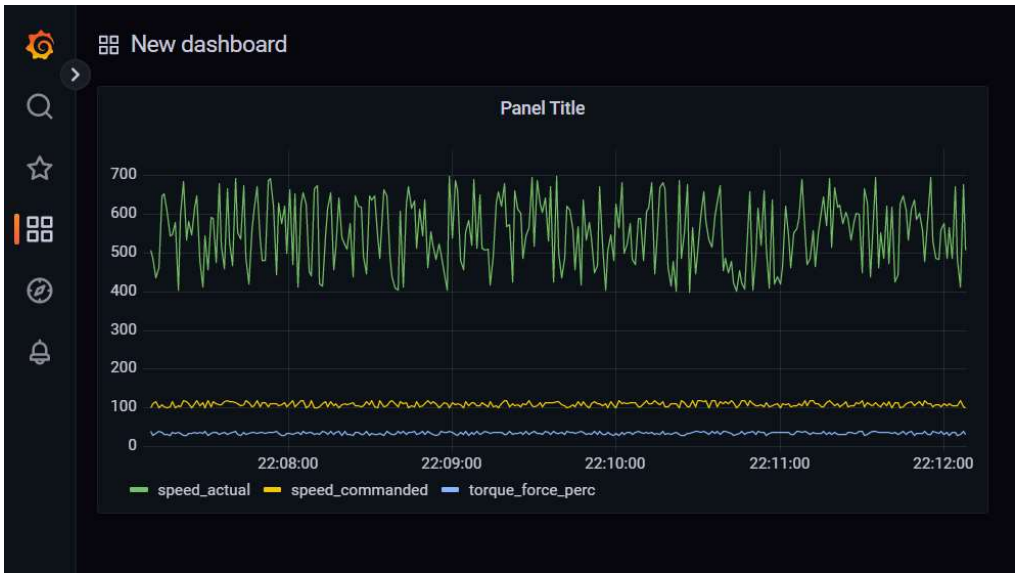


InfluxDB ctrlx grafana

Go back inside InfluxDB and open up the script editor, copy the qu panel and save!



ctrlx InfluxDB2 query



grafana ctrlx first dashboard

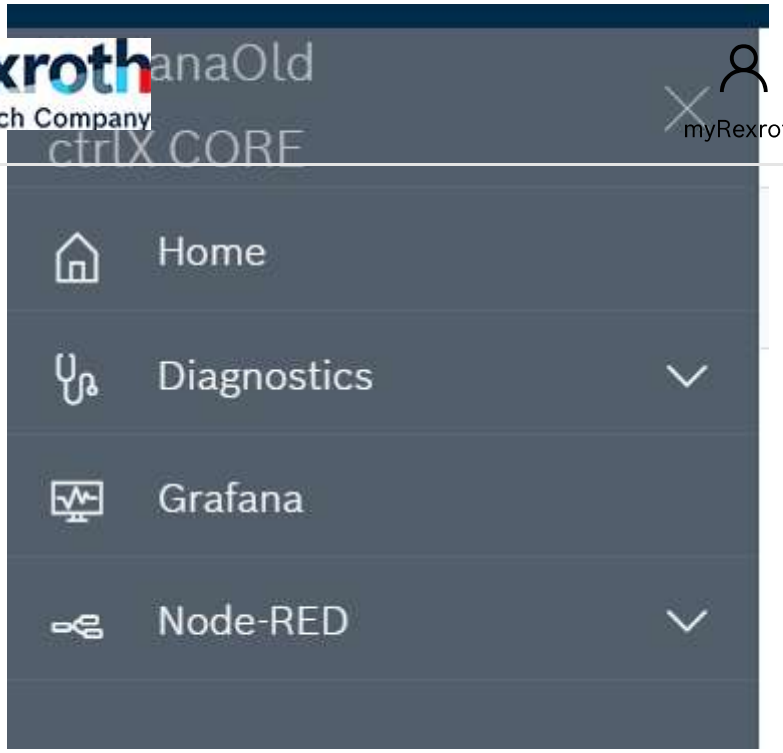
First Panel completed!!

Setup 2 - Alternative (not official)

What we need to install is:

- InfluxDB 1.8.3
- Grafana

In the end the sideboard looks like this:

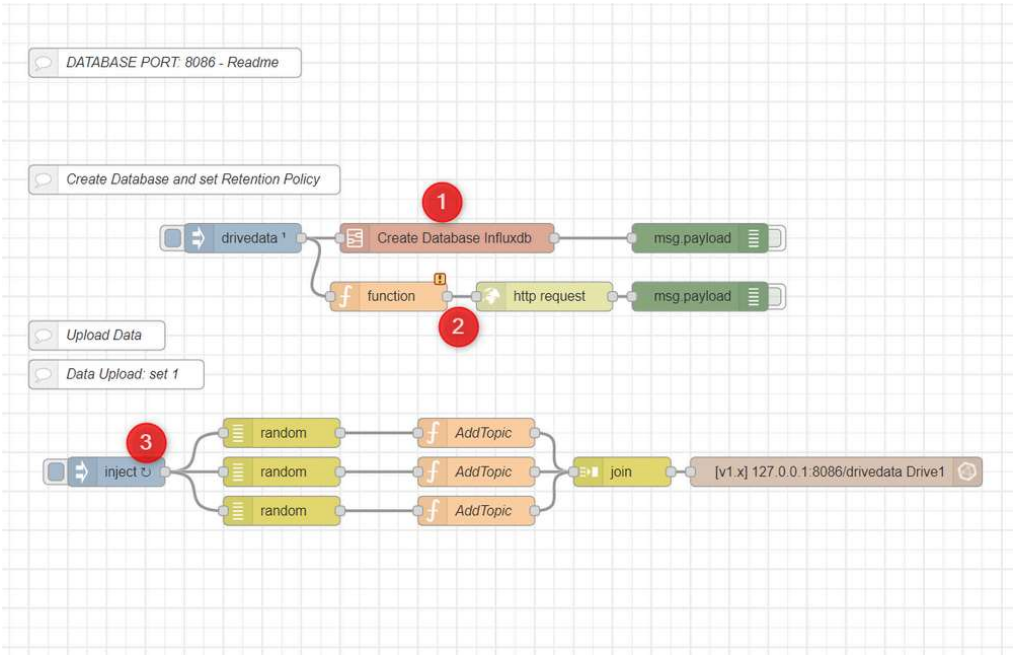


simple ctrlx apps grafana nodered

By default InfluxDB 1.8.3 has no frontend so, there is no icon on the sidebar.

Step 1 - Setup influx and NodeRed

How? load up the NodeRed example and deploy it!

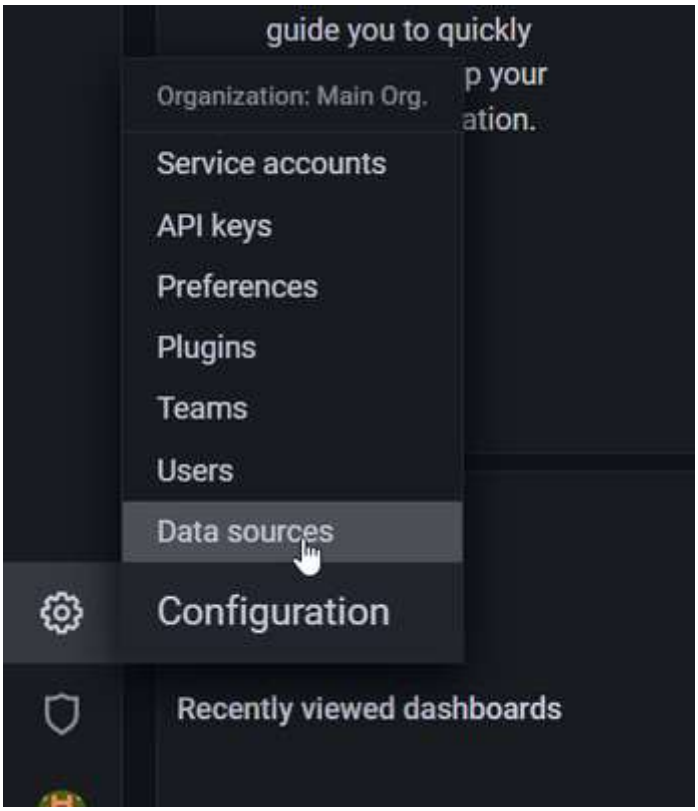


ctrlx InfluxDB 1.8.3

What is happening? 1 si creating the database trough REST API 2 is setting a proper retention policy and 3 is creating random data!

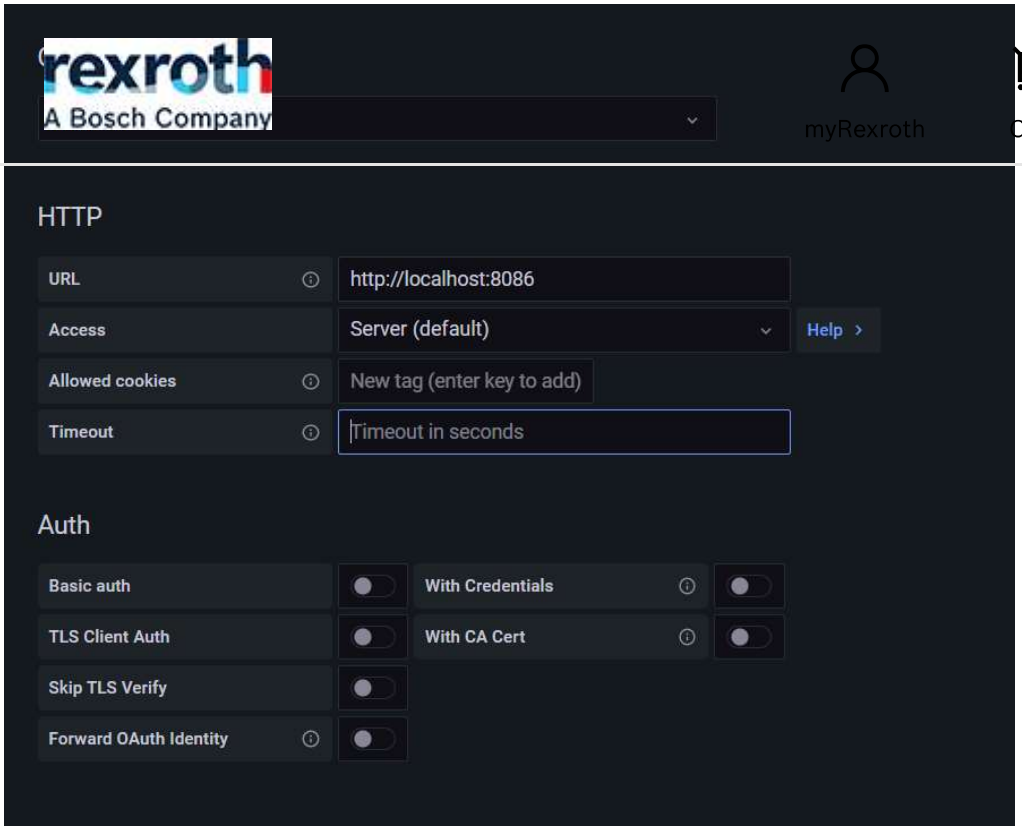
Step 2 - Setup Grafana

ust open up Grafana, login with **admin** as user and **admin** as password then move to settings and then Data sources:



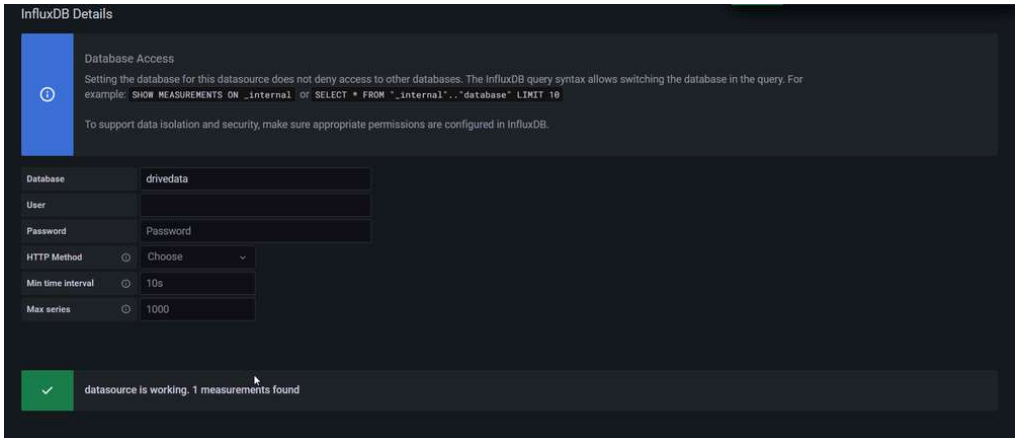
Data sources

Important! keep InfluxQL as Query language! and setup the url like this!



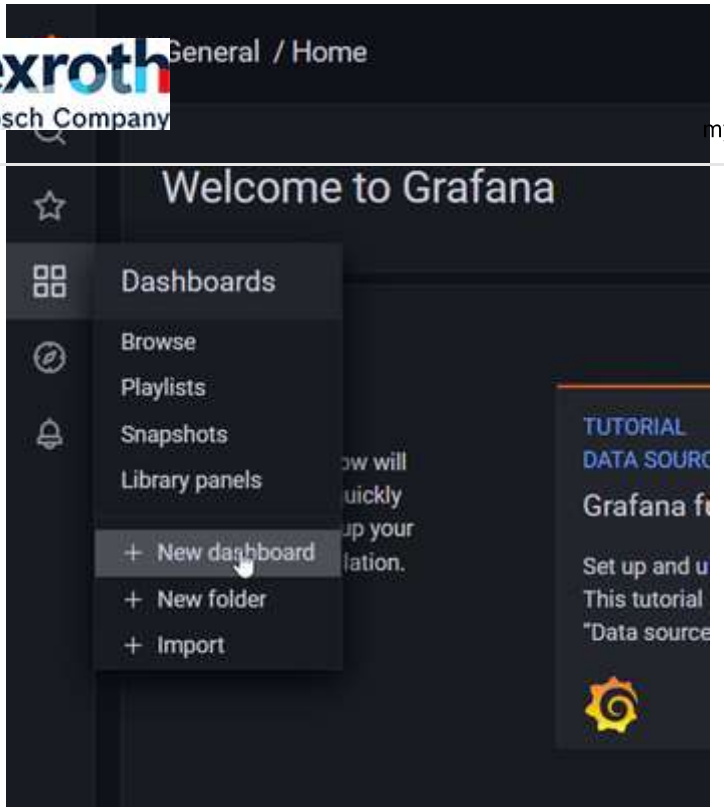
ctrlX setup grafana InfluxDB

This setup has not security active, use the firewall app to protect InfluxDB! Insert drivedata as database (the example creates this automatically).

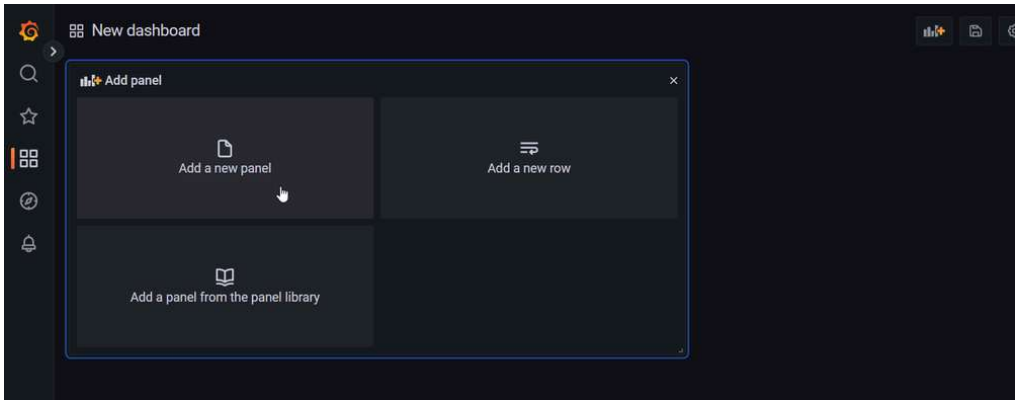


ctrlx setup grafana InfluxDB

Ok almost done, create the first dashboard and then click the "add panel button":



ctrlx grafana new dashboard



ctrlx grafana new dashboard

Now we just need to select what we would like to see, it's far more easy in this case!