



Digitalization
Industrie 4.0

Smart Production
E-Mobility
Smart Energy

Energy Efficiency
Smart Infrastructure

Smart Buildings
Renewables

Welcome

PLCnext Technology Part 2 **Getting started with Proficloud**

enhance your automation thinking



PLCnext Technology

Part 2

Getting started with ProfiCloud



ProfiCloud – Professional Cloud Solutions

- Cloud service hosted by Phoenix Contact
- Provides a convenient means of creating dashboards to show content generated from your PLCnext controller(s)
- Platform to conduct analytics on your data
- Trending, time series data



ProfiCloud – Professional Cloud Solutions

This training assumes you have completed Part 1 of this PLCnext training series. If so, you can follow this training almost verbatim. If you have not completed Part 1, but already have familiarity with PLCnext programming, you may still use this training, although you will need to adapt the examples to your existing program.

Thanks to Dave Hoysan – his Proficloud tutorial

Thanks to Liz Bertelson – Help with networking

Thanks to Loren Brown – Help with PLCnext Engineer





Topics

- Hardware and software used
- Preparing your PLCnext controller to communicate with ProfiCloud
 - Access the PLCnext controller's web-based management to configure
 - Adapt your laptop and network to reach the internet
- PLCnext Engineer programming/configuration
 - Creating code and variables in PLCnext Engineer to interact with Proficloud
- ProfiCloud configuration
 - Time Series Data (TSD)
 - Adding your device
 - Creating dashboards

Hardware and software

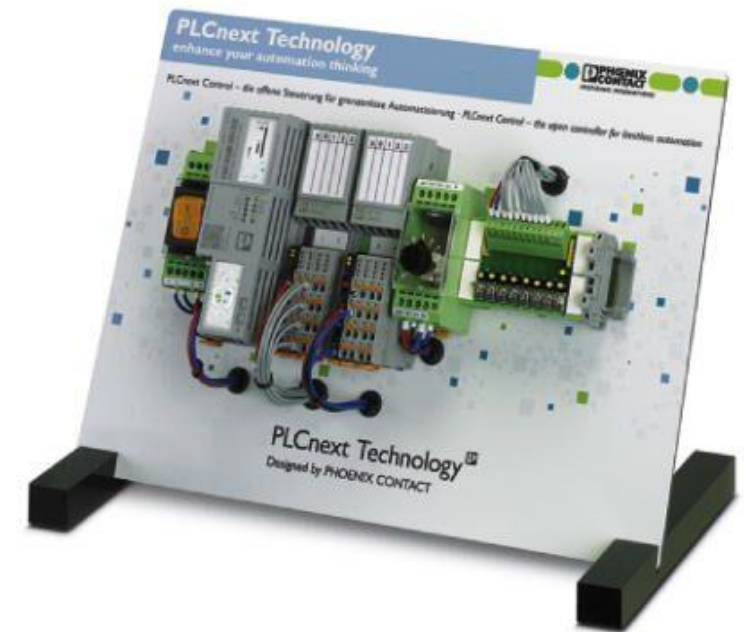
Hardware:

- AXC F 2152 STARTERKIT Order # **1046568**
- ...or build your own:
 - Controller - AXC F 2152 - **2404267**
 - DI/DO Module – DI8 /1 DO8 /1 – **2701916**
 - AI/AO Module – AI2 AO2 – **2702072**
 - *I/O Exerciser - **5603026**
- *To follow the programming example in this training, a means of generating a 0-10vdc analog input signal and a 4-20mA analog input signal is needed.

Software:

- PLCnext Engineer – for PLCnext controller programming
- ProfiCloud

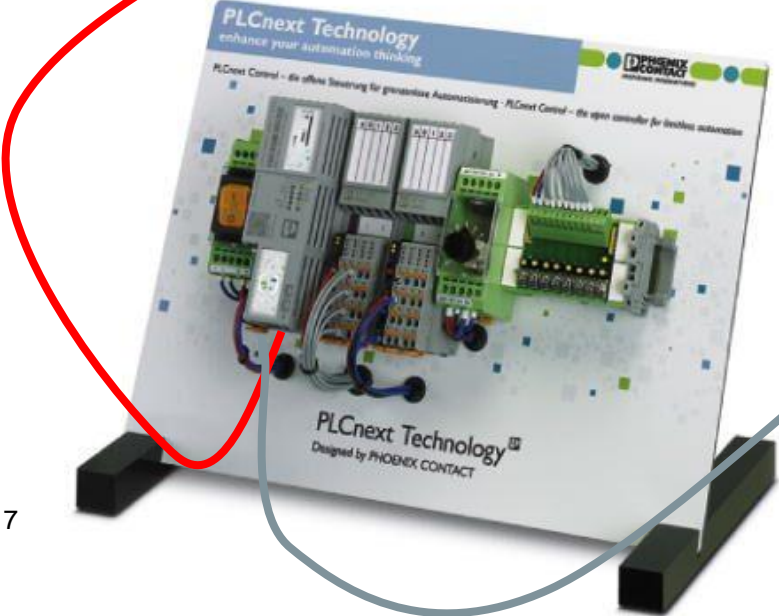
As this is follow-on training to the PLCnext training course, the same hardware and software are being used, with the addition now of the ProfiCloud application.



Connect the PLCnext controller to the internet, and simultaneously to your computer – via Ethernet



Modem – wired or cellular – to provide the PLCnext controller with internet access



Connect the PLCnext controller to the internet, and simultaneously to your computer – via Ethernet

To work with Proficloud, the PLCnext controller requires simultaneous connection to both the programming PC and to the internet. This requires the use of an Ethernet switch. Fortunately a 2 port Ethernet switch is built into the AXC F 2152 (and other PLCnext models). Simply keep the existing Ethernet cable connected between the PLCnext controller and your programming PC. Plug a second Ethernet cable into the second Ethernet port on your PLCnext controller and plug the other end into a modem/router that has access to the internet. This could be cellular router, such as the one shown on the previous slide, or it could be for example, an Internet Service Provider's Router at your house, as shown on the following slide. In the case of this training session's development, the ISP's modem in the author's home office was used. This requires some reconfiguration of the IP address of the PLCnext controller, and some additional tweaks to the Ethernet network, which will be explained.

Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

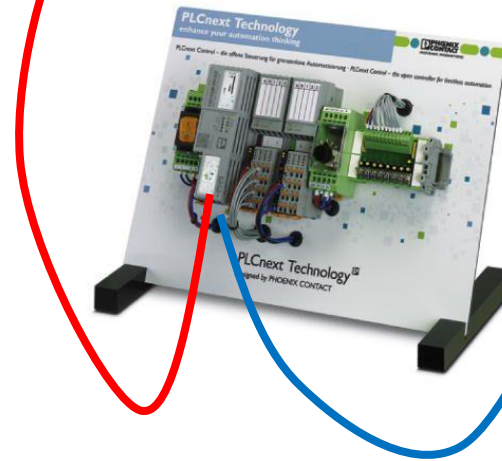
In many cases you will not be able to change the IP address, subnet, or default gateway of the upstream router, so you must discover these, and adapt the PLCnext controller, and your laptop, to communicate with and through the router, to the internet.

We will use some Windows tools to discover the IP information of the upstream router and will adjust the IP address of the PLCnext controller accordingly.

Internet Service Provider's Modem

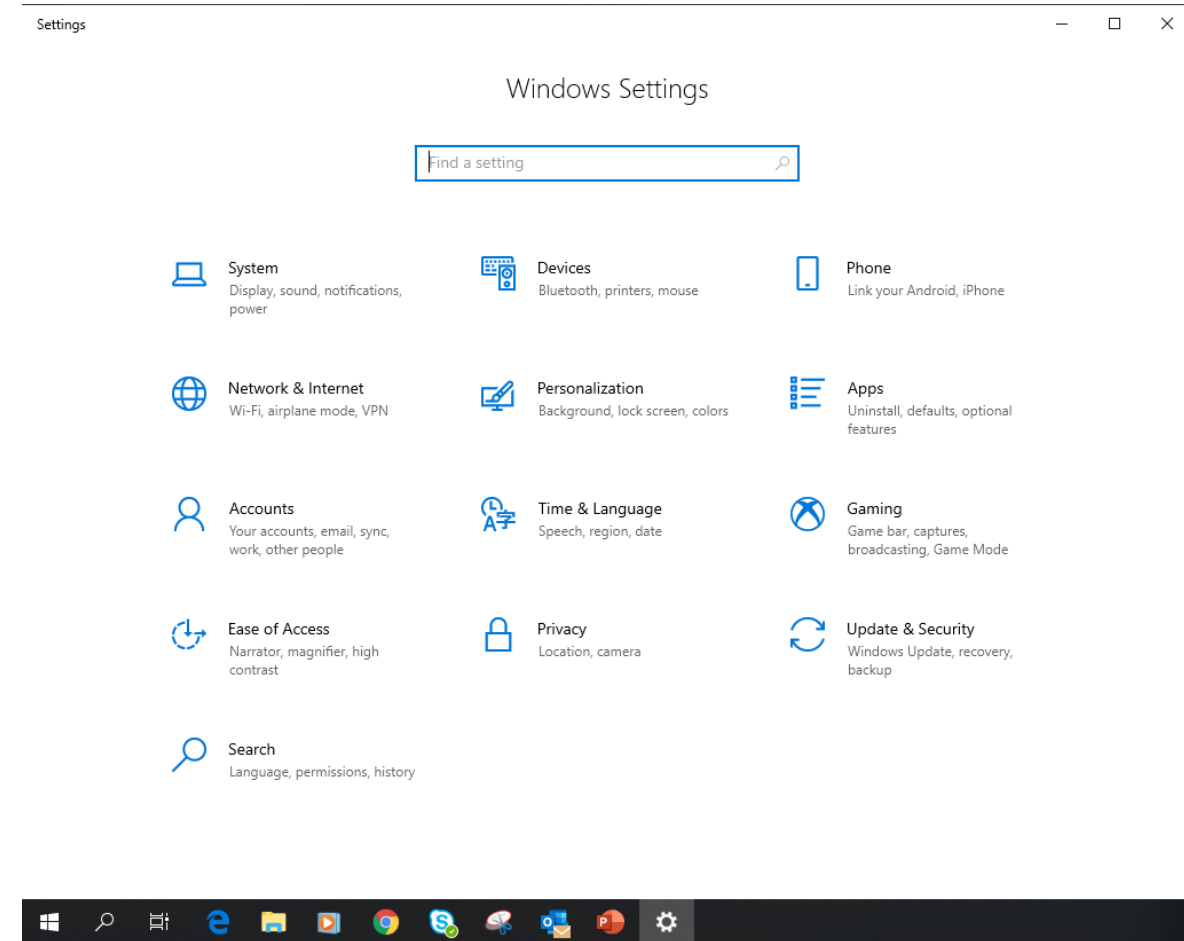


IP address: 192.168.0.1
Subnet mask: 255.255.255.0
(we'll see how to discover this info over the next few slides)



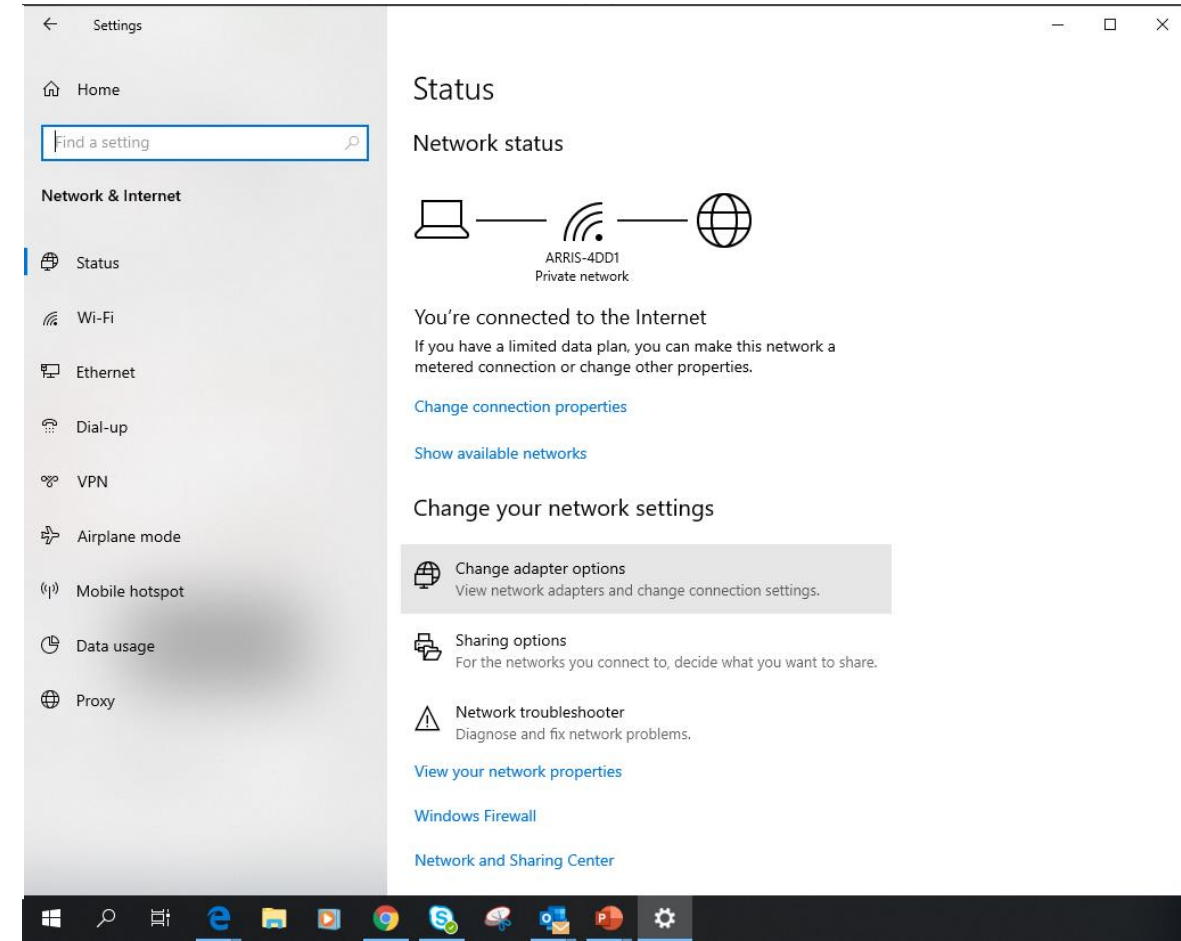
Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- Click on the Windows icon at the bottom-left of the screen
- Click on the “Settings” menu item
- When “Settings” opens, click on “Network & Internet”



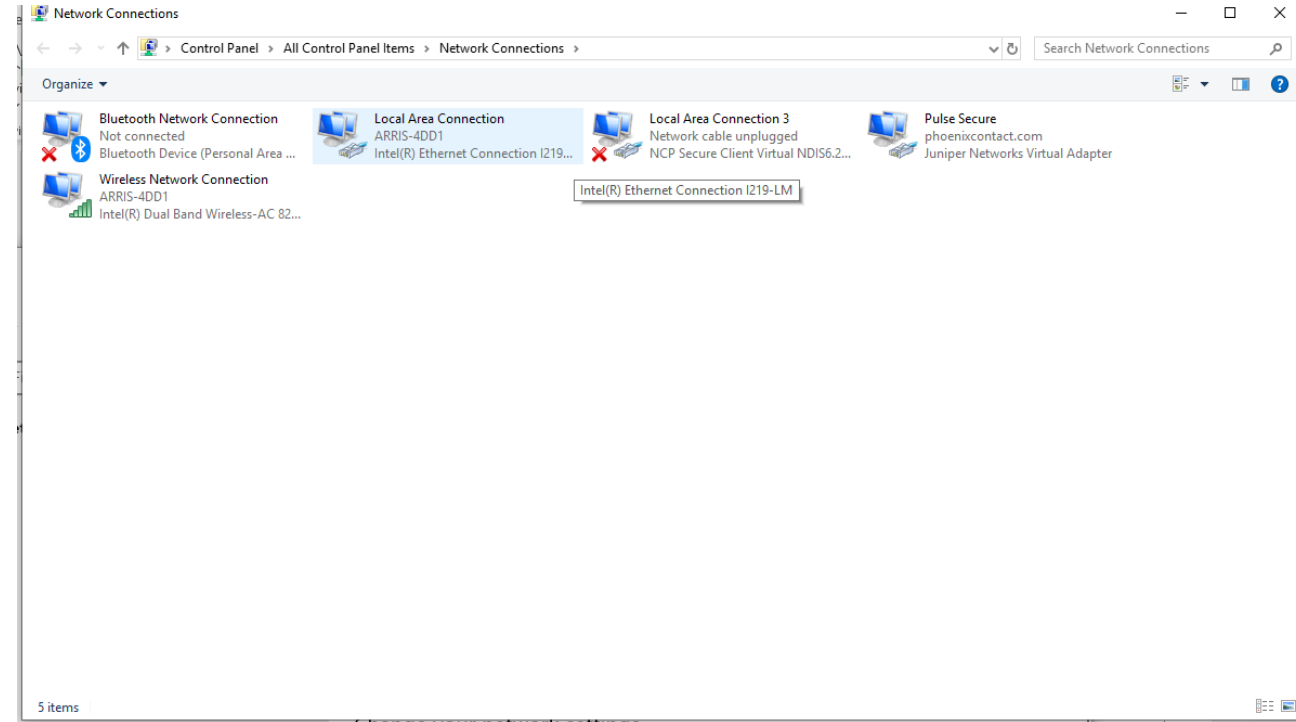
Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- Click on the Windows icon at the bottom-left of the screen
- Click on the “Settings” menu item
- When “Settings” opens, click on “Network & Internet”
- **Click on “Change adapter options”**



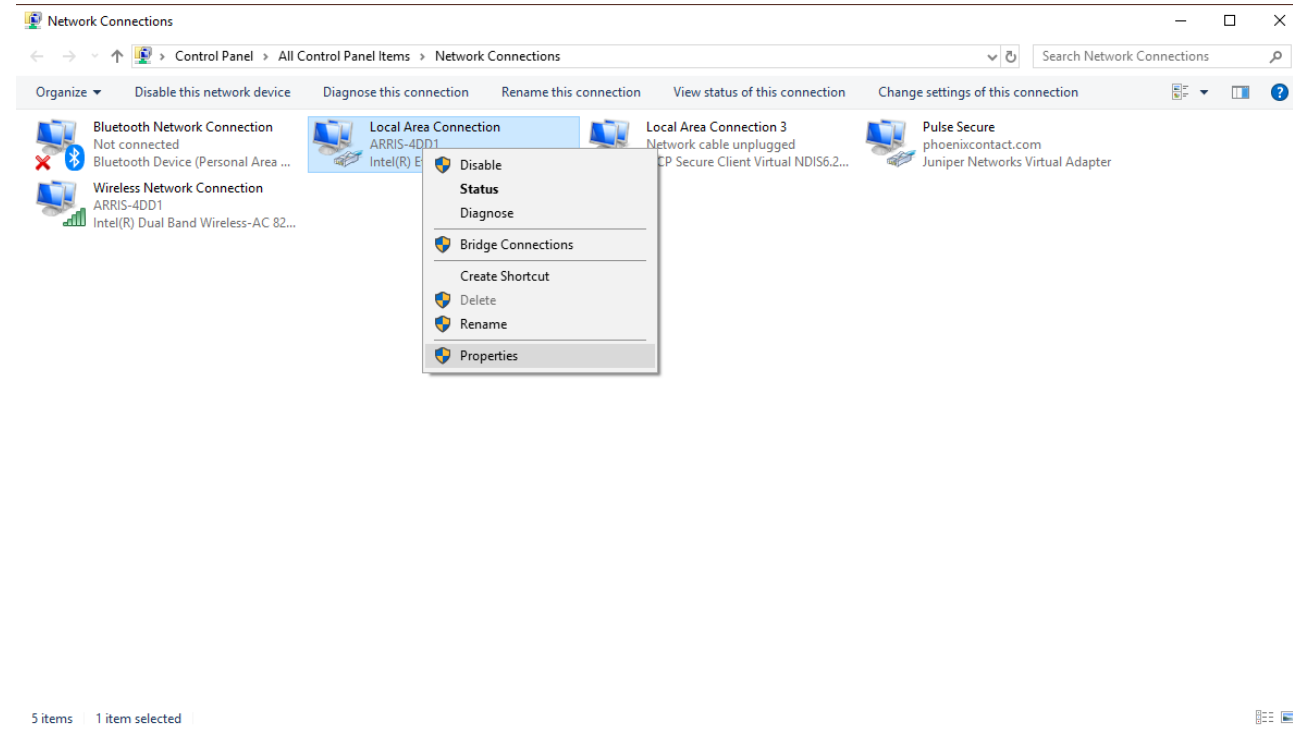
Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- Right-Click on “Local Area Connection”



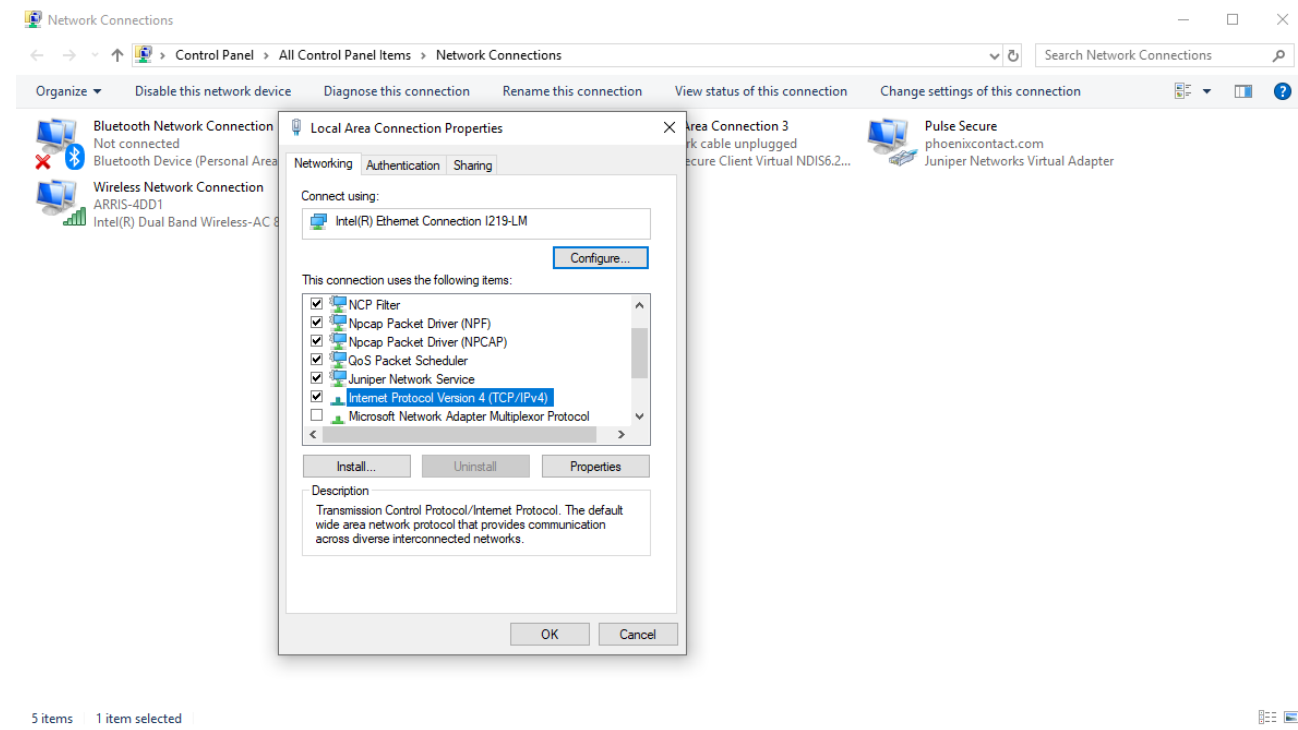
Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- Right-Click on “Local Area Connection”
- Then click on “Properties” from the drop-down list



Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

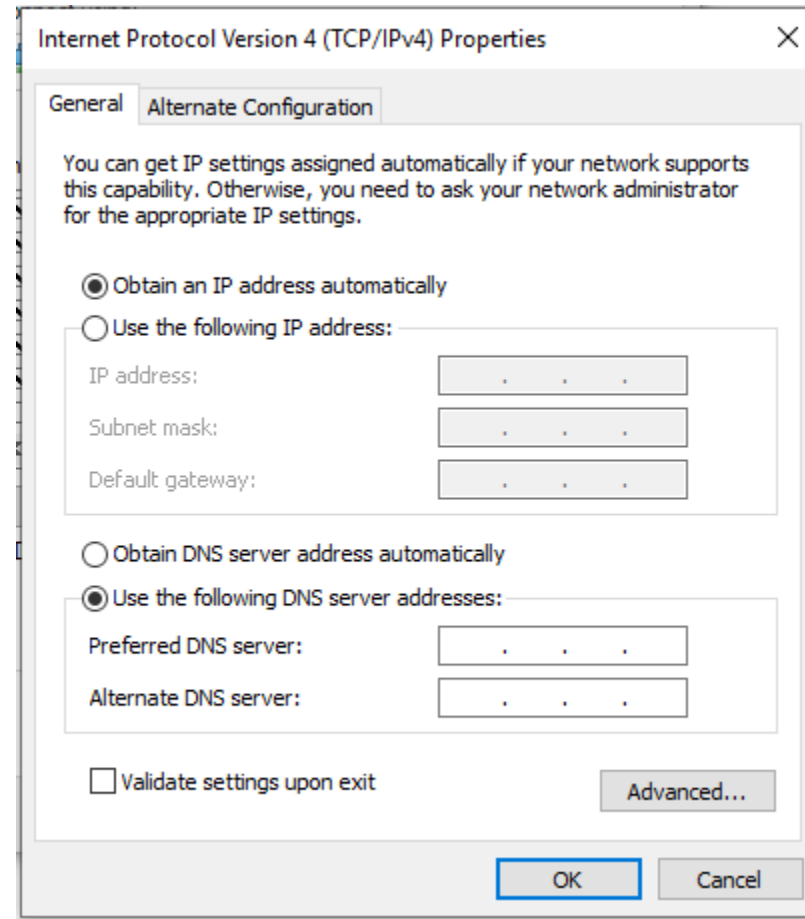
- Right-Click on “Local Area Connection”
- Then click on “Properties” from the drop-down list
- **Scroll down the list and double-click on “Internet Protocol Version 4 (TCP/IPv4)”**



Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- Right-Click on “Local Area Connection”
- Then click on “Properties” from the drop-down list
- Scroll down the list and double-click on “Internet Protocol Version 4 (TCP/IPv4)”
- **Click on “Obtain an IP address automatically.”**
- **Click “Ok” and “Ok” again**

This will force the Internet router to dynamically assign an IP address to your laptop and will give you insight into the internet router's configuration settings, so you can then change the PLCnext controller's IP information to interact with it and access the internet.



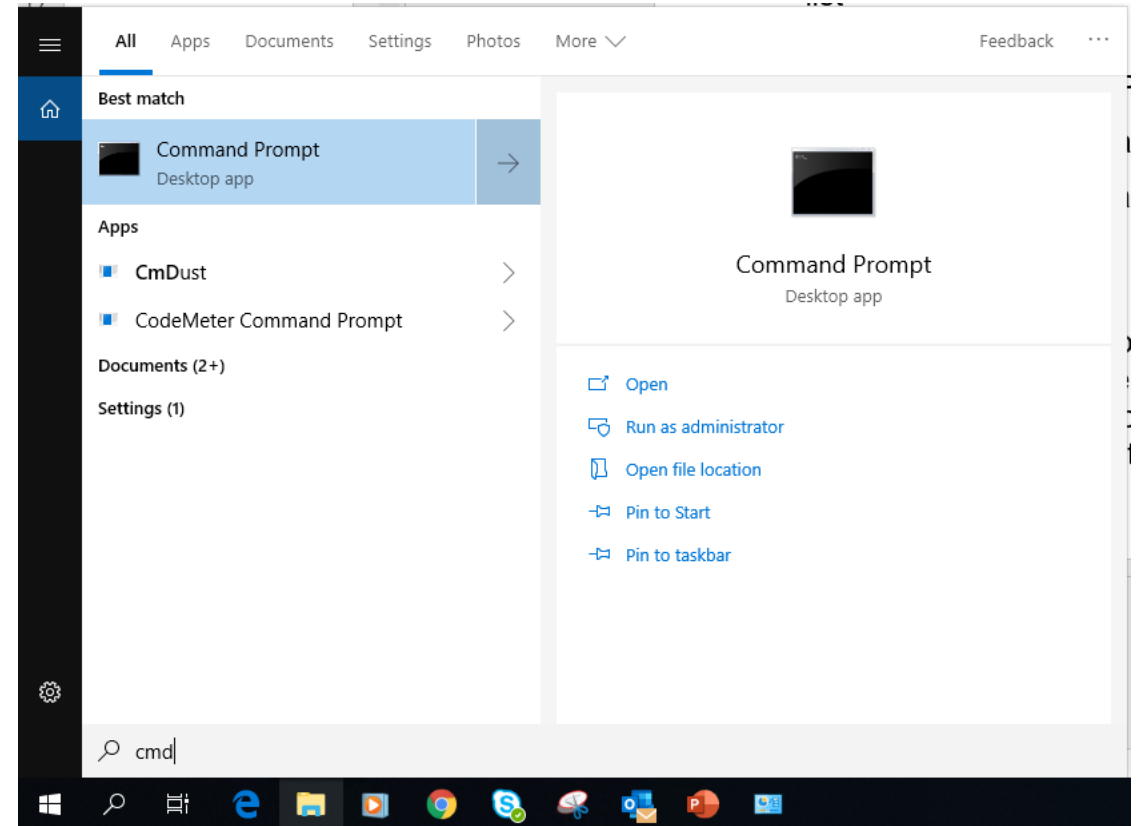
Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

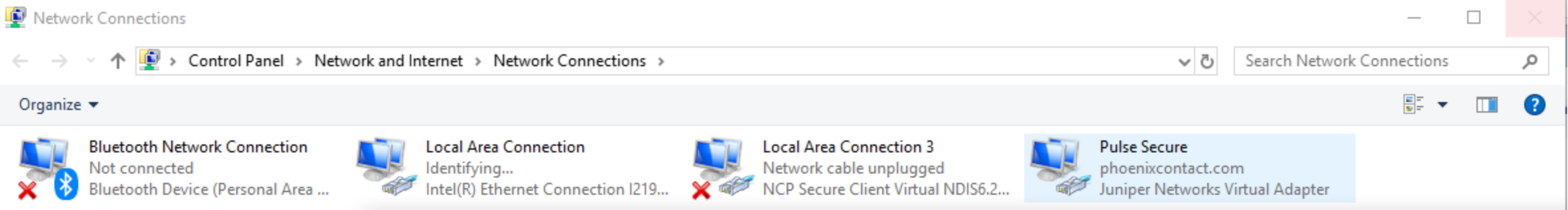
We will use another Windows tool to get insight on the Ethernet network that the Router is part of.

- Click on the magnifying glass next to the Windows icon at the bottom-left, and type in “CMD”
- This will find the “Command Prompt” program
- Click on the “Command Prompt” shortcut to open it.

This will pull open the Command Prompt program.

- Type in: “ipconfig” and hit the enter key. (don't use the quotation marks...just the contents between the quotation marks).





In my case, the internet router has given the laptop the IP address: 192.168.0.4

We now know that this is the network that we need to join.

We also know that we need to select 192.168.0.1 as the default gateway.

- **Make note of your information.**

```
C:\> Command Prompt

Subnet Mask . . . . . : 255.255.255.255
Default Gateway . . . . . :

Unknown adapter Local Area Connection 3:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix . : wowway.com
Link-local IPv6 Address . . . . . : fe80::a8a7:4c44:f84d:fdb2%4
IPv4 Address. . . . . : 192.168.0.4
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1

Wireless LAN adapter Wireless Network Connection:

Connection-specific DNS Suffix . : wowway.com
Link-local IPv6 Address . . . . . : fe80::442e:78ac:3135:dafb%20
IPv4 Address. . . . . : 192.168.0.24
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

P:\>
```

Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

- From PLCnext Engineer – open the project you created in the last training.
- Double click on the controller immediately under “Project” in the PLANT area.
- Open the “Settings” sub-tab
- Click on Ethernet from the menu
- Configure as shown to the right, using the information specific to your case, as discovered by following the previous slide.

Note: Match the network's first three octets exactly (e.g. 192.168.0)...For the 4th octet, use any integer between 2 and 254 that is not already in use on the network).

The screenshot displays the PLCnext Engineer software interface. On the left, the 'PLANT' area shows a project tree with 'PLCnext2152 : AXC F 2152' selected. The right pane shows the 'Settings' tab for the selected controller, with the 'Ethernet' section expanded. Under 'TCP/IP [Profinet]', the 'IP address assignment mode' is set to 'manual'. The 'IP address' field is highlighted with a red box and contains the value '192 . 168 . 0 . 10'. A red arrow points from this field to the note in the previous slide. Other fields include 'Subnet mask' (255 . 255 . 255 . 0), 'Gateway' (192 . 168 . 0 . 1), 'Name of station' (axc-f-2152-1), and 'DNS hostname' (axc-f-2152-1). The bottom right corner of the interface shows a 'RECYCLE BIN' button.

Changing the PLCnext controller's IP address to match the subnet of the default gateway (upstream router)

(Note we are now on the same network as the internet router and using the internet router as the default gateway address).

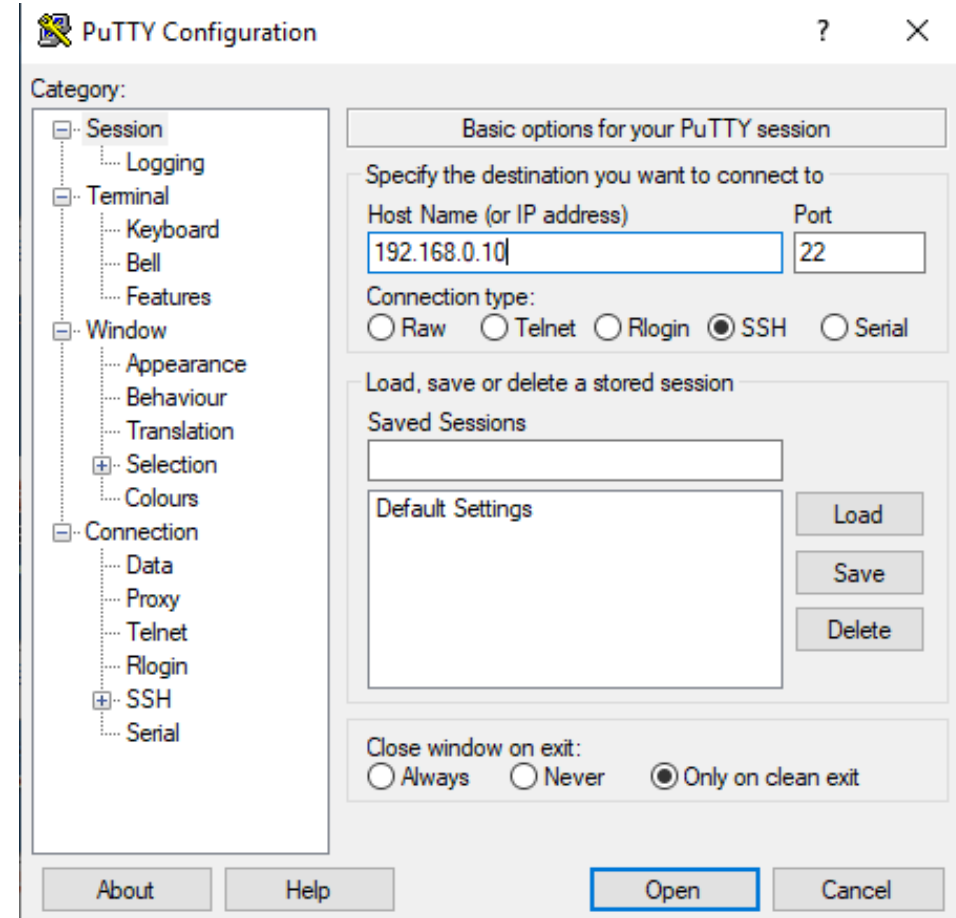
Now, Write and Start the project on the PLCnext controller.

The screenshot displays the PLCnext software interface. The main window is titled 'Settings' and shows configuration options for a PLCnext controller. The 'IP address' field is highlighted, showing the current address '192.168.0.10' and the subnet mask '255.255.255.0'. The 'Station name' is 'axc-f-2152-1'. A context menu is open over the 'Write and Start Project' option, showing keyboard shortcuts like 'F5', 'Ctrl+F5', 'Ctrl+Shift+R', and 'Del'. The background shows the 'PLANT' view with a tree structure of components including PLCnext (2), PLC, HMI Webserver, OPC UA, Profinet (0), and Axioline F (2).

Testing to assure the PLCnext controller has internet access

We need a free 3rd party software package to test whether the PLCnext controller can access the internet through the modem.

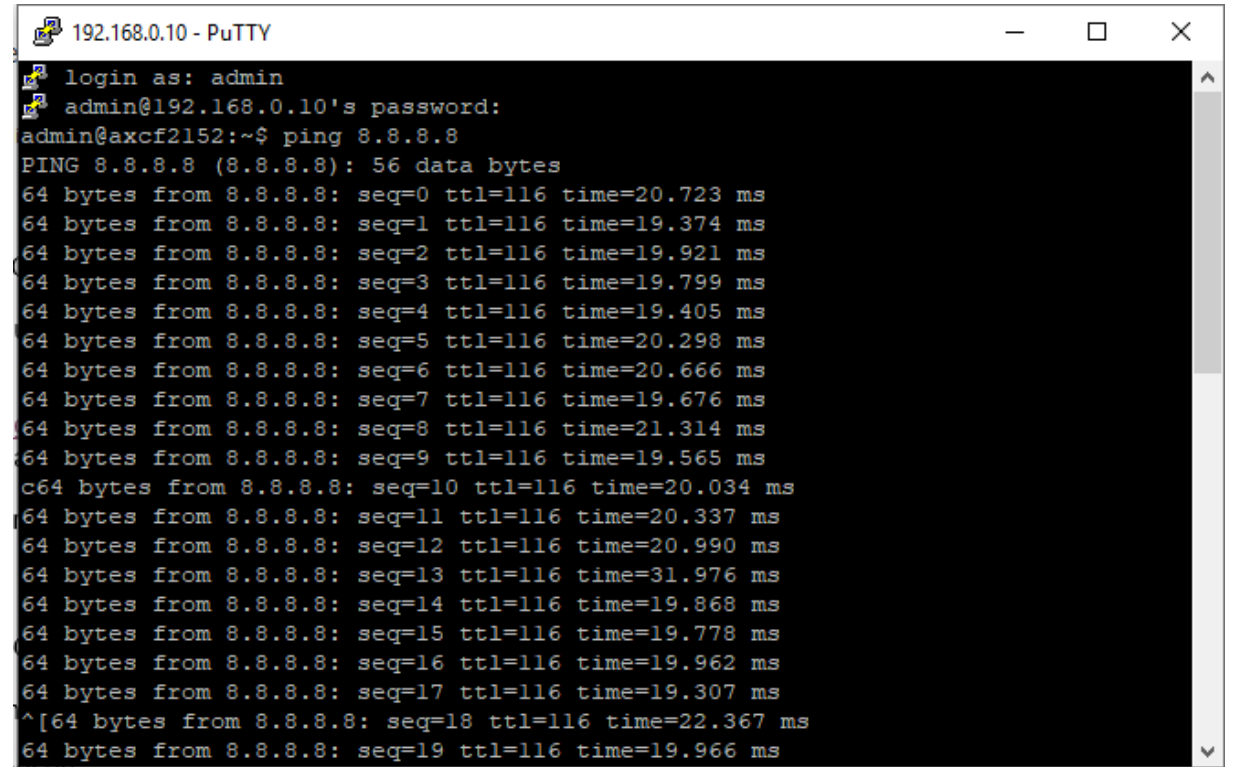
- Download and install PuTTY:
 - <https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>
- Open PuTTY
- Type in the PLCnext controller's IP address and set the Port to 22
- Click the "Open" button



Testing to assure the PLCnext controller has internet access

We will PING a known site on the internet – FROM THE PLCnext CONTROLLER to verify that it has a good connection to the internet

- Type in the username for the PLCnext controller (factory default is “admin”)
- Type in the password. (This is found on the face of the PLCnext controller)
- Type “Ping 8.8.8.8” then hit the enter key
 - (8.8.8.8 is the IP address for Google)
- You should see positive responses as shown to the right. To stop the Pinging, hit Ctrl C
- If that worked, close PuTTY. If it didn't, the PLCnext controller does not have internet connectivity, and this must be fixed.

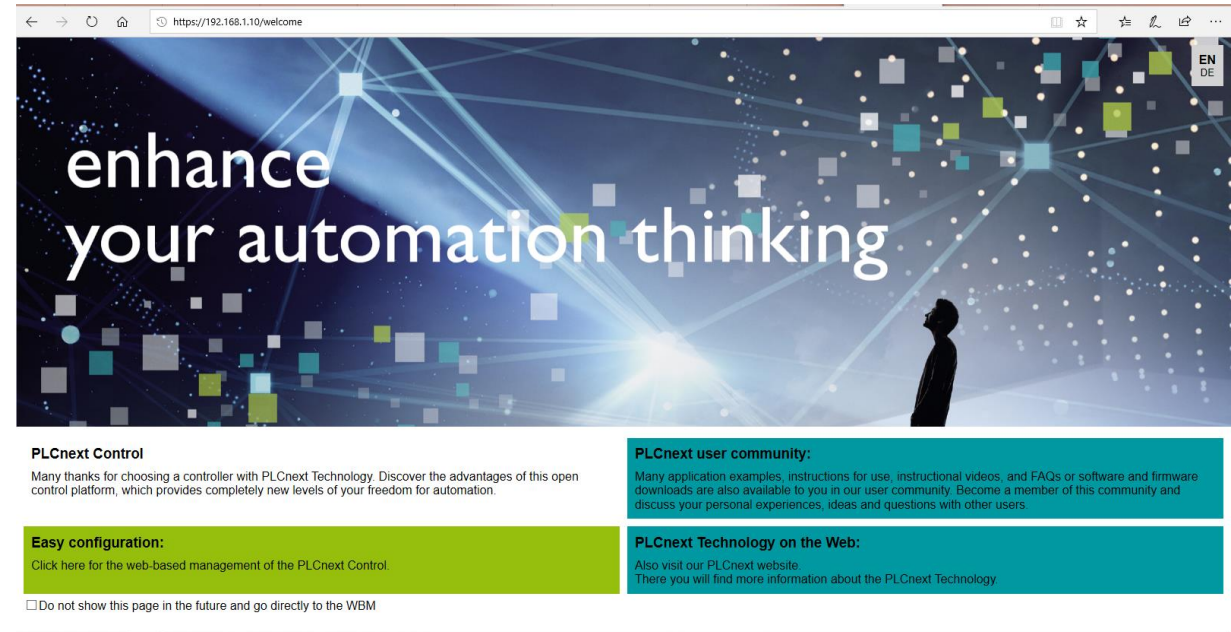


```
192.168.0.10 - PuTTY
login as: admin
admin@192.168.0.10's password:
admin@axcf2152:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=116 time=20.723 ms
64 bytes from 8.8.8.8: seq=1 ttl=116 time=19.374 ms
64 bytes from 8.8.8.8: seq=2 ttl=116 time=19.921 ms
64 bytes from 8.8.8.8: seq=3 ttl=116 time=19.799 ms
64 bytes from 8.8.8.8: seq=4 ttl=116 time=19.405 ms
64 bytes from 8.8.8.8: seq=5 ttl=116 time=20.298 ms
64 bytes from 8.8.8.8: seq=6 ttl=116 time=20.666 ms
64 bytes from 8.8.8.8: seq=7 ttl=116 time=19.676 ms
64 bytes from 8.8.8.8: seq=8 ttl=116 time=21.314 ms
64 bytes from 8.8.8.8: seq=9 ttl=116 time=19.565 ms
64 bytes from 8.8.8.8: seq=10 ttl=116 time=20.034 ms
64 bytes from 8.8.8.8: seq=11 ttl=116 time=20.337 ms
64 bytes from 8.8.8.8: seq=12 ttl=116 time=20.990 ms
64 bytes from 8.8.8.8: seq=13 ttl=116 time=31.976 ms
64 bytes from 8.8.8.8: seq=14 ttl=116 time=19.868 ms
64 bytes from 8.8.8.8: seq=15 ttl=116 time=19.778 ms
64 bytes from 8.8.8.8: seq=16 ttl=116 time=19.962 ms
64 bytes from 8.8.8.8: seq=17 ttl=116 time=19.307 ms
64 bytes from 8.8.8.8: seq=18 ttl=116 time=22.367 ms
64 bytes from 8.8.8.8: seq=19 ttl=116 time=19.966 ms
```

Preparing the PLCnext controller to work with Proficloud

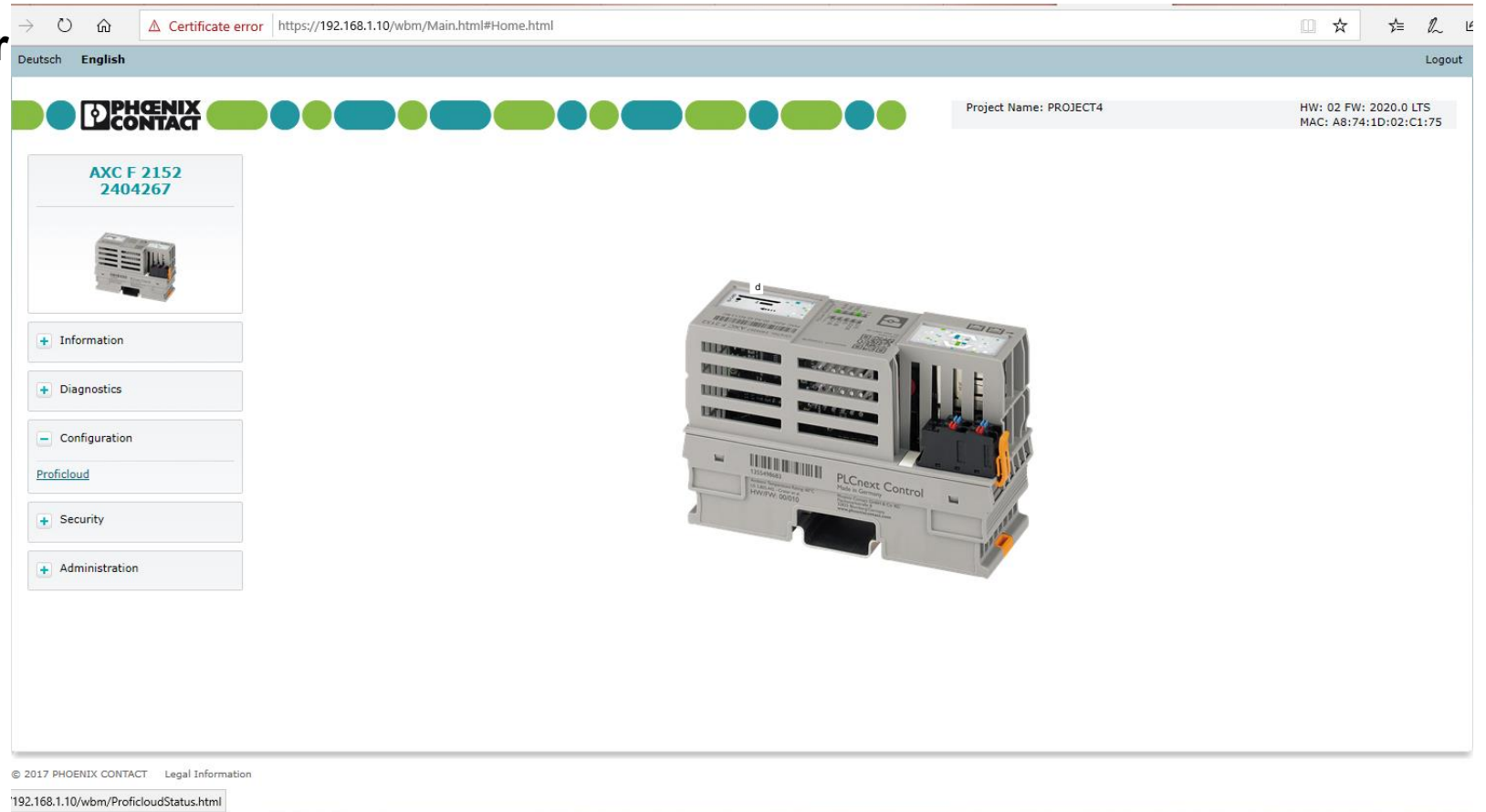
- Ever since we developed the HMI in the PLCnext training, typing the PLCnext controller's IP address into a browser has pulled up the HMI page.
- We need to reach the web-based management page of the PLCnext controller to make some configuration changes.
- Use 192.168.0.10/admin
 - Log in if necessary

Once at this welcome screen, click on the “Easy configuration” block to access the PLCnext controller's web-based management to make the configuration changes. (Remember, admin = username and password is from the front of the PLCnext controller).



Preparing the PLCnext controller to work with Proficloud

- Click on “Proficloud” under the “Configuration” menu



The screenshot shows a web browser window displaying the Phoenix Contact PLCnext Control configuration interface. The browser address bar shows a URL with a certificate error. The page header includes the Phoenix Contact logo, language options (Deutsch, English), and a Logout button. The main content area displays the device model 'AXC F 2152 2404267' and a list of configuration menus: Information, Diagnostics, Configuration, Proficloud, Security, and Administration. The Proficloud menu is highlighted. A 3D model of the PLCnext Control device is shown on the right side of the page. The footer contains copyright information for 2017 Phoenix Contact and a link to the Proficloud status page.

Preparing the PLCnext controller to work with Proficloud

- Click on “Proficloud” under the “Configuration” menu
- Check the following boxes:
 - Enable Proficloud services
 - Enable Time-Series Data (TSD) Service
 - Enable PLCnext Store Service
- Click “Apply”

Deutsch English Logout

Project Name: PROJECT4 HW: 02 FW: 2020.0 LTS MAC: A8:74:1D:02:C1:75

AXC F 2152 2404267

Information
Diagnostics
Configuration
Proficloud
Security
Administration

Configuration

PROFICLOUD

State

d	
add7479a-235f-465f-a29d-aaad097e9591	UUID
...	Proficloud Service State
Offline	Proficloud Connection State
Not Registered	Device Registration State

Settings

Enable Proficloud Service
Enable Time-Series Data (TSD) Service
Enable PLCnext Store Service

Apply

(Note: We are not yet connected)

Preparing the PLCnext controller to work with Proficloud

The PLCnext controller's Realtime clock must be set to the same time as the Proficloud server (which is in Germany). Format should be in 24-hour format time, such as HH:MM:SS (the seconds are not critical. But try to match the hours and minutes). In my case, I needed to add six (6) hours to Eastern (US) time.

The screenshot displays the PLCnext Engineer software interface. The main window is titled "Online Parameters" and shows the configuration for a PLCnext controller. The "Real time clock" section is expanded, showing the following settings:

- Date: 2020-06-25
- Time: 18:55:19
- Time zone: (empty)

The interface also shows a project tree on the left with the following structure:

- Project
 - PLCnext2152 : AXC F 2152
 - PLCnext (2)
 - PLC
 - HMI Webserver
 - OPC UA
 - Profinet (0)
 - Axioline F (2)

The right-hand side of the interface shows a "COMPONENTS" panel with the following structure:

- Programming (288)
 - Local (3)
 - Data Types
 - Functions & Function Blocks (2)
 - InternalFunctions (2)
 - Programs (1)
 - Main
 - Extended (72)
 - IEC 61131-3 (123)
 - PLCnext Controller (34)
 - Safety IEC 61131-3 (56)

Preparing the PLCnext controller to work with Proficloud

From inside PLCnext Engineer, select the tab and subtab shown below to access the real time clock setting. Enter the time, being sure to match the hours and minutes to the current German time. Click the icon shown with the red arrow to write the time to the PLCnext controller.

The screenshot displays the PLCnext Engineer software interface. The main window is titled 'Online Parameters' and shows the 'Real time clock' settings. The 'Date' field is set to '2020-06-25', the 'Time' field is set to '|18:55:19', and the 'Time zone' field is empty. A red arrow points to a gear icon in the top left corner of the 'Real time clock' section, which is used to write the time to the PLCnext controller. A black arrow points to the 'Online Parameters' subtab in the top navigation bar. The left sidebar shows the 'PLANT' view with a tree structure including 'PLCnext (2)', 'PLC', 'HMI Webserver', 'OPC UA', 'Profinet (0)', and 'Axioline F (2)'. The right sidebar shows the 'COMPONENTS' view with a tree structure including 'Programming (288)', 'Local (3)', 'Data Types', 'Functions & Function Blocks (2)', 'InternalFunctions (2)', 'Programs (1)', 'Main', 'Extended (72)', 'IEC 61131-3 (123)', 'PLCnext Controller (34)', and 'Safety IEC 61131-3 (56)'. The top menu bar includes 'File', 'Edit', 'View', 'Project', 'Extras', 'Window', and 'Help'. The top toolbar contains various icons for file operations and navigation. The bottom right corner features the PHENIX CONTACT logo and the tagline 'INSPIRING INNOVATIONS'.

Preparing the PLCnext controller to work with Proficloud

- Note the Proficloud Service State now reads:
 - The Proficloud is reachable and available

The screenshot displays the configuration page for a Phoenix Contact PLCnext controller. The top navigation bar includes the Phoenix Contact logo, a project name 'PROJECT4a', and hardware information: 'HW: 02 FW: 2020.3.1 MAC: A8:74:1D:02:C1:75'. The main content area is titled 'Configuration' and is divided into 'PROFICLOUD' and 'Settings' sections.

PROFICLOUD State:

UUID	add7479a-235f-465f-a29d-aaad097e9591
Proficloud Service State	The Proficloud is reachable and available.
Proficloud Connection State	Online
Device Registration State	Registered

Settings:

- Enable Proficloud Service
- Enable Time-Series Data (TSD) Service
- Enable PLCnext Store Service

An 'Apply' button is located at the bottom of the settings section. A blue circle highlights the 'Proficloud Service State' row in the table above.

Left Sidebar:

- AXC F 2152 2404267
- Information
- Diagnostics
 - Profinet
 - Local Bus
 - Notifications
- Configuration
 - Proficloud
- Security
 - User Authentication
 - Certificate Authentication
 - Firewall
 - SD Card
- Administration
 - Firmware Update
 - License Management
 - PLCnext Apps

AXC F 2152
2404267



+ Information

- Diagnostics

Profinet

Local Bus

Notifications

- Configuration

Proficloud

- Security

User Authentication

Certificate Authentication

Firewall

SD Card

- Administration

Firmware Update

28

License Management

PLCnext Apps

Configuration

PROFICLOUD

State

UUID	add7479a-235f-465f-a29d-aaad097e9591
Proficloud Service State	The Proficloud is reachable and available.
Proficloud Connection State	Online
Device Registration State	Registered

Settings

Enable Proficloud Service

Enable Time-Series Data (TSD) Service

Enable PLCnext Store Service

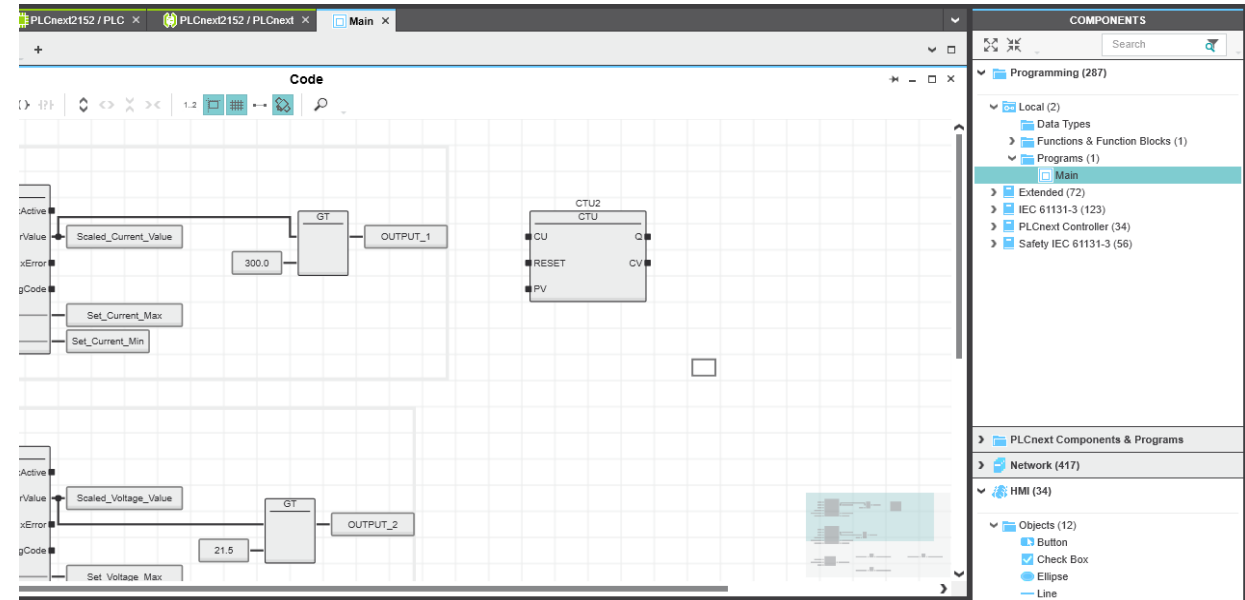
Apply

Preparing your program to communicate with Proficloud

- We will create some specific new variables in PLCnext Engineer to affect Proficloud communications
- We will create some code in PLCnext Engineer, making use of these new variables to affect Proficloud communications

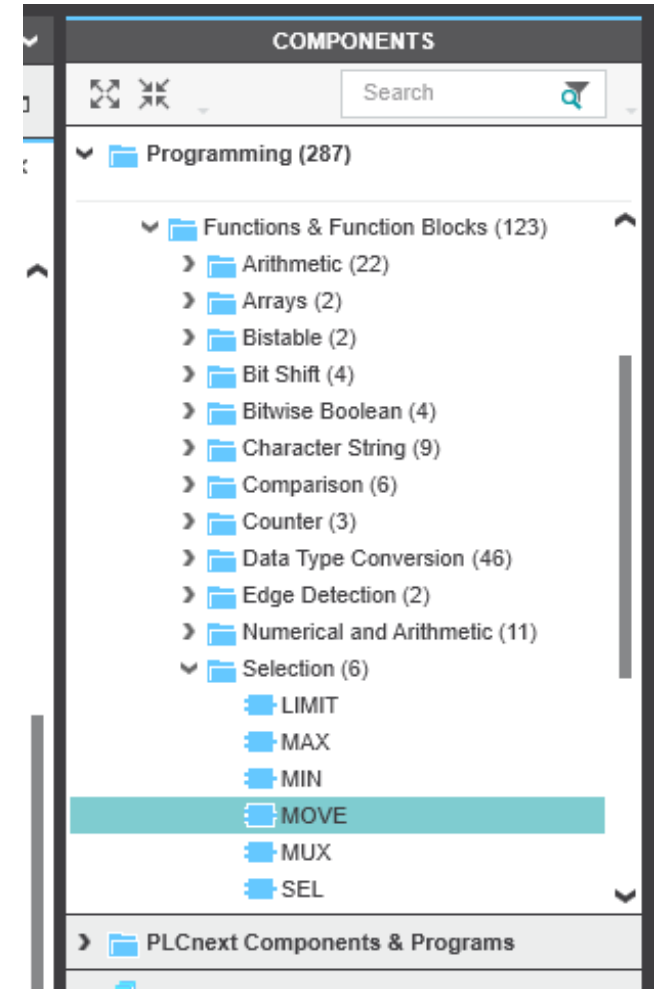
Creating code to enable Proficloud communications

- Select your program from the Programming/Local/Programs tree under the COMPONENTS area
- Make sure you have selected the “Code” sub-tab in the under “Main” in the top/middle section of the screen
- We have already created a program with plenty of interesting variables in Part 1 of this training. Rather than create any unique variables, we will simply adapt some existing variables for life in the Proficloud.
- To do this we will “move” some existing variables using a “MOVE” function block.



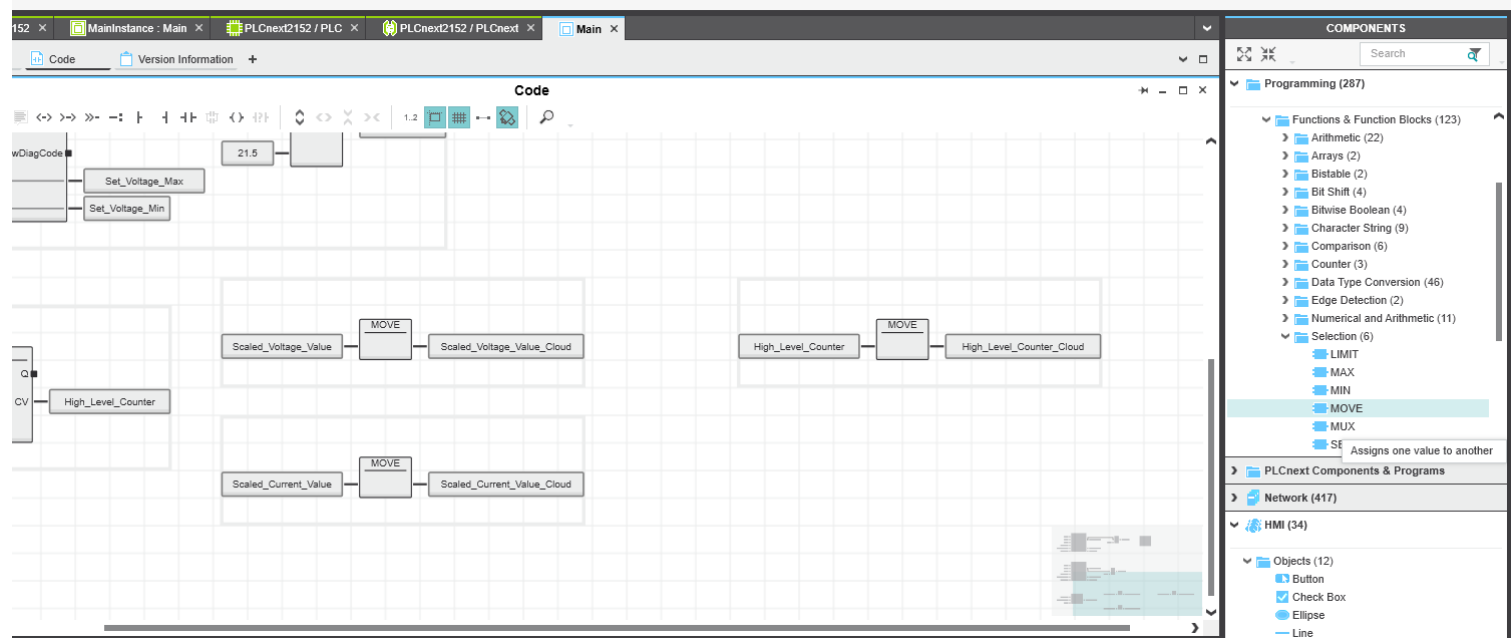
Creating code to enable Proficloud communications

- Choose a “MOVE” function block from the programming tree as seen to the far right.
- Drag and drop three instances of the “MOVE” block onto the Code work surface.



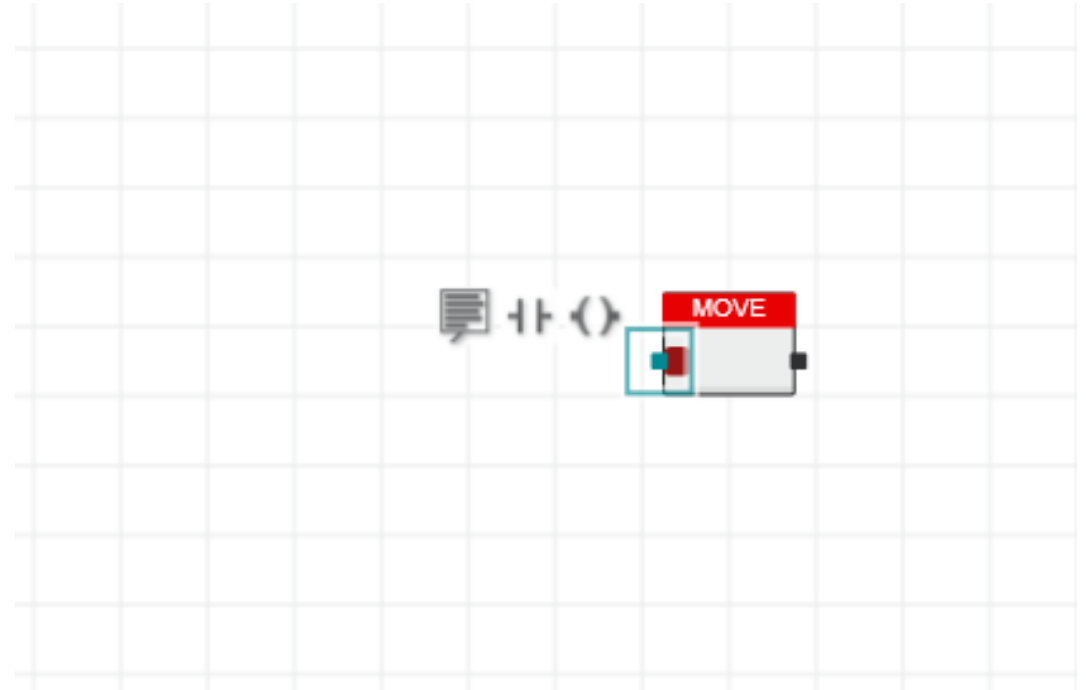
Creating code to enable Proficloud communications

- We will create three new variables, based on three existing variables, which essentially will allow those three original variables to be sent to the Proficloud
 - Scaled_Voltage_Value_Cloud
 - Scaled_Current_Value_Cloud
 - High_Level_Counter_Cloud



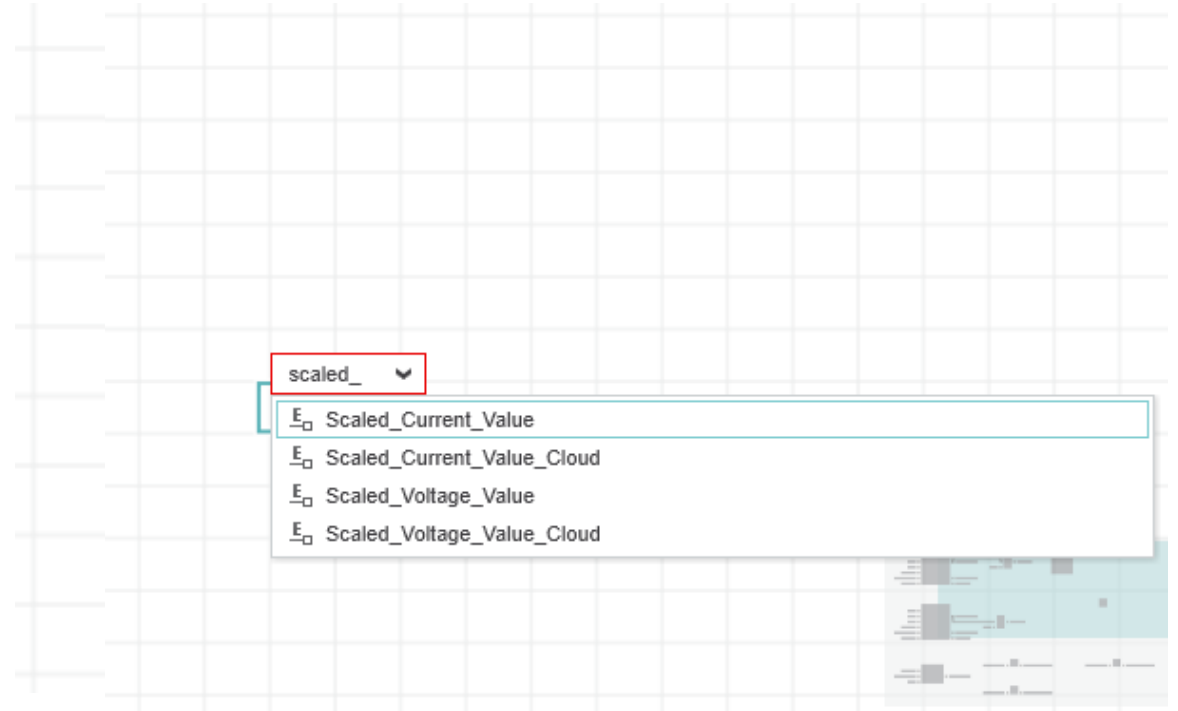
Creating code to enable Proficloud communications

- Double-click on the node on the left of the “MOVE” function block
- Start typing in the name of one of the variables we want to send to the Proficloud



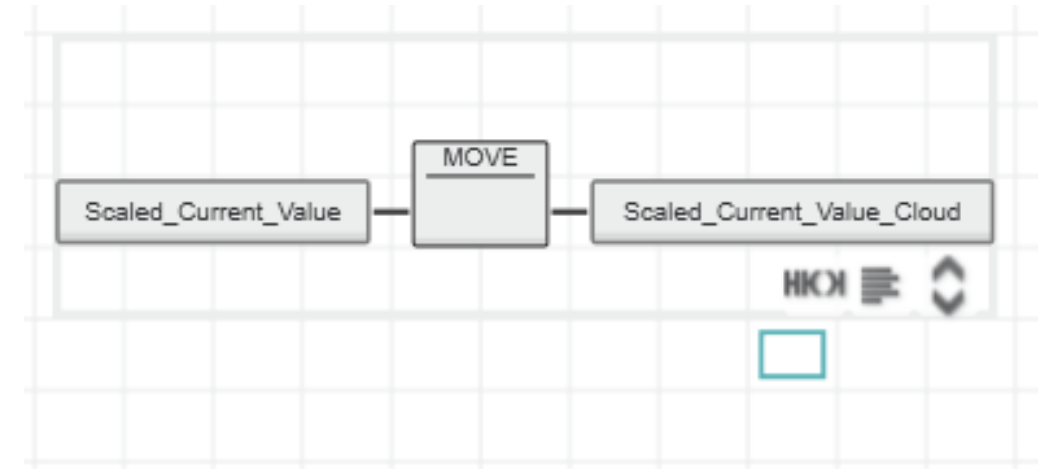
Creating code to enable Proficloud communications

- Double-click on the node on the left of the “MOVE” function block
- Start typing in the name of one of the variables we want to send to the Proficloud
- **Select the one you want, then repeat:**
 - **Scaled_Current_Value**
 - **Scaled_Voltage_Value**
 - **High_Level_Counter**



Creating code to enable Proficloud communications

- Double-click on the node on the left of the “MOVE” function block
- Start typing in the name of one of the variables we want to send to the Proficloud
- Select the one you want, then repeat:
 - Scaled_Current_Value
 - Scaled_Voltage_Value
 - High_Level_Counter
- **On the right side of the block, double-click and create new variables:**
 - **Scaled_Current_Value_Cloud**
 - **Scaled_Voltage_Value_Cloud**
 - **High_Level_Counter_Cloud**



Parameterizing the variables to enable Proficloud communication

- Still on the “Main” tab, click on the “Variables” sub-tab.
- Find the three new variables you have just created, and finish parameterizing them as shown to the right.
- It is critical that you check the “Proficloud” box for each new variable, and designate its usage as “OUT Port”
- The “Type” should match the “Type” of the original variable (i.e. REAL, INT, etc.)
- Note: the “Enable Cloud” variable is not necessary.

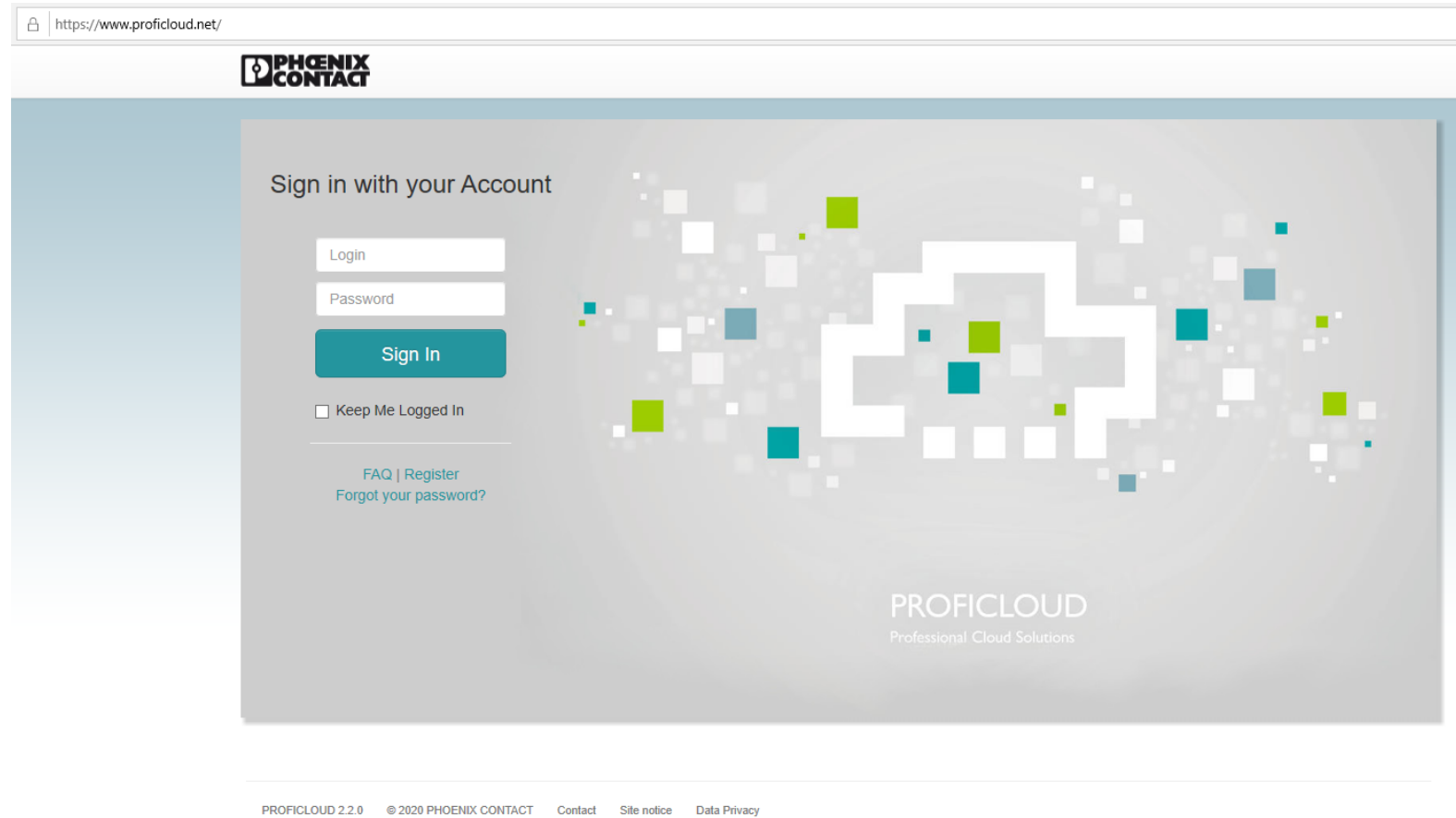
The screenshot shows the 'Variables' table in the PLCnext Engineer software. The table has columns for Name, Type, Usage, Comment, Init, Retain, OPC, HMI, Proficloud, and I/Q. A blue box highlights the last four rows, which are the newly created variables. In these rows, the 'Usage' is set to 'OUT Port', the 'Proficloud' checkbox is checked, and the 'Init' value is set to match the original variable's type (e.g., REAL#0.0, INT#0).

Name	Type	Usage	Comment	Init	Retain	OPC	HMI	Proficlo...	I/Q
AI_Norm1	AI_Norm	Local							
Set_Voltage_Min	BOOL	Local		FALSE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Set_Voltage_Max	BOOL	Local		FALSE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Voltage_0_10	WORD	External							
Scaled_Voltage_Value	REAL	External							
AI_Norm2	AI_Norm	Local							
Set_Current_Min	BOOL	External							
Set_Current_Max	BOOL	External							
Current_4_20	WORD	External							
Scaled_Current_Value	REAL	External							
OUTPUT_1	BOOL	External							
OUTPUT_2	BOOL	External							
CTU1	CTU	Local							
High_Level_Counter	INT	External							
High_Level_Reset	BOOL	External							
CTU2	CTU	Local							
Scaled_Current_Value_Cloud	REAL	OUT Port		REAL#0.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Scaled_Voltage_Value_Cloud	REAL	OUT Port		REAL#0.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Enable_Cloud	BOOL	OUT Port		FALSE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
High_Level_Counter_Cloud	INT	OUT Port		INT#0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Enter variable name here					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Working in Proficloud

Register and sign in

- Finally! We begin working in Proficloud...
- Visit www.proficloud.net
- Register for the site
- Then sign in

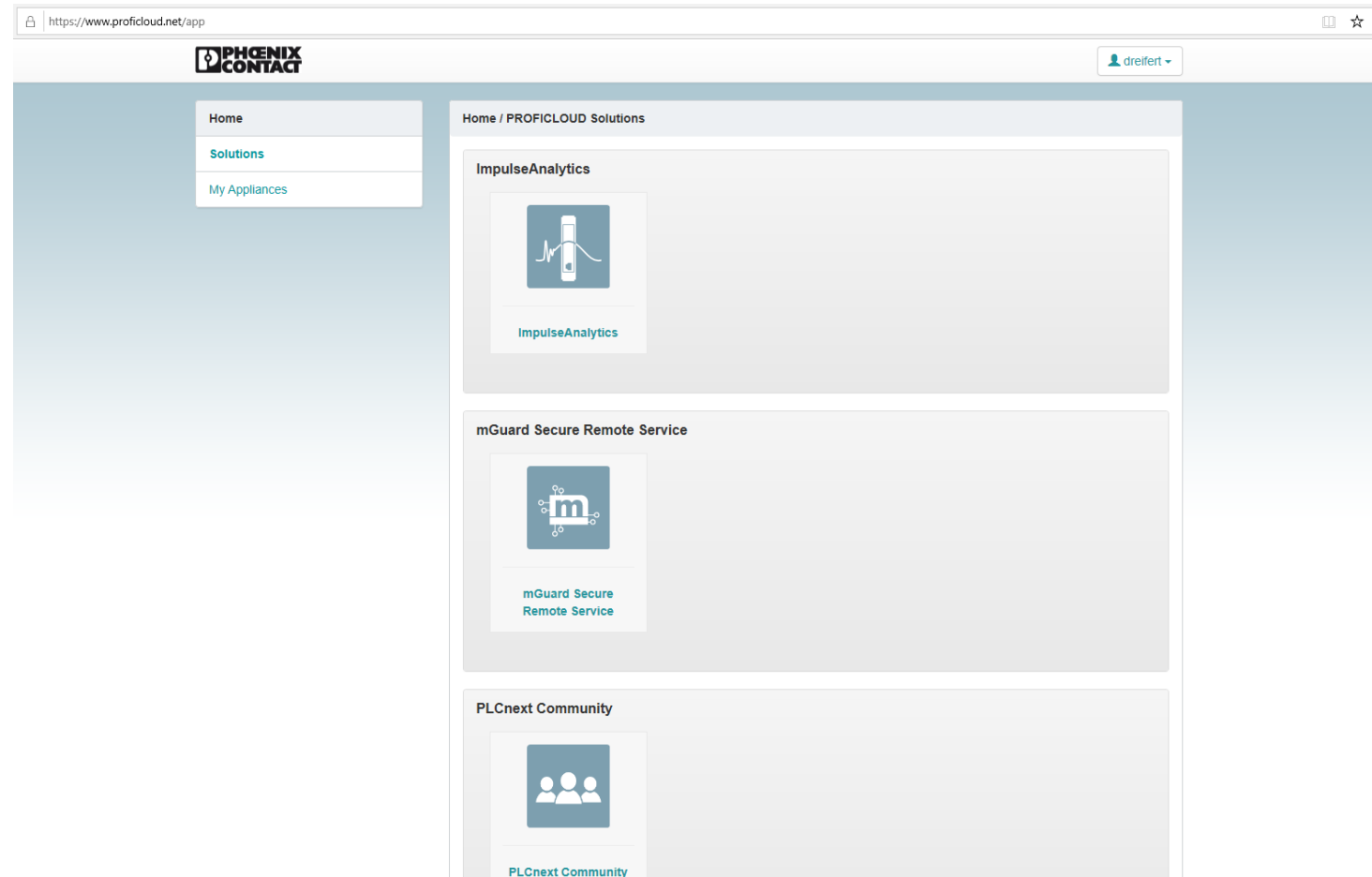


Working in Proficloud

Time Series Data (TSD) Device Manager

Proficloud's home screen

- Scroll to the bottom of this page

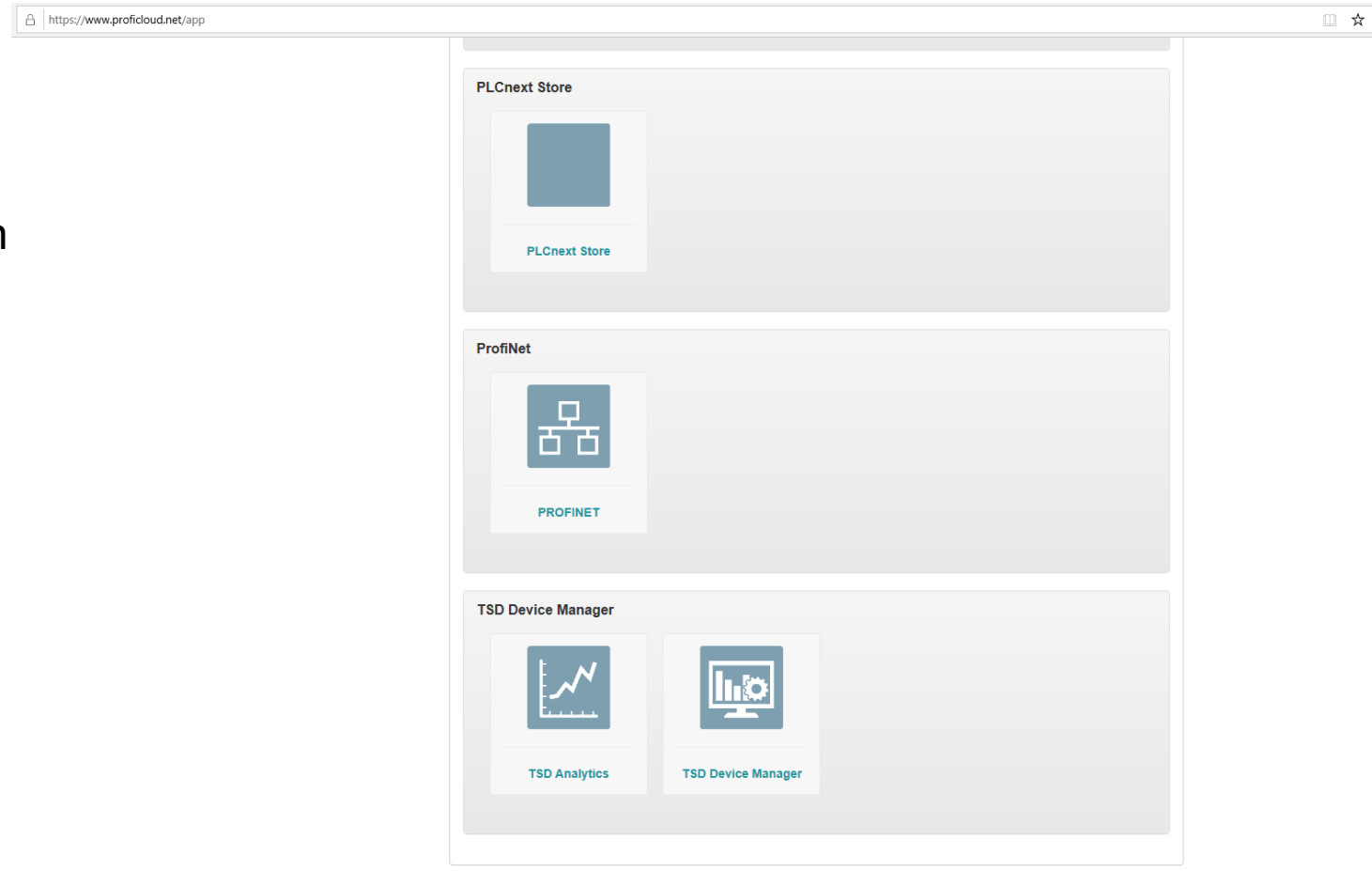


Working in Proficloud

Time Series Data (TSD) Device Manager

Proficloud's home screen

- Click on the “TSD Device Manager” icon in the TSD Device Manager section at the bottom of the screen

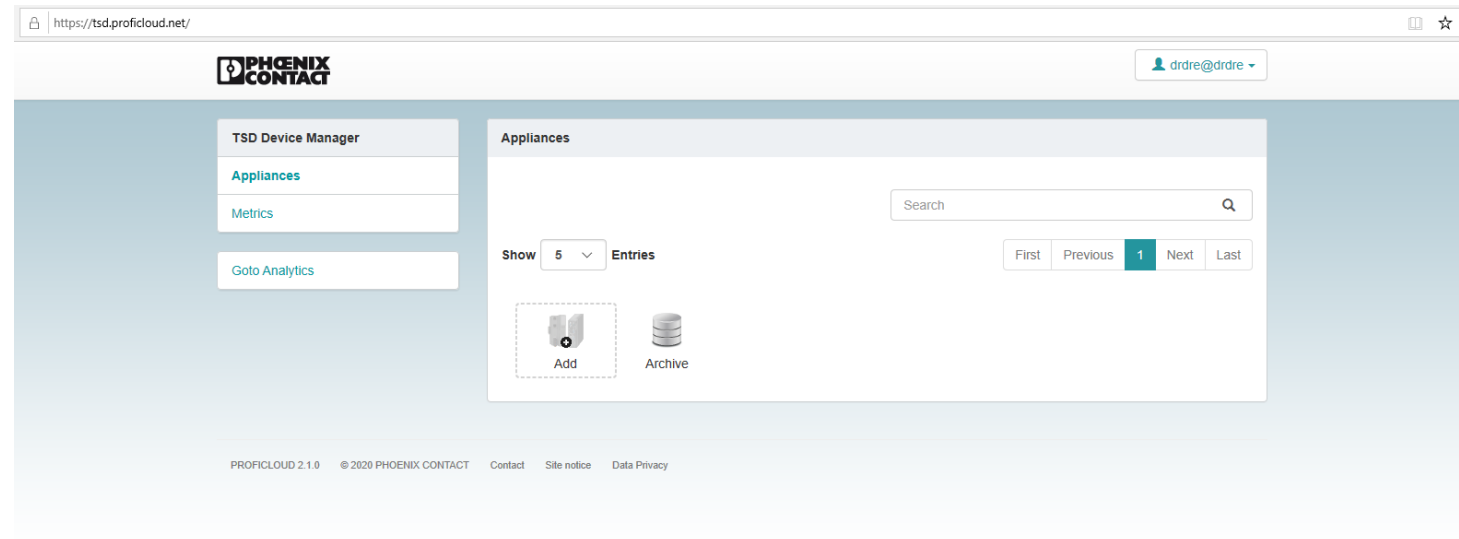


Working in Proficloud

Time Series Data (TSD) Device Manager

The TSD Device Manager Page

- Click in “Appliances”
- Click on the “Add” icon



Time Series Data (TSD) Device Manager

The TSD Device Manager Page

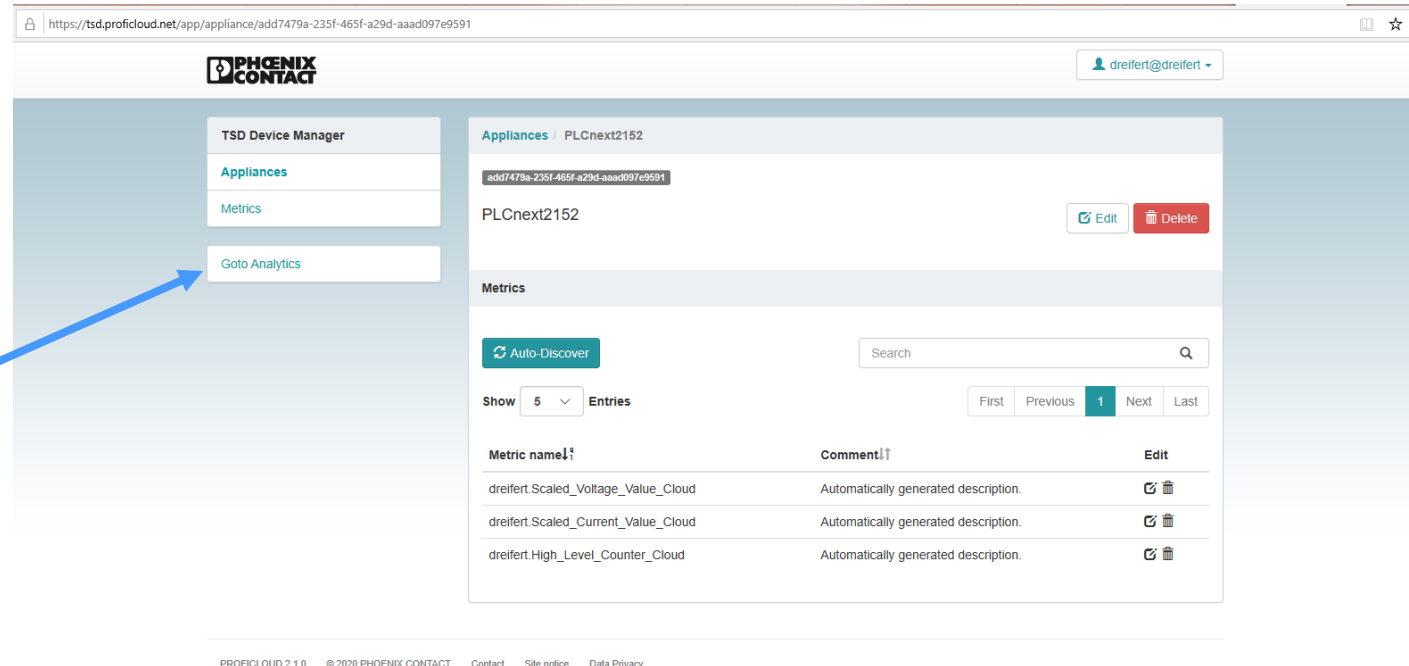
- Enter the UUID* of the PLCnext controller that you have programmed to communicate with Proficloud
- Enter a descriptive name for your PLCnext controller. It could be “4th street Pump Station”, or “PLCnext2152”, etc.
- Click “Add”

* This UUID can be found on the web-based management configuration page of your PLCnext controller, under “Proficloud”. See page 24 of this training.

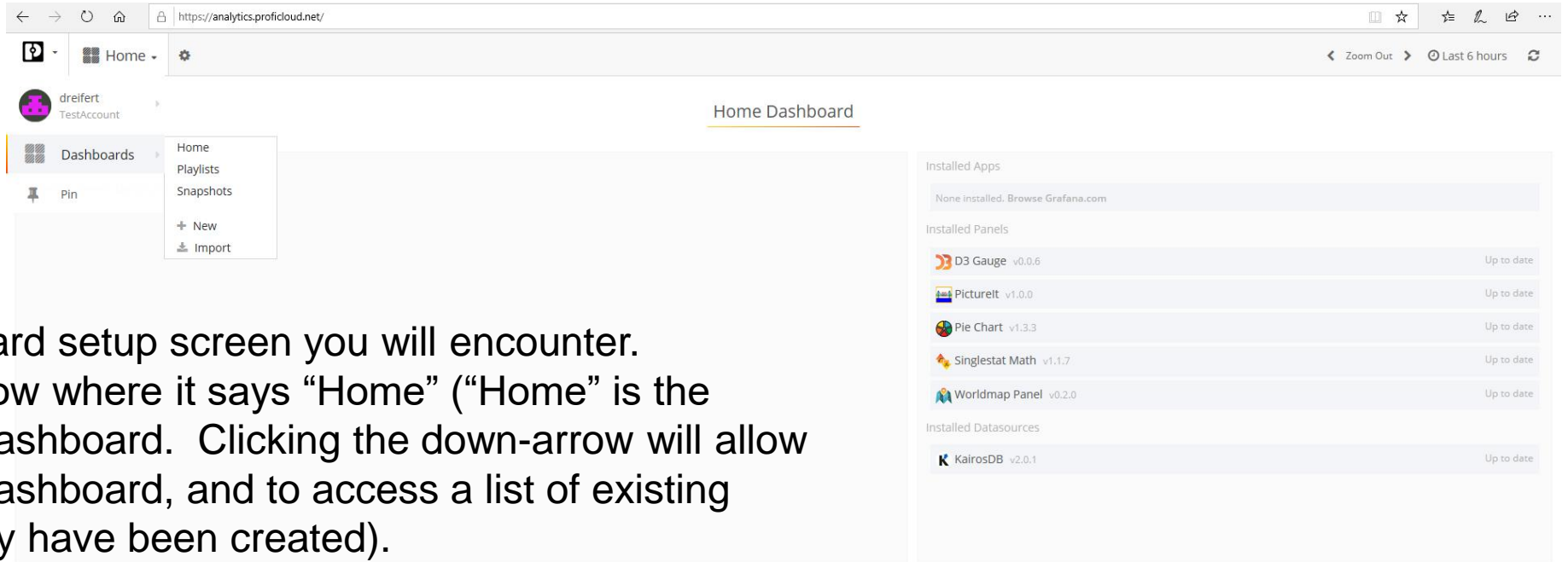
The image shows two screenshots from the Proficloud interface. The left screenshot is the 'TSD Device Manager' page, which has a sidebar with 'Appliances' selected. The right screenshot is a 'Create Appliance' modal form with the following fields: 'Account name' (value: drdre), 'UUID' (value: d7479a-235f-465f-a29d-aaad097e9591), and 'Appliance name' (empty). At the bottom right of the modal are 'Close' and 'Add' buttons.

Time Series Data (TSD) Device Manager

- Your PLCnext controller should be successfully added to Proficloud
- The variables you set up in your PLCnext Engineer program should automatically be pulled in and will be displayed as seen to the right.
- Click the “Goto Analytics” button to start the process of building a dashboard



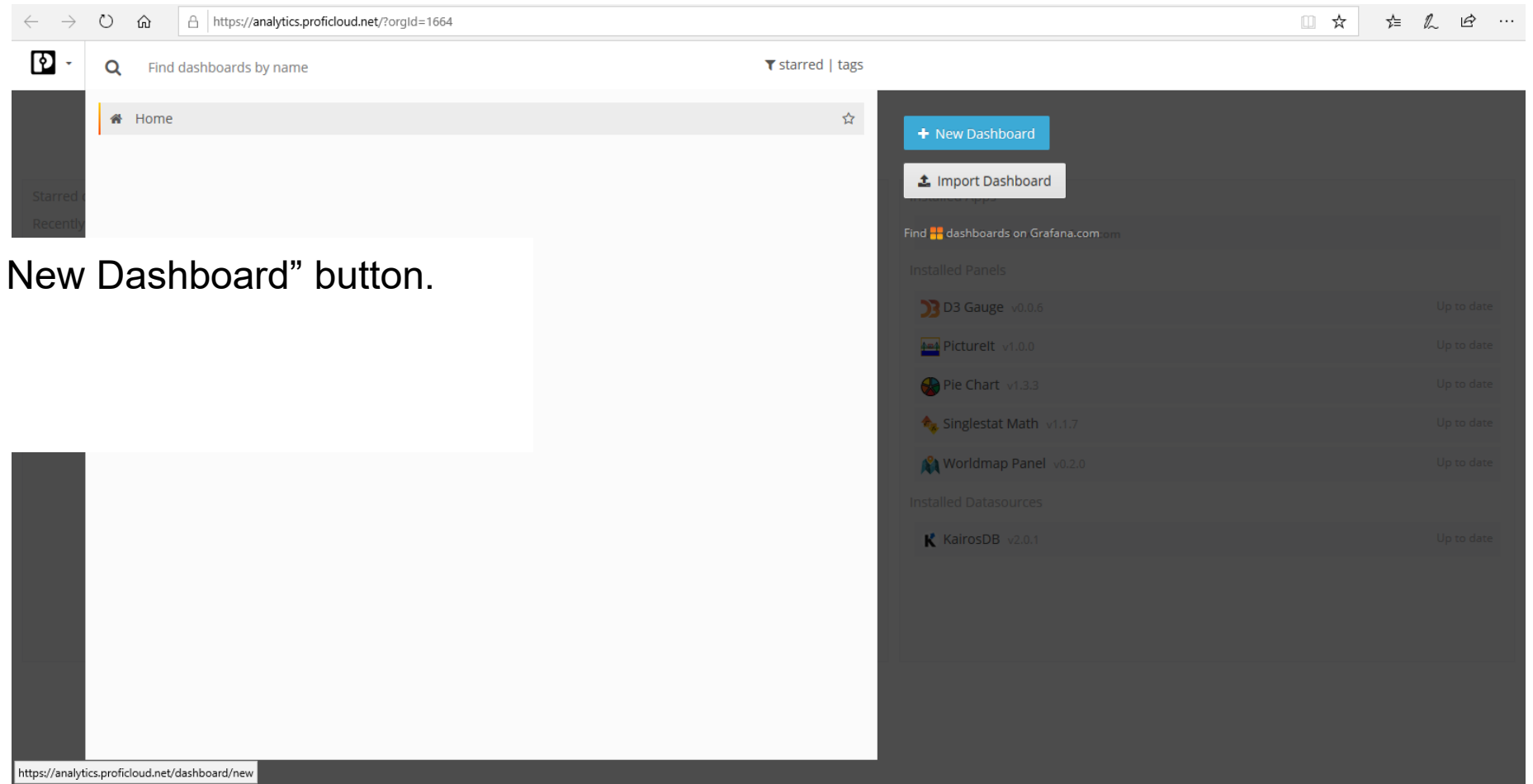
TSD Analytics – getting started building a dashboard



This is the initial dashboard setup screen you will encounter.

- Click on the down-arrow where it says “Home” (“Home” is the name of this default dashboard. Clicking the down-arrow will allow you to create a new dashboard, and to access a list of existing dashboards, once they have been created).

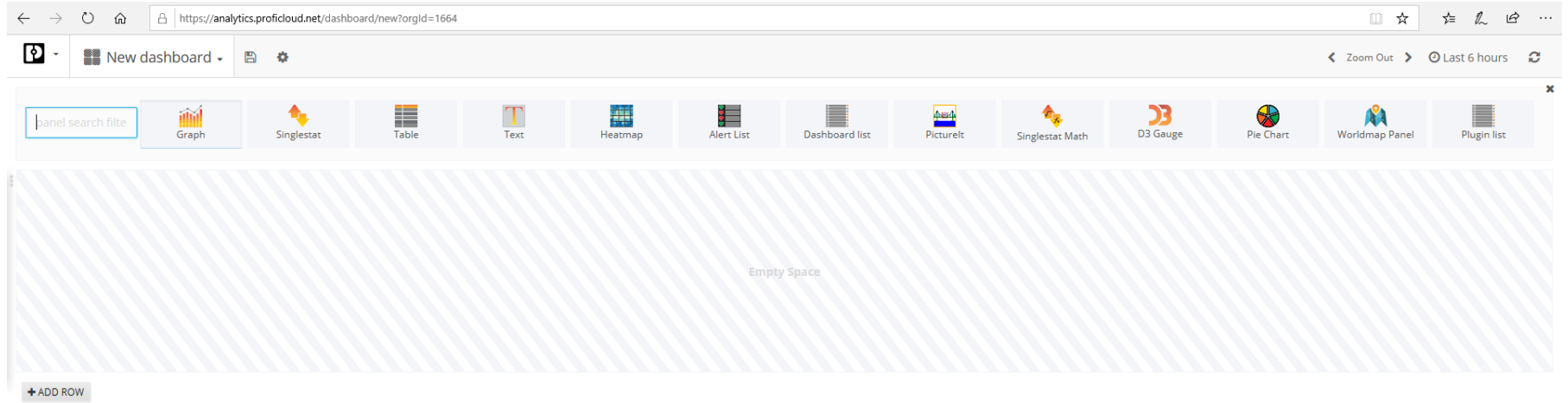
TSD Analytics – Getting started building a dashboard



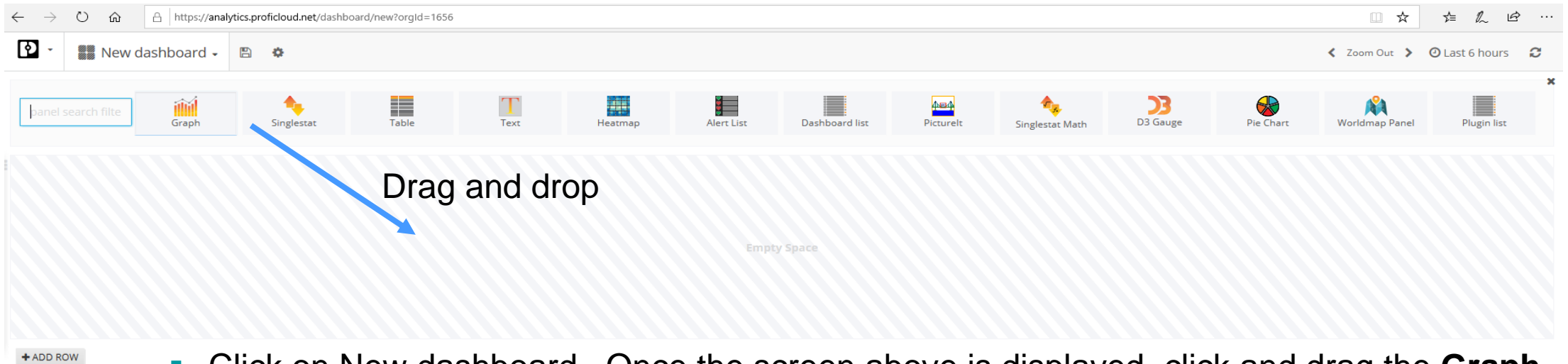
- Click on the blue “+ New Dashboard” button.

TSD Analytics – Getting started building a dashboard

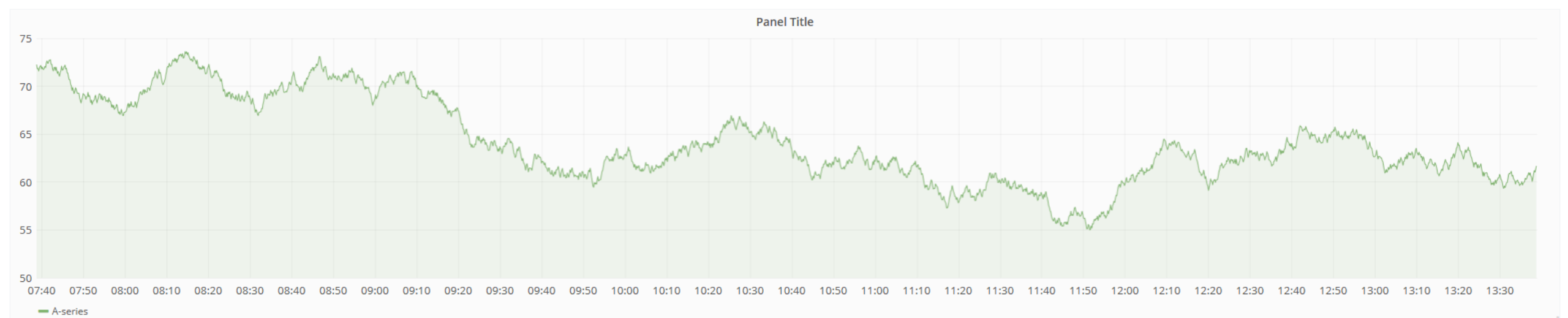
- You will be brought to this dashboard configuration screen. You can click and drag any of the elements you see. You can then click “+Add row” to add a row and drop other elements onto the dashboard.
- Start with a Graph



TSD Analytics – Getting started building a dashboard



- Click on New dashboard. Once the screen above is displayed, click and drag the **Graph** element onto the shaded empty space. This will automatically create a chart. It will look like it has been trending real data, but it is not yet linked to any data source.
- On the next screen we will see how we can link a data source (a variable from our PLCnext program...which is called a metric in Proficloud)



Graph | General | **Metrics** | Axes | Legend | Display | Time range

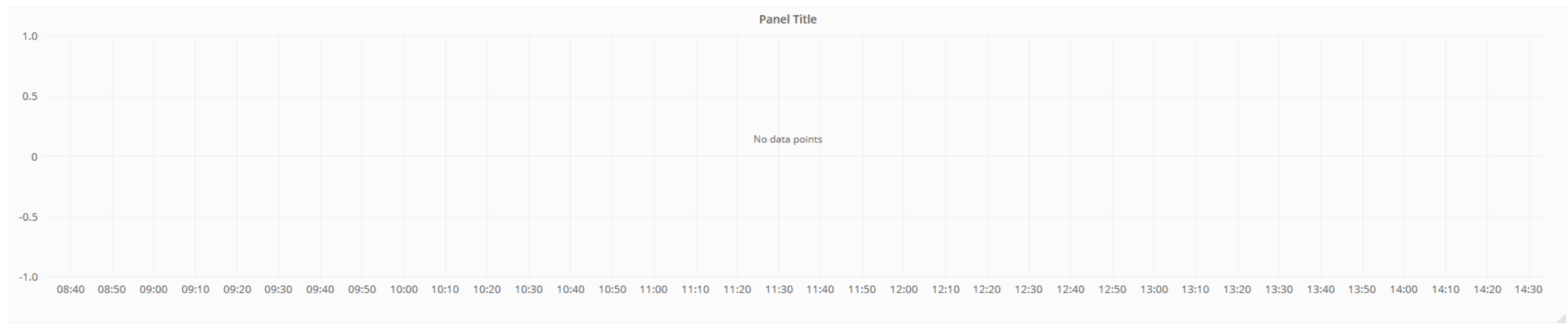
Data Source: | Query Inspector

- dreifert
- Grafana --
- default
- Mixed --

Test data: rand | Add Query

Click on “Panel Title” at the top of the page. This will expose a menu. Choose “Edit” from the menu.

From the “Data Source” box (currently showing “Default”), click on your account (“dreifert” in this case).



Graph

General Metrics Axes Legend Display Time range

Data Source: dreifert

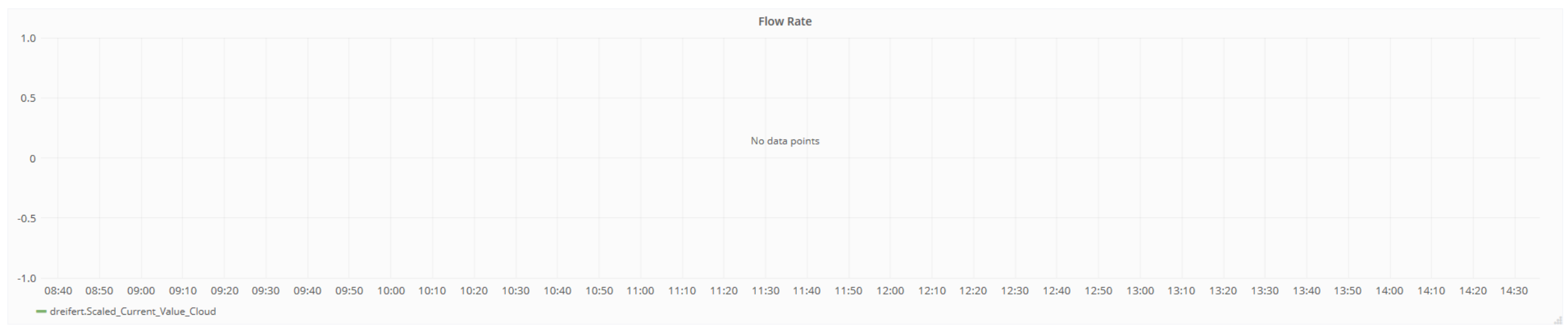
Query Inspector

Metric: dre

- dreifert.Scaled_Current_Value_Cloud
- dreifert.Scaled_Voltage_Value_Cloud
- dreifert.High_Level_Counter_Cloud
- dreifert.Scaled_Current_Value_Cloud-1
- dreifert.Enable_Cloud
- dreifert.Scaled_Voltage_Value_Cloud-1
- dreifert.High_Level_Counter_Cloud-1

Add Query

In the "Metric" area, start typing the first several characters of your account name. After a second or two a list of available metrics (variables) associated with your account will auto-populate. Select the metric you want to be trended in this chart.



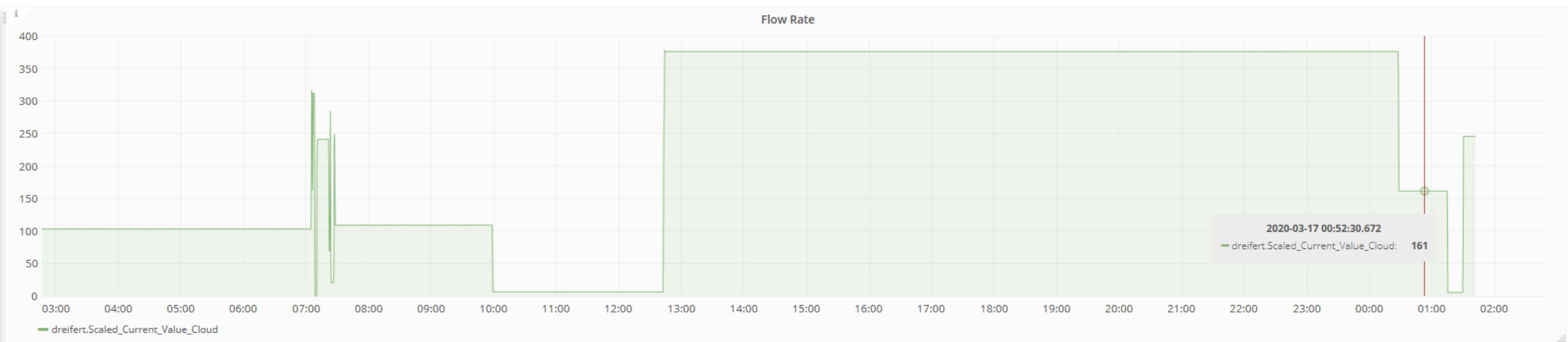
Graph General **Metrics** Axes Legend Display Time range ✕

☰ Data Source dreifert ▶ Query Inspector

▼ A	Metric	dreifert.Scaled_Current_Value_Cloud		Peak filter <input type="checkbox"/>	📄	👁	🗑
	Tags	+					
	Group By	+					
	Aggregators	+					
	Alias	default	dreifert.Scaled_Current_V...				🔍

▼ B Add Query 49

The screen should look like this. Now click on the “General” tab, to the left of the “Metrics” tab we are currently on. We will be able to rename the chart.

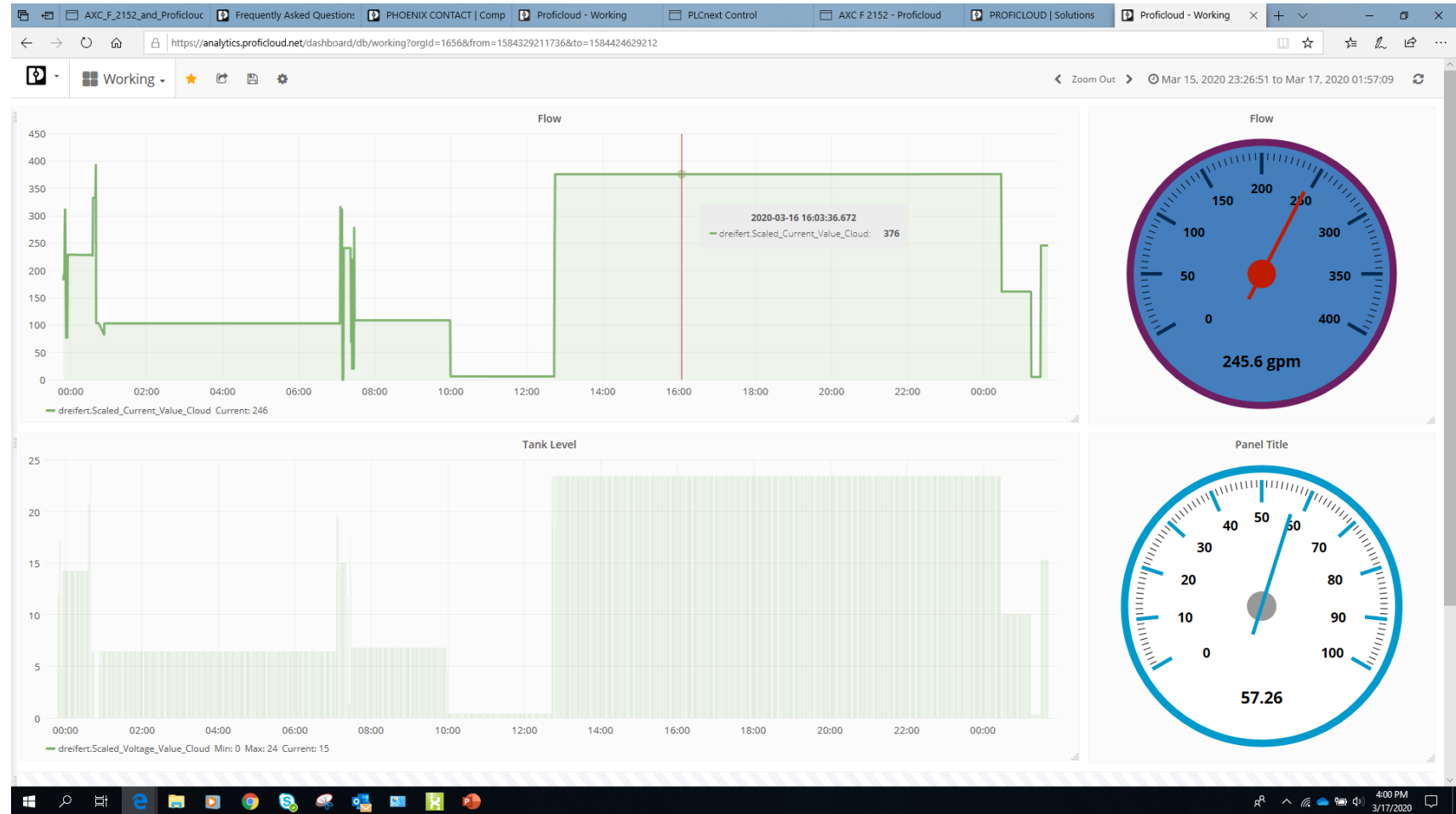


+ ADD ROW

Note – the title of the chart has changed at the top of the page, and you can see directly under the chart, the metric (variable) that is trended. Click the x below the chart to leave Configuration mode.

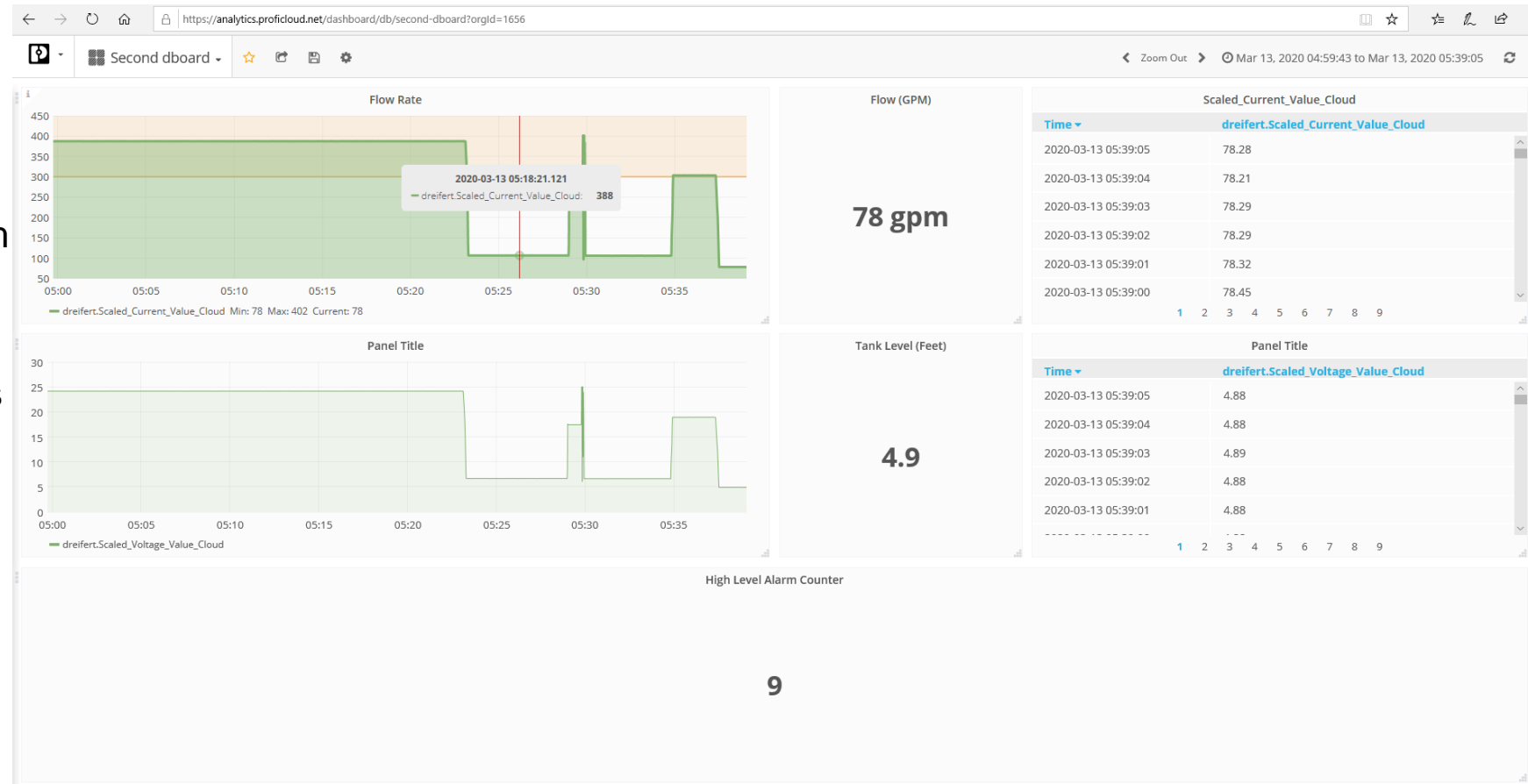
Configuring a dashboard


- “Add row” and drop in another chart. Follow the procedures to link another metric (like Scaled_Voltage_Value_Cloud and, label it with “Tank Level”
- At the very bottom/right of the chart area is a faint triangular “handle”. Click on it and drag to re-size the chart.
- When the cursor is placed at the top/right of the chart area, the cursor turns from an arrow to a hand. This enables you to grab and move that element to another part of the dashboard

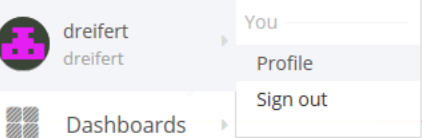



Configuring a dashboard

- Keep experimenting. You can add dashboards, which can reference the same metrics (variables).
- Note the inclusion of a high-alarm threshold on the top chart (pink shaded area).
- Note it is possible to show values as numbers, rather than gauges
- Note – you can display time series data in tables
- In a huge waste of space, I am using the screen's entire width to show a counter value.



 User Profile

 dreifert dreifert
You
Profile
Sign out

 Dashboards

Information

Pin

Name	dreifert
Email	dreifert
Username	dreifert

[Update](#)

Preferences

UI Theme	Dark
Home Dashboard	Working
Timezone	Local browser time

[Update](#)

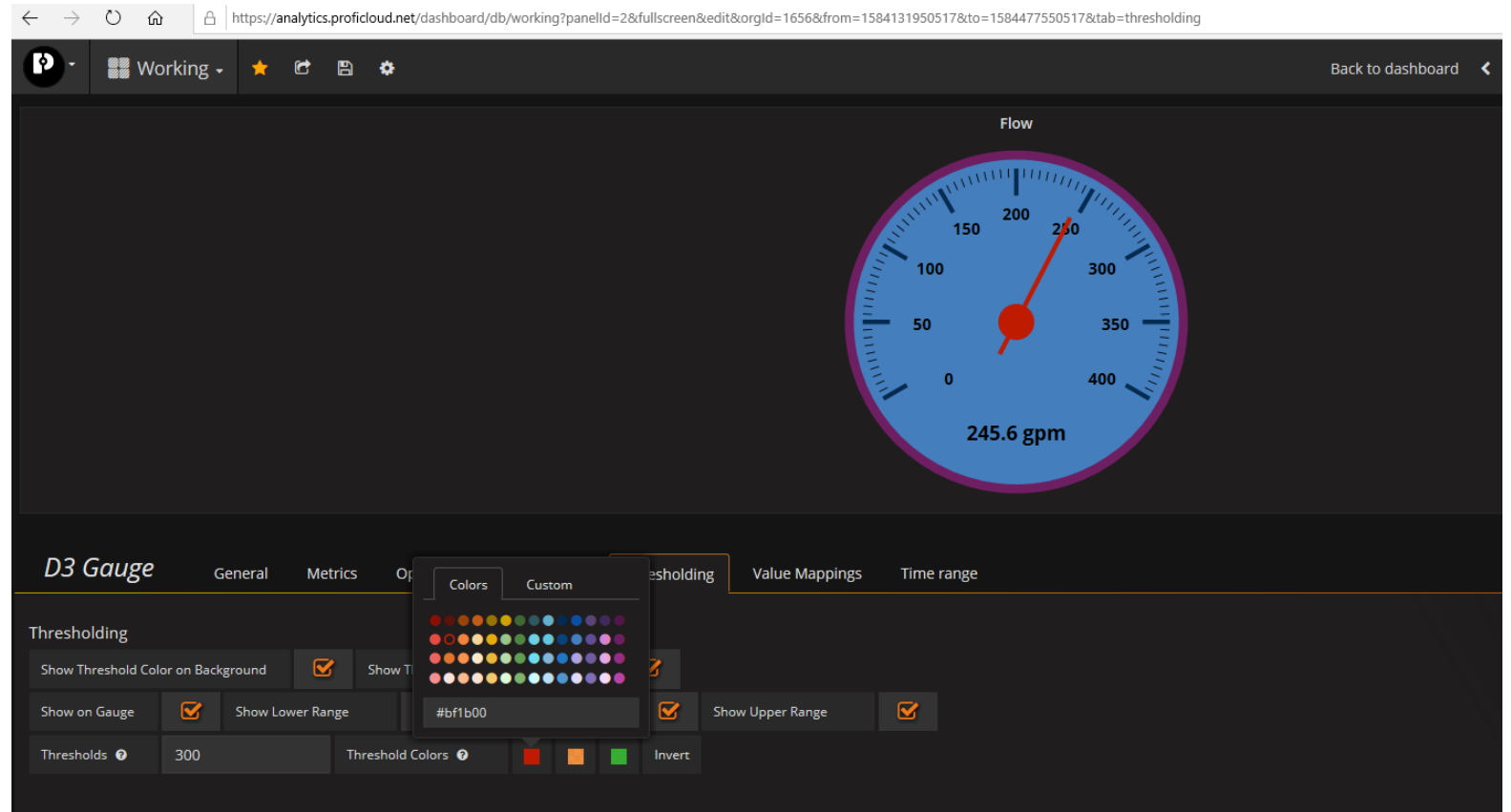
Password

[Change Password](#)

- Click on the Phoenix Contact logo at the top/left of the screen and click on your user, Select “Profile” from the drop-down list.
- You can change the UI (User Interface) theme from default to dark, as I will do.
- You can adjust time to reflect local browser time, UTC, or some other time.
- Click “Update” to save changes

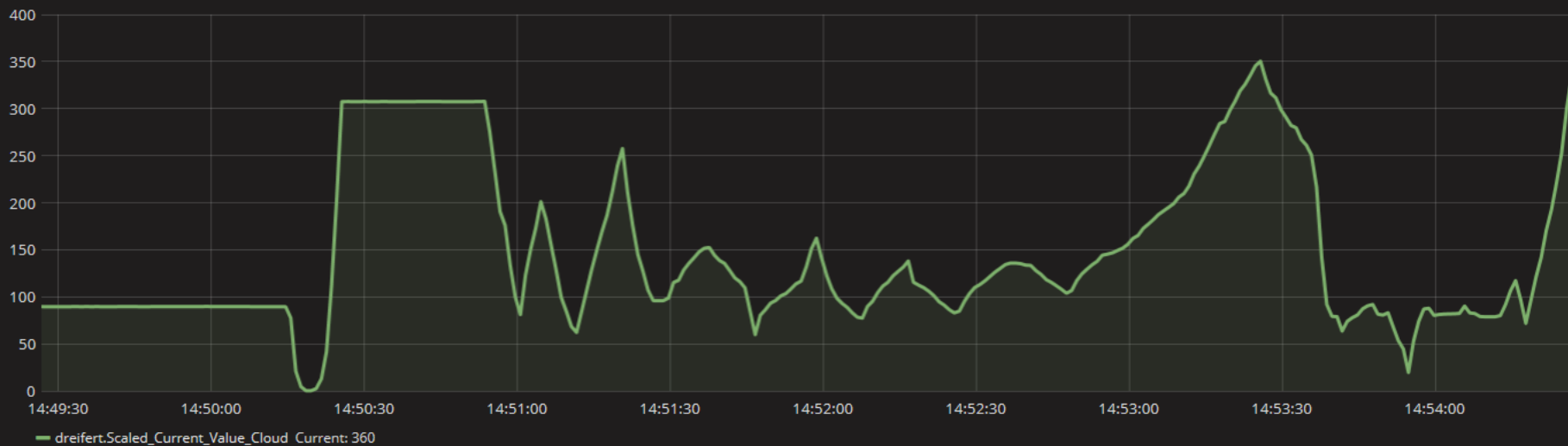
Configuring a dashboard

- Then experiment with other elements, like D3 gauges. They are configured similarly.
- Trial and error is the best bet to become familiar with dashboarding.

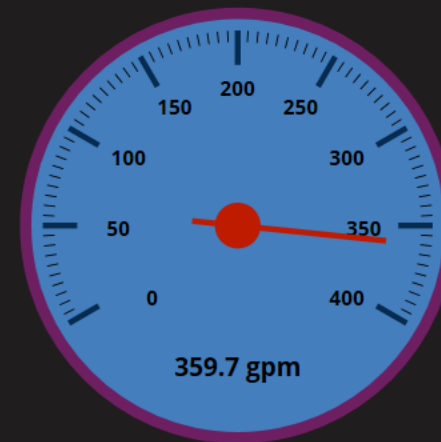


Working

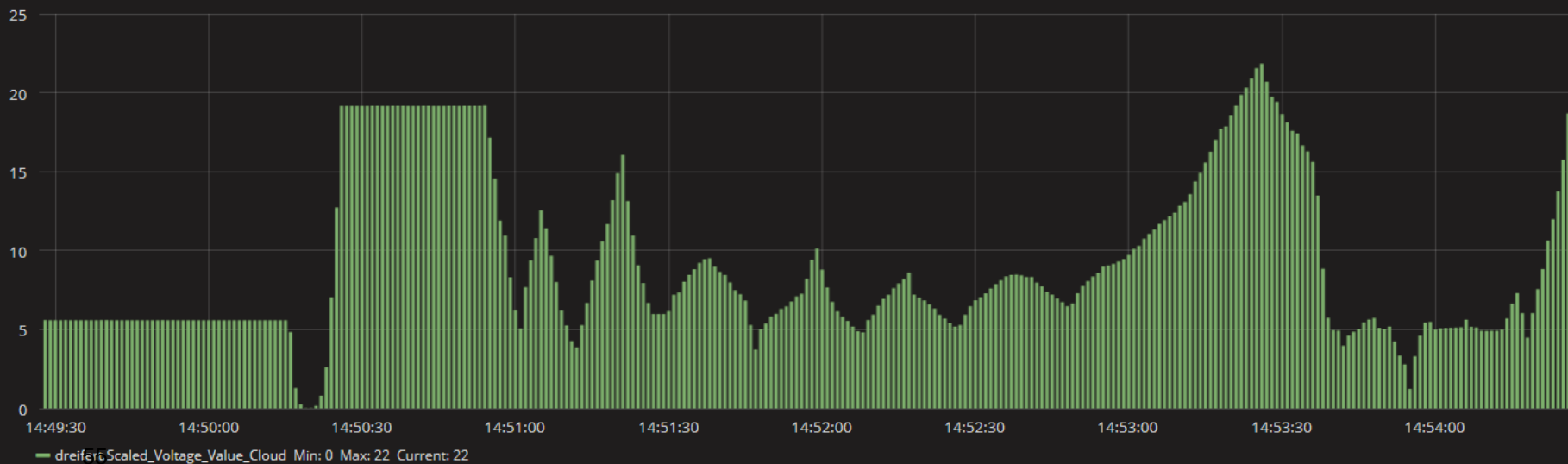
Flow



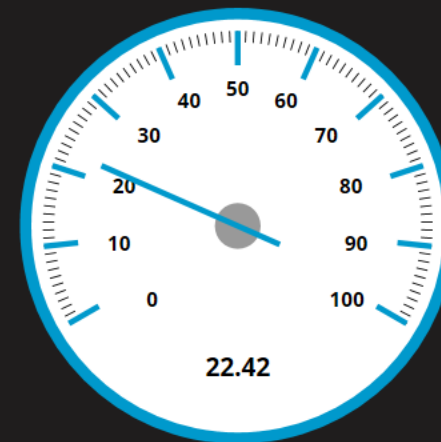
Flow



Tank Level



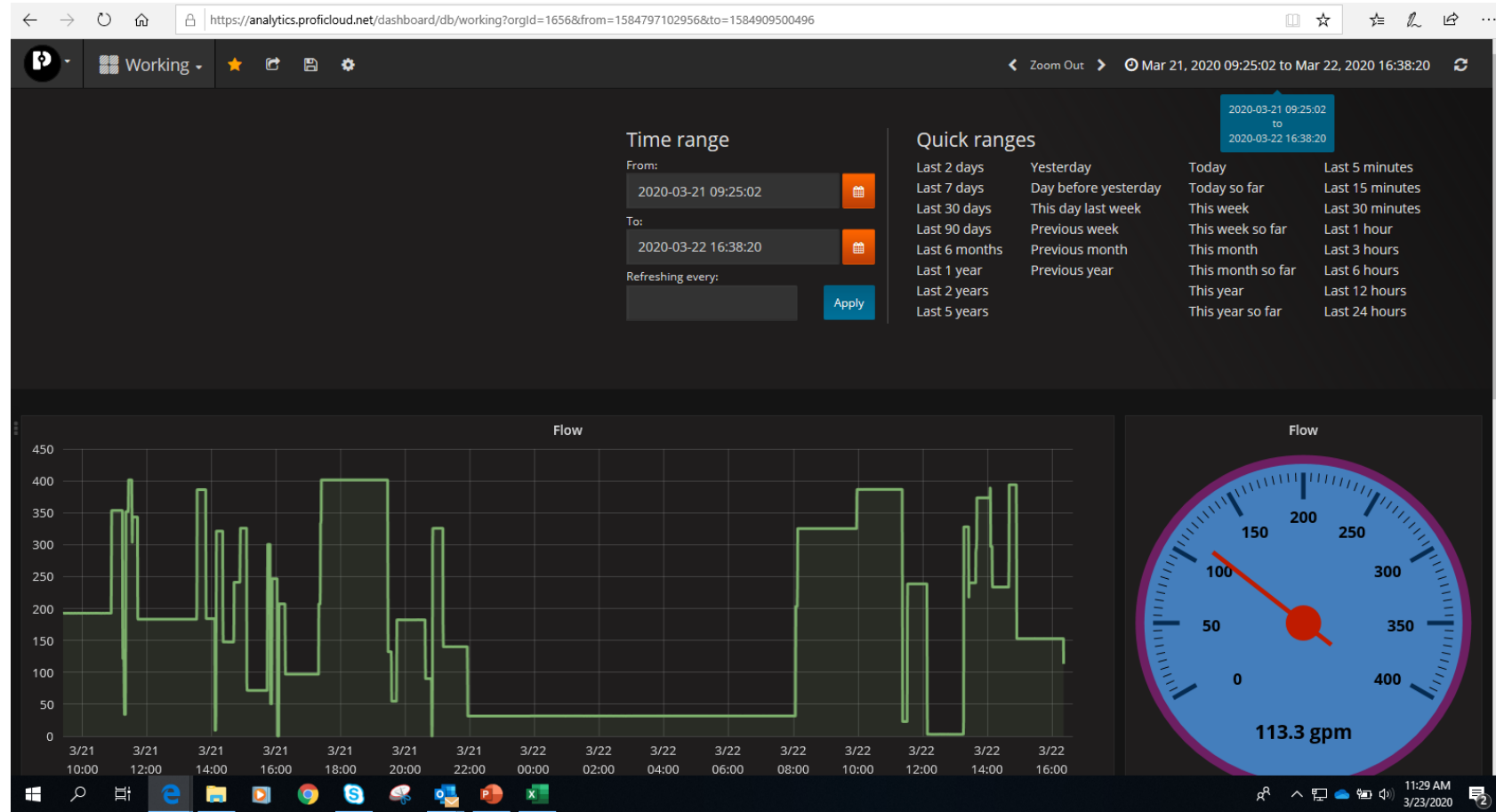
Tank Level (Feet)

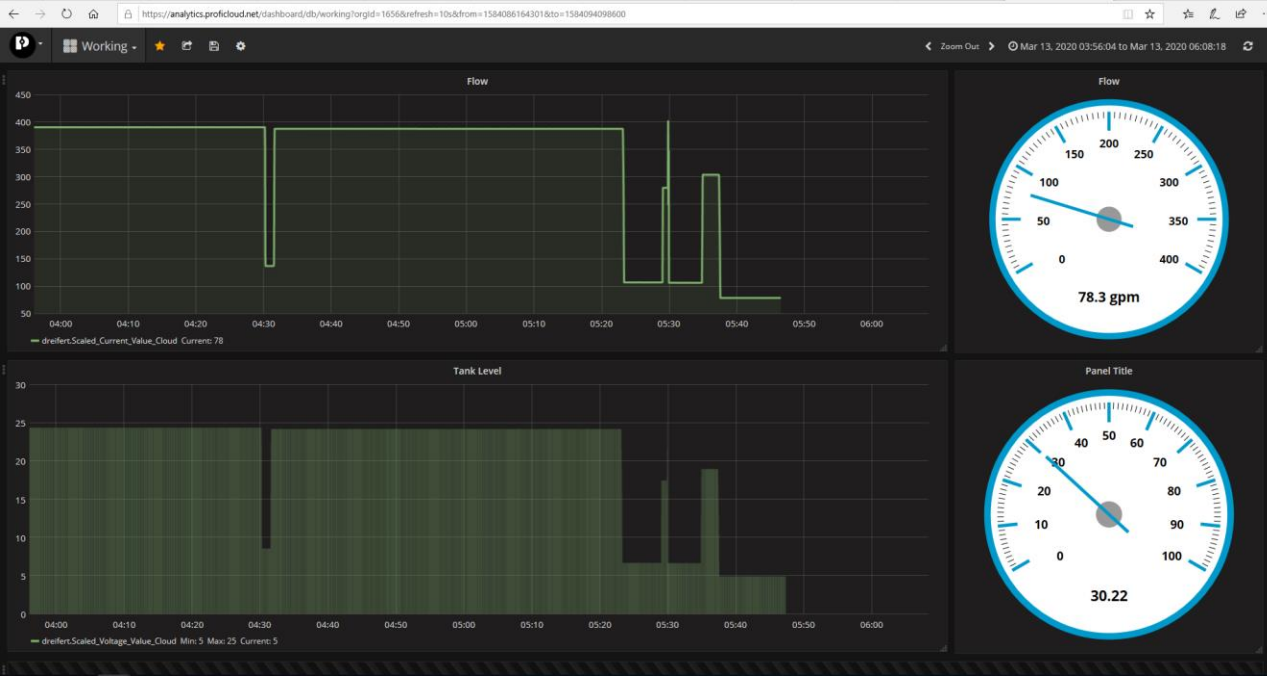


Dashboarding – changing the time range, update rates

At the top/right of any dashboard is an indication of the time range.

- Click on the time range to open the interface seen in this graphic.
- Choose “Quick range” or enter your own custom range.
- Also click in the “Refreshing every” box, and select a refresh rate
- Click enter

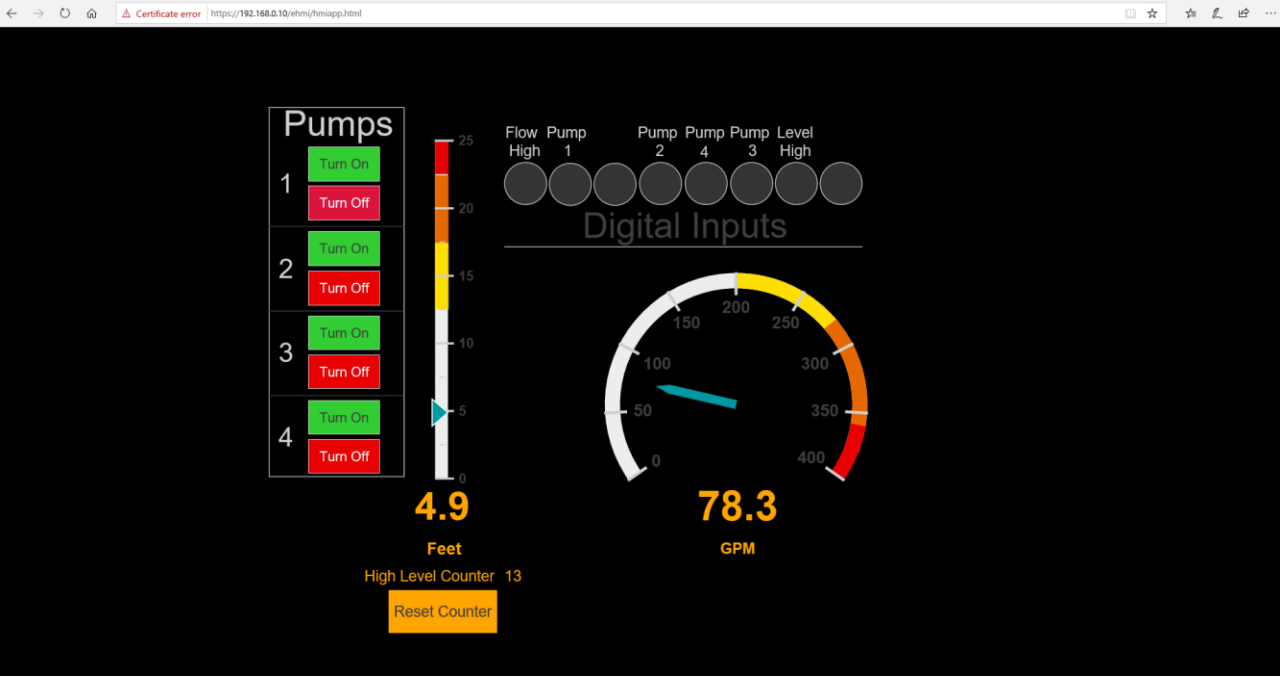
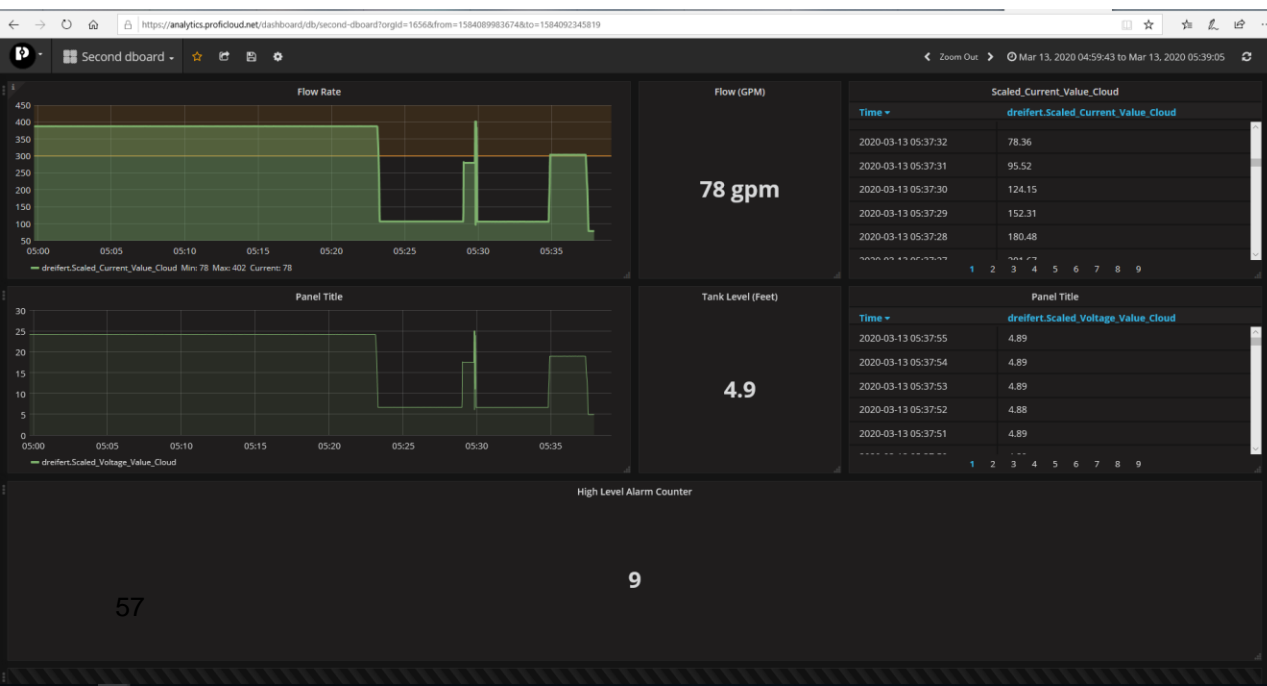




Examples of Graphical User Interfaces, all displaying the same information from the PLCnext controller

ProfiCloud dashboards

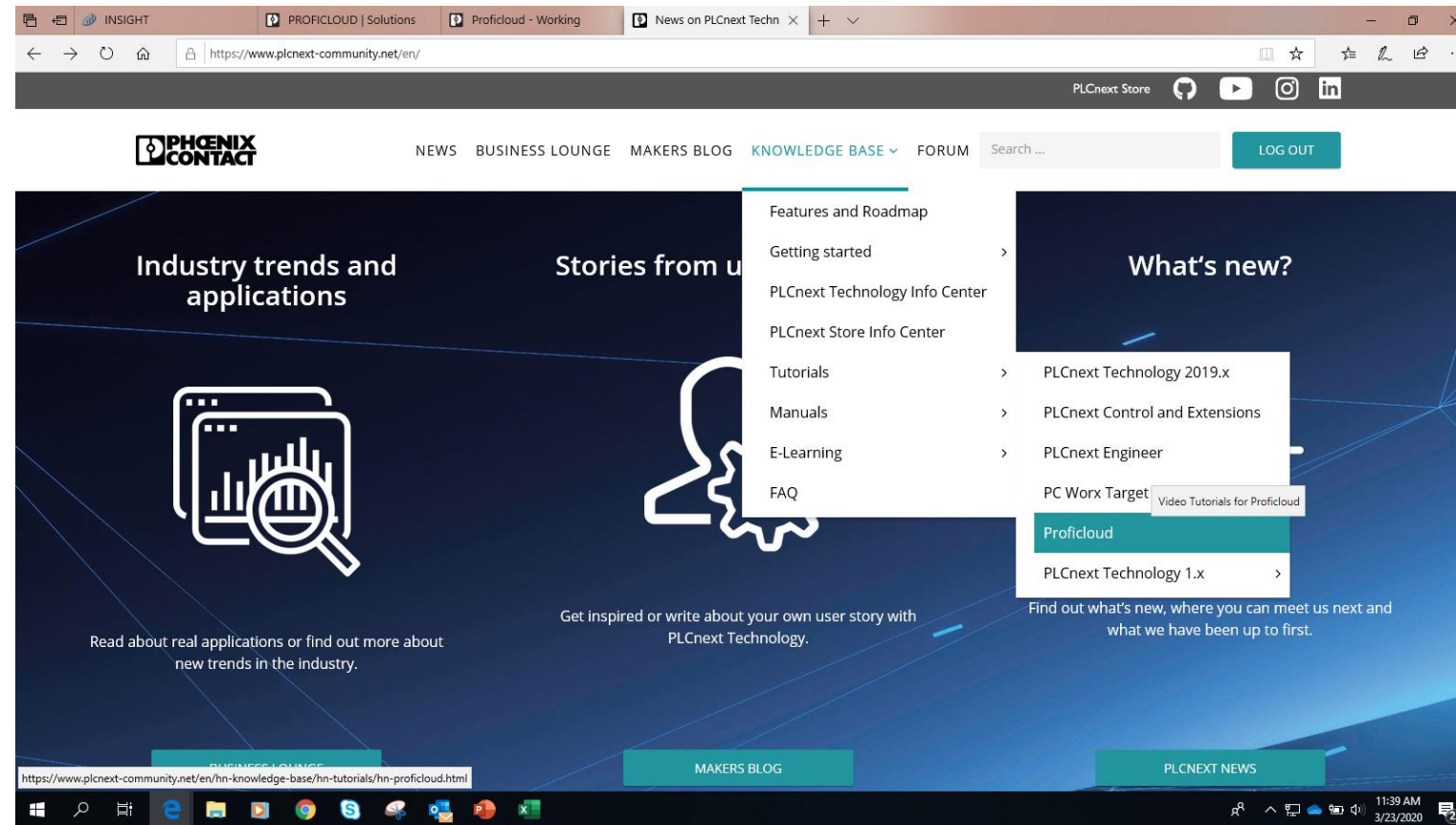
PLCnext's internal HMI



Proficloud – other training resources

The PLCnext Community is a great place to check for help and training on any PLCnext topic, including Proficloud

- Navigate as shown
- Also go to FAQ section
 - Look for “How do I create dashboards on Proficloud by Dave Hoysan”
 - [Link](#)



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Part 2

Getting started with ProfiCloud

End



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