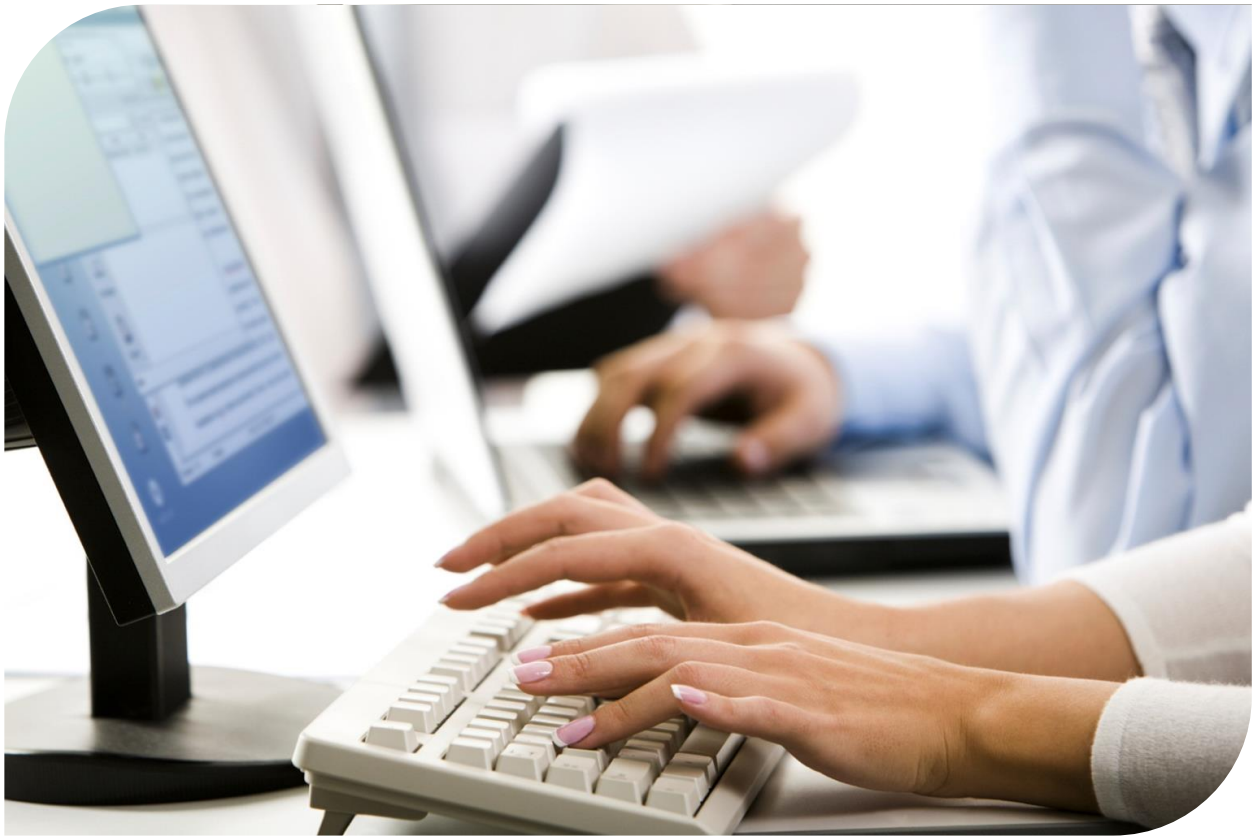

EXERCISE GUIDE

CUMULOCITY FOR POWER USERS

231-70E

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Exercise 1:
Connect the u-blox Device to Cumulocity

Objectives

In this exercise, you will get first hands-on experience of using the Internet of Things with Cumulocity and u-blox.

An assembled training hardware kit (**Mbed u-blox C027** with **mbed application shield**) with the **Cumulocity** software, an activated SIM card is a prerequisite for the training and provided by the training environment. You would also need good mobile network coverage. The kit provides the following sensor data:

- Temperature
- GPS
- Accelerometer
- Analog sensor

In case of questions you can refer to https://cumulocity.com/guides/users-guide/overview/.

Steps

1. Get first hands-on experience of using the u-blox
   a. An active SIM card is already assembled to the kit.
   b. The Cumulocity Agent Software is already installed on the kit.
   c. Attach the cellular antenna to the board.
   d. For GPS/GNSS capabilities, attach the GPS antenna to the board
2. Connect the kit to a power source or use the USB connection and connect the kit directly with your notebook. The **Mbed u-blox C027** will now dial up to the Internet. On a successful login for the first time the display of the kit shows **Bootstrapping** and below the IMEI of the cellular modem on the LCD display. Please note the IMEI, you will need it for registration.
   a. In case upon boot-up, the device displays **Connect to Cloud** right after **Agent Run**, instead of showing **Bootstrapping** and IMEI, your device is already registered with Cumulocity under another user account. A Factory Reset has to be performed to unregister the device. The factory reset removes the credentials so that the device can be re-registered again.
      i. Press and hold the joystick when (re) starting an already registered device.
      ii. Simply wait for **Factory Resetting** to appear on the screen. You can release your finger already. After about 2 seconds, you should see **Reset Success** on the display.
      iii. Now restart the **Mbed u-blox C027** device.
3. Open your Chrome Browser and open **<Cumulocity tenant url>**. Verify that your browser shows the login prompt. Login to the **Cumulocity** account with the following properties:
   a. **Cumulocity tenant url:** - as provided by the instructor –
   b. **Username:** admin
   c. **Password**: - as provided by the instructor –
4. Select the **Device management** application from the menu if not already open.

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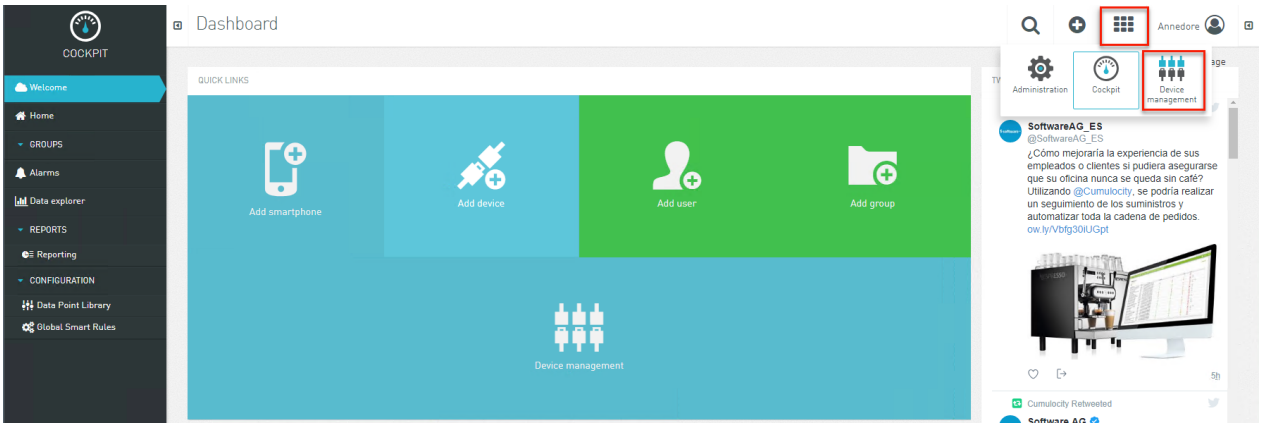
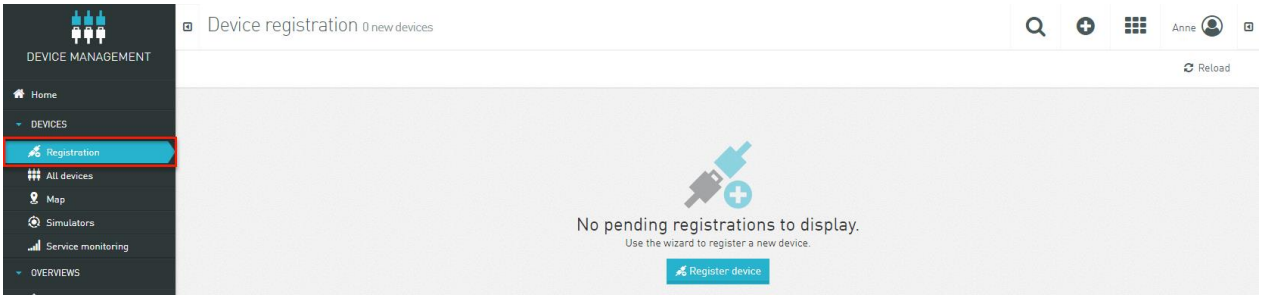
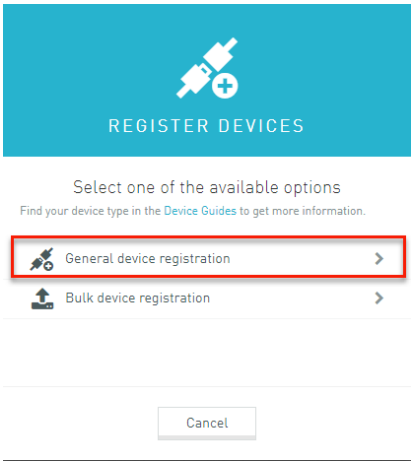


5. Open the **Device Management** menu and select **Devices > Registration**.



6. Click **Register Device and s**elect **General device registration.**



7. Enter the IMEI as shown in the LCD display after successful connection - refer to Step 2. Click **Next**.

   Note: The IMEI can also be found on the white sticker on modem chip of the C027.

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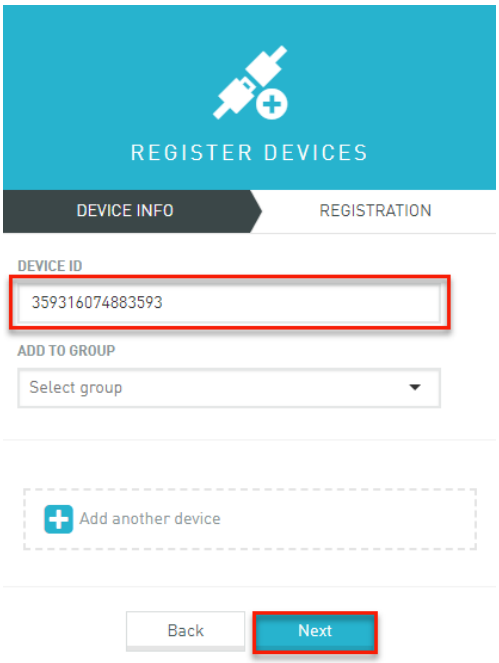
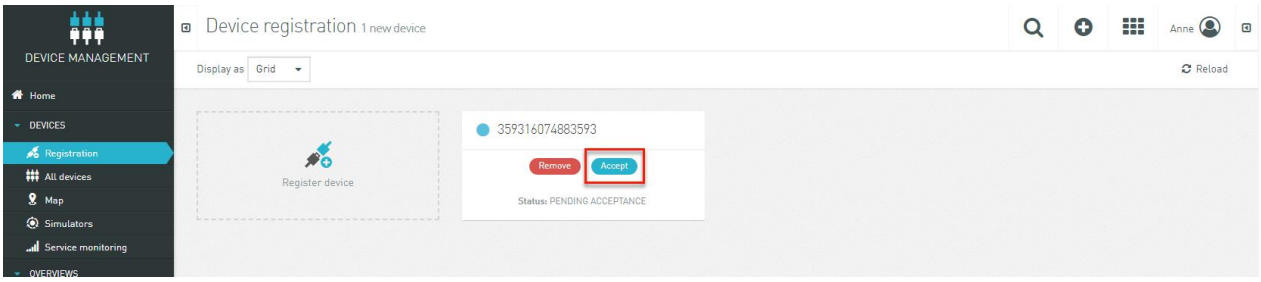
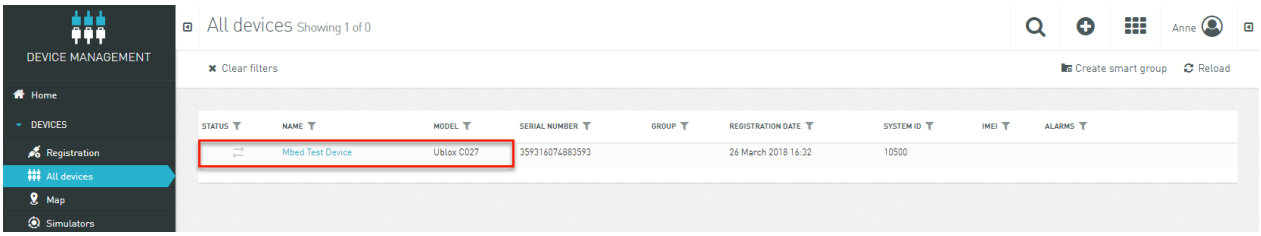


8. Click **Finish**. Turn on the device. After a while the device appears as status **Pending Acceptance.** Click the **Accept** button



9. The device is now registered with Cumulocity. Navigate to **Devices > All devices**. In case you don't see your device click **Clear filters.** The new connected device shows up with the name **Mbed Test Device.**



10. After the device is successful connected to the Cumulocity platform, it will update the LCD display regarding its current status. The first line always displays the tenant name (until there is a message received from the platform). The second line shows the signal quality in units of dBm. The third line displays information about which sensor data the u–blox is sending and their corresponding values. In case similar sensory values are read comparing with the last sending, the third line is empty implying a skip of sending.

11. In order to distinguish your device from the other devices select the device from the list.

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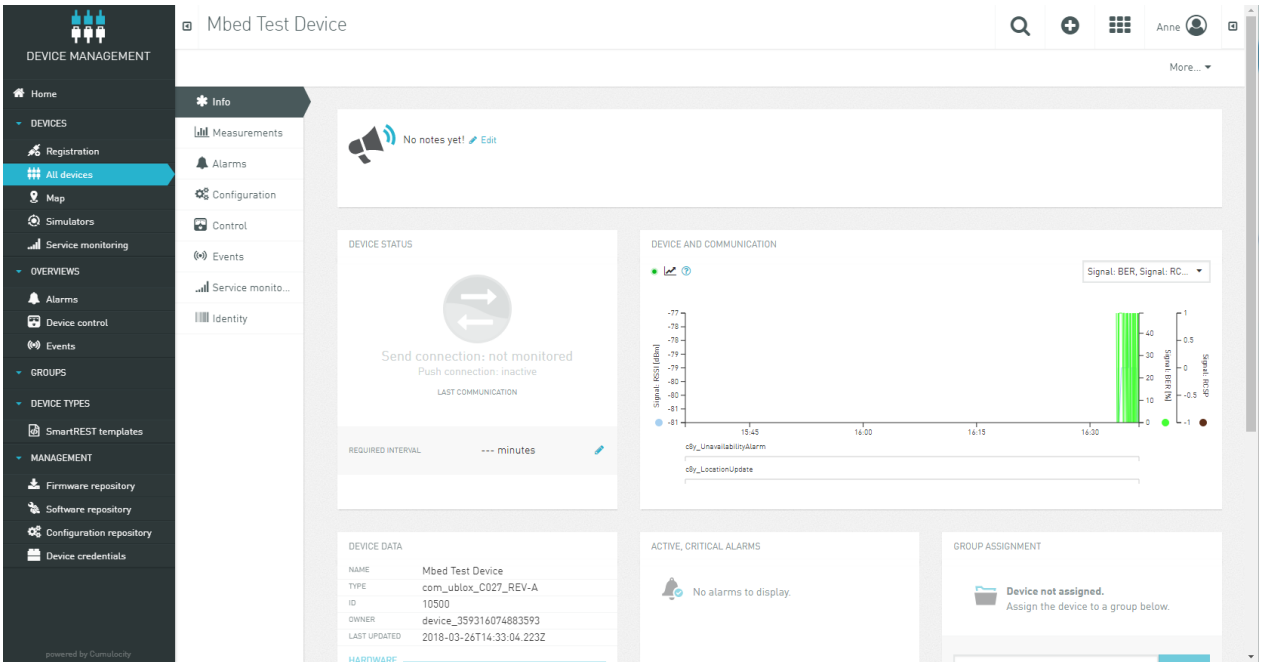
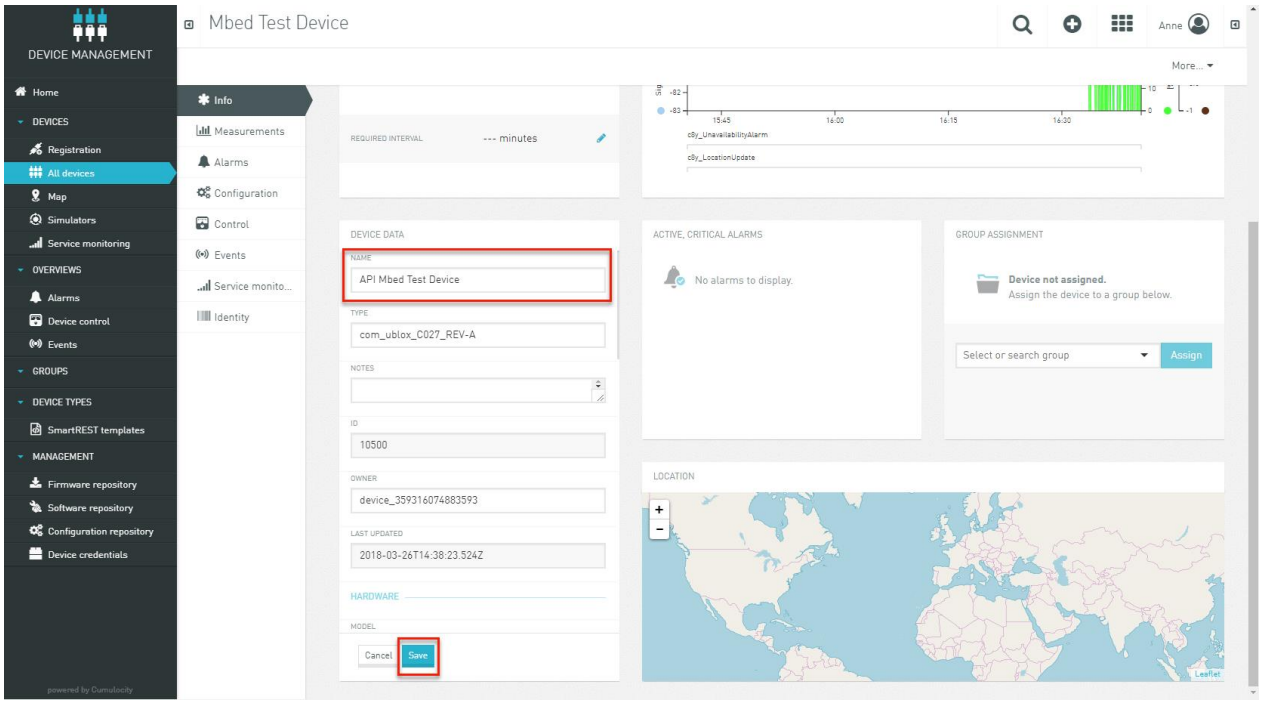


12. In order to change the name of the device navigate to **Info > Device Data**. Switch over to **Edit** mode. Change the name of the device by using your Software AG userid as a prefix.

    a. **Name**: <softwareag-userid> Mbed Test Device



    Click **Save**.

13. Use the Search functionality to just show your device in the list of devices.

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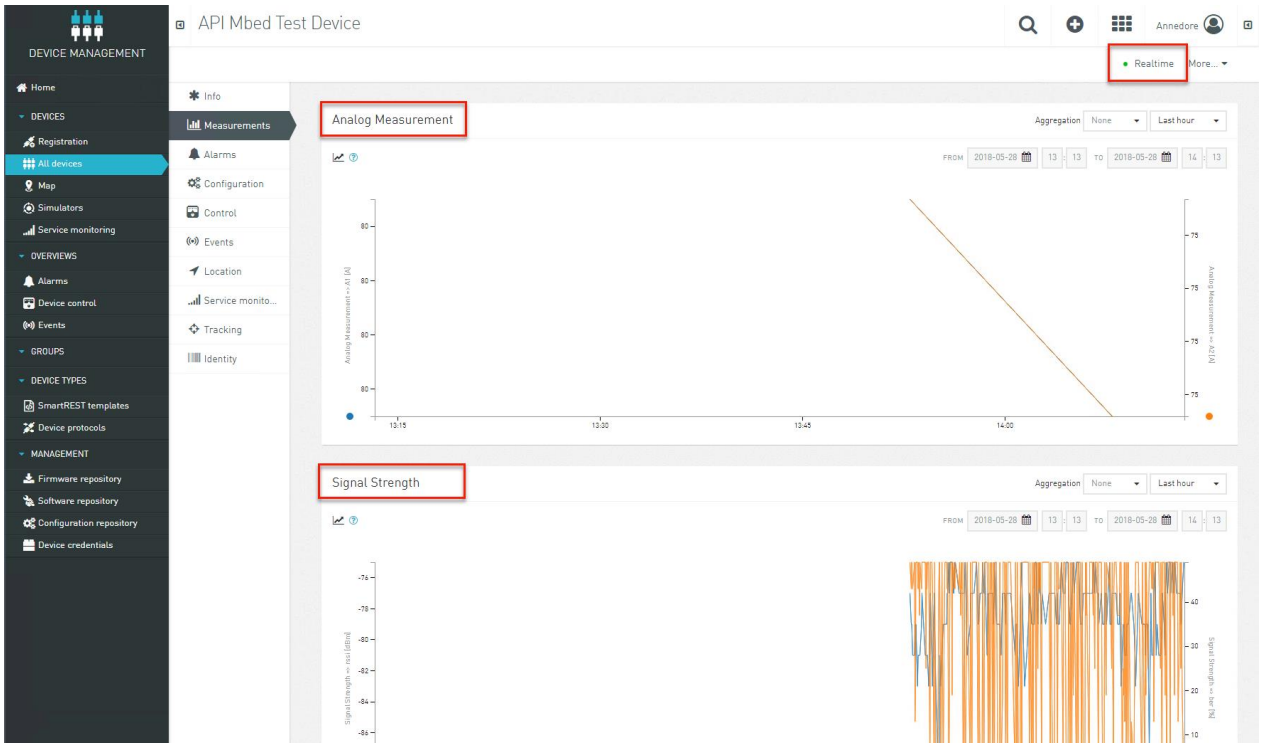
14. Select your device from the list. Move your device up and down, left to right. Select **Measurements** form the menu bar on the left hand side. The list of measurements covers a set of available sensor data. This might be:

    a. **Analog Measurement**

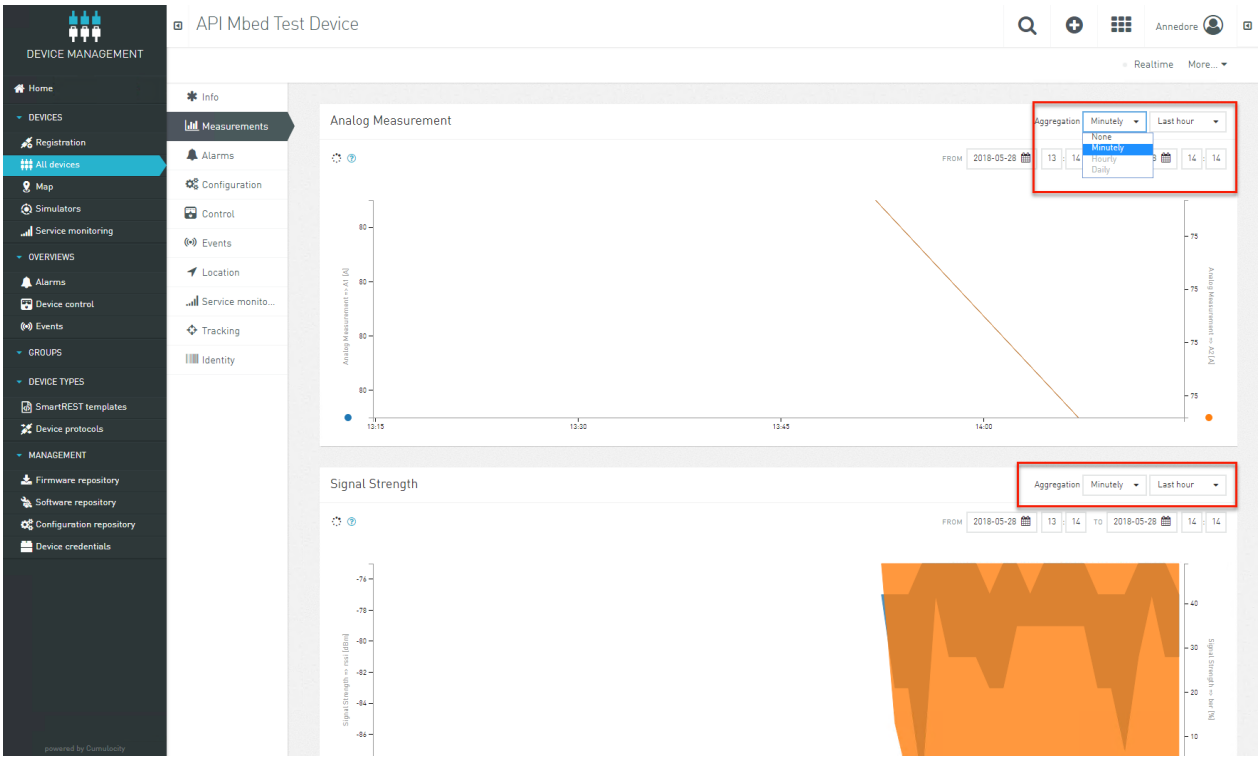
    b. **Signal Strength**

    In case not already selected switch to **Realtime.**



15. Use the different filter criterias to customize the default display

    a. modify the timeline interval of the graph to last hour



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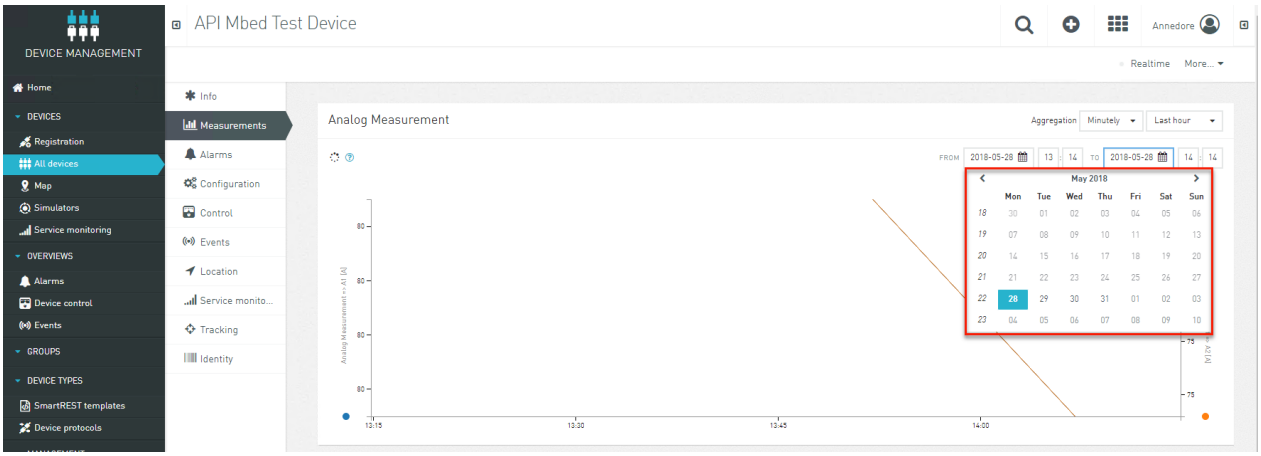
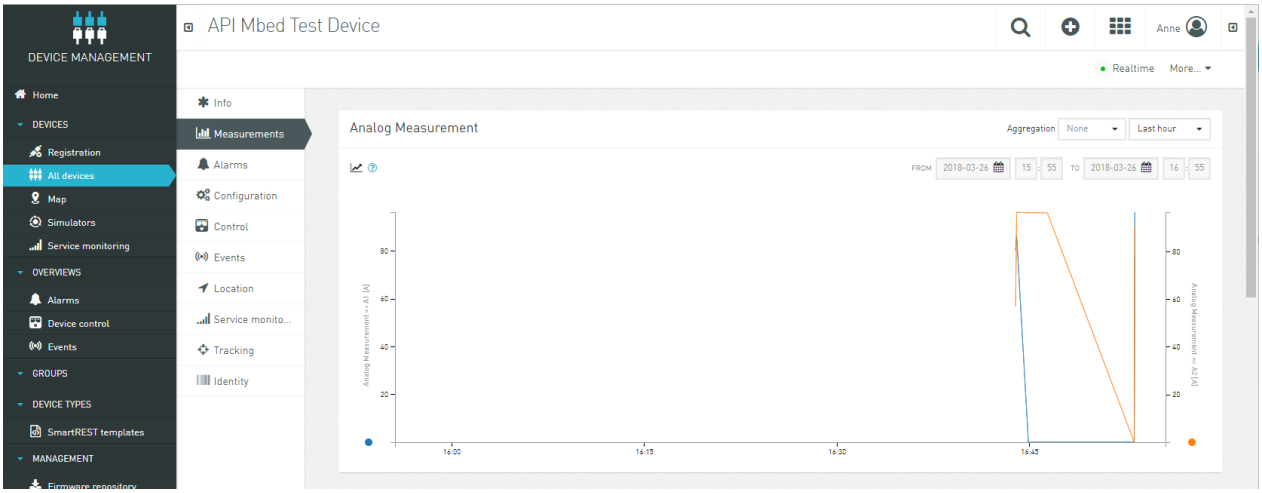
b. Modify the start-date for the timeline by moving the start to a date in the past. Click the date-value a calendar will show up.



16. Turn the 2 accelerator wheels, turn the left accelerator to the very right limit and turn the right accelerator to the very left limit. Refresh the screen, this will now show an additional graph **Analog Measurement.** This is shown in the graph with one line at the top of the y-axis and the other line at the bottom of the y-axis.



Note:

a. In case of display showing **Network: no coverage** make sure that you have a **good mobile network coverage.**

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Exercise 2:
Connect your Smartphone (Android) to Cumulocity

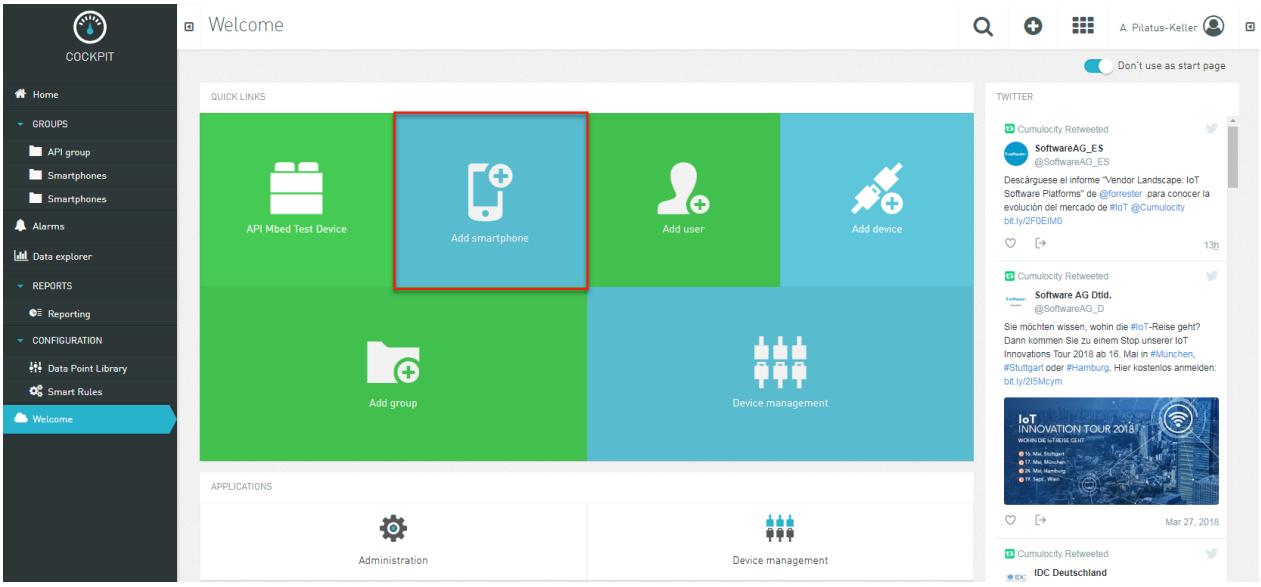
Objectives

In this exercise, you will get first hands-on experience of using the Internet of Things with Cumulocity and Android.

Note: This only works with Android 5.

Steps

1. Login to **Cumulocity** account. Open the URL <**Cumulocity tenant url>**
   a. **Cumulocity tenant url:** - as provided by the instructor –
   b. **Username:** admin
   c. **Password**: - as provided by the instructor –
2. Navigate to the **Cockpit** application. Navigate to the **Welcome** page. Click the **Add smartphone** button under QuickLinks. This will open a wizard.



3. If you have a QR code scanner on your mobile phone, scan QR code. You will be navigated to Google Play for installing the Cloud Sensor App.

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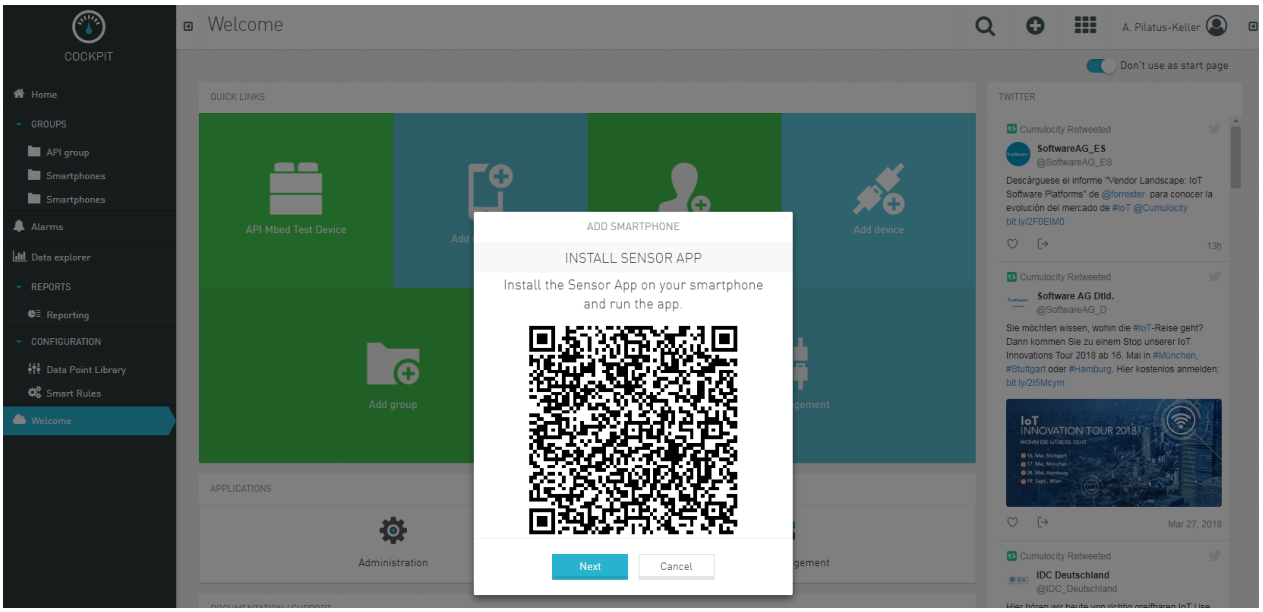
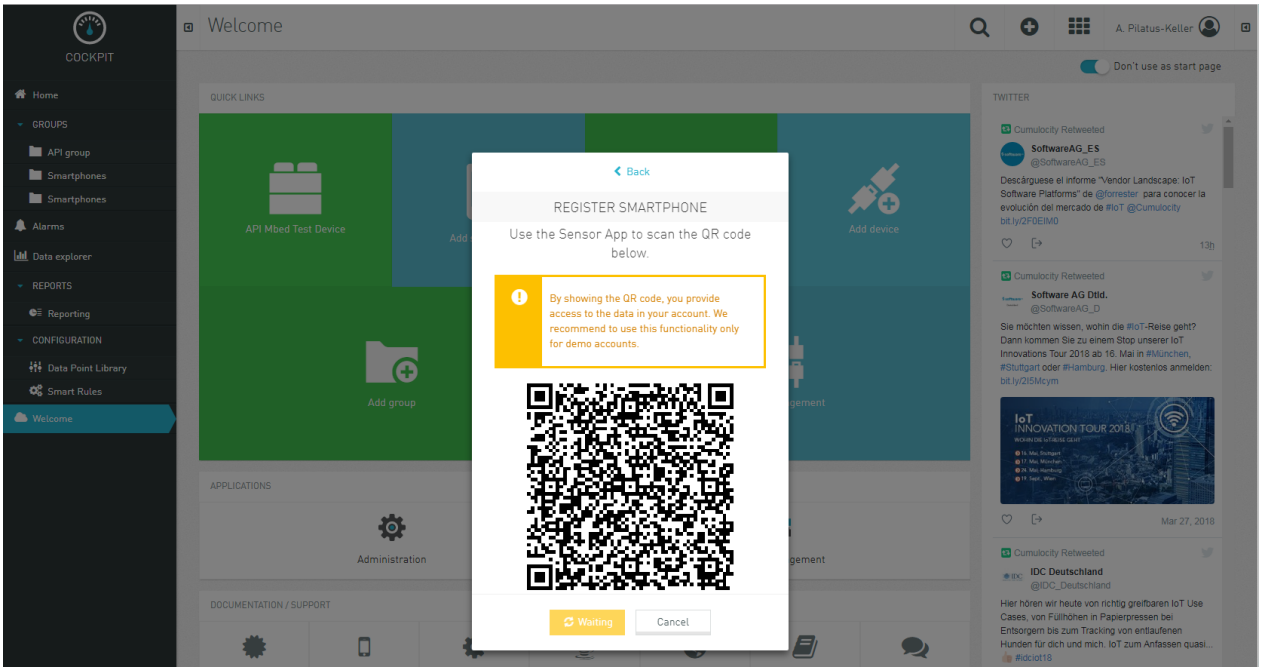


You can also start **Google Play** manually.

a. Search for **Cumulocity** and install the **Cloud Sensor App** listed in the results.

4. Click **Next** in the **Cockpit** wizard to see the QR code with credentials to register the Cloud Sensor App to your tenant. The registration credentials are encrypted however, it is recommend to use this only for demo purposes.



5. Open the Cloud Sensor App on your smartphone and click the **QR code Scannen** symbol on the top. Then scan the second QR code.

a. Note: On Android 6 or later, the app will request for permission to access your device location and camera.

6. As soon as the smartphone has scanned the registration credentials QR code, it is added to the automatically created group **Smartphones**.

7. Once your Cloud Sensor app is registered, the next screen will indicate the device name that will be used to identify your smartphone at the platform. The permission requests for accessing the network

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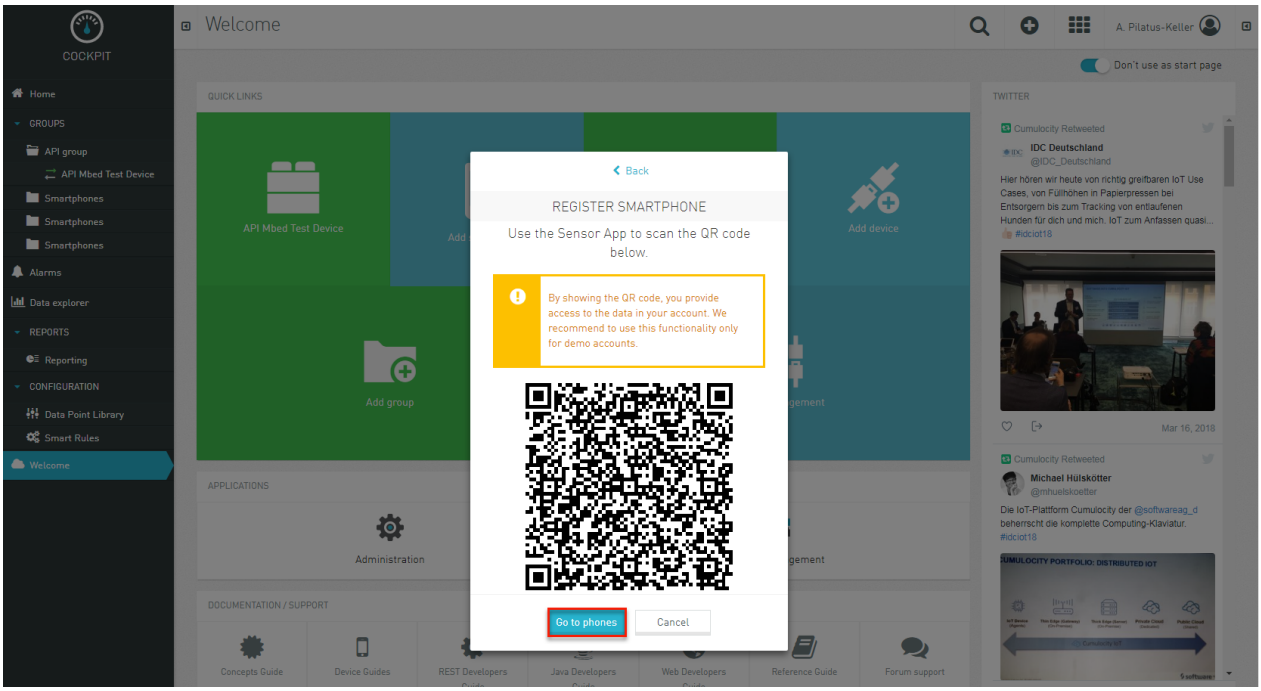
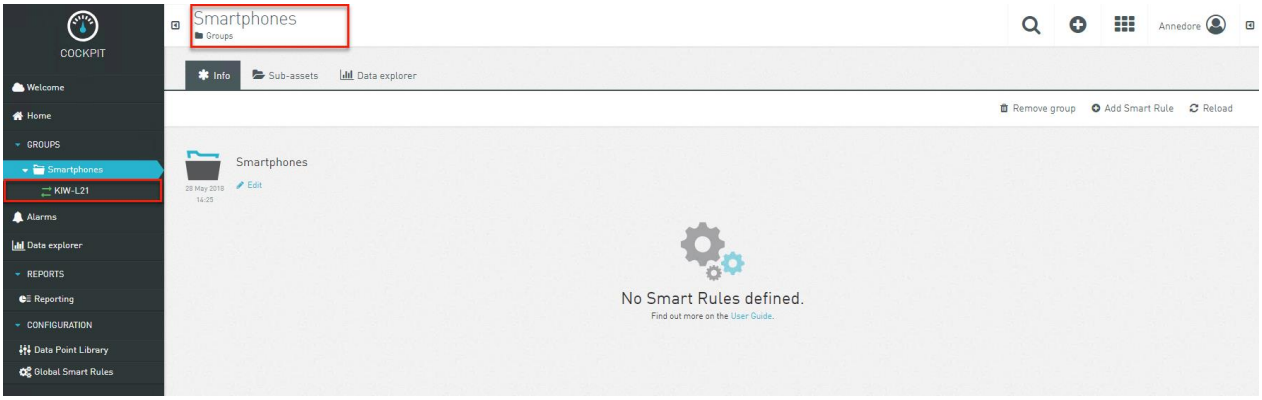
information, accessing GPS data and storing location map images cache will be prompted only once on start. Please accept them so that the smartphone can transfer network and GPS data to the cloud.

8. Within your Cockpit application you can navigate to the **Smartphones** group in Cockpit by clicking **Go to phones.**



Click on **Go to phone** in the wizard.

9. Your smartphone is listed in the group.



10. Navigate to **Device Management** application and change the name of your smartphone by adding your <softwareag userid> as prefix.

11. Switch back to **Cockpit** application. Select your smartphone and open the sensor smartphone dashboard.

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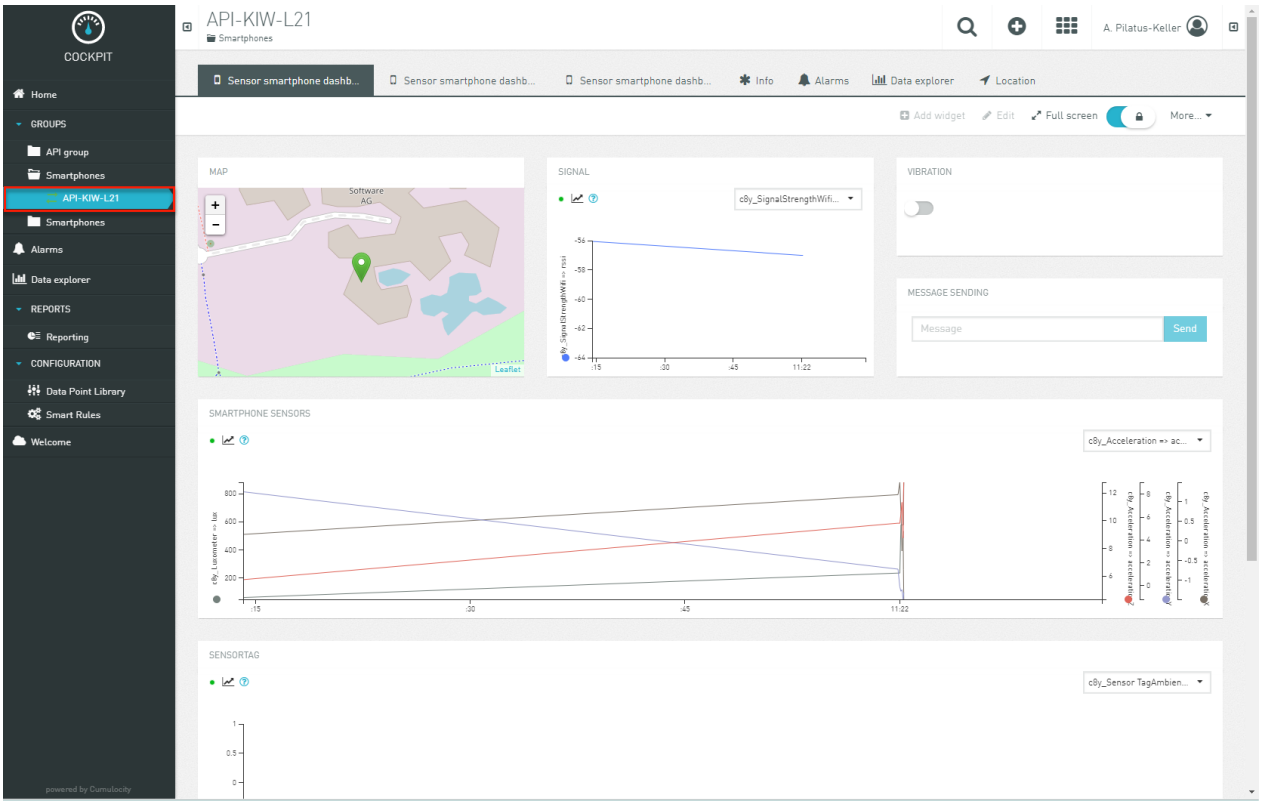

12. Experiment with the phone and see how the visualization on the dashboard changes.
    a. Send a message to your smartphone.
    b. Rotate your smartphone and view the rotation in the **Rotation widget**.
13. Take your smartphone with you for the coffee break and check the track.

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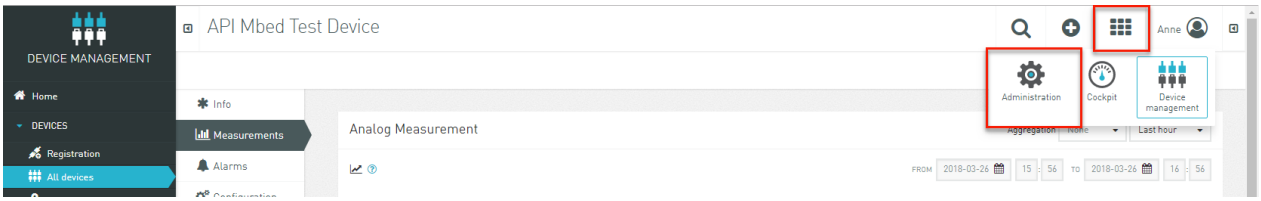
Exercise 3:
Create a User in Cumulocity

Objectives

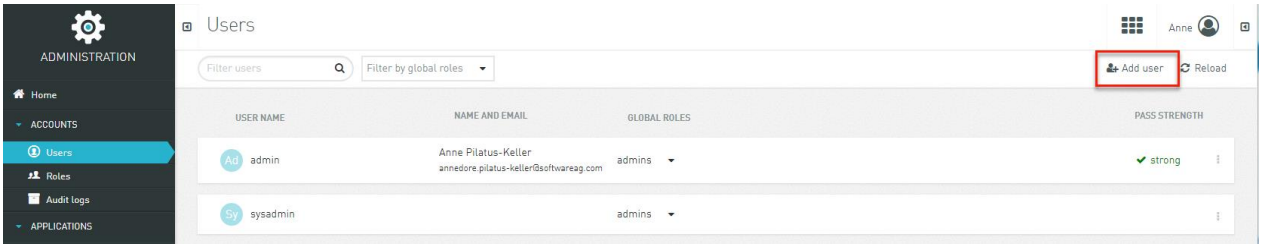
In this exercise you create a user for yourself to not disturb the other users during experimenting and to test concepts related to ownership, permissions, auditing …

Steps

1. Make sure that your device is installed, running and connected to the Cumulocity platform. If this is not the case please refer to Exercise 1.
2. Login to **Cumulocity** account. Open the URL <**Cumulocity tenant url>**
   a. **Cumulocity tenant url:** - as provided by the instructor –
   b. **Username:** admin
   c. **Password**: - as provided by the instructor –
3. Navigate to **Administration** application by clicking on the application switcher (grid icon on the top right) and selecting **Administration.**



4. Navigate to **Users.** Click **Add user**.



5. Fill in at least the following properties:
   a. **Username**:
   b. **E-mail**:
   c. **Firstname**:
   d. **Lastname**:

   In case the checkbox **Send password reset link as e-mail** is ticked, please untick and provide

   e. **Password**:
   f. **Confirm password**:
6. Select the **admins** and **business** checkbox in the **Global roles** section.

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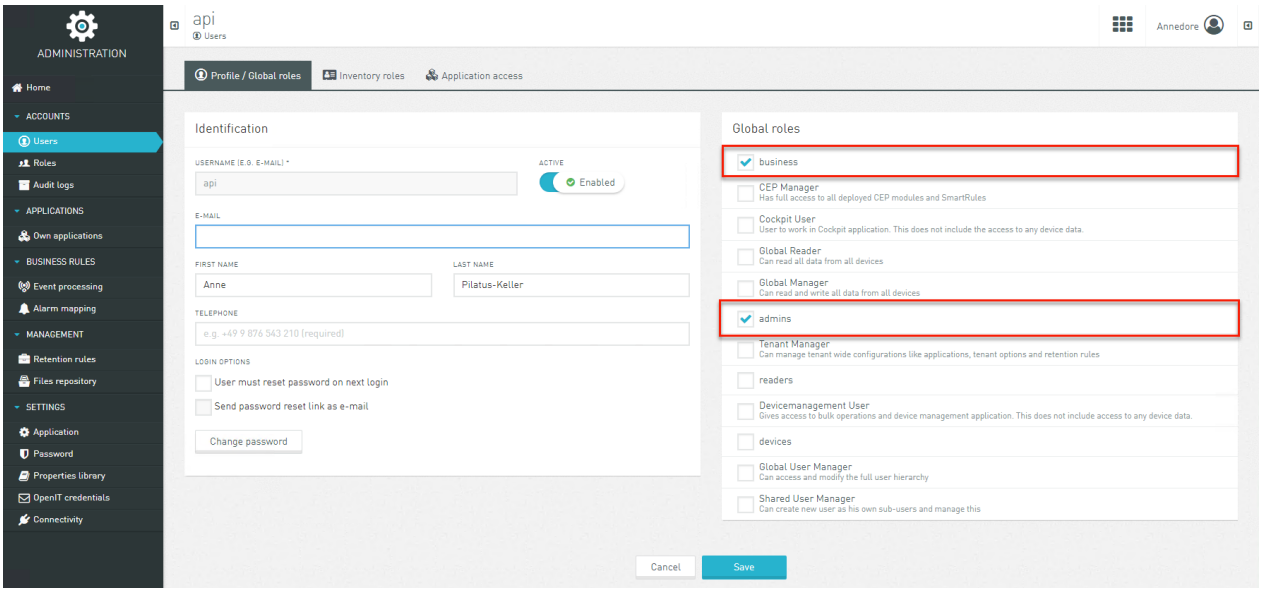
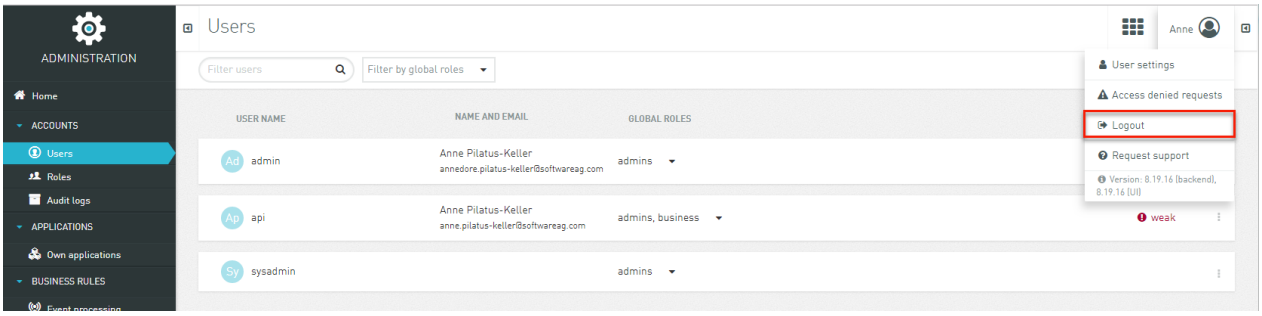


Click **Save** at the bottom of the page.

7. Click the small **User** icon on the top right and select **Logout** to go back to the **Login** page.



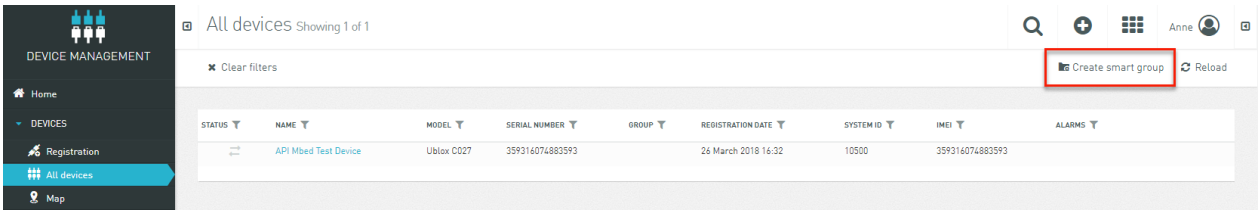
8. Log in as your new user. You may want to select **Remember me**.

9. Navigate to the **Device Management** Application. Navigate to **All devices** and experiment with sorting and filtering. Examples:

   a. Sort the list of devices by registration date

   b. Filter all **Ublox C027**

   c. Create a **smart group** with all **Ublox devices C027**.



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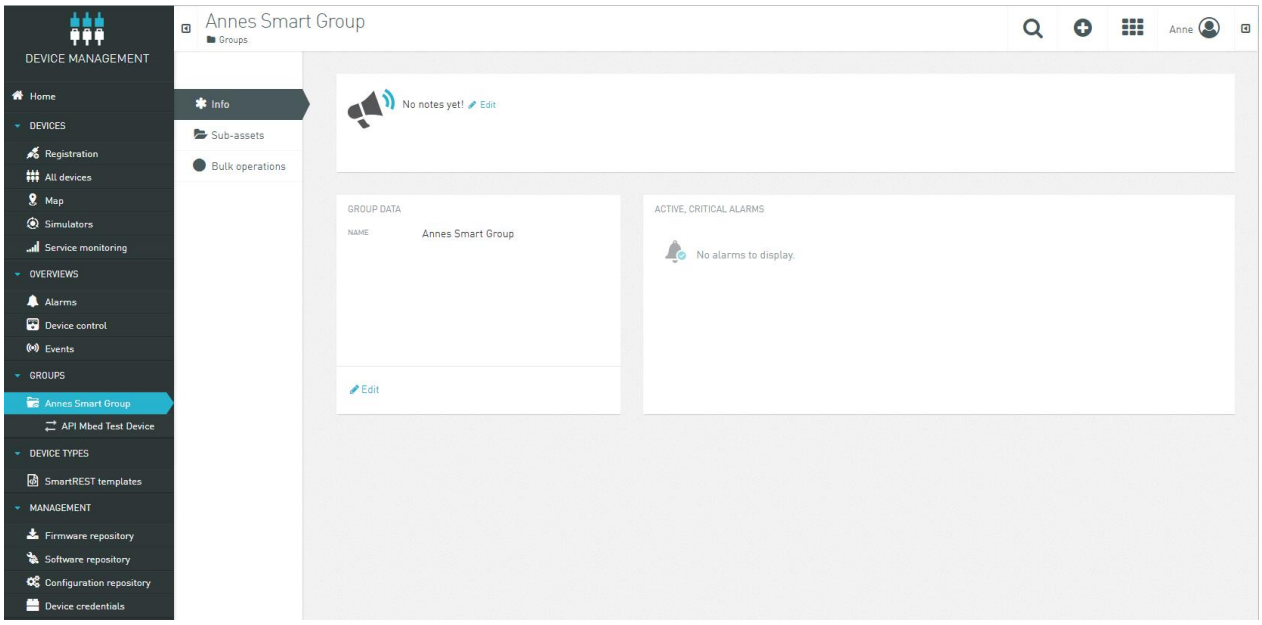

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Exercise 4:
Create your own Dashboard

Objectives

In this exercise, you will understand how Cumulocity decouples devices and asset hierarchies. You will create your own dashboard.

Steps

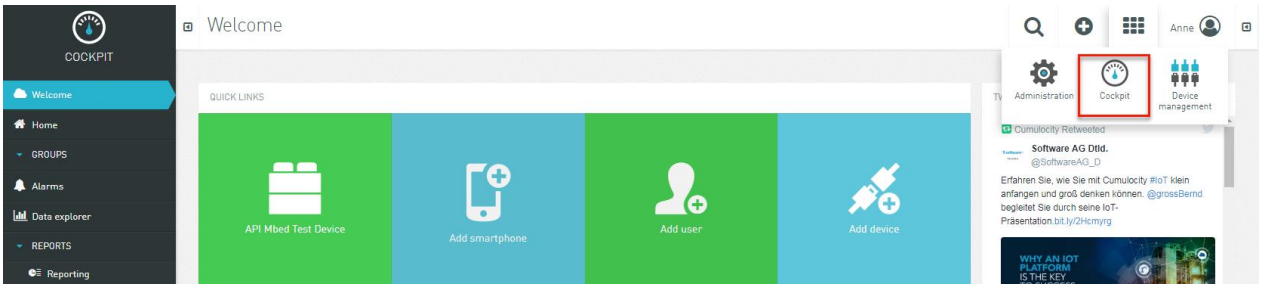
1. Make sure that your device is installed, running and connected to the Cumulocity platform. If this is not the case please refer to Exercise 1.
2. Login to **Cumulocity** account. Open the URL **<Cumulocity tenant url>**

   <Cumulocity tenant url> as provided by the instructor

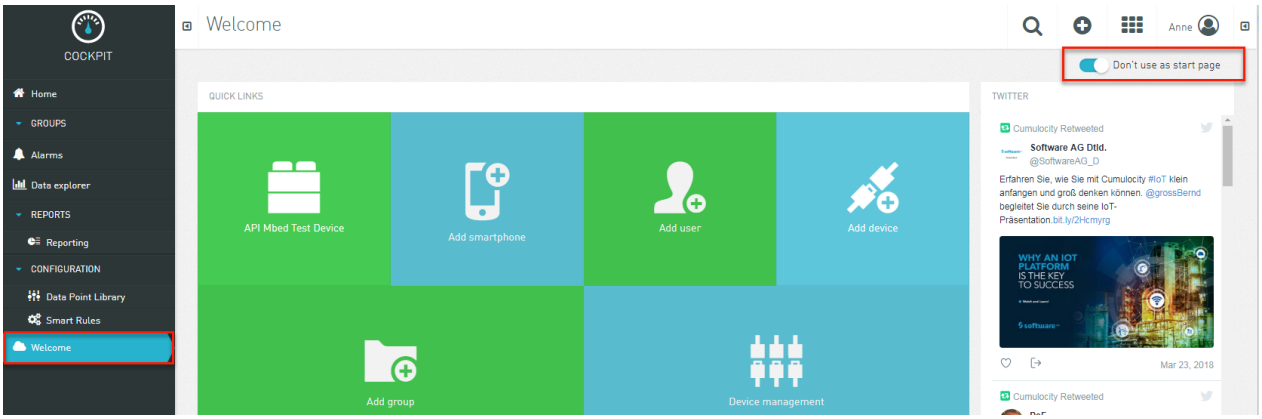
   Log in with the following credentials:

   Username: - as defined in exercise 3 step 5 –

   Password: - as provided in exercise 3 step 5 –
3. Open the **Cockpit** application through **Application Switcher**, the grid icon on the top right of the user interface



4. You can use the **Don't use as start page** slide to change the start from the **Welcome** page to the **Home** page.



5. Click the **+** button at the top and select **New group** to add a new group.

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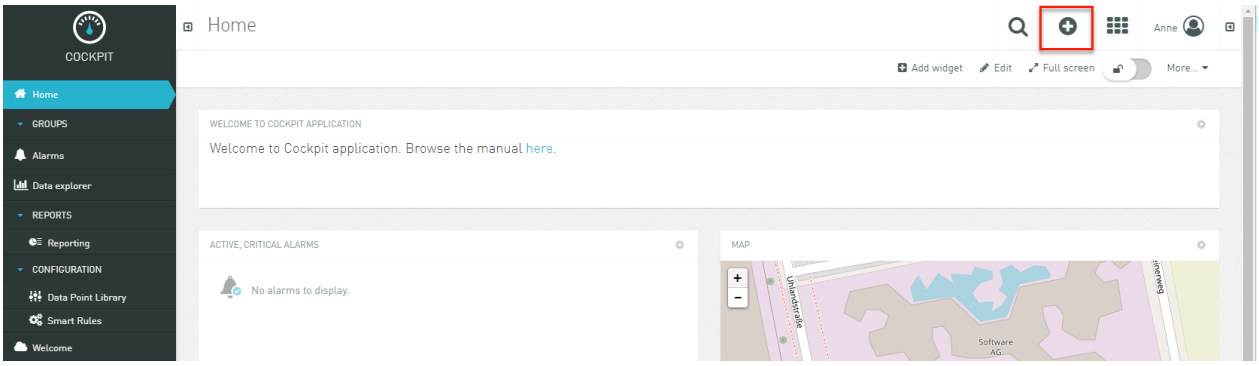
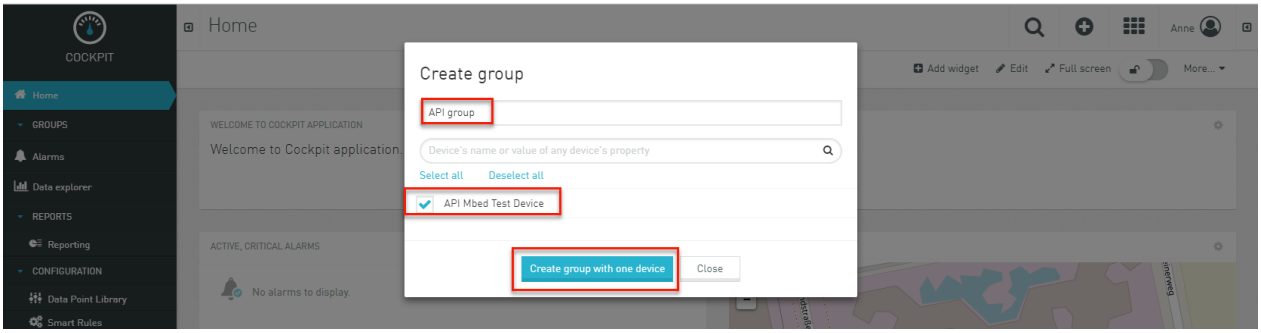


Provide the following properties:

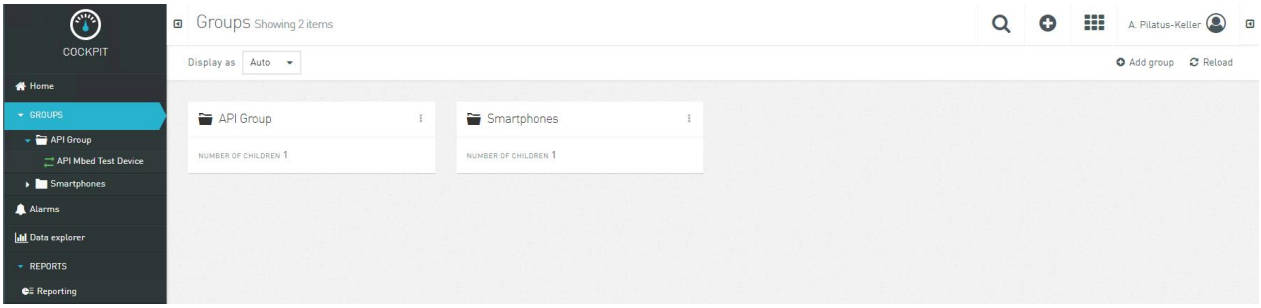
a. **New group name**: <your userid> group

Select some of the training kits in the list. If needed click **Search more** to expand the list.



Click **Create Group With .. Device**.

6. Click on the new created asset in the navigation tree **Groups.**



7. Select the previously created group. Select **Sub-assets** tab. Select you device from the list. Select the tab **Location.**

a. This is a shortcut to the default **Location** widget.

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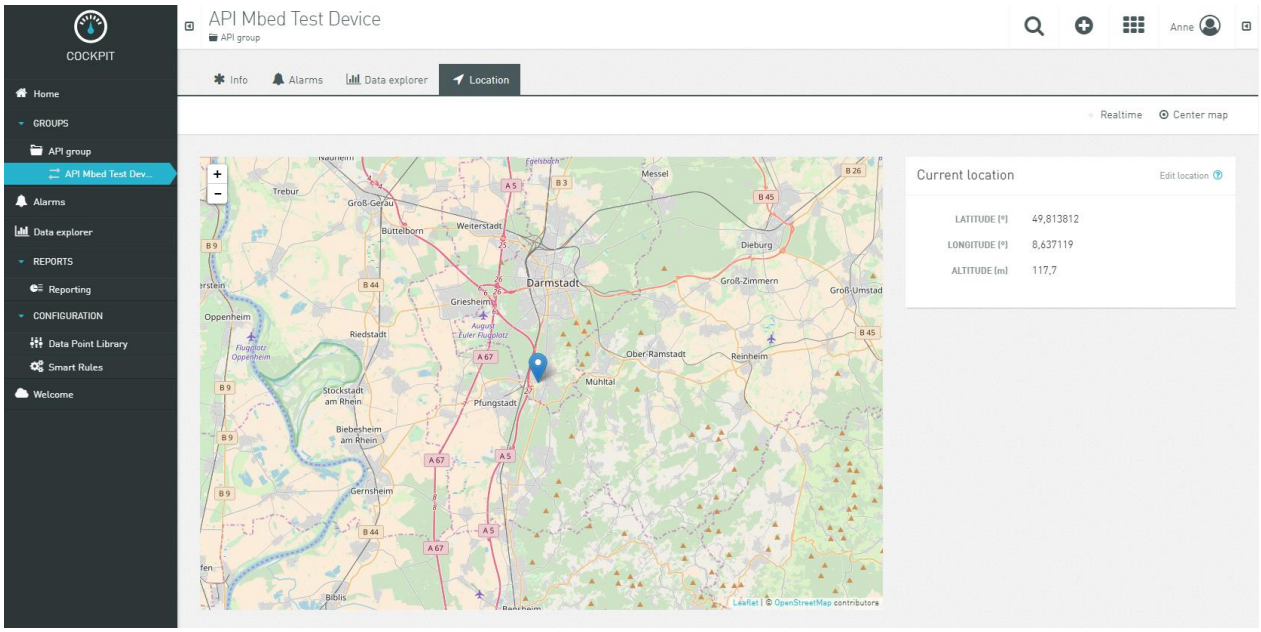
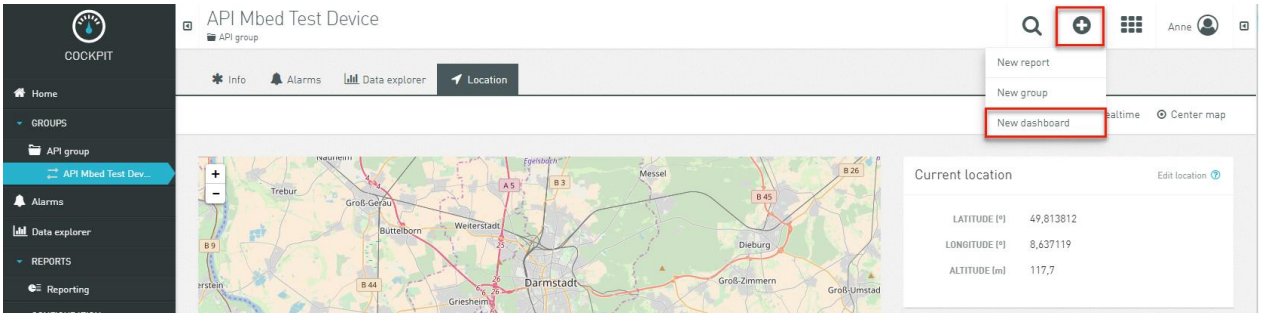
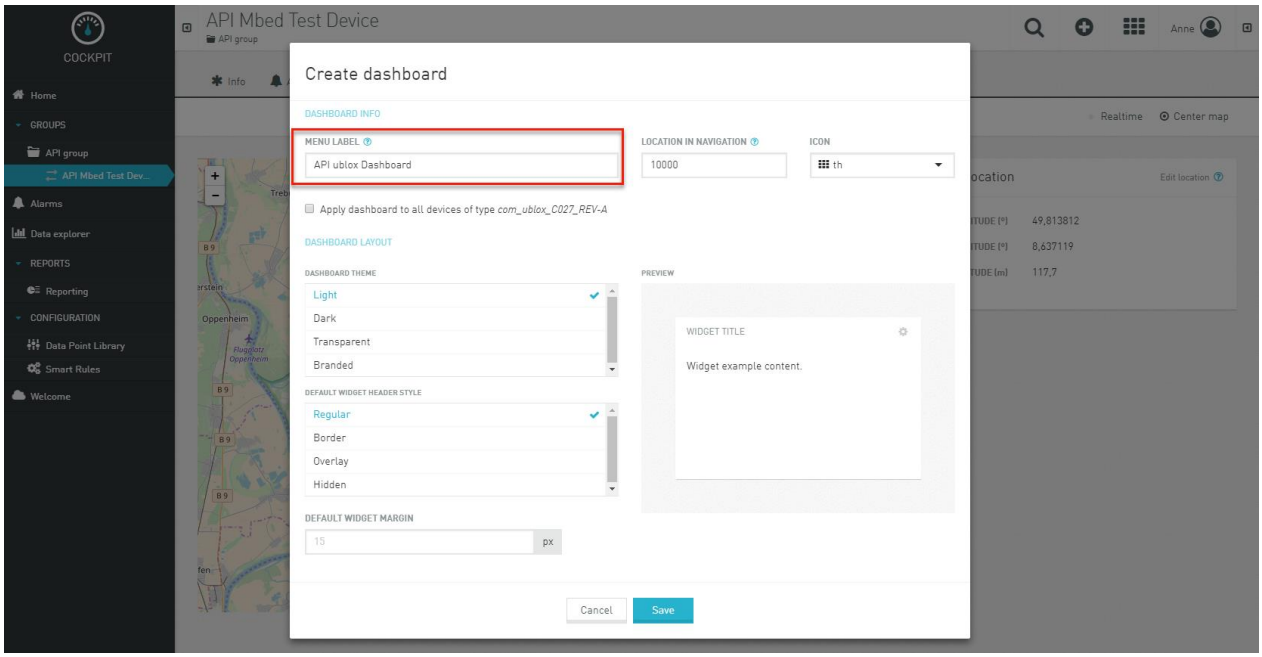


8. Create a dashboard by clicking the **+** in the header. Click **New Dashboard**.



a. **Menu Label**: <your userid> ublox Dashboard



Keep all defaults. Click **Save.**

9. Send the **Data Explorer** widget to the dashboard. Select the tab **Data Explorer.**

   a. This is a shortcut to the default data explorer information to the selected device.

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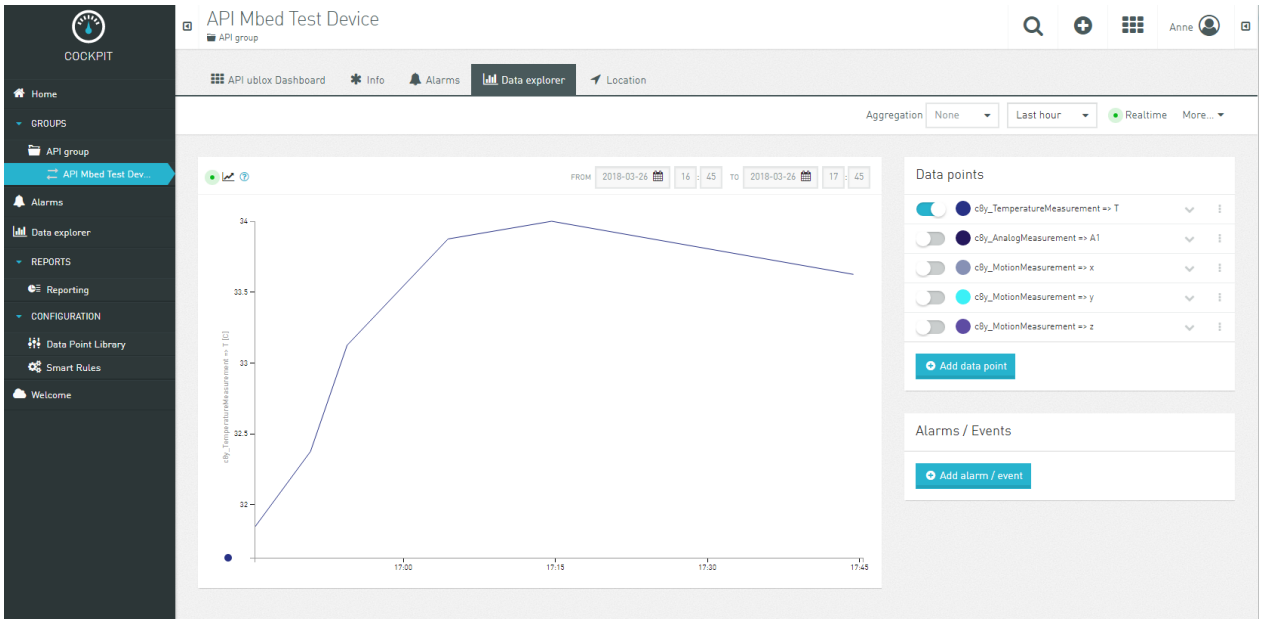
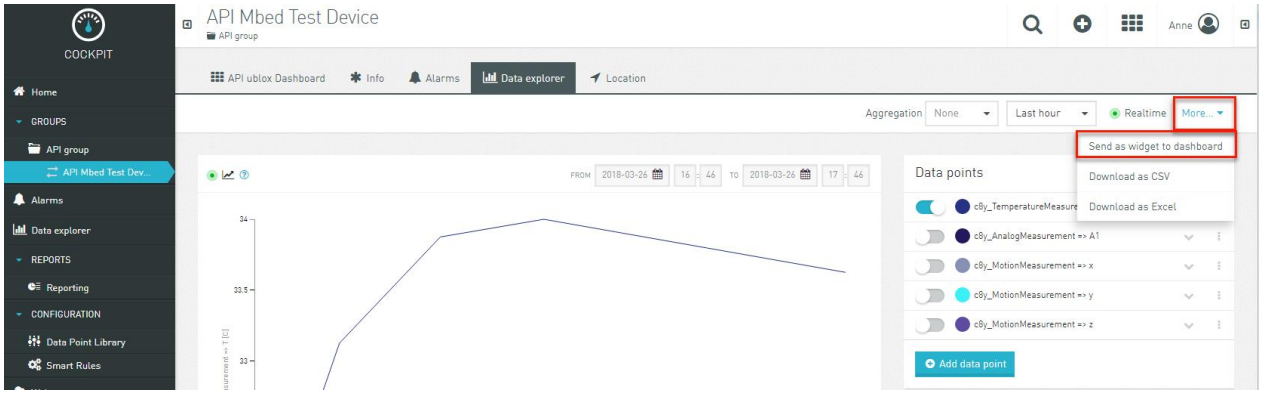
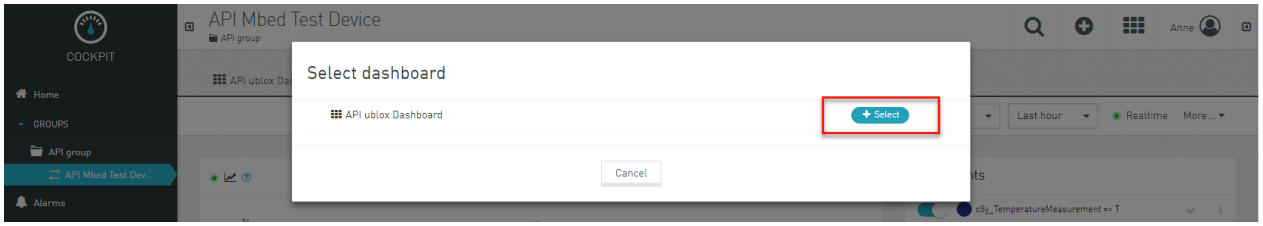


b. Click **More …**in the upper right corner to open the drop down menu. Click **Send as widget to dashboard.**



On the **Select Dashboard** dialog ´select the new created dashboard.



Click **+Select**.

10. Select the tab with the name of your new created dashboard. Add some widgets to the dashboards. Click the **Add widget** button.

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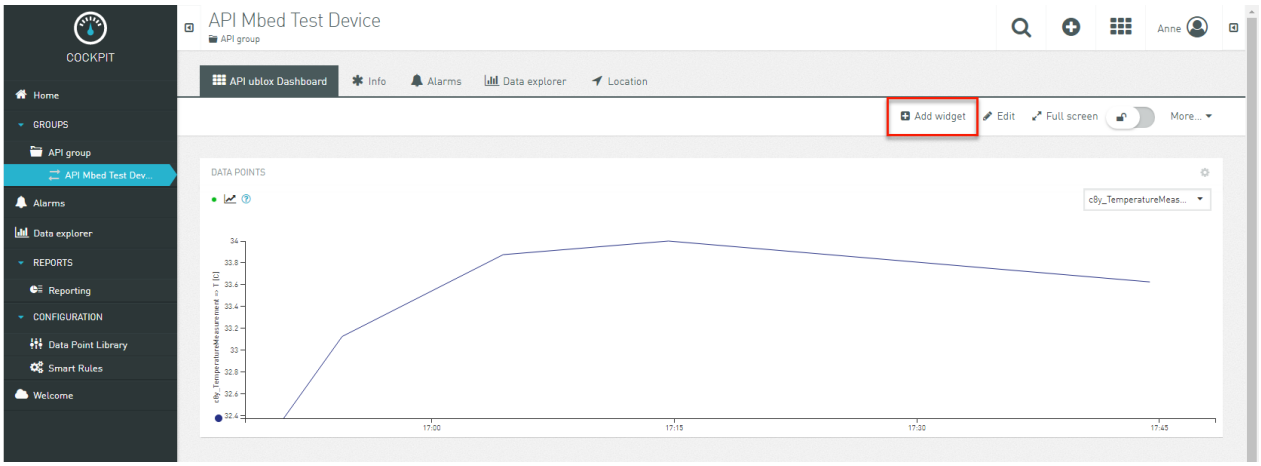
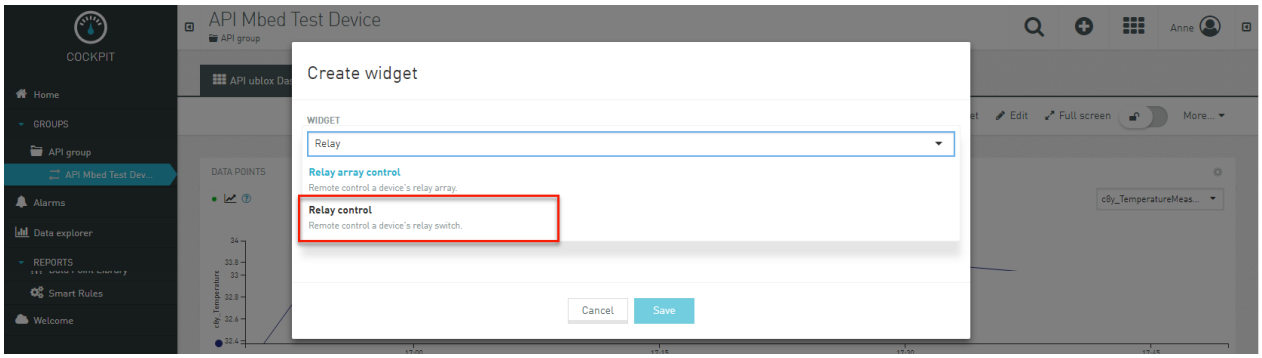
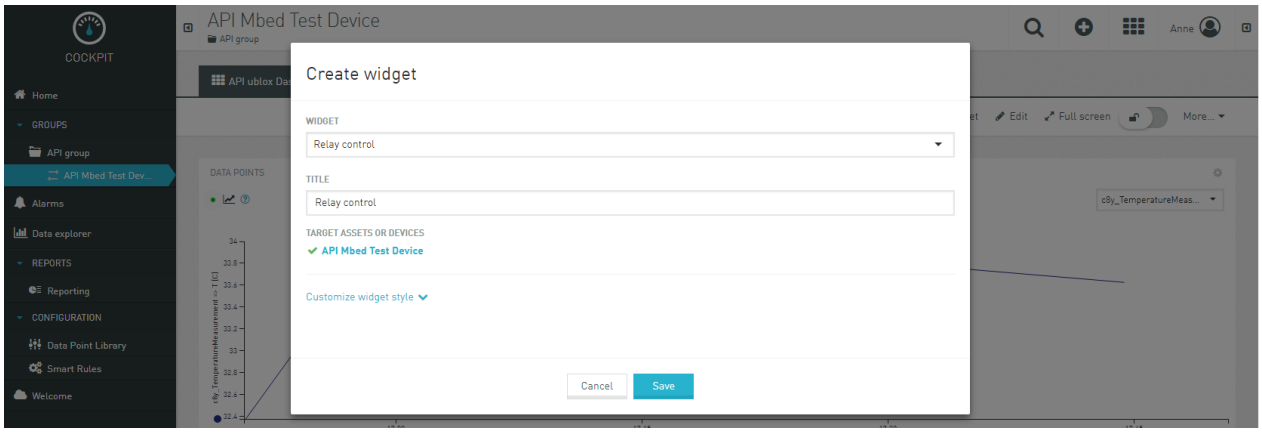


a. Search for Relay and select **Relay Control**



Keep the defaults and click **Save**.



11. Use the **Relay Control**. The little green light on the **Ublox** device will show up.

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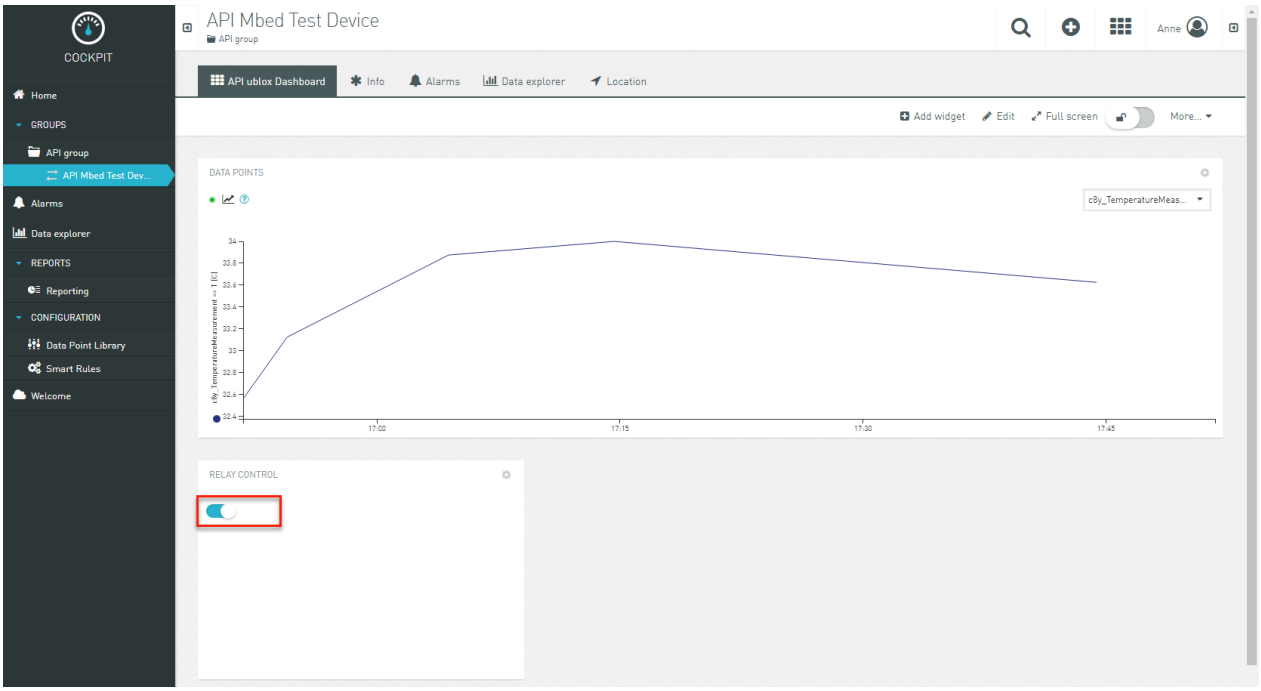
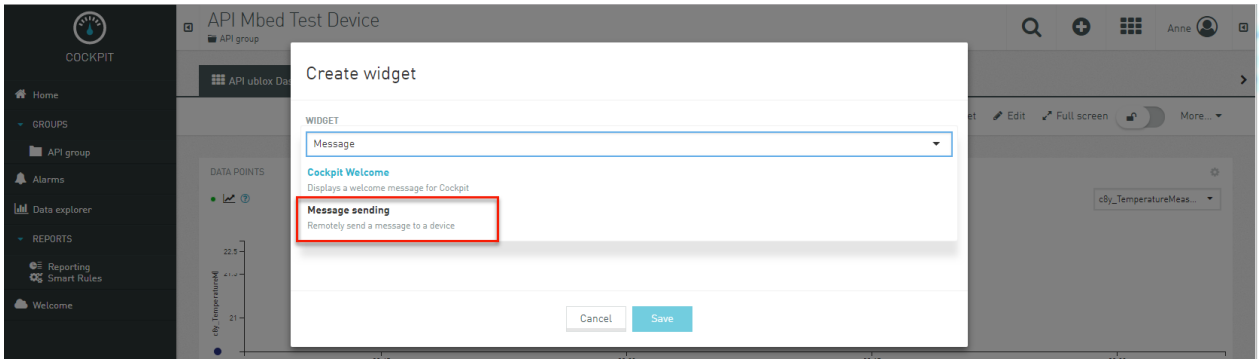
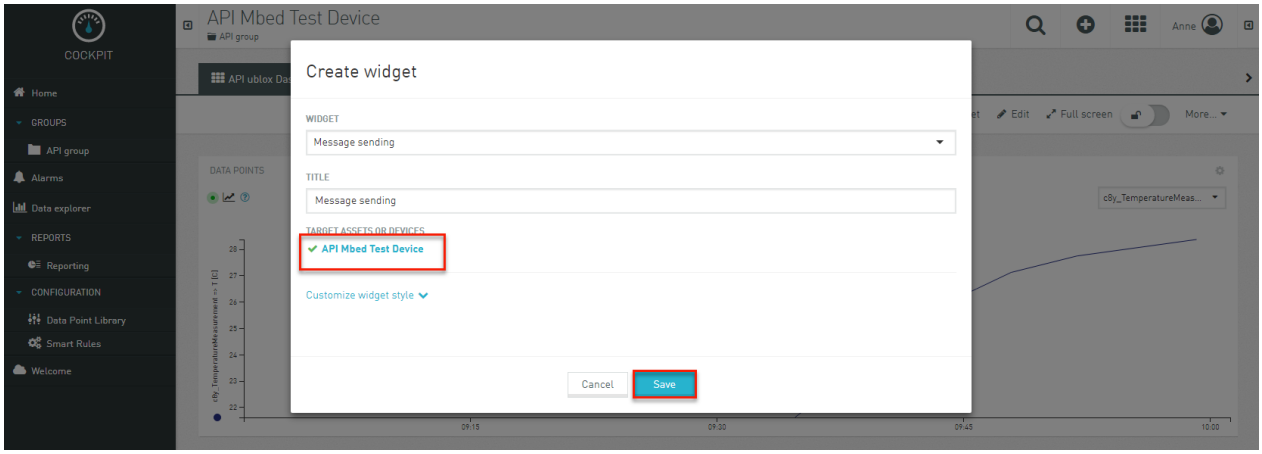


12. Add another widget to the dashboard.

    a. Search for **Message** and select **Message sending**



    b. Select your device, keep the defaults and click **Save.**



    c. Use the widget to send a message to your device. You will see the message of the display of your ublox device.

13. Add the widget **Info Gauge** to the dashboard.

    a. On the configuration page **Data point for gauge** select

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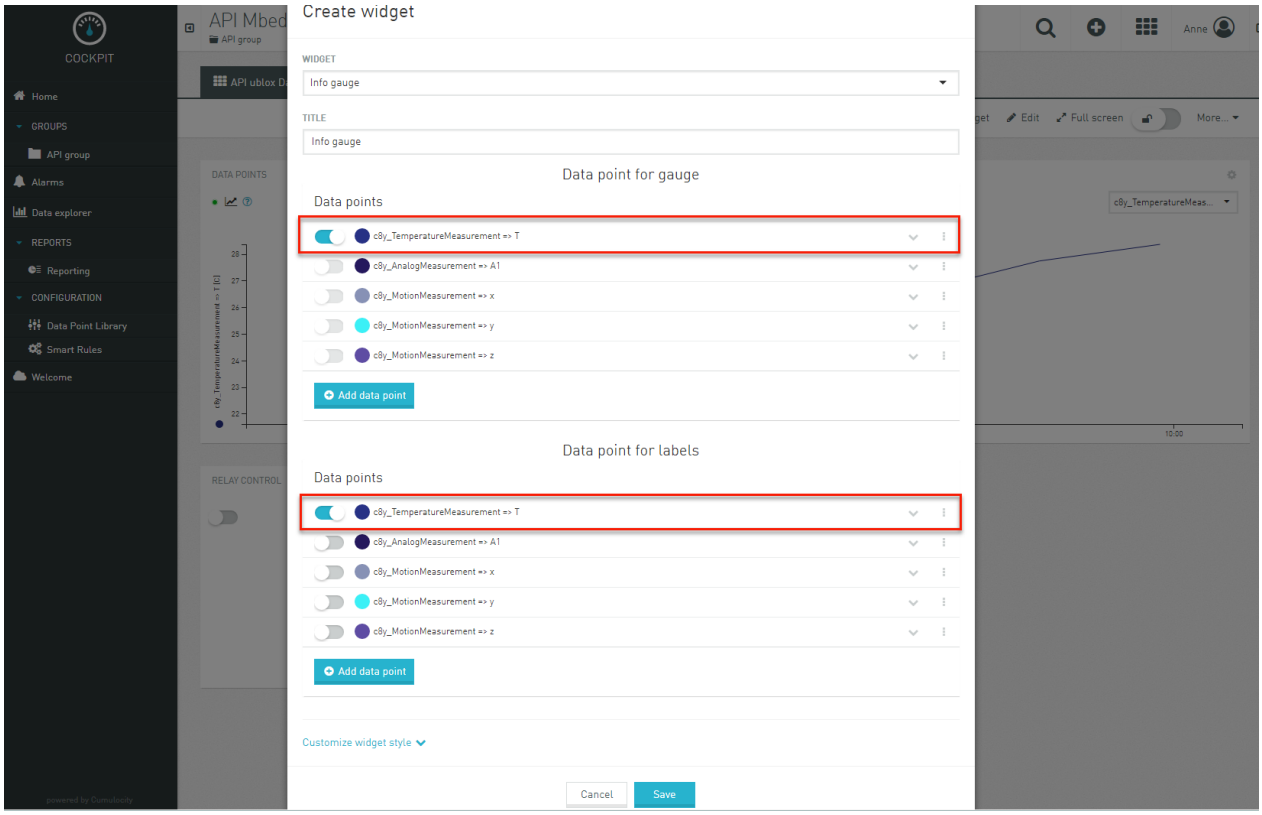
i. **c8y_TemperatureMeasurement**

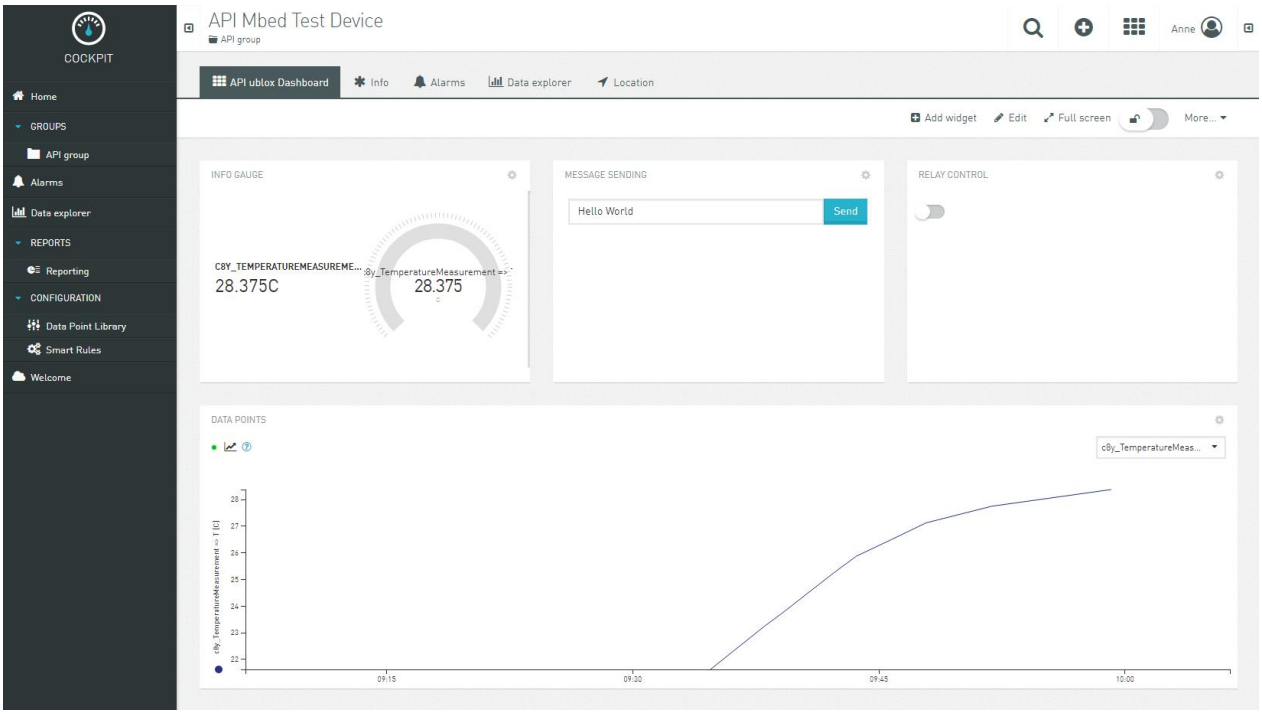
b. On the Configuration for Data point for labels select

i. **c8y_TemperatureMeasurement**



Click **Save.**

14. Drag and drop the widgets in the dashboard.



15. Add the widget **Map** to the dashboard.

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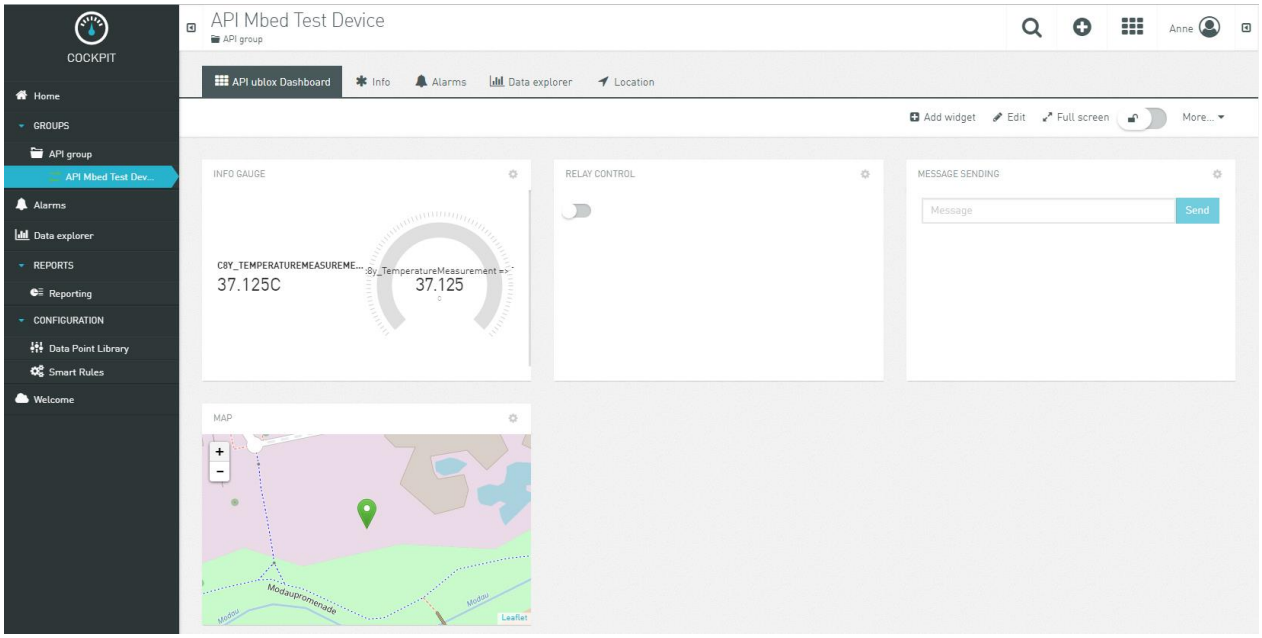
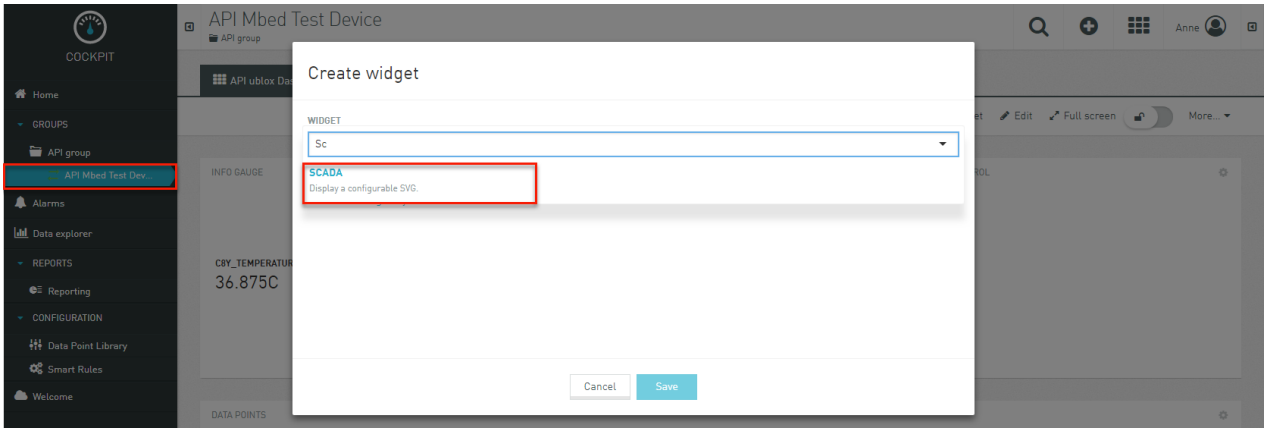
a. Keep the defaults. Click **Save.**



16. Add a Pie Chart widget and configure the parameters to show the 3 motion measurement values.

17. Add a **SCADA** Widget to your device dashboard. A **SCADA** widget is a dashboard with animation. Select your device dashboard. Click the **Add widget** button to add a widget. Search for **SCADA**



a. Provide the following porperties:

   i. **Title:** <your userid> Scada

b. Browse to the location **C:\Training\231-70E\Exercise4** where you find the file **windmill.svg**.

c. Configure the 5 placeholders. You need to choose a device and map device information. Hover the mouse over one of the placeholders. You will find the edit icon on the right hand side of the placeholder section. Click the edit icon.

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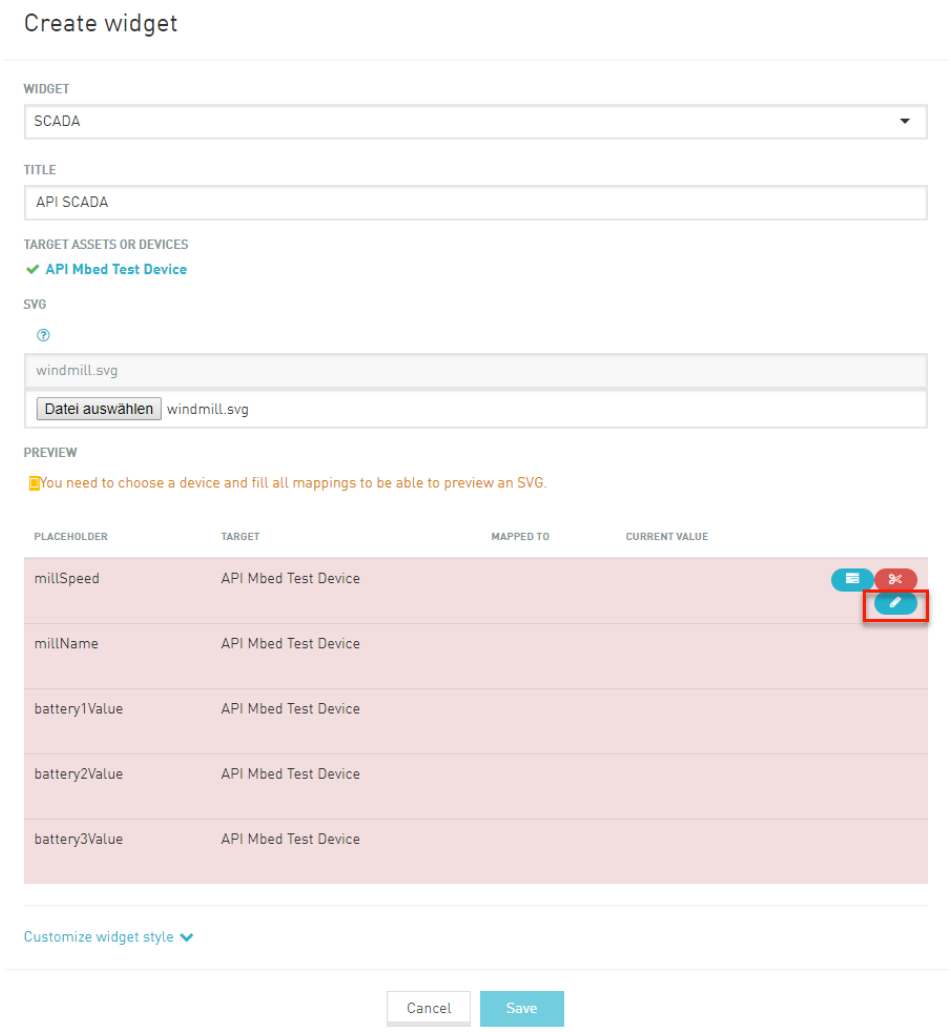

This will show the list of available device properties.

i. millSpeed

1. Within the **Select proper**ties dialog scroll down to **LastMeasurement**

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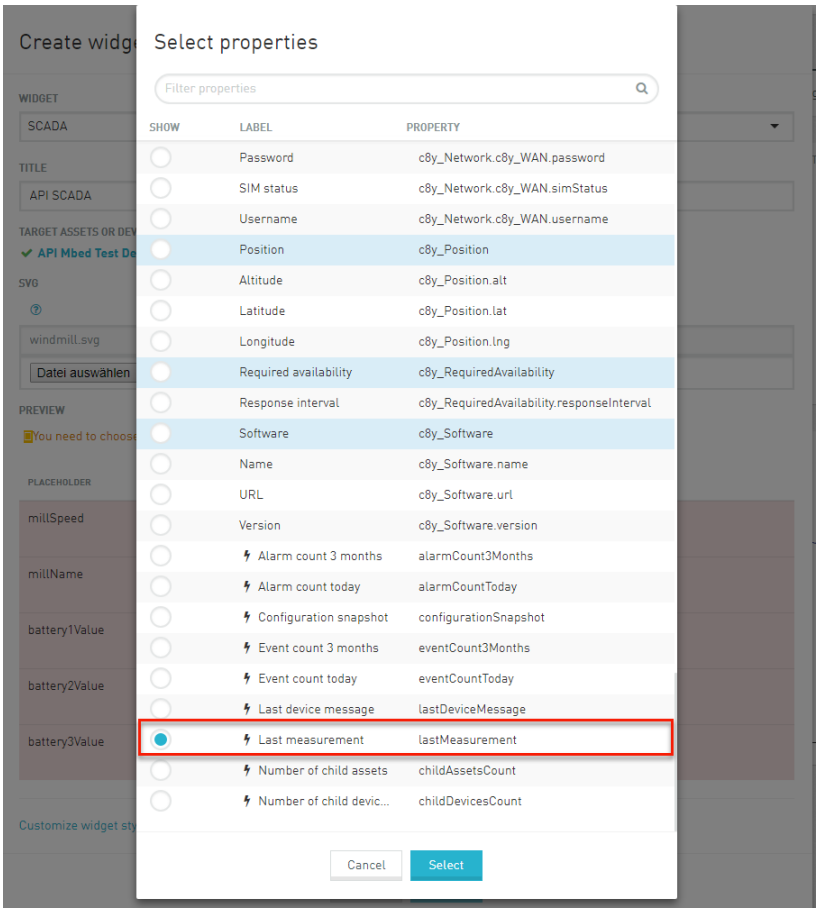
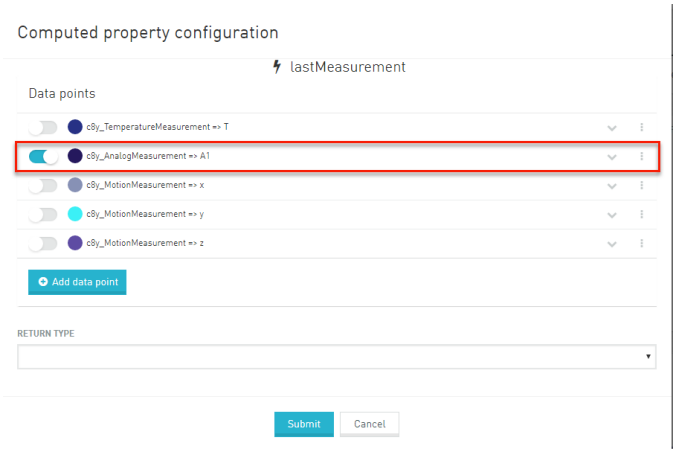


Click **Select.**

2. From the list of data points in the **Computer property configuration**, select **c8y_AnalogMeasurement => A1**



Click **Submit.**

ii. millName

1. Map the value **Name** from the list in the **Select properties** dialog.

iii. battery1Value

1. Follow the steps as described above to map **c8y_AnalogMeasurement => A2** to **battery1Value.**

iv. battery2Value

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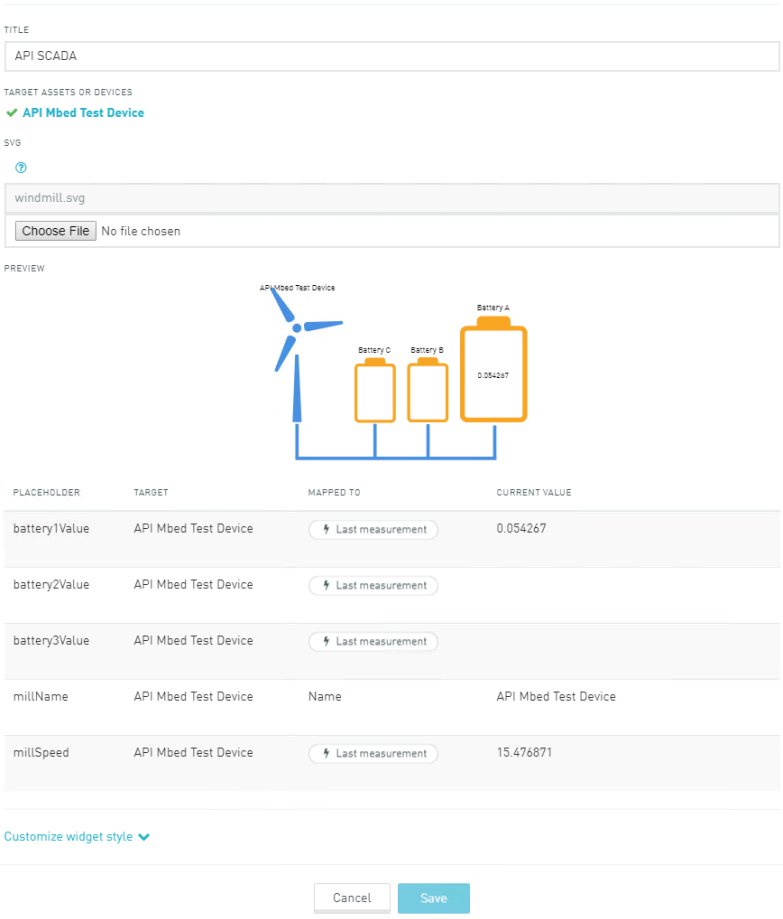
1. Follow the steps as described above to map **c8y_SignalStrength => rssi** to **battery2Value.**

v. battery3Value

1. Follow the steps as described above to map **c8y_TemperatureMeasurement => T** to **battery3Value**



Click **Save**.

d. Move the widget wherever you want.

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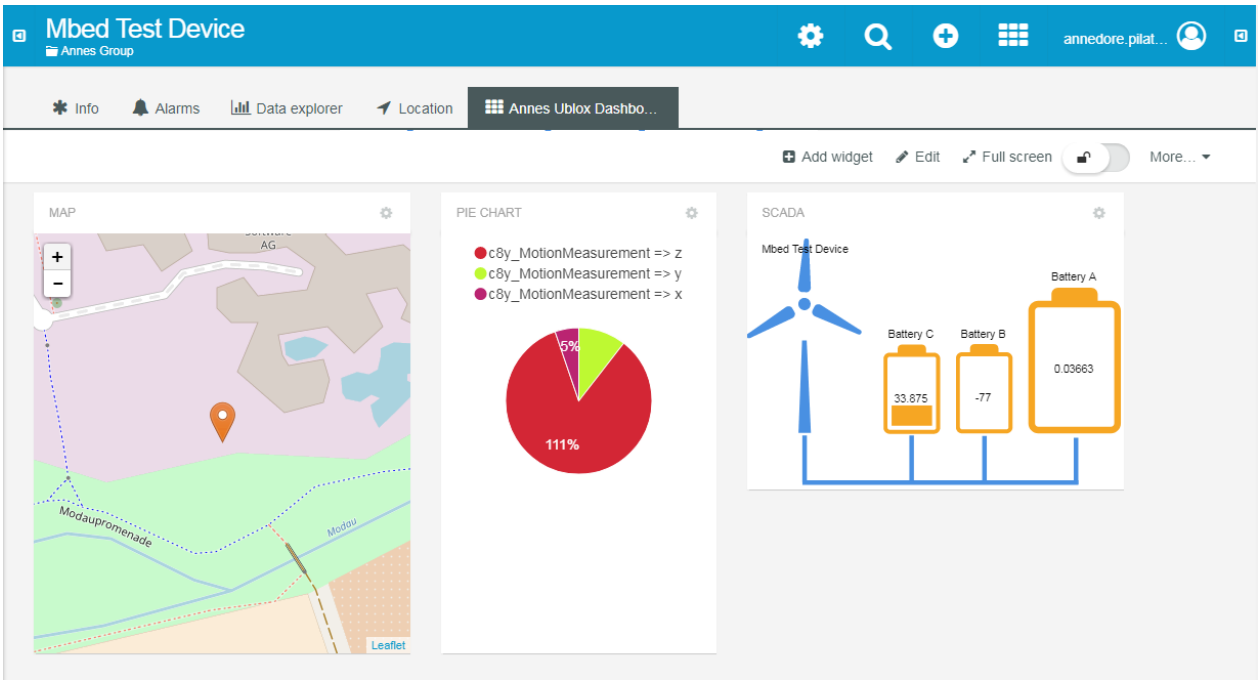
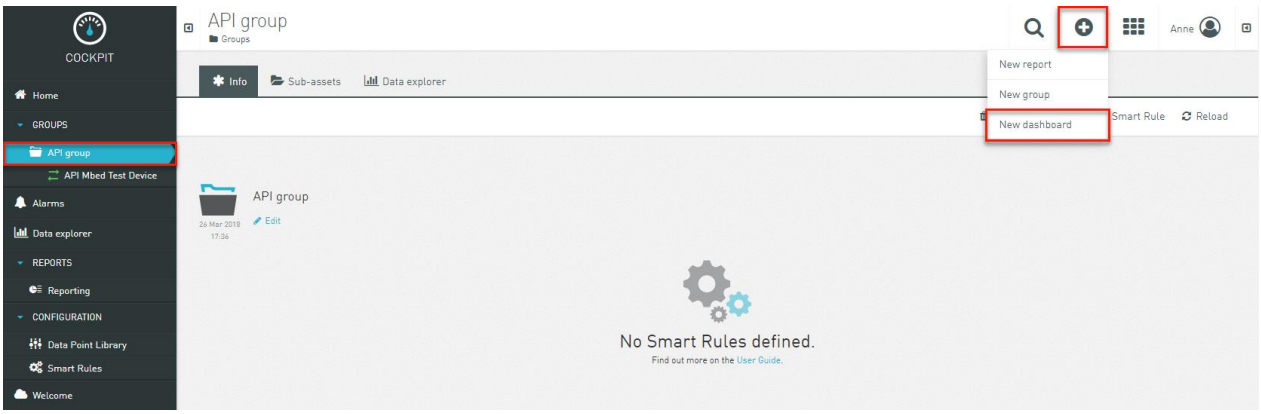
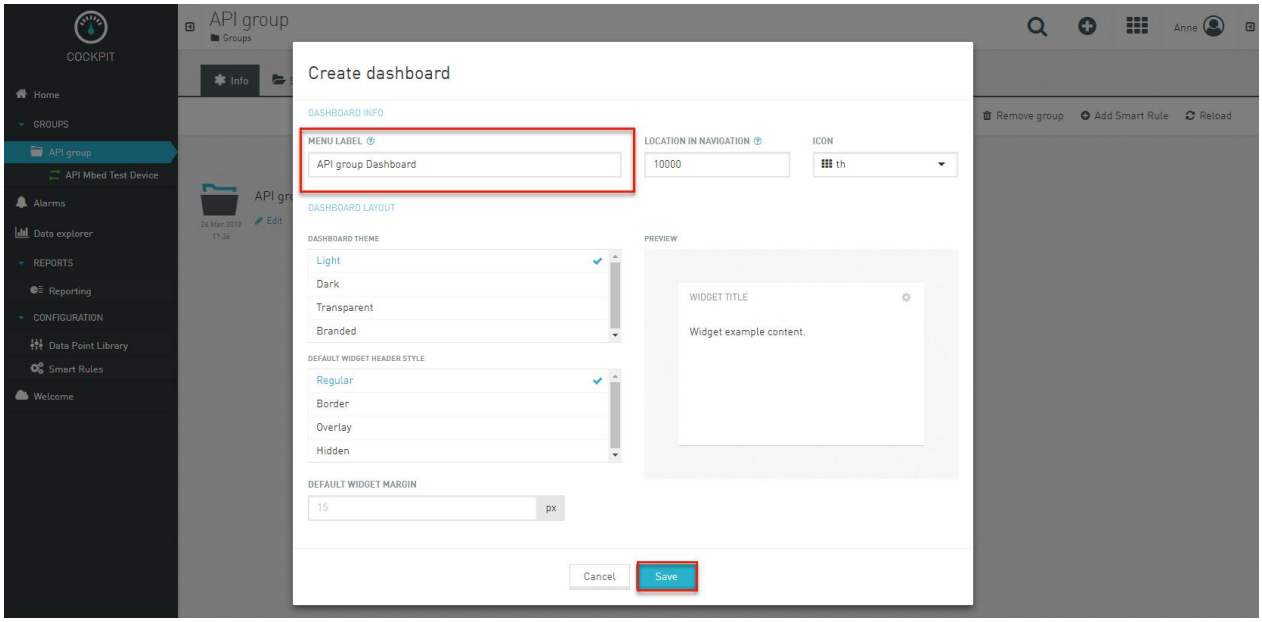


18. Now we want to create a group dashboard. Navigate back to the new created group and click the + icon in the header at the top right. Select **New dashboard** to add a group dashboard.



Provide the following properties:

Name: <your group name> Dashboard



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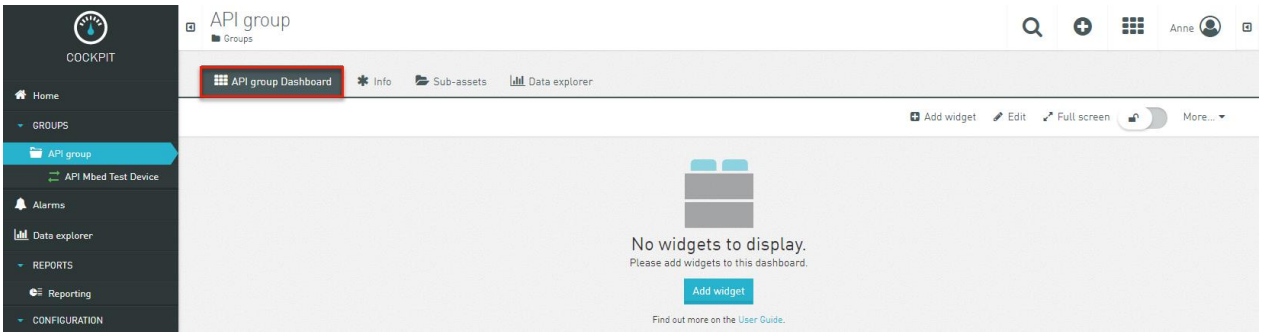
Keep all defaults. Click **Save.**

19. Click the tab representing the new created group dashboard .



Click the **Add widget** button to add a widget **Asset Table** with some columns. On the widget configuration page provide the following properties

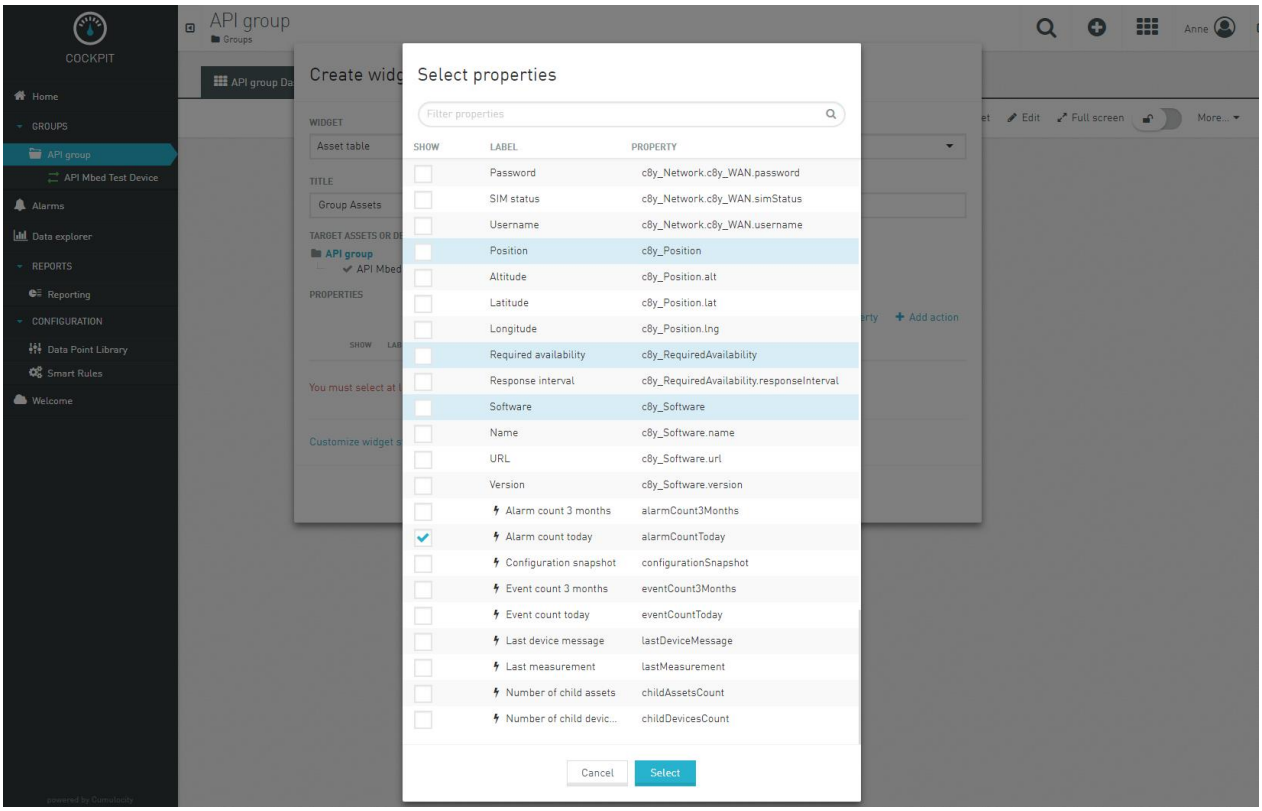
a. **Widget:** Asset table (predefined)

b. **Title**: Group Assets

c. **Properties**

   i. Click **Add property** and select (scroll down to find all properties)

   1. **Creation time:**
   2. **Name:**
   3. **Owner:**
   4. **Availability:**
   5. **Last message:**
   6. **Status:**
   7. **Alarm count today:**



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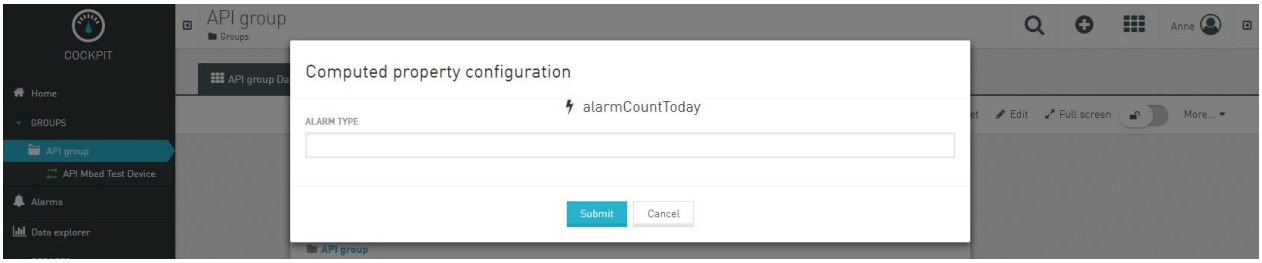
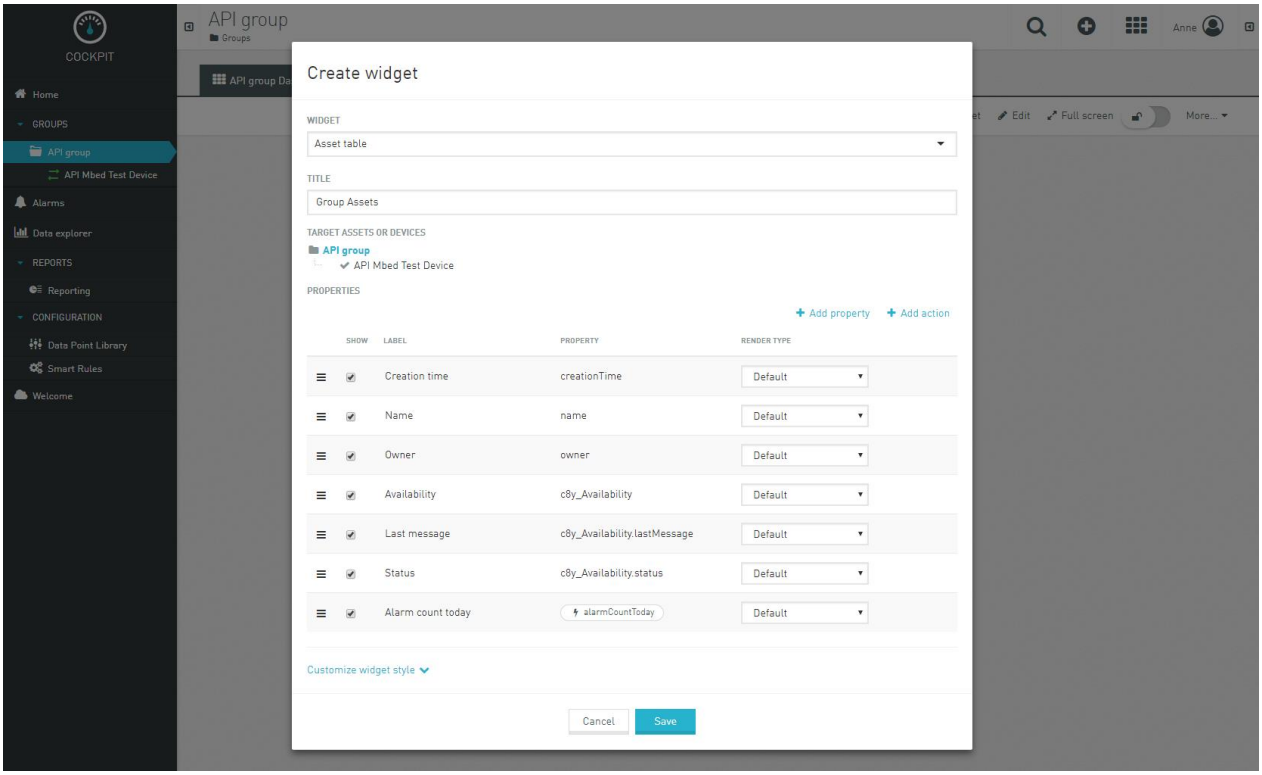
Click **Select** on the **Select properties** dialog**.**

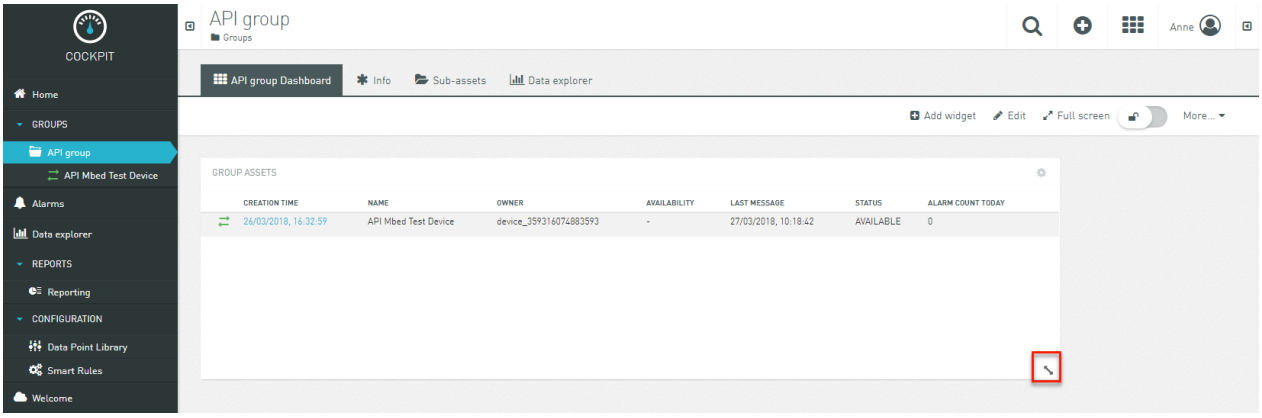


Ignore the request for the alarm type. Click **Submit.**



Click **Save.**

d. Within the widget use the arrow in the right hand bottom corner to enlarge the table



Within the widget use the arrow in the right hand bottom corner to enlarge the table

20. Click **Add widget** to add **Data points graph** widget to the group dashboard. Provide the following properties:

a. **Widget**: Data points graph

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b. **Title:** <your userid> ublox device

c. **Label**

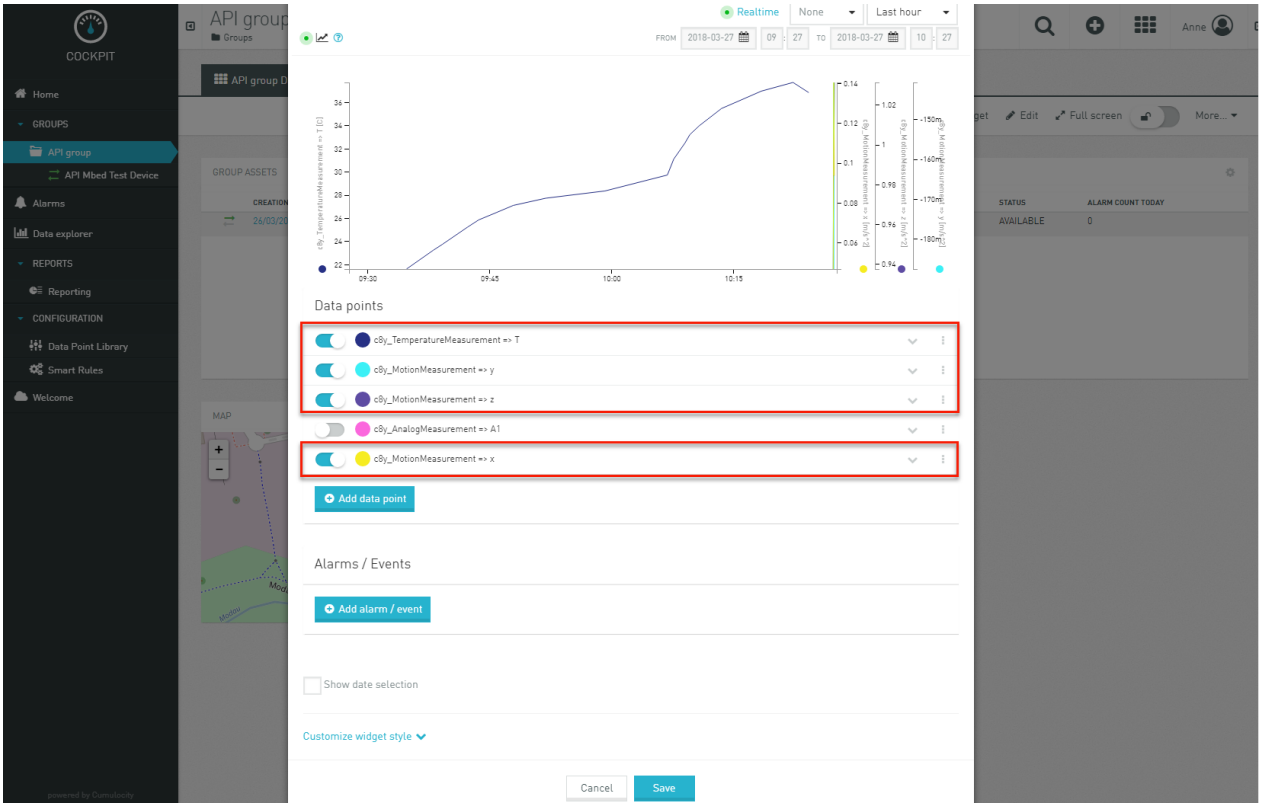
i. c8y_TemperatureMeasrement => T

ii. c8y_MotionMeasurement => x

iii. c8y_MotionMeasurement => y

iv. c8y_MotionMeasurement => z

In case one of the labels is missing click **Add data point** and select from the list.



Click **Save.**

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Exercise 5:
Create your Smart Rule

Objectives

In this exercise, you will create your smart rule. Using a smart rule Cumulocity includes a rule engine to analyze data in real-time and to perform actions based on data. These rules are specified in a scripting language and are managed in the **Administration** Application. The Cockpit application includes the **Smart Rules builder**. Using the **Smart Rules builder** rules can be created from templates.

Steps

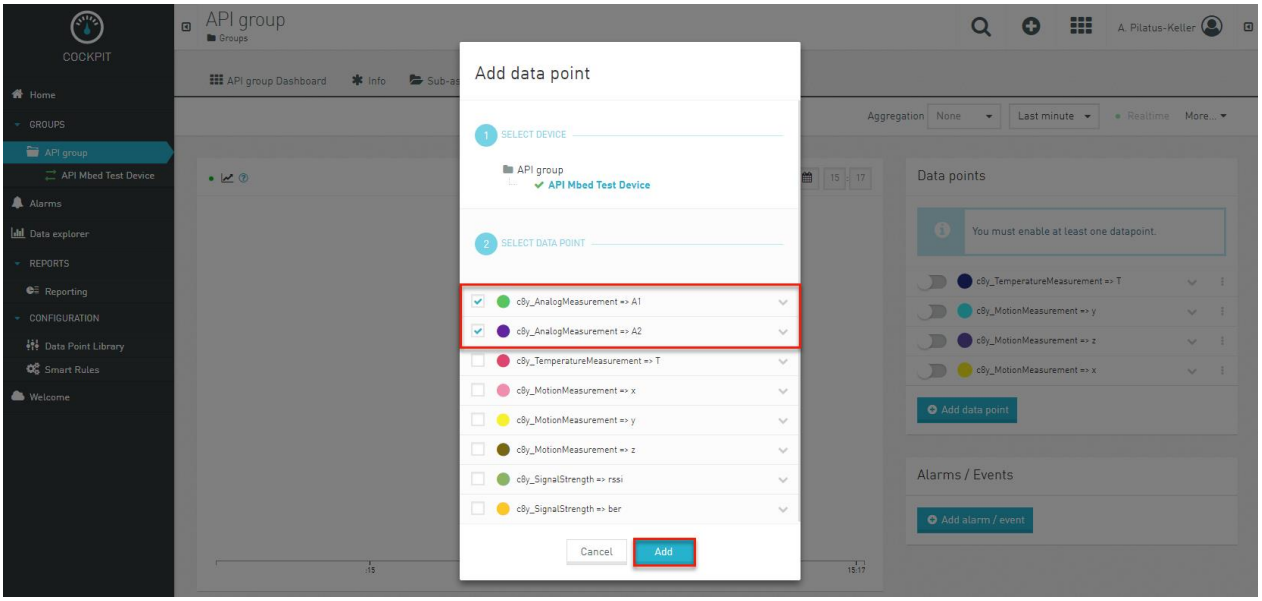
1. Make sure that your device is installed, running and connected to the **Cumulocity** platform. If not refer to Exercise 1.
2. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>.**

   <Cumulocity tenant url> as provided by the instructor.

   Log in with the following credentials:

   Username: - as defined in exercise 3 step 5 –

   Password: - as provided in exercise 3 step 5 –
3. Open the **Cockpit** application through **Application Switcher**, the grid icon on the top right of the user interface. Select your group. Navigate to **Data Explorer**. Configure to see values for **c8y_AnalogMeasurment**… If needed, click **Add data point** to add sensor data to the explorer.
   a. Click **Search**. Select the device <your prefix> Mbed Test Device.
   b. Select the following data points.
      i. **c8y_AnalogMeasurement => A1**
      ii. **c8y_AnalogMeasurement => A2**



   Click **Add** to visualize the data points in the graph.
4. Disable all other data points. Change the Filter to show **Realtime, Last minute**.

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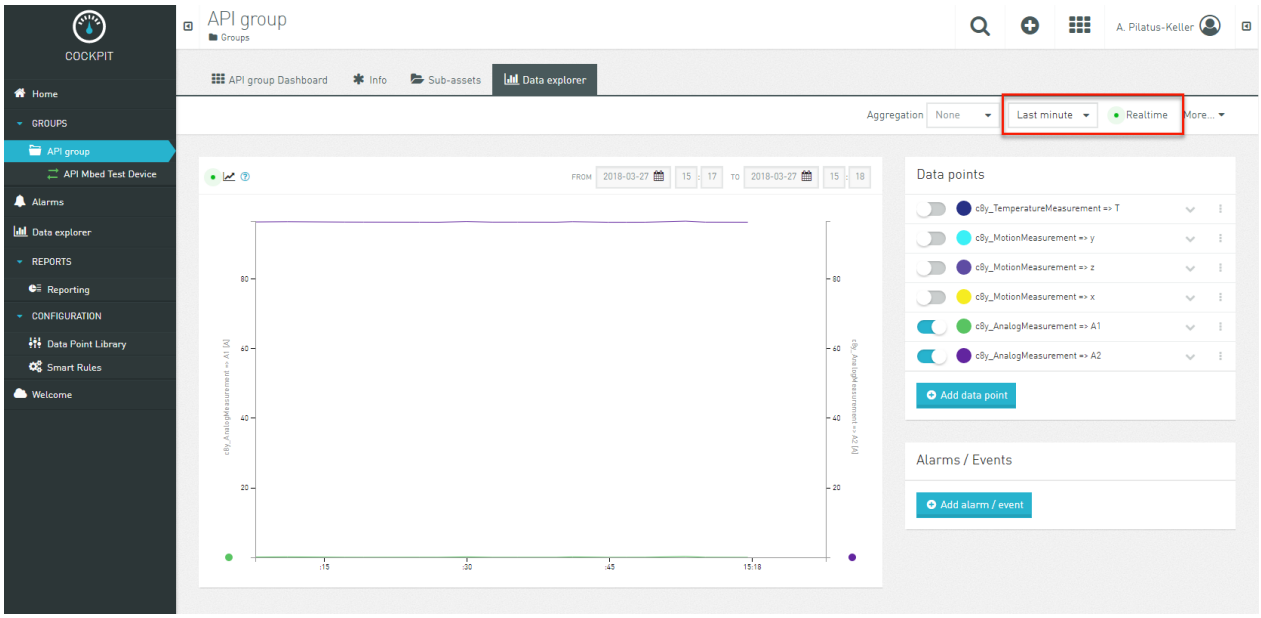
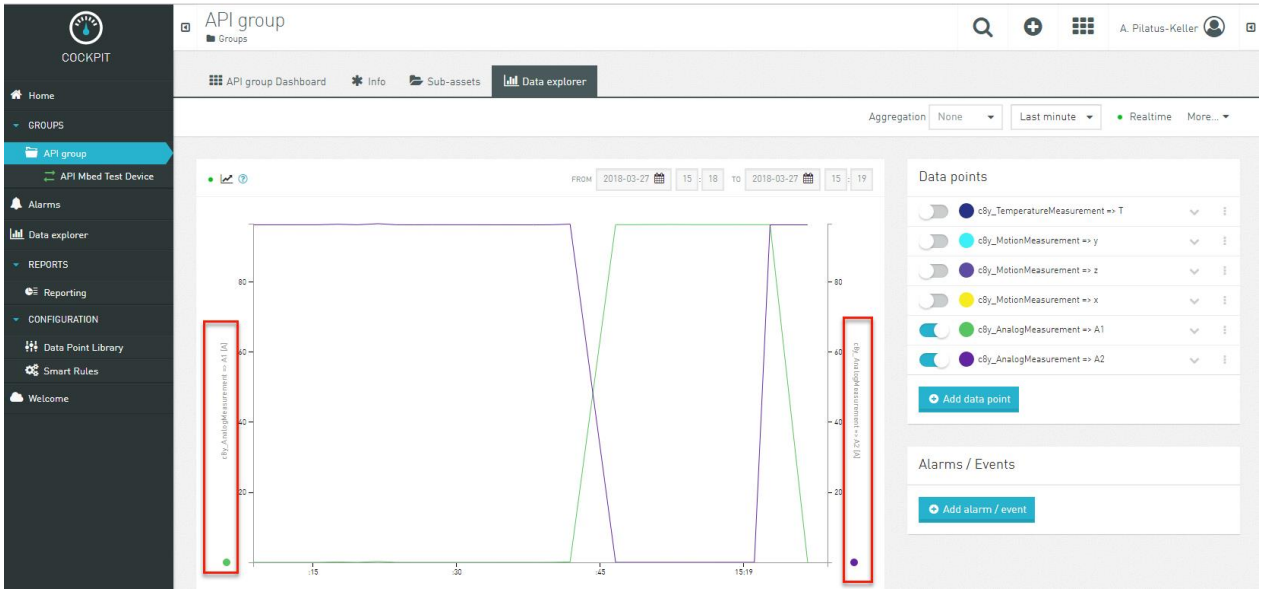


5. Use the wheel on your device to enforce changes in the line. Move one of the wheels to the minimum limit and the other one to the maximum limit. This way you can see which line is representing which wheel. Decide for which of the wheel you would like to set up the alarm.



6. Select the data point from the list of labels and click the right most button in the row to open the command menu.

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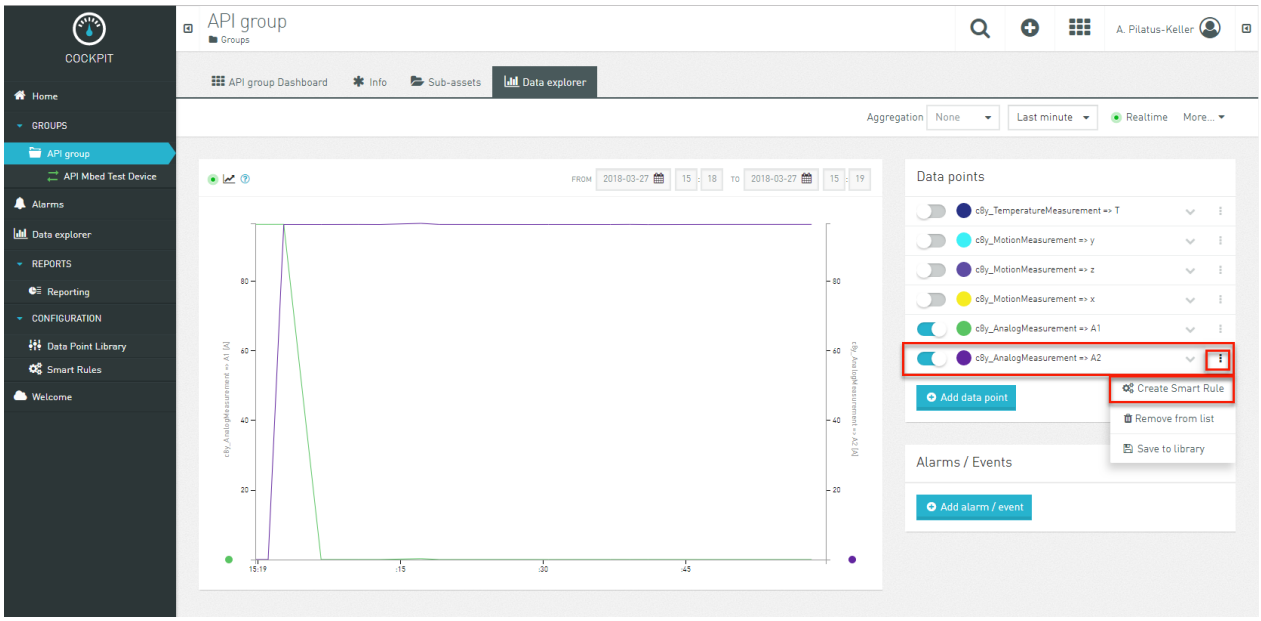
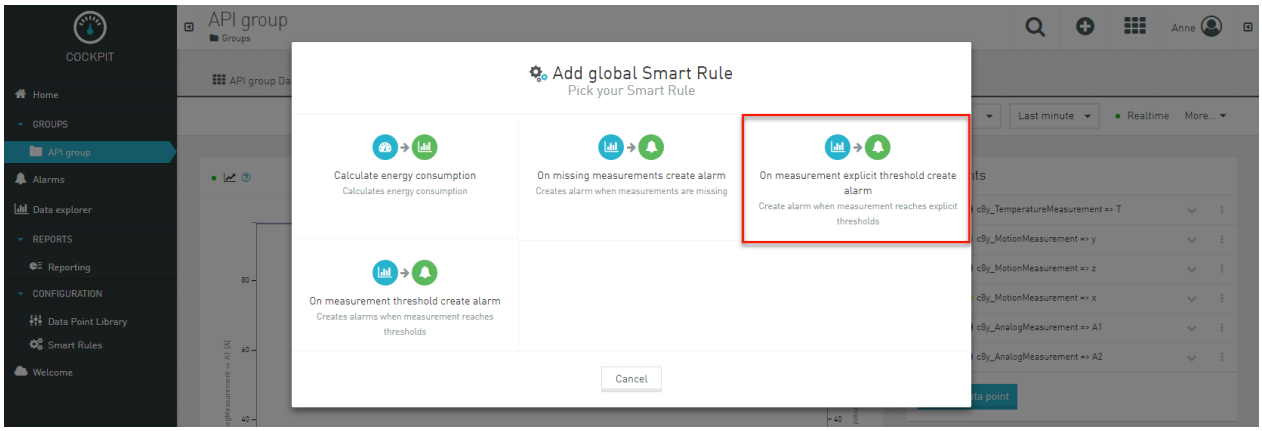


Select **Create Smart Rule** from the list.

7. Create a Smart Rule with the following parameters

   a. **Type**: On measurement explicit threshold create alarm



   b. Provide the following **create alarm** properties for the smart rule – hover the mouse over the fields will show the name of the property/field. Keep the defaults

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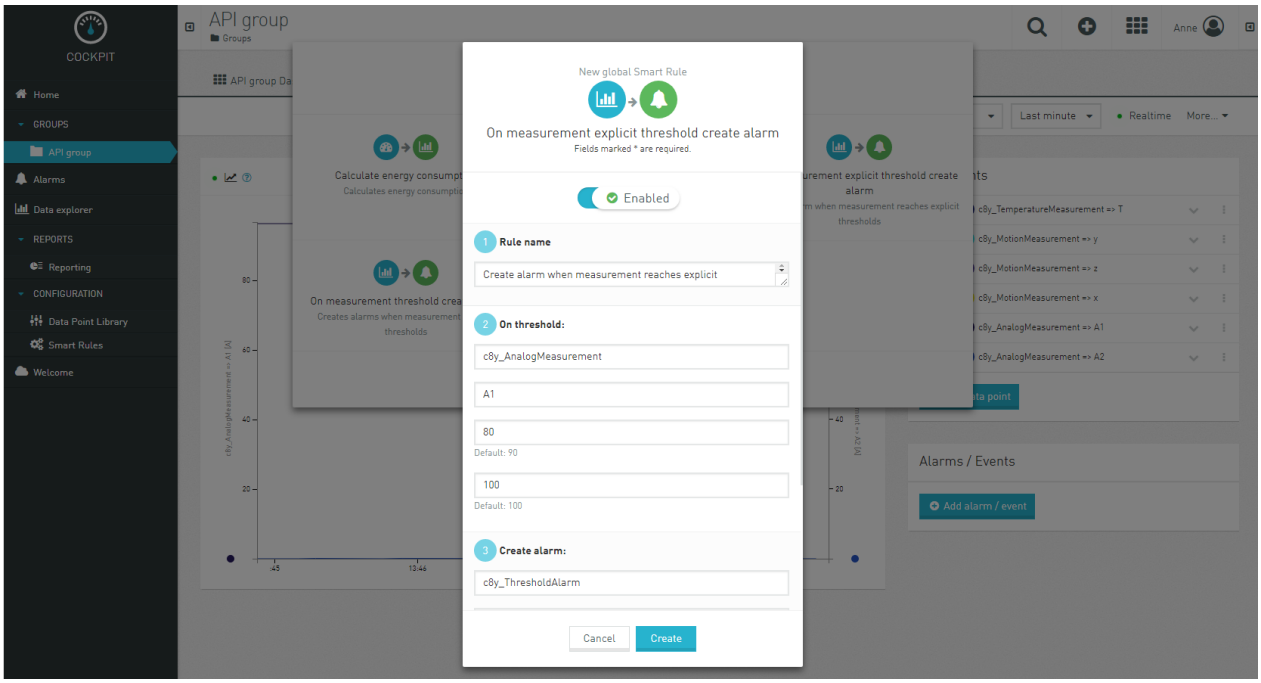
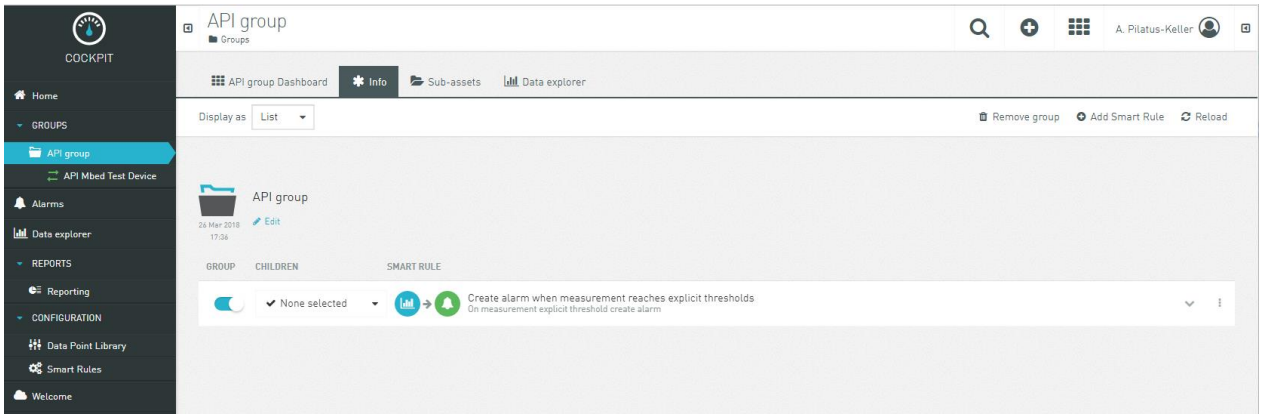
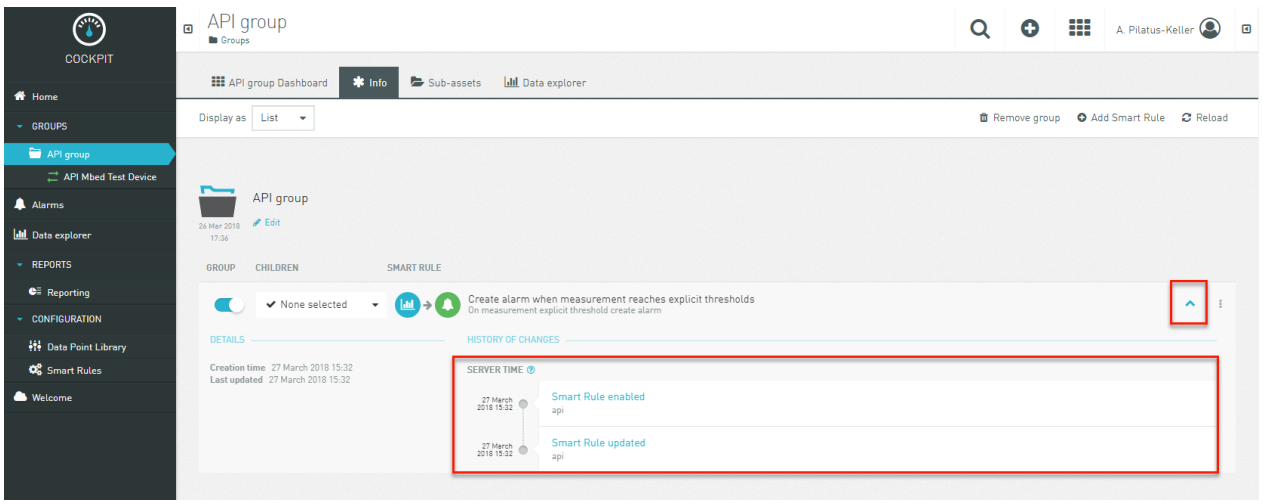


Click **Create.**

8. Navigate to the **Info** tab of your group. You will find a list of **Smart Rules** the bottom of the page. Verify the creation of the smart rule. The little green icon indicates that the rule is enabled.



9. Use the icon on the very right hand side of the smart rule row to see the **history of changes**.



10. As for now the **Smart rule** is not attached to any device, within the **Children** column it is listed as **None selected**. Open the drop box and search and select your mbed device.

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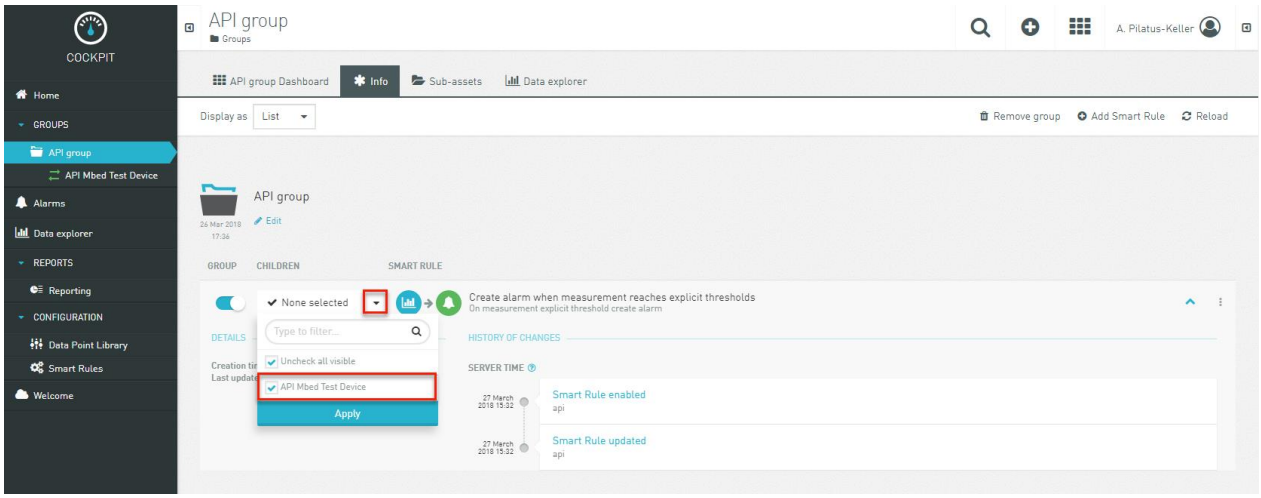
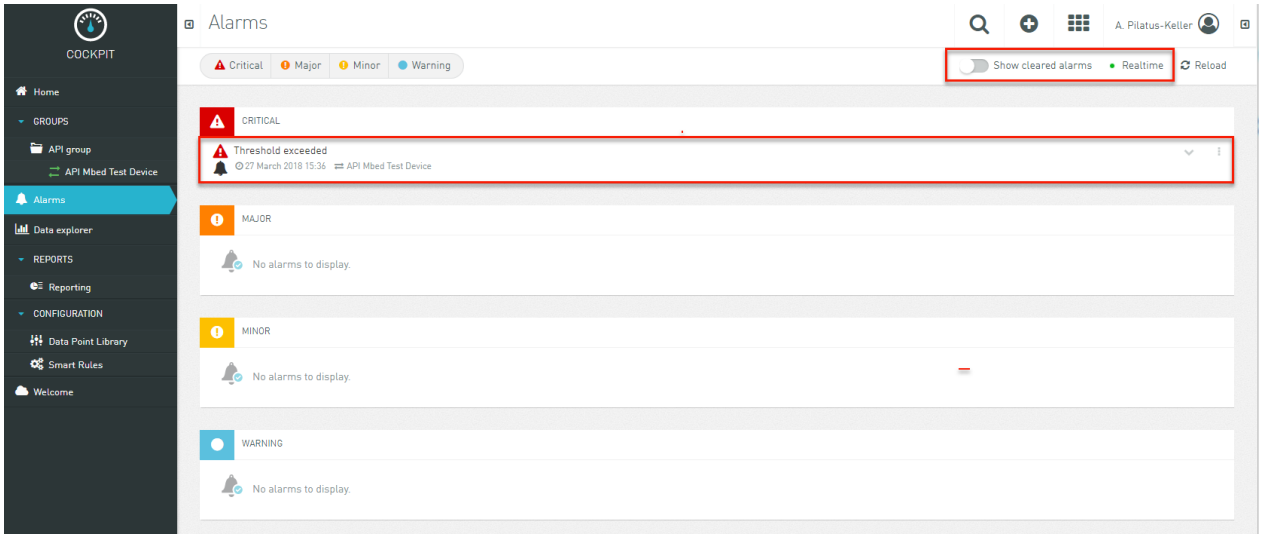
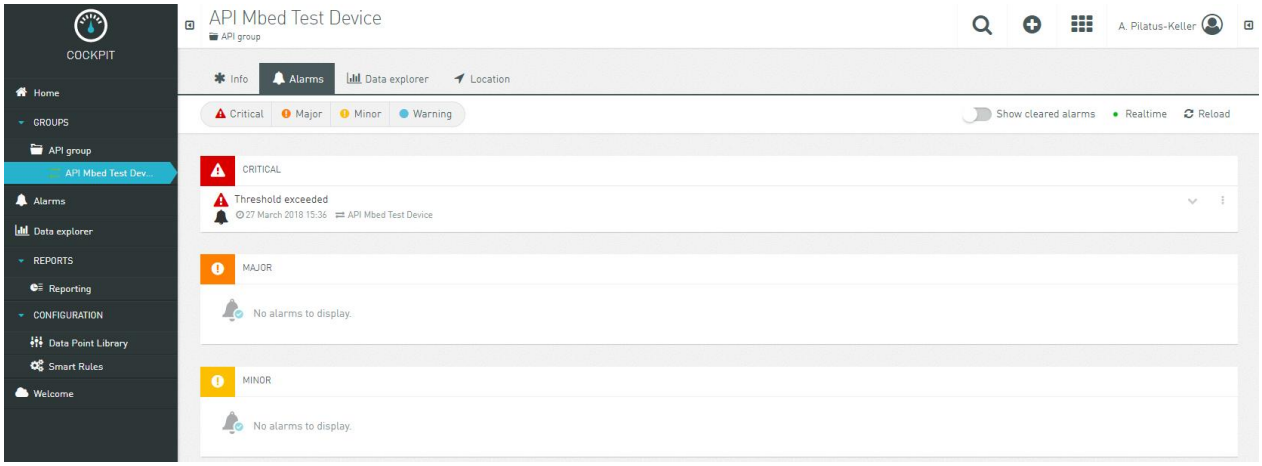


Click **Apply**.

11. Move the wheel on your mbed application shield to enforce the smart rule sending the alarm message.
12. Navigate to **Alarms.** Leave the switch Show cleared alarms off to only show unresolved alarms. Use the toggle to show **Realtime**.



13. You can also find the alarm when looking on the device detail page.



14. Now we want to disable the rule. Navigate to your **group > Info > Smart rules** and select the new created rule form the list. Click the right most button in the row. Select the command **Edit** from the list.

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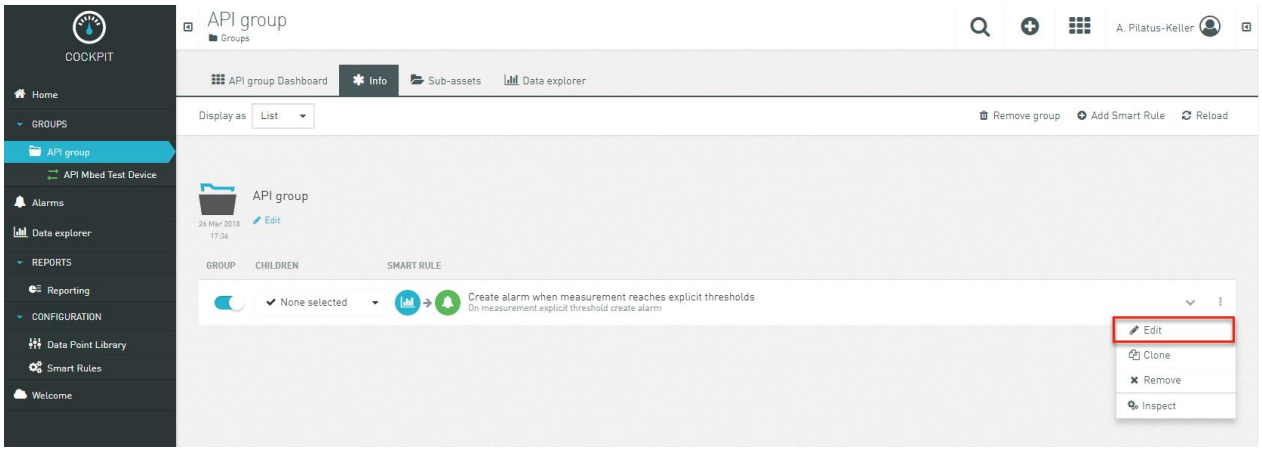
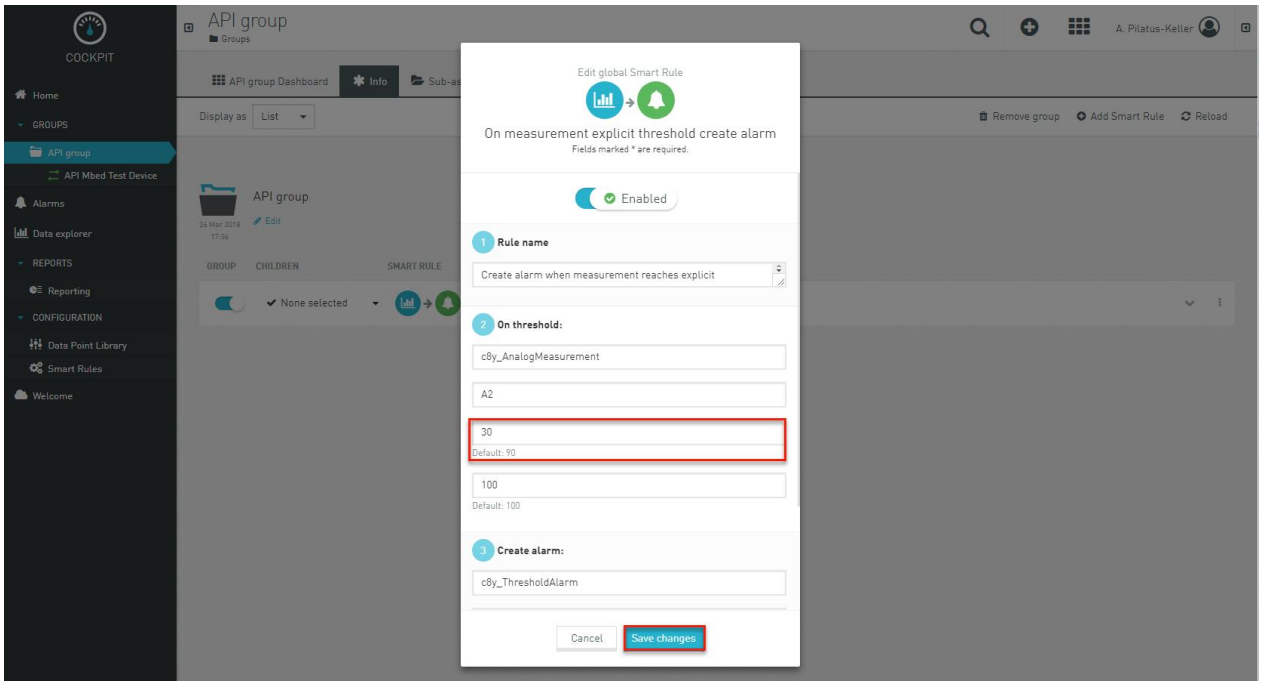


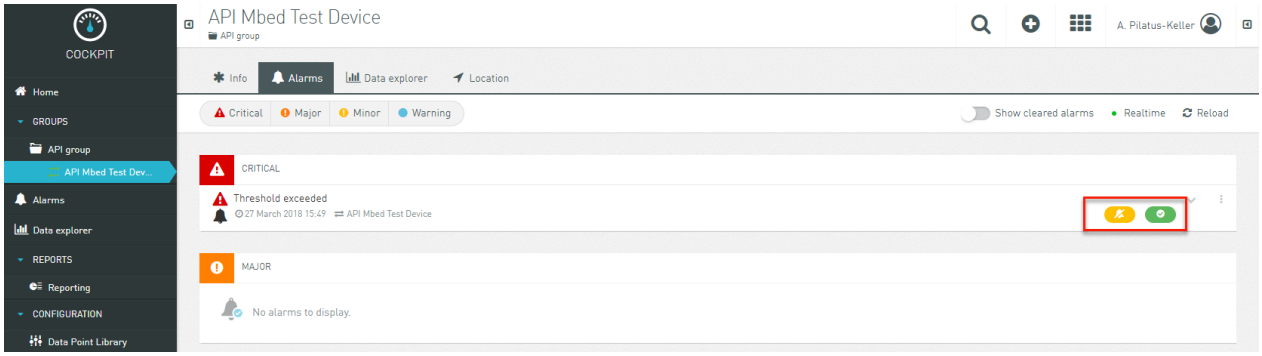
15. Change the value for red range (min) down to 30.



Click **Save changes**.

16. Move the wheel as before.

17. Review the **Alarms** page. Select the alarm listed under in the **Critical** section and hoover the mouse over the alarm. This will show additional icons to acknowledge the alarm or to mark the alarm as resolved.



Click the **Acknowledge** button, this will mark the alarm with a specific icon.

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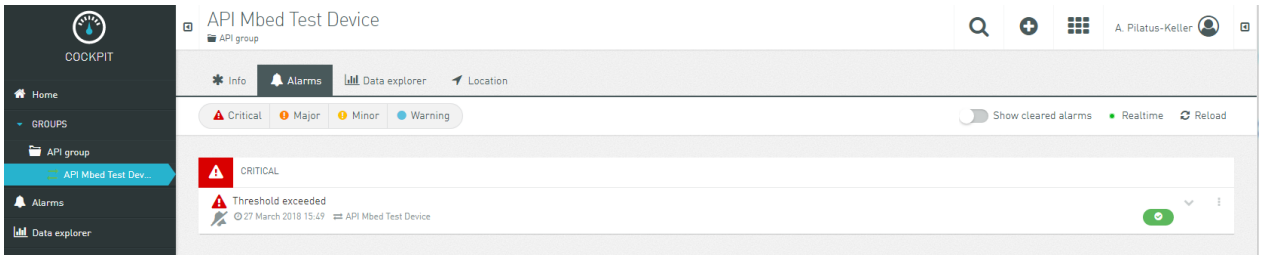
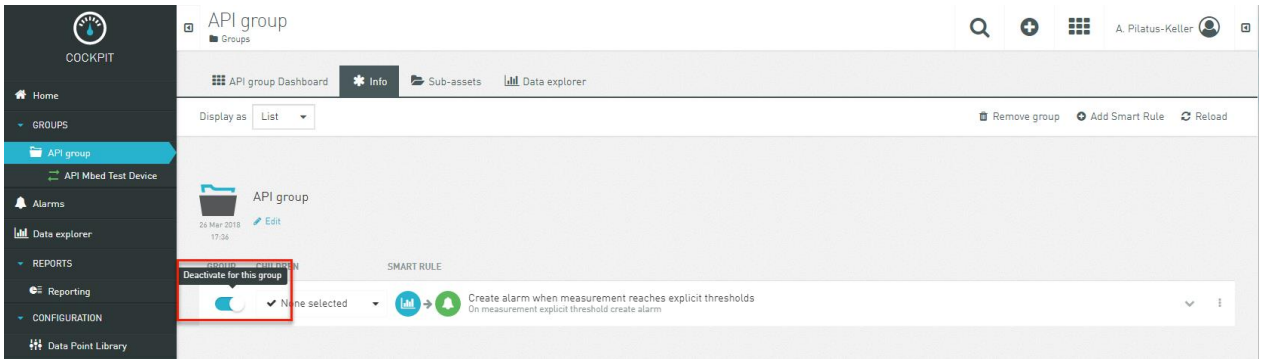


Click the **mark as resolved** icon to delete the alarm in the list.

18. Use the toggle button to de-activate the rule.



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Exercise 6:
Export data as a Report

Objectives

In this exercise, you will use Cumulocity to create a report covering some of the device properties. The report will be created as Excel sheet and can be send to your email account.

Steps

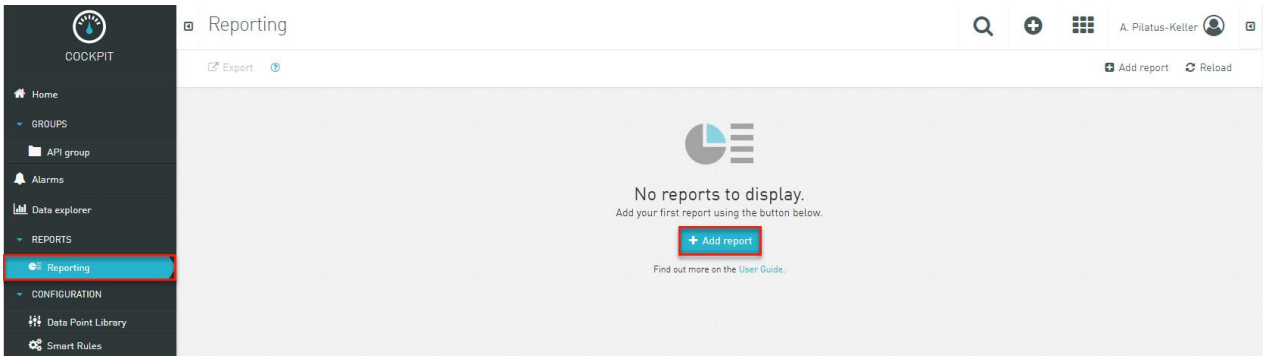
1. Make sure that your device is installed, running and connected to the Cumulocity platform. If not refer to Exercise 1.
2. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>.**

   <Cumulocity tenant url> - as provided by the instructor.

   Log in with the following credentials:

   Username: - as defined in exercise 3 step 5 –

   Password: - as provided in exercise 3 step 5 –
3. Open the **Cockpit** application through **Application Switcher**, the grid icon on the top right of the user interface. Navigate to **Reports > Reporting.**
4. Click the **+ Add report** button to create a new report.



5. Provide the following properties
   a. **Name:** <your userid> first report
   b. **File Type**: Excel
   c. **Filters**:
      i. **Objects to export**: - select your group –
      ii. **Time range**: Last week
   d. **Fields**:
      i. Use the toggle button to include **Alarms**
      ii. Use the **+ Add predefined** button to add columns to the report. From the list of predefined columns select all properties, except the properties **Time** and **Device name**. Click **Select.**

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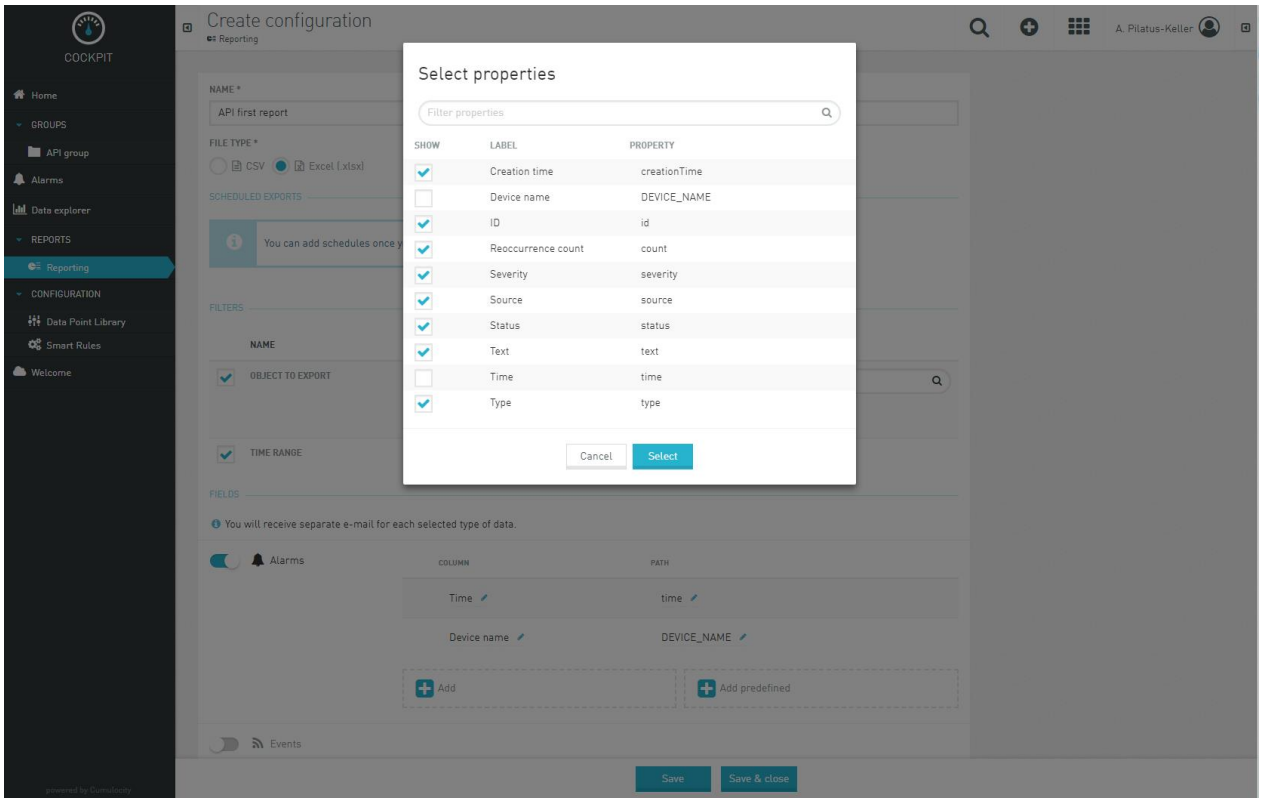

Click **Select.** Click S**ave.**

a. **Fields**:

iii. Use the toggle button to include **Alarms**

iv. Use the **+ Add predefined** button to add columns to the report. From the list of predefined columns select all properties, except the properties **Time** and **Device name**. Click **Select.**

6. In order to create another report which is sending measurements do the following

a. Within Fields

i. Use the toggle button to include **Measurements**

ii. Use the **+ Add from datapoint** button to add columns to the report. From the list of datapoints select **c8y_AnalogMeasurment => A**1 and **c8y_AnalogMeasurment => A2**.

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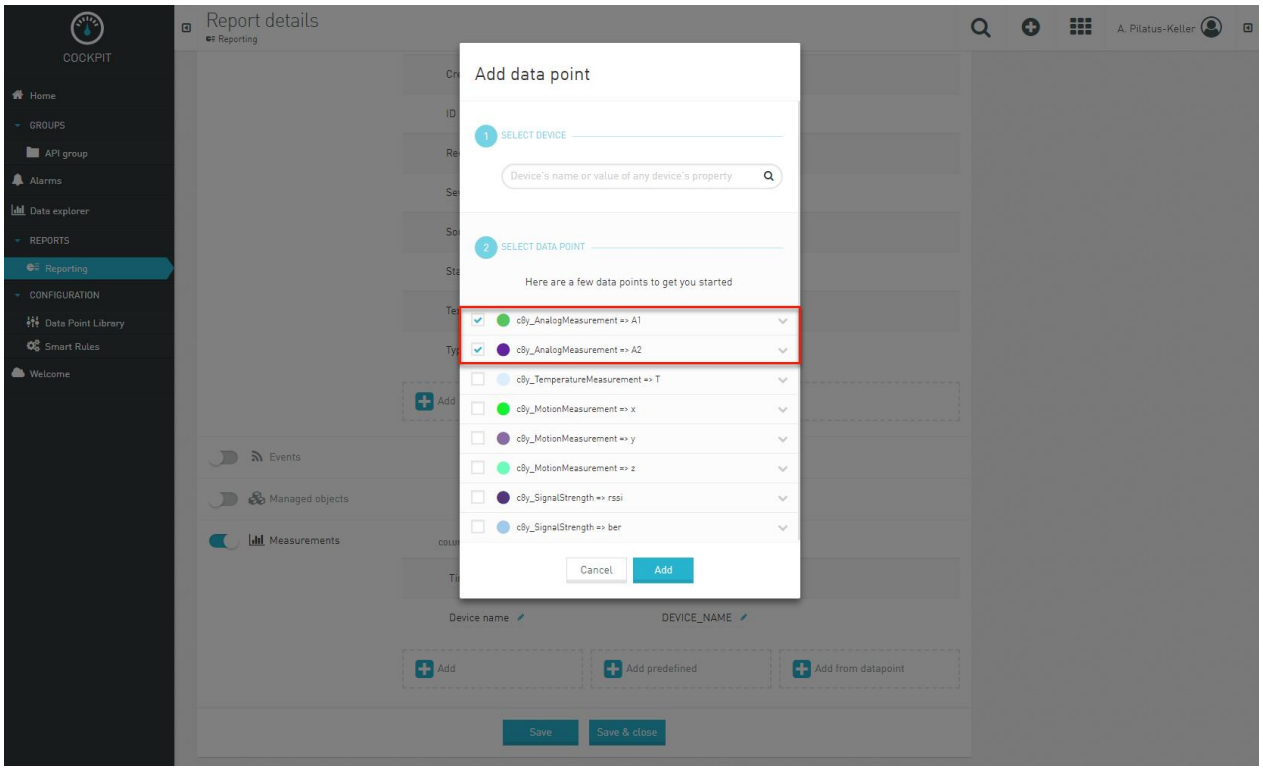
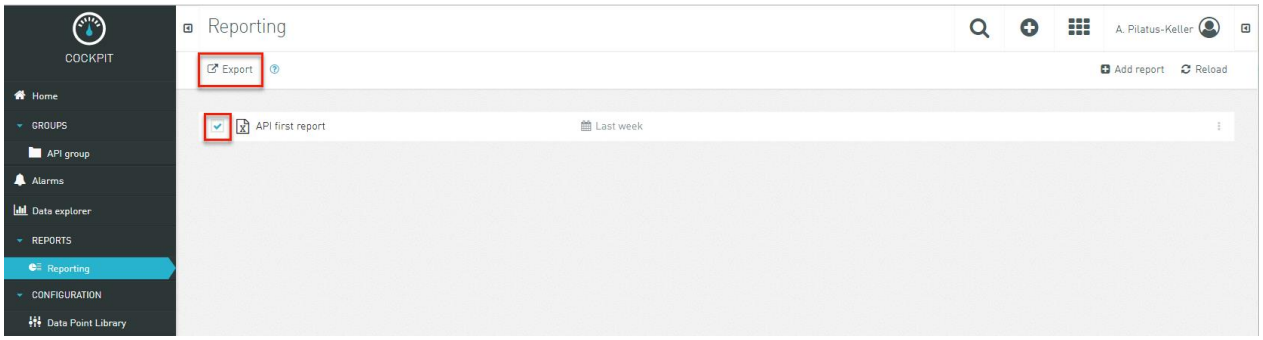


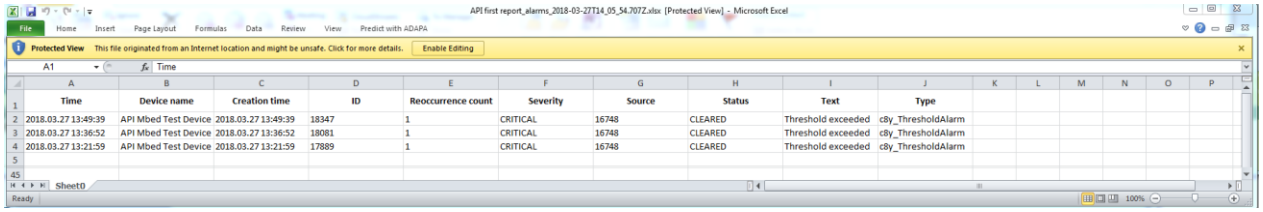
Click **Select.** Click **Save & Close.**

7. From the list within Reporting select your new created report and click **Export**.



8. For each of the selection an email is sent to your Outlook account including a link to the report in Cumulocity.

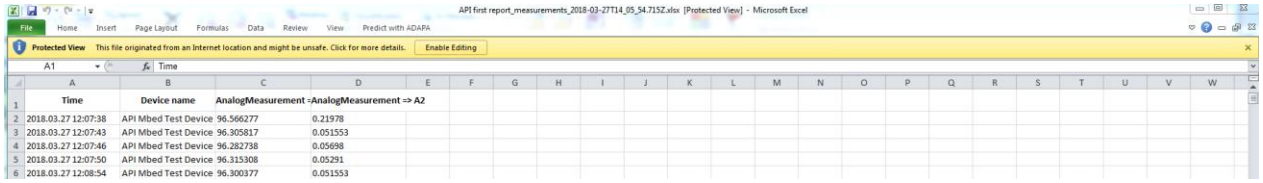
9. Use the link to open the report of alarms.



Time	Device name	Creation time	ID	Reoccurrence count	Severity	Source	Status	Text	Type
2018.03.27 13:49:39	API Mbed Test Device	2018.03.27 13:49:39	18347	1	CRITICAL	16748	CLEARED	Threshold exceeded	c8y_ThresholdAlarm
2018.03.27 13:36:52	API Mbed Test Device	2018.03.27 13:36:52	18081	1	CRITICAL	16748	CLEARED	Threshold exceeded	c8y_ThresholdAlarm
2018.03.27 13:21:59	API Mbed Test Device	2018.03.27 13:21:59	17889	1	CRITICAL	16748	CLEARED	Threshold exceeded	c8y_ThresholdAlarm

10. In case of problems, make sure that you have your email provided.

11. Use the link to open the report of measurements.



Time	Device name	AnalogMeasurement => A1	AnalogMeasurement => A2
2018.03.27 12:07:38	API Mbed Test Device	96.566277	0.21978
2018.03.27 12:07:43	API Mbed Test Device	96.305817	0.051553
2018.03.27 12:07:46	API Mbed Test Device	96.282738	0.05698
2018.03.27 12:07:50	API Mbed Test Device	96.315308	0.05291
2018.03.27 12:08:54	API Mbed Test Device	96.300377	0.051553

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Exercise 7:
Work with Alarms

Objectives

In this exercise, you will work with Alarms. Devices can raise alarms to indicate that there is a problem requiring an intervention. Alarms can be viewed in different places.

- By clicking on **only unresolved** in the Alarms tab to see alarms of all devices that have not been cleared yet.
- By clicking on **Alarms** in the Navigator to see the entire alarm history
- By clicking on a device and selecting the **Alarms tab** to see the alarms of that device. By default only unresolved alarm as are shown, but you can disable the **Only unreslolved** check box to see all alarms.

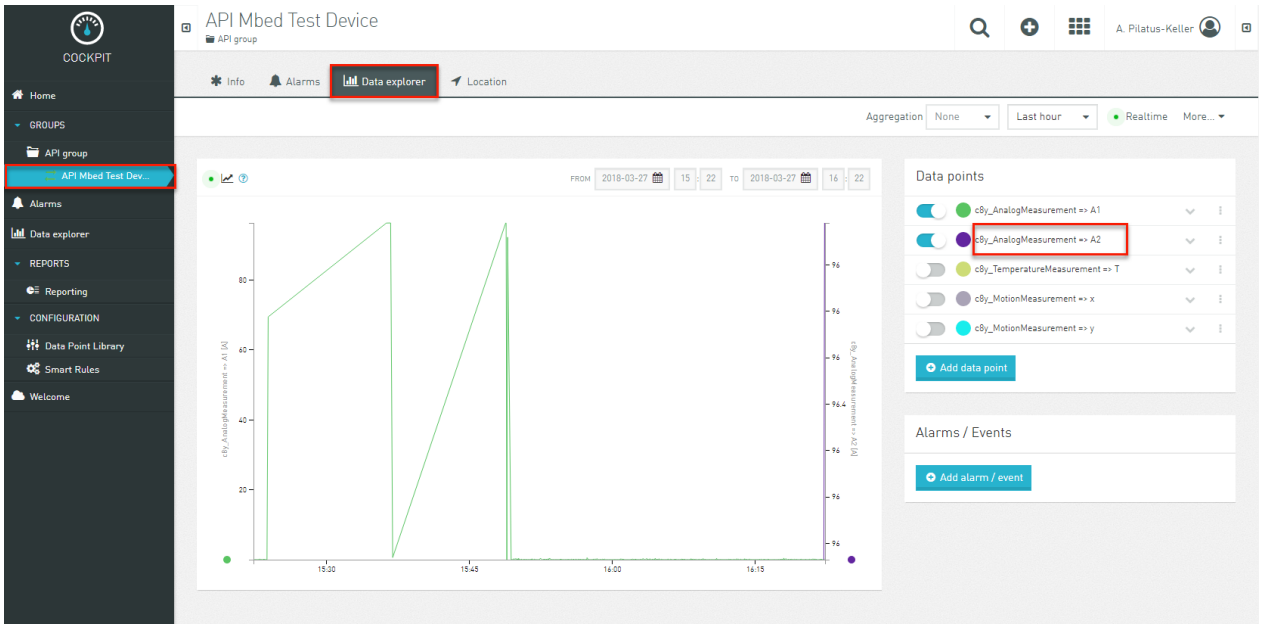
Steps

1. Make sure that your device is installed, running and connected to the Cumulocity platform. If not refer to Execise 1.
2. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>**

   <Cumulocity tenant url> - as provided by the instructor.

   Username: - as defined in exercise 3 step 5 -

   Password: - as provided in exercise 3 step 5 -
3. Working with alarms needs the creation of a threshold on a reading from the kits. Thresholds are, by default, global. Therefor the label of the reading must be unique by adding e. g. your name to it. We configure the existing data point. Navigate to your device in your group and select **Data explorer. Select the data point c8y_AnalogMeasurement => A2**



   This will open the detail page of this data point.
4. Provide the following properties to the data point

   a. **Label:** <your userid>_ c8y_AnalogMeasurement_A2

   b. **Default Unit:** A

c. **Minimum:** 00

d. **Maximum:** 120

e. Target: - leave empty -

f. Yellow Range (min): 50

g. Yellow Range (max): 79

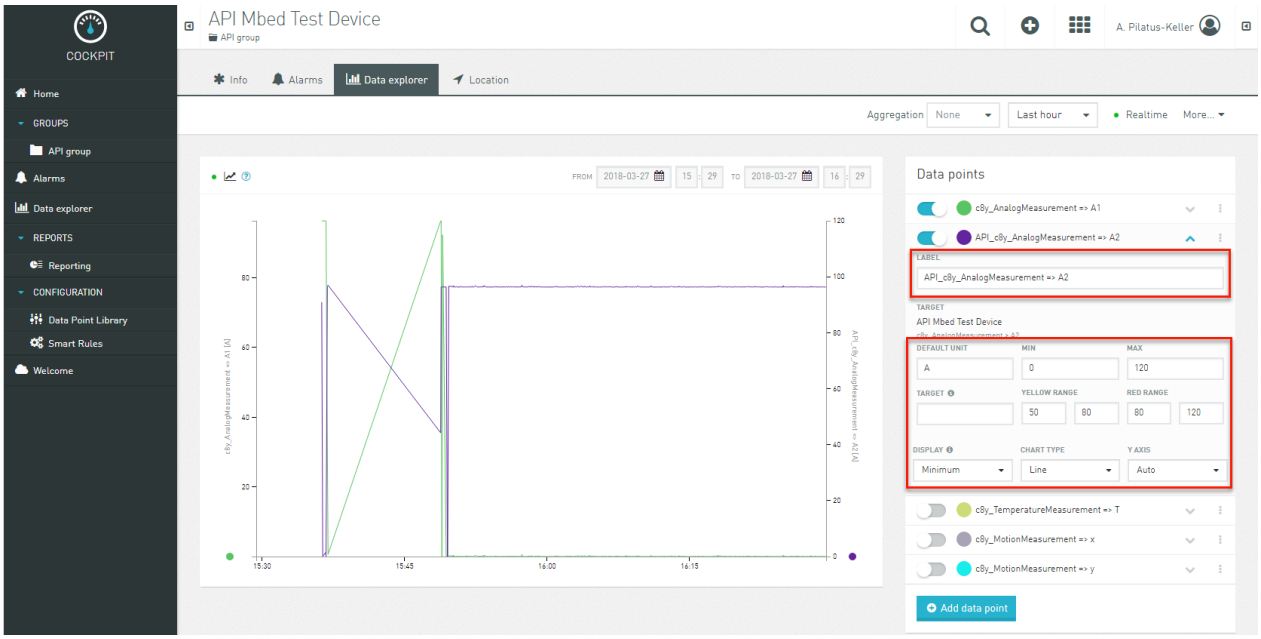
h. Red Range (min): 80

i. Red Range (max): 120

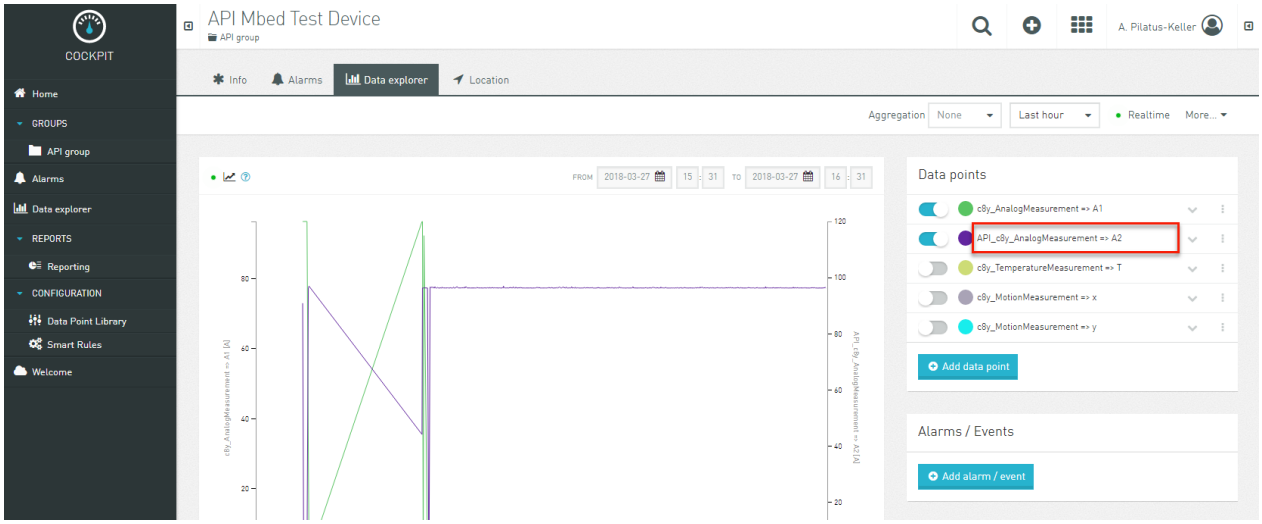
j. Display: Minimum

k. Chart Type: Line

l. Y Axis: Auto



Close the detail section of this data point. You will see the data point listed with your label.



5. Select your new created data point and click the right most button in the row to open the menu. Select Save to library to save the definition of your data point to the library.

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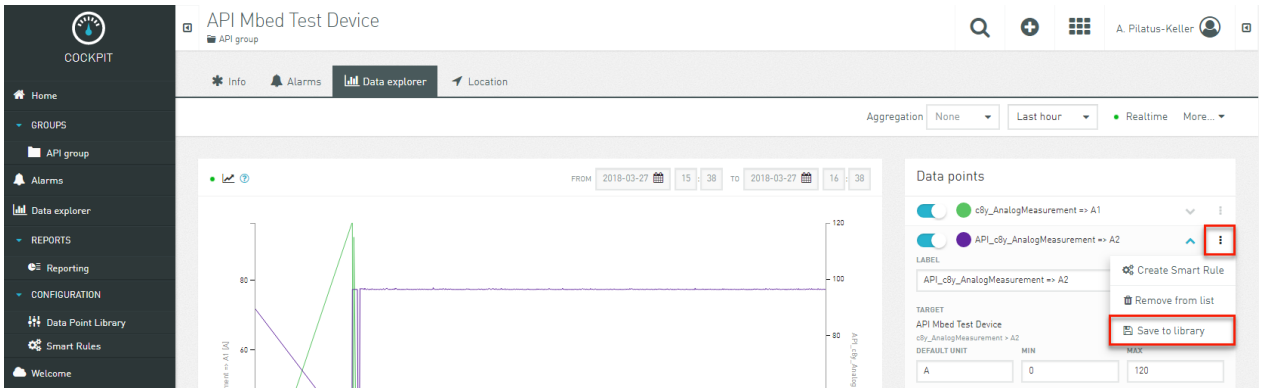
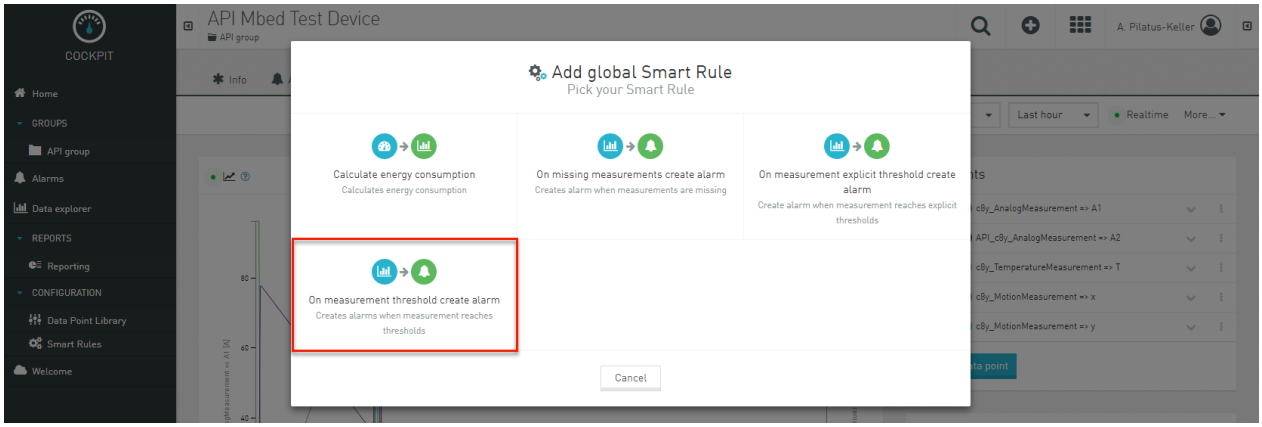


6. Select the your new created data point and click the right most button in the row and select the command to create a new smart rule. Select the Smart Rule **On measurement threshold create alarm**.



7. Provide the following properties:
    a. **Rule name**
        i. – leave the default -
    b. **On threshold**
        i. **Fragment:** – leave the default -
        ii. **Series:** – leave the default -
        iii. **Drop-down box**: - select the data point definition that you have just created -
    c. **Create alarm**
        i. **Type:** – leave the default -
        ii. **Text:** <your userid> Thresholds for c8y-AnalogMeasurement_A2 exceeded

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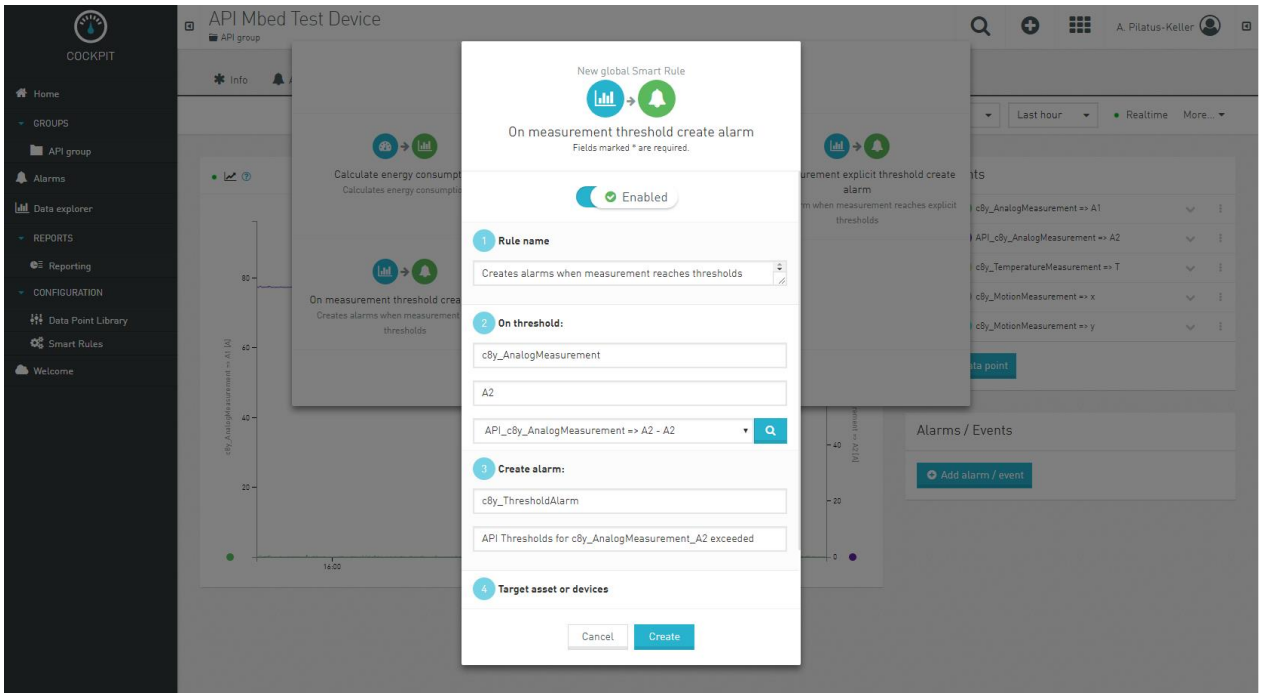
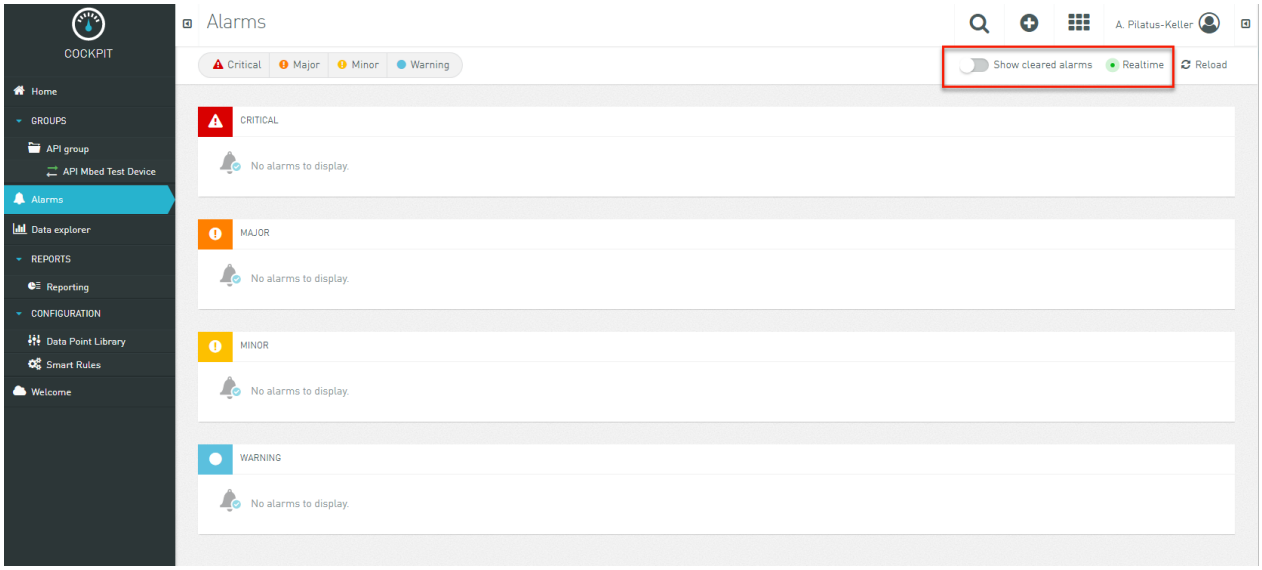


Click **Create**.

8. Select **Info** tab of your device. The new **Smart Rules** is listed.

9. Navigate to **Alarms** and click on **Realtime**.



10. Manipulate your sensors on the kit to raise an alarm.

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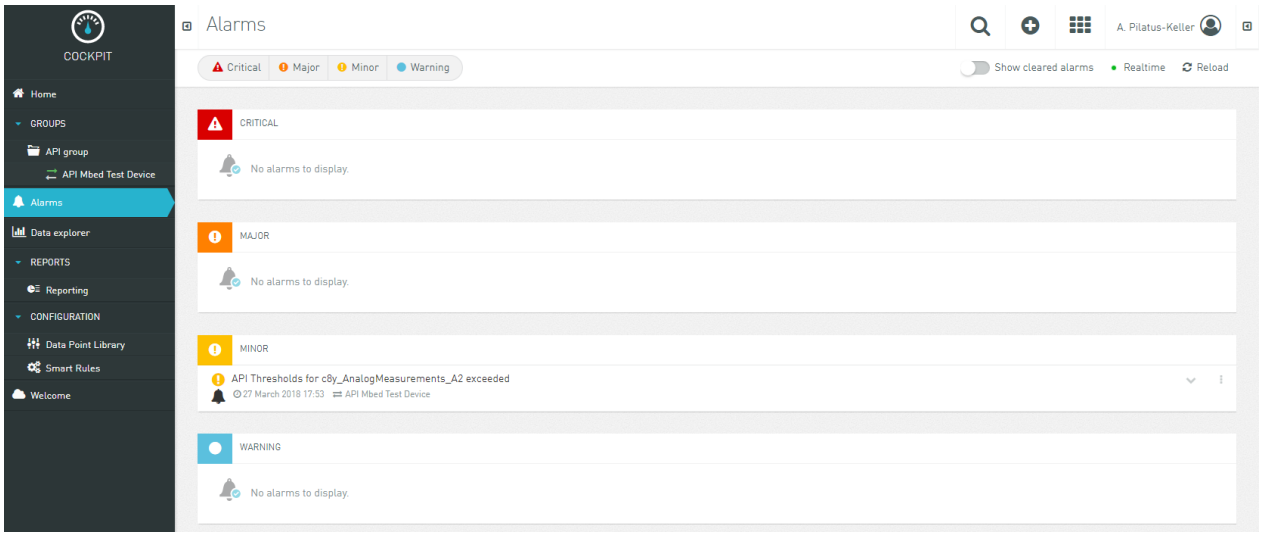
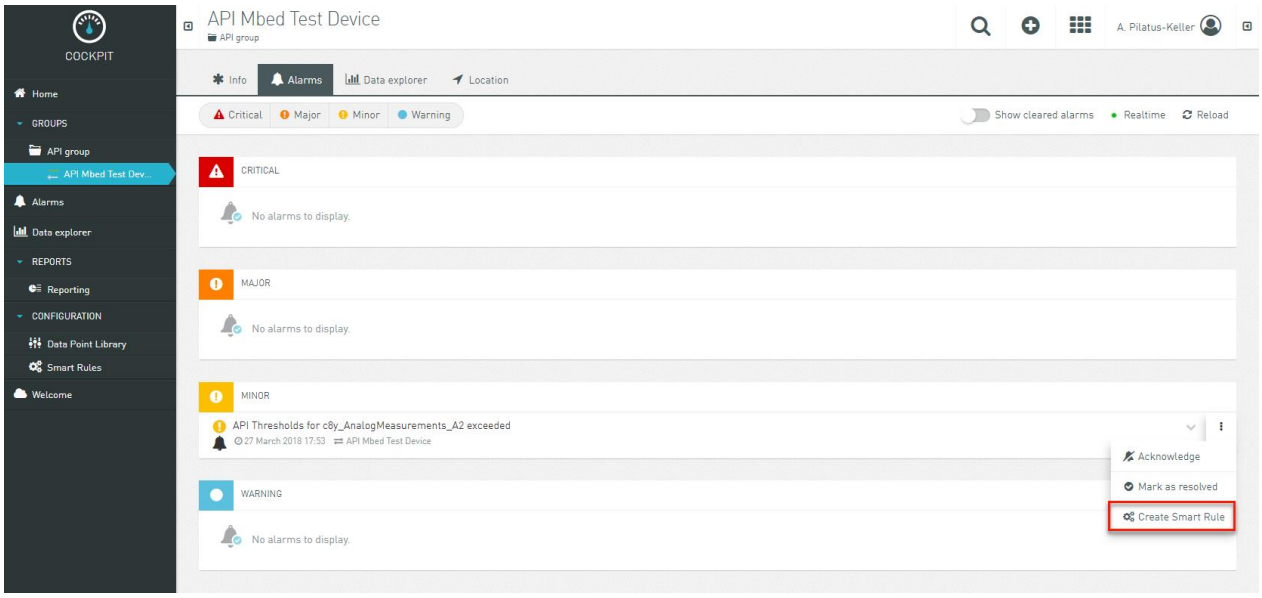
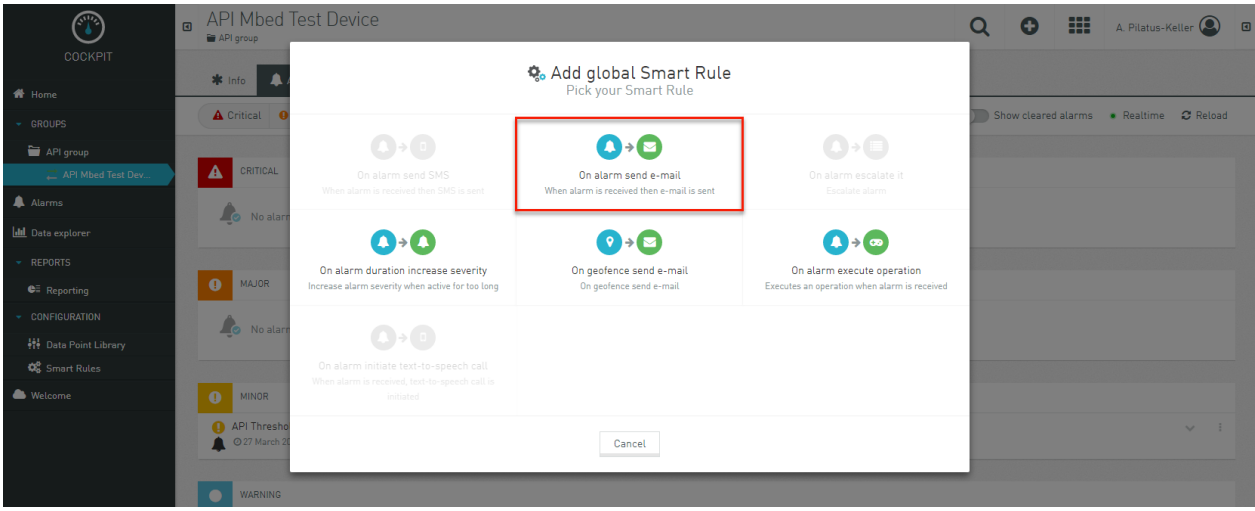


11. Forward Alarm to your email account. Look on the list of Alarms of your device. Hover over the alarm and click the right most button in the row. From the list of command select **Create Smart Rule**.



a. Select **on alarm send e-mail**



b. Leave all Defaults. Your email address should be already listed in the **Send to** text field.

c. Optionally, give the rule a name on the top left and edit the content of the email.

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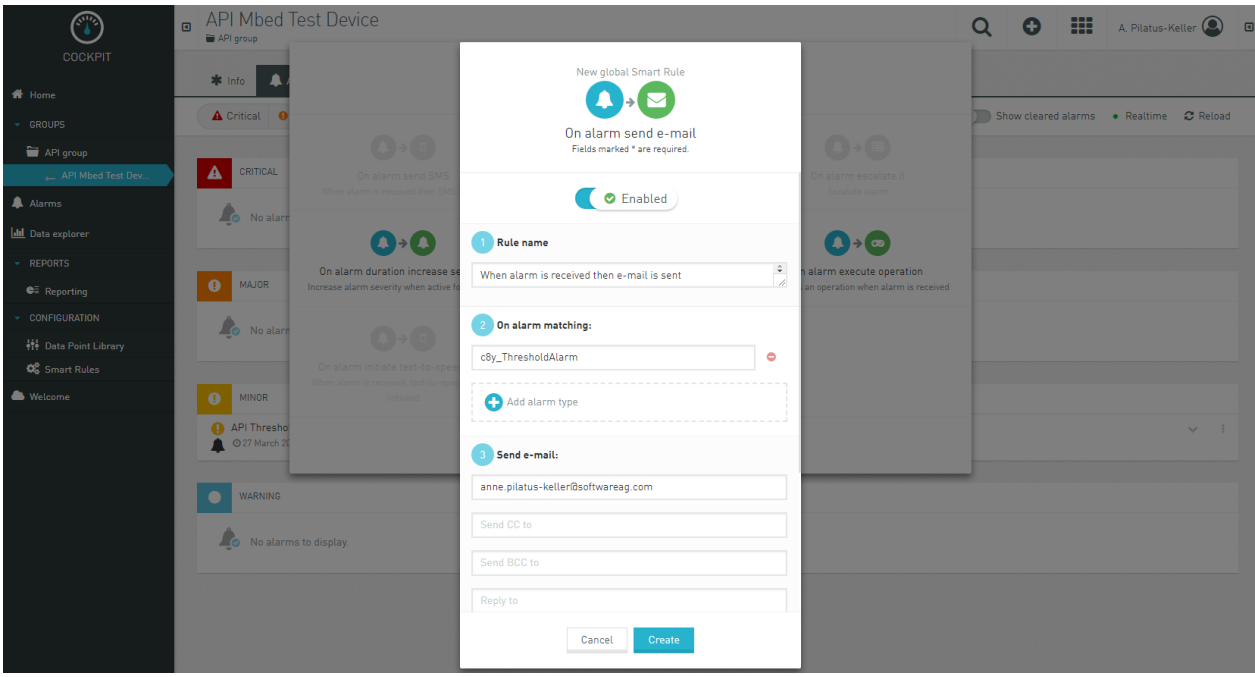

Click **Create**.

12. Use the device to generate a new alarm, This alarm should go to your email.

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Exercise 8:
Experiment with Device Lifecycle

Objectives

In this exercise, you will simulate to install a device somewhere else while keeping its old data.

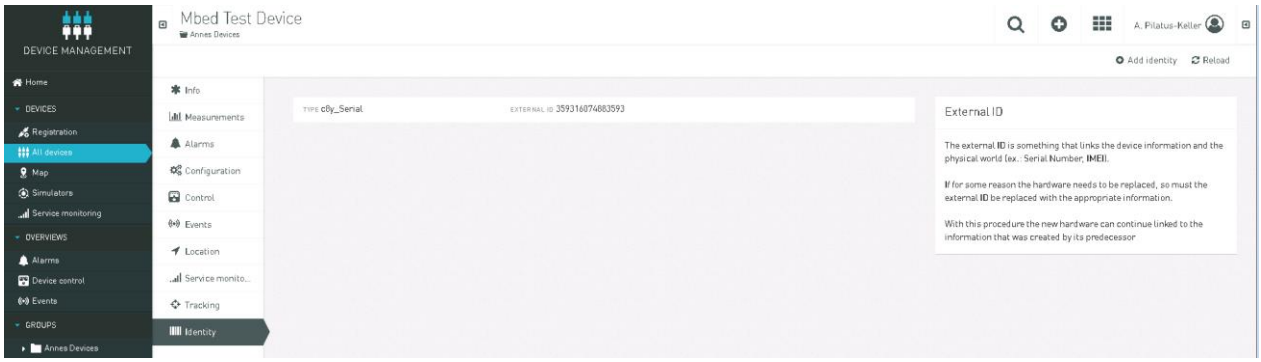
Steps

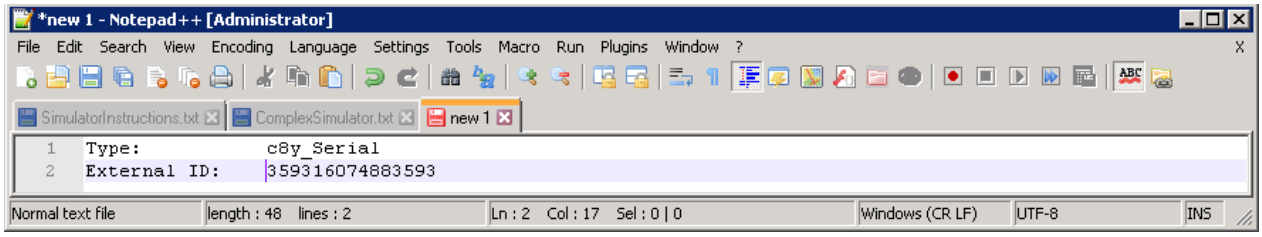
1. Make sure that your device is installed, running and connected to the Cumulocity platform. If not refer to Exercise 1.
2. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>**

   <Cumulocity tenant url> - as provided by the instructor.

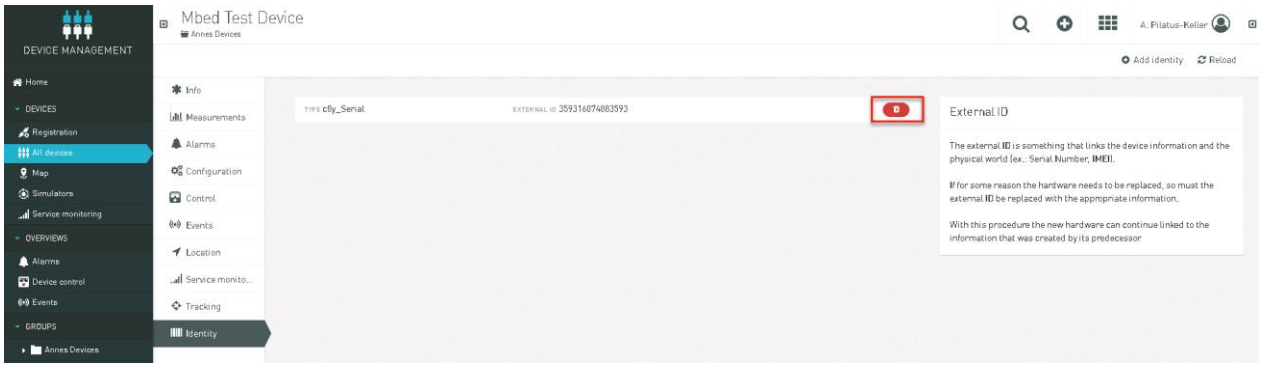
   Username: - as defined in exercise 3 step 5 -

   Password: - as provided in exercise 3 step 5 -
3. Navigate to **Device Management** application. Select **All devices** and navigate to your device.
4. Select the **Identity** tab.



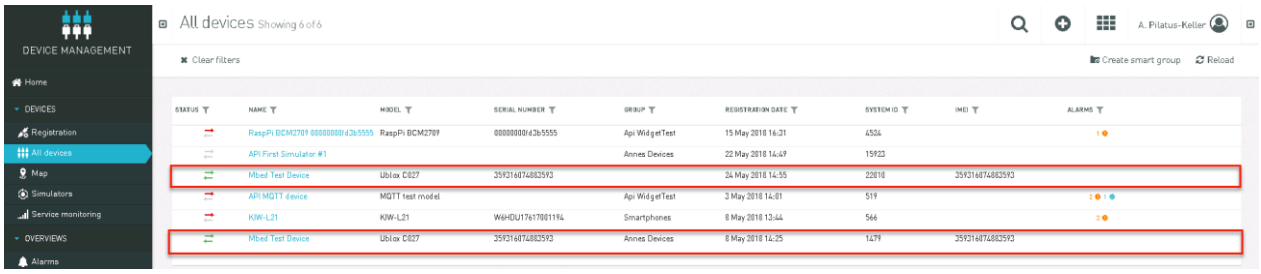


5. Delete the registered identity by clicking the **Delete** icon on the right side of the table entry. Hover the mouse over the table entry.

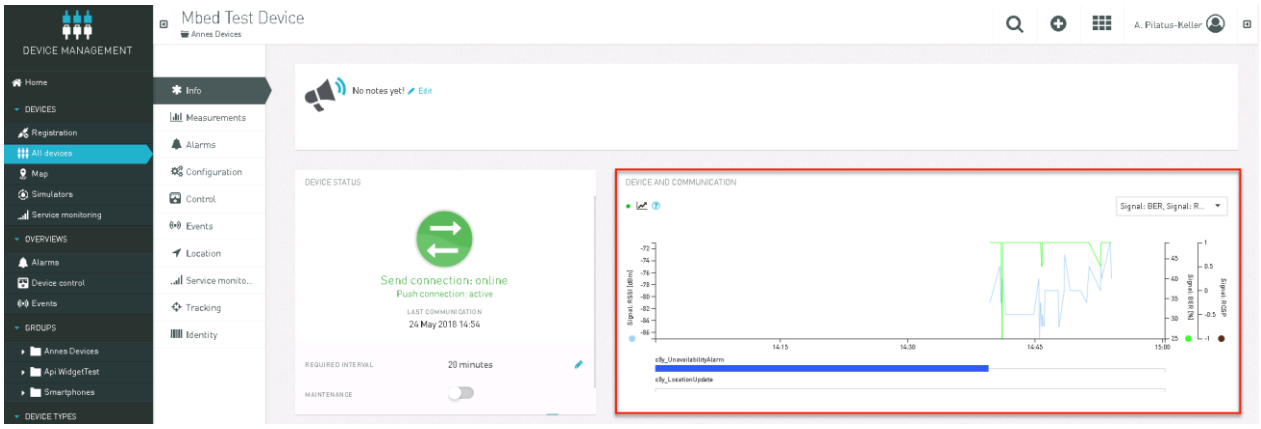


   Confirm the deletion.

6. Restart your device. After your device has started up, navigate to **Device Management > All devices**. Note that there is a second device with the same serial number. This device is live while your original device is archived including all its data.

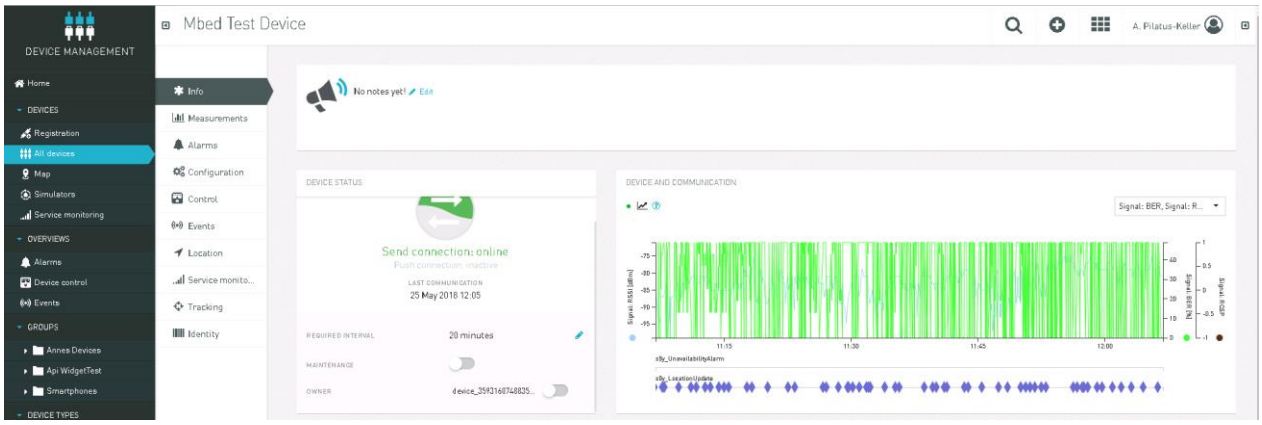


7. Select thenewly registereddevice and review **device and communication** within the **Info** tab.



8. Now we want to temporarily prevent a device from sending data into the tenant. Within the **Device Status** section search for the **owner**. In case you don't see the owner there is a problem with the rendering. The **Device Status** section has a scrollbar, scroll down until you see the **owner.**

9. Use the slider to deactivate the device owner.



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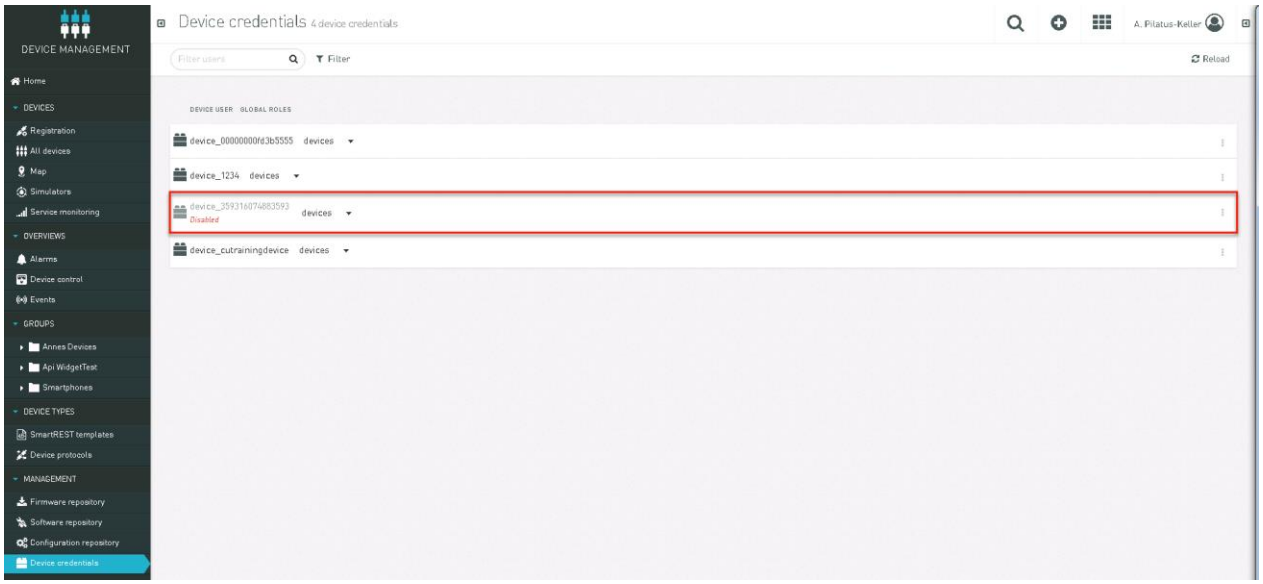
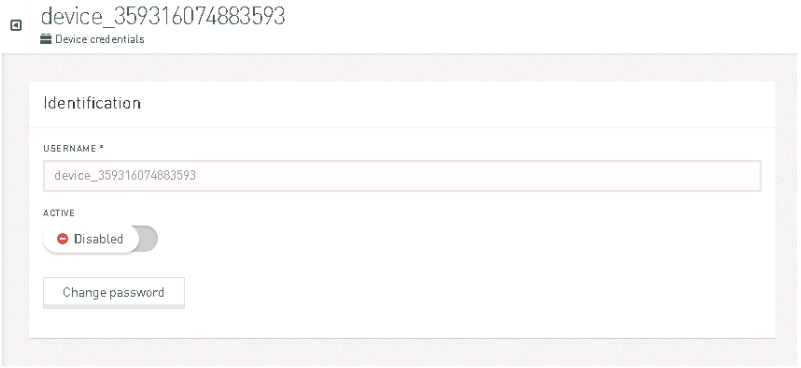
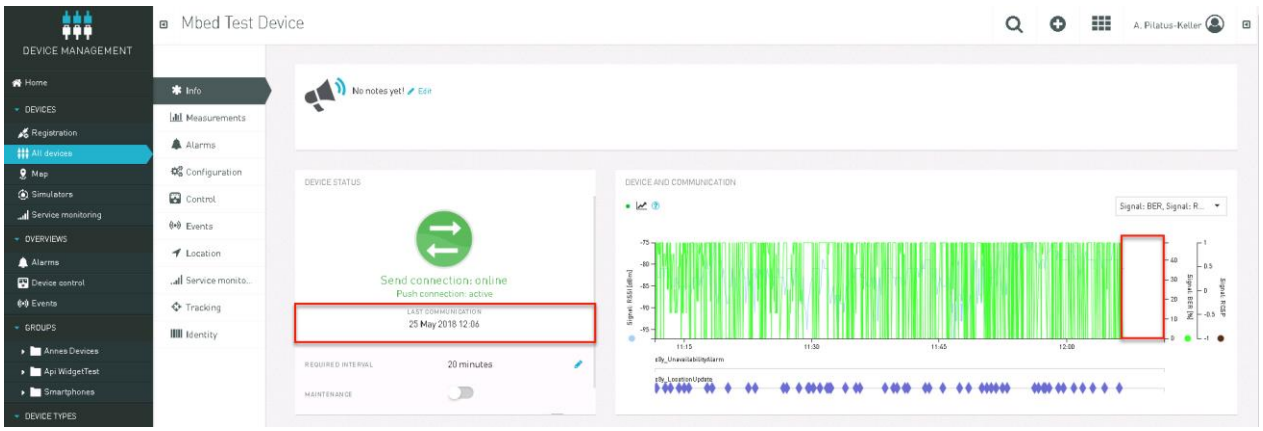
10. Navigate to System **Device Management > Management > Device Credentials**. You device is listed as **Disabled.**



11. From the list of **Device credentials** select your device credentials. Within **Identification** there is a similar slider to enable/disable the device user as you have used before within the Info tab of your device.



12. Navigate back to **Device Management > All devices** and select your device. Review the date of the last communication and check that the **last communication** is before disabling the device user.



Navigate to **Measurements** and verify that no measurements are sent after disabling the device user.

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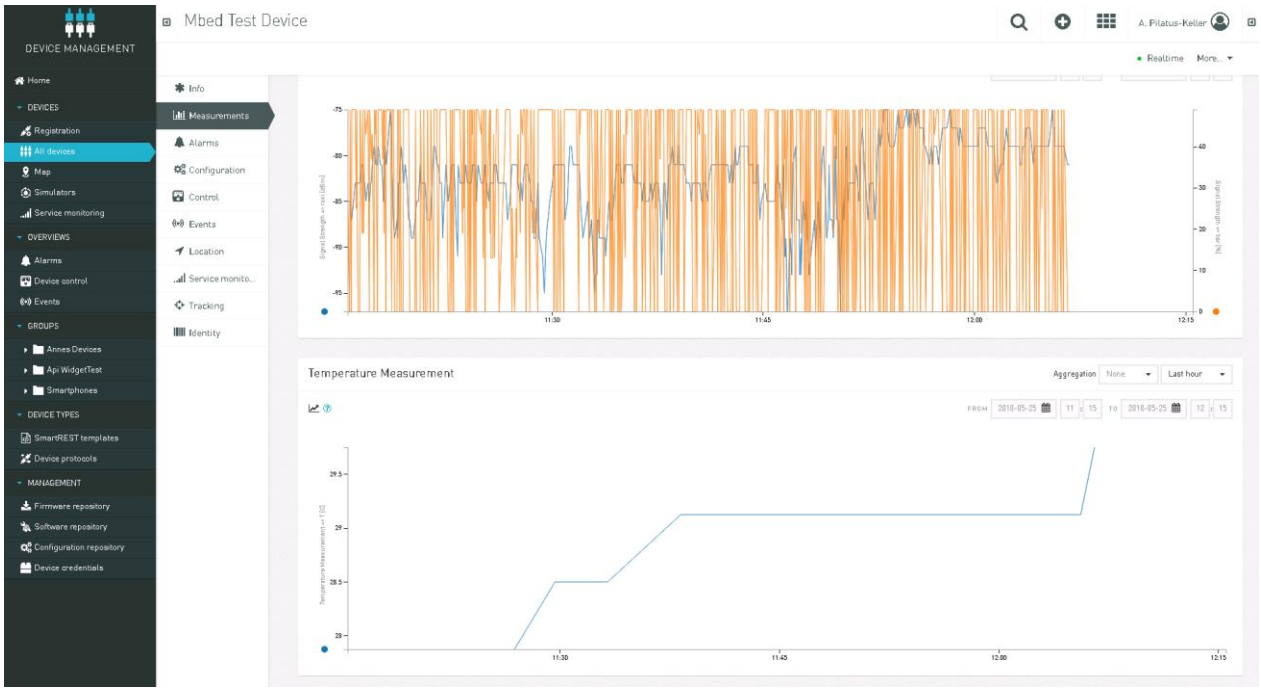
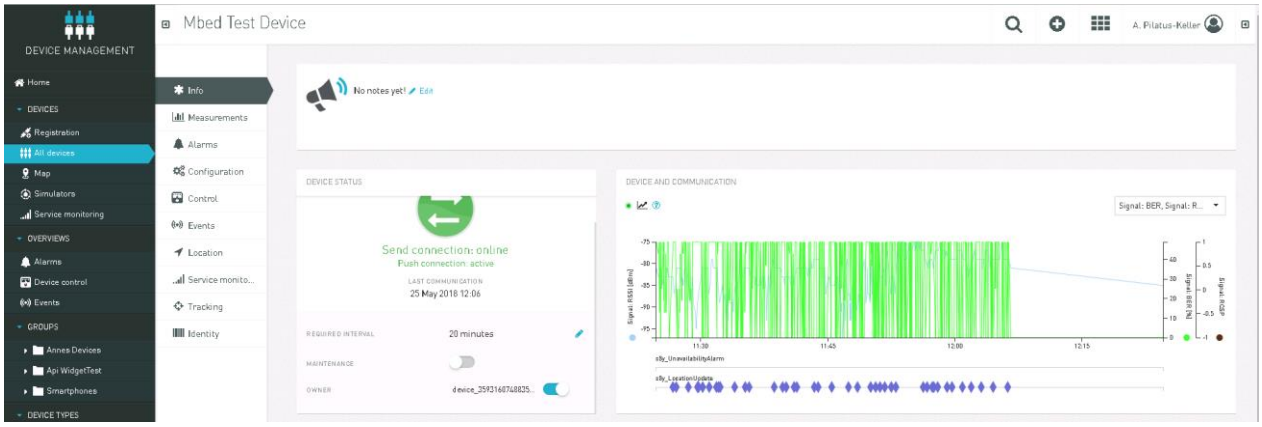
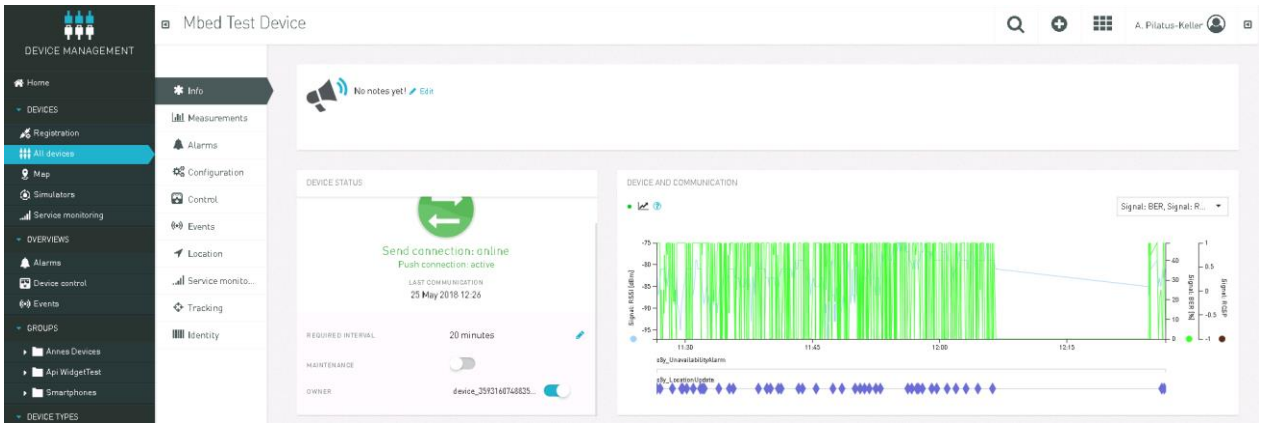


13. Now we want to enable the device user. Navigate to **Info** > **Device Status** section. Use the slider to enable the device user.



14. Restart the device. The device continuous sending measurements.

15. Navigate to **Device Management > All devices** and select your device. Check that the date of the last communication is up to date and the Measurements are updated.



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Exercise 9:
Create Inventory Role

Objectives

In this exercise, you will experiment with permissions. You define an inventory role which you assign to specific user. The user should only have the permission to see a particular set of devices. For these devices the user should only have access to see device information and **c8y_TemperatureMeasurement**.

Steps

1. Make sure that your device is installed, running and connected to the Cumulocity platform. If not refer to Exercise 1.
2. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>**

   <Cumulocity tenant url> - as provided by the instructor.

   Username: - as defined in exercise 3 step 5 -

   Password: - as provided in exercise 3 step 5 -
3. Navigate to **Administration** application and click on **Roles** menu. Add a new role from the Inventory roles tab. The users in this inventory role should only have the permission to see a particular set of devices. For these devices the user should only have access to see device information and the c8y_TemperatureMeasurement.
4. Create a new Inventory Role which allows access to only temperature measurement and device information
   a. **Name:** <Cumulocity login id> First Inventory role
   b. Description:
   c. Section Inventory:
      i. Type: *****
      ii. Permission: Read
   d. Section Measurements:
      i. **Type:** c8y_AnalogMeasurement
      ii. **Permission:** Read

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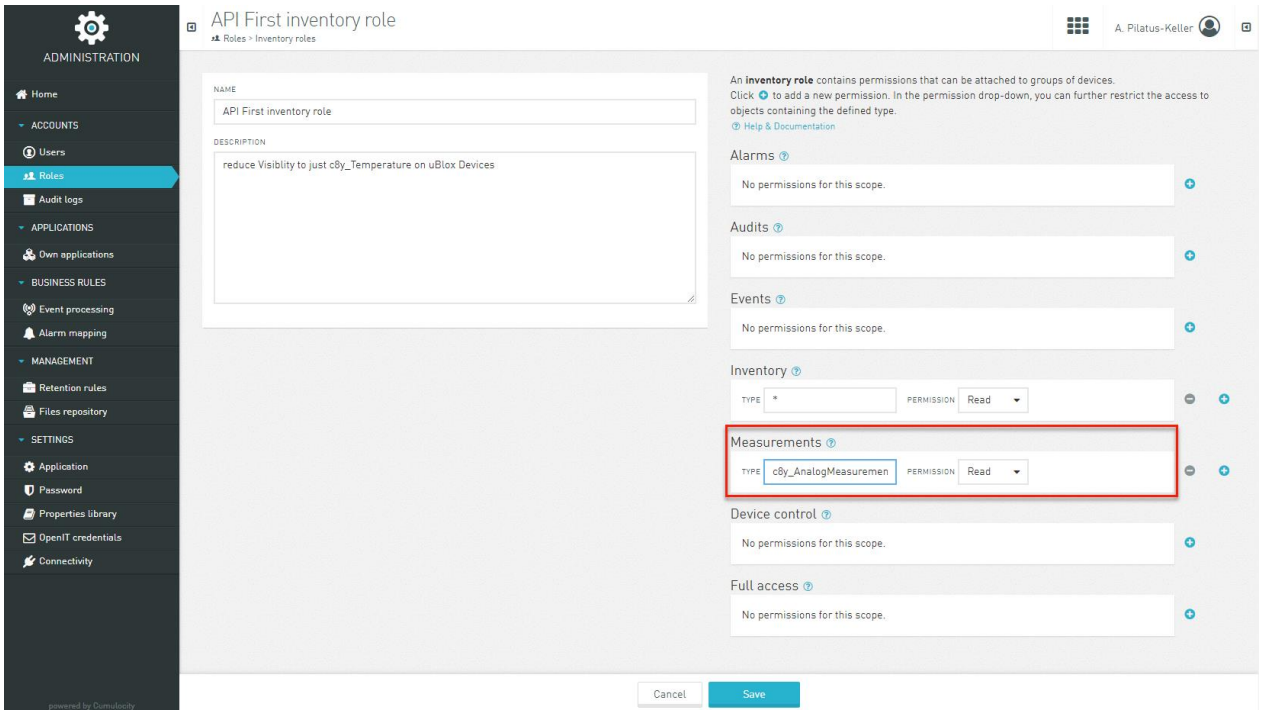
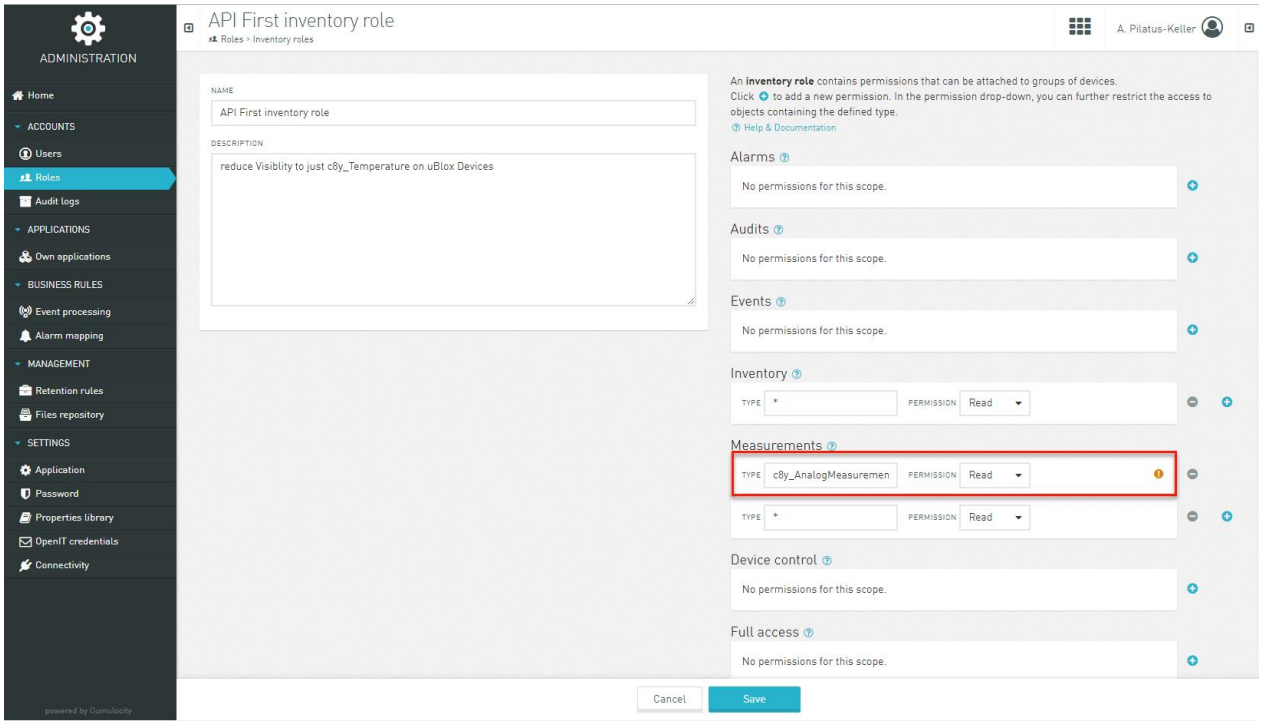


5. Add another permission to the section **Measurement** to allow access to all types:

   a. **Type:** *

   b. **Permission:** Read

This will show an exclamation mark on the **c8y_TemperatureMeasurement**. The exclamation mark indicates that the permission is not effective, because another “higher” permission set for the user already includes the respective permission.



Remove the permission you have defined giving access to all measurements.

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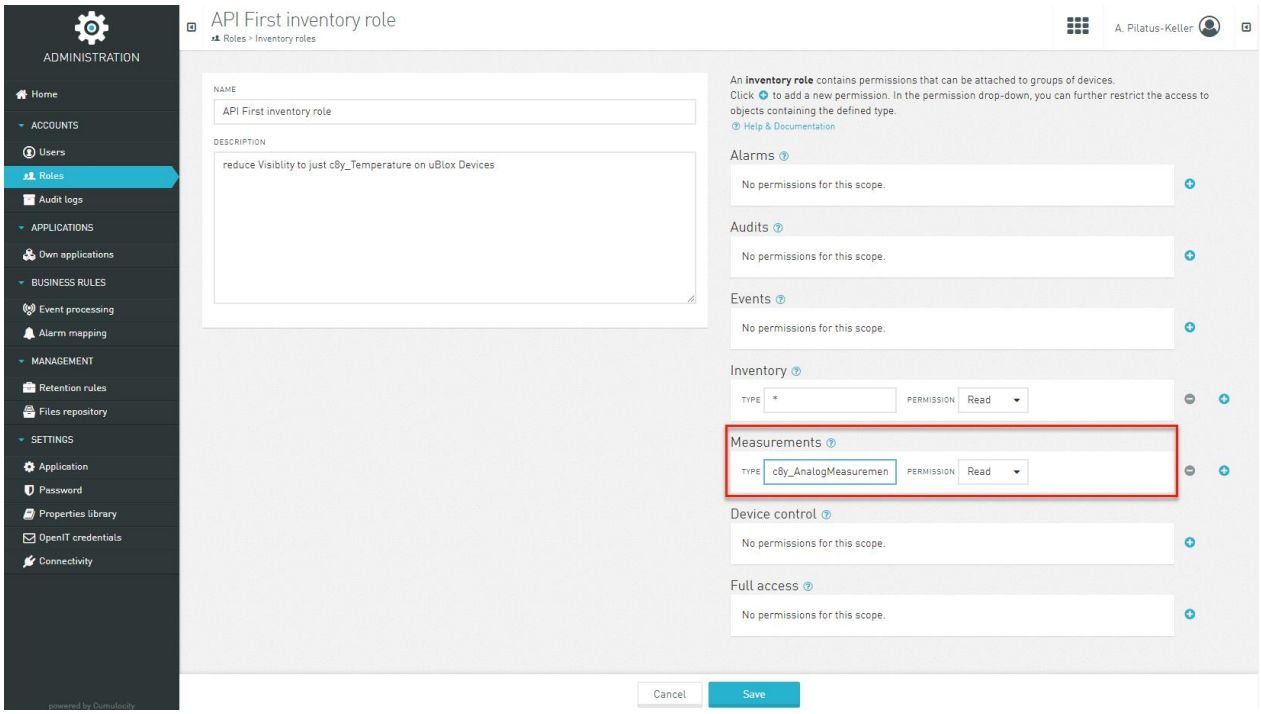
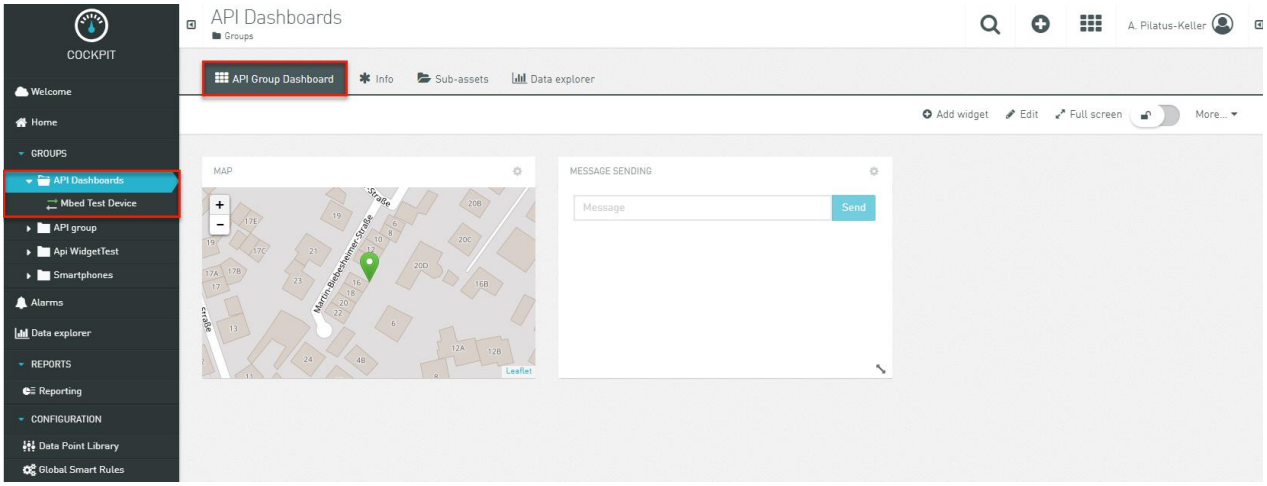


6. Navigate to **Cockpit** and create a new group named <softwareag userid>Dashboards. Assign the ublox device to it. Create a group dashboard.
    a. Assign your device to it
    b. Create a group dashboard and assign a number of widgets to the dashboard



7. Navigate to **Administration > Users** and select the user to whom you want to give the new role. You either add a new user with your private email address or you work together with your neighbour and decide whom to gives this role.
    a. When creating a new user account refer to exercise 2.
        i. Provide as username: <softwareag userid>Customer
        ii. Within **Global Roles** just provide the role **Cockpit User**.
    b. When using an existing the user account, edit the user and change the **Global roles** to just the role **Cockpit User**.

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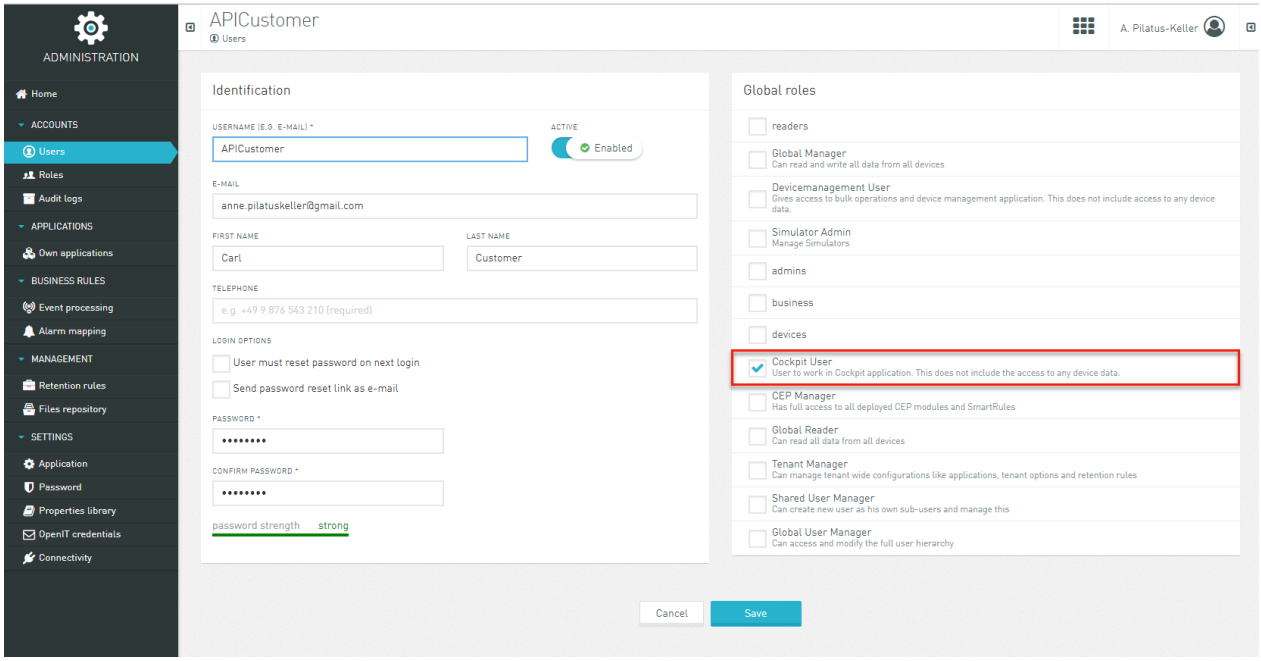
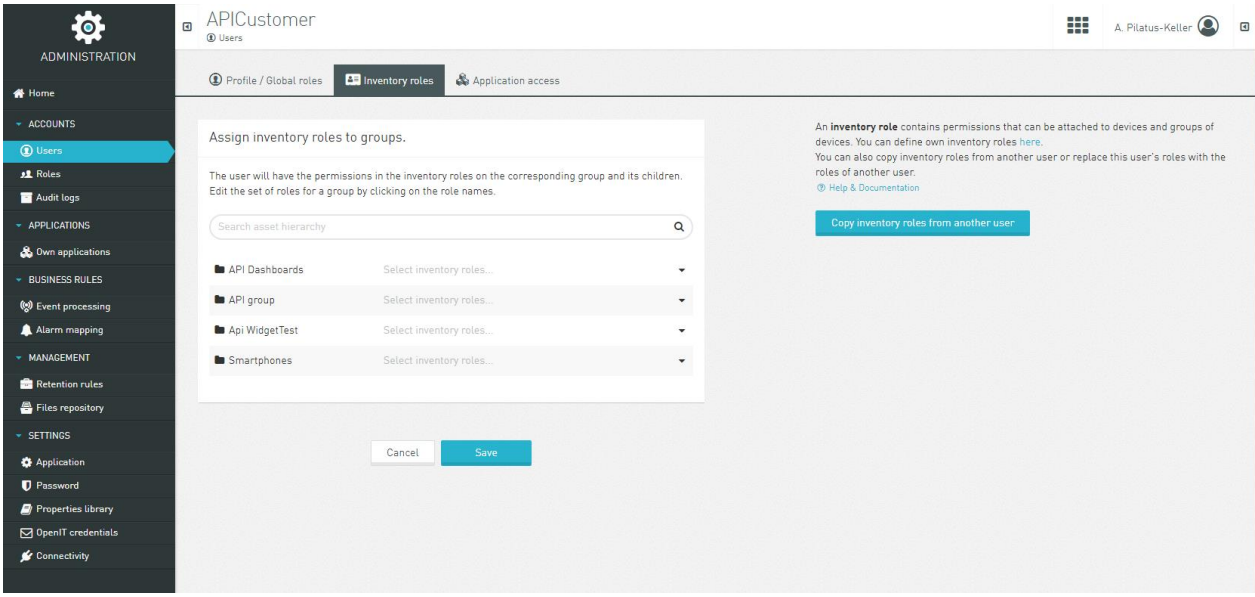


8. Select **Inventory Role** tab.

   a. With the new role you want to reduce the access to the measurements sent by your device. The first step when assigning an inventory role is to select the group which contain your asset.



   b. Click **Select inventory roles**. Select the role you have just created

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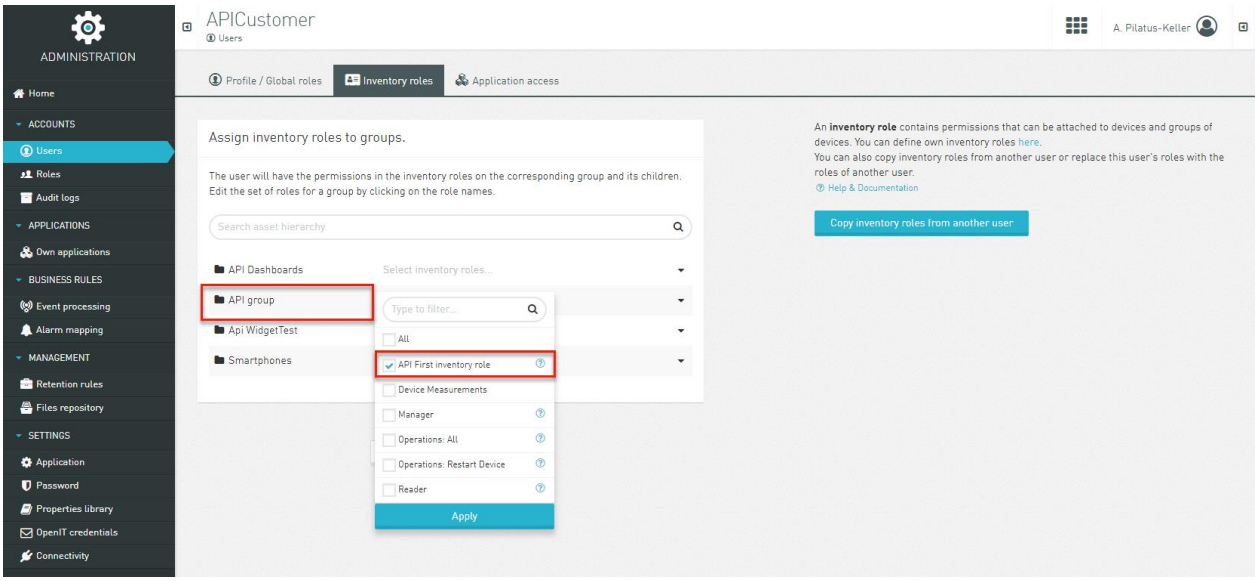
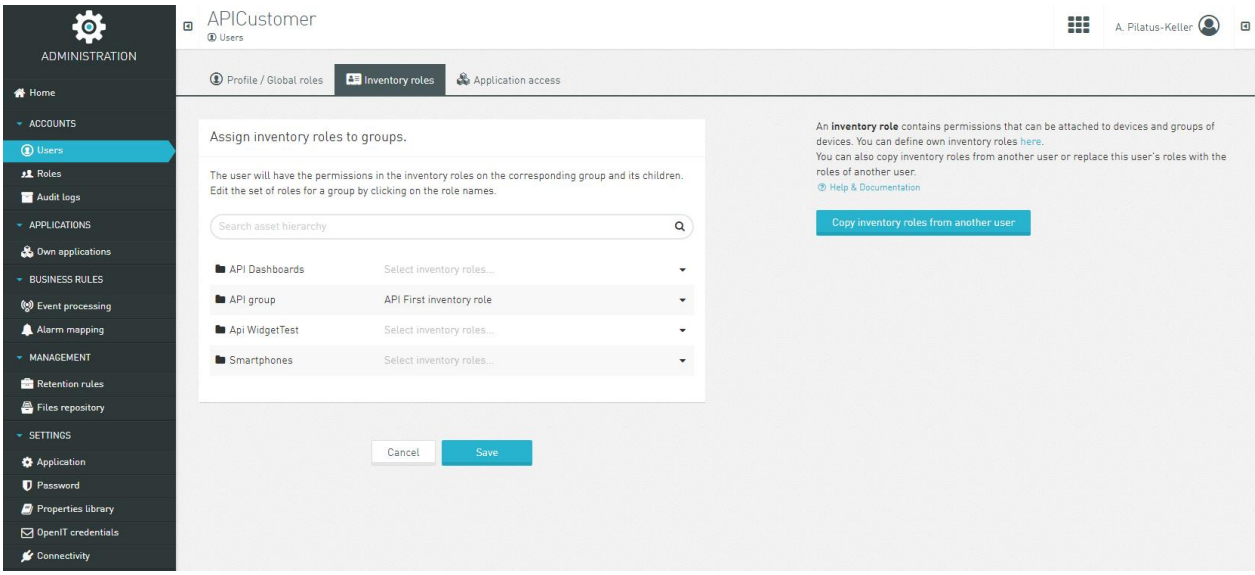


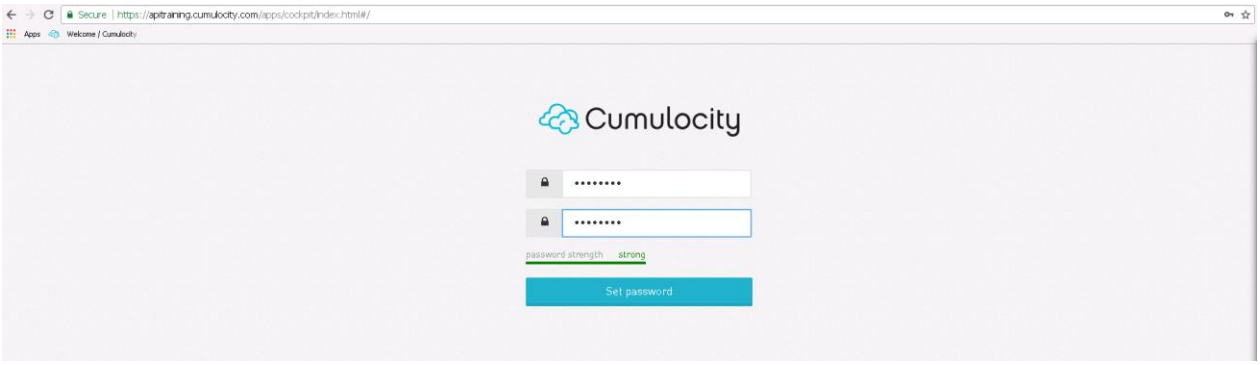
Click **Apply**.

c. Review the configuration of the **Inventory roles**



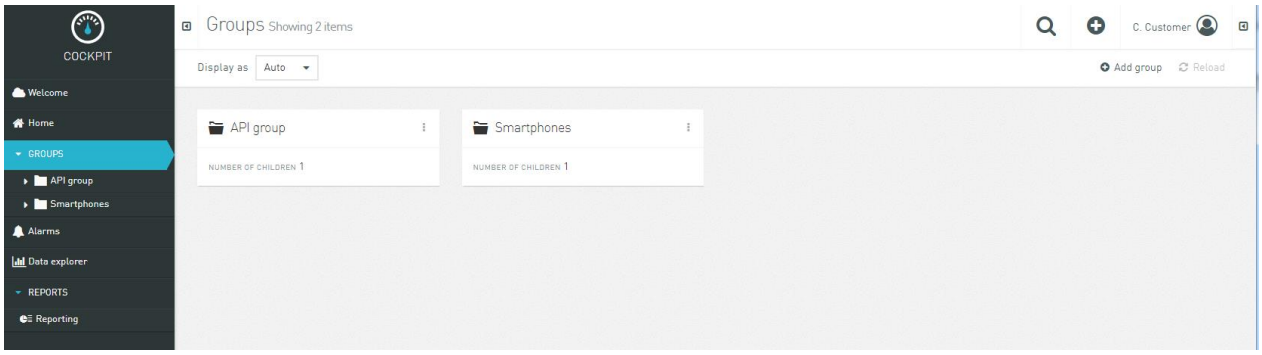
Click **Save**.

9. Start a new Brower session and login as the user which you have just configured to have restricted permissions. If needed provide a new password.

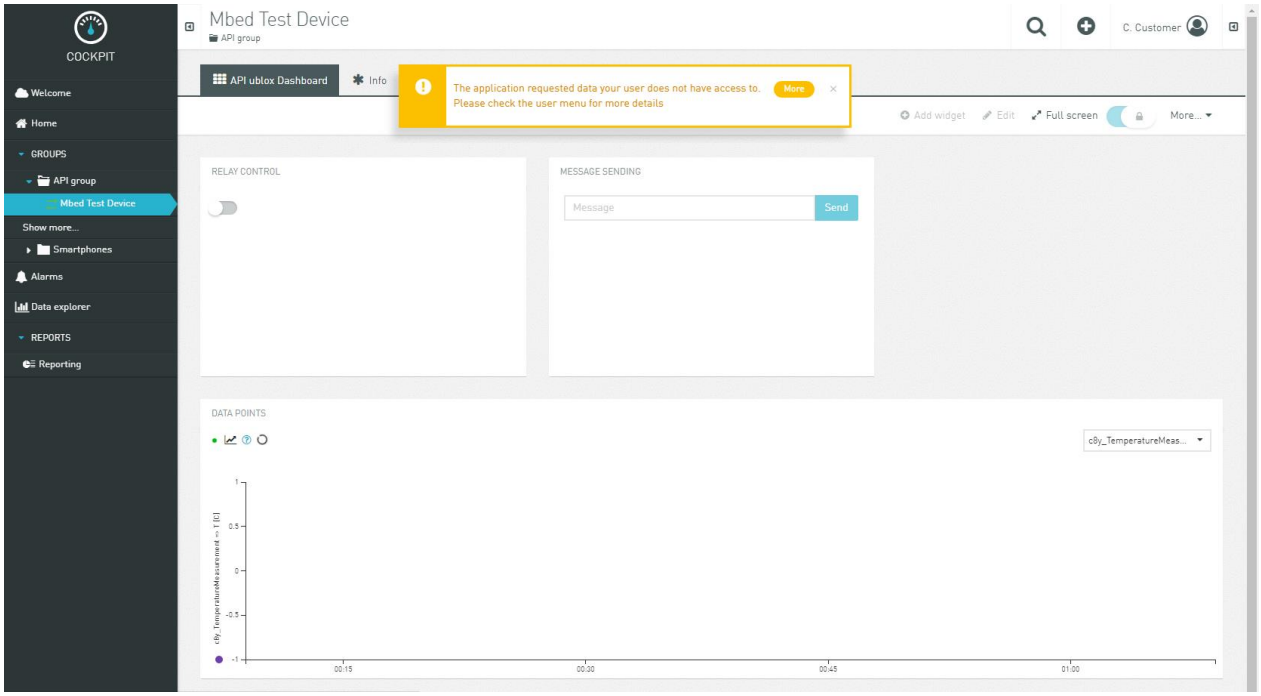


Click **Set password**.

10. You will directed be navigated to the **Cockpit** application. This is the only application the user has access to. The only groups the user can see are the groups for which we have assigned the inventory role.



11. Open the group and from the list of devices select the device. Depending on the selected widget and the configured measurements in the widget you might get a warning concerning missing access privileges.



12. Click the close icon on the warning.

13. Navigate to the Data Points widget and change the listed measurements to show only **c8y_AnalogMeasurement => A1** and **c8y_AnalogMeasurement => A2**.

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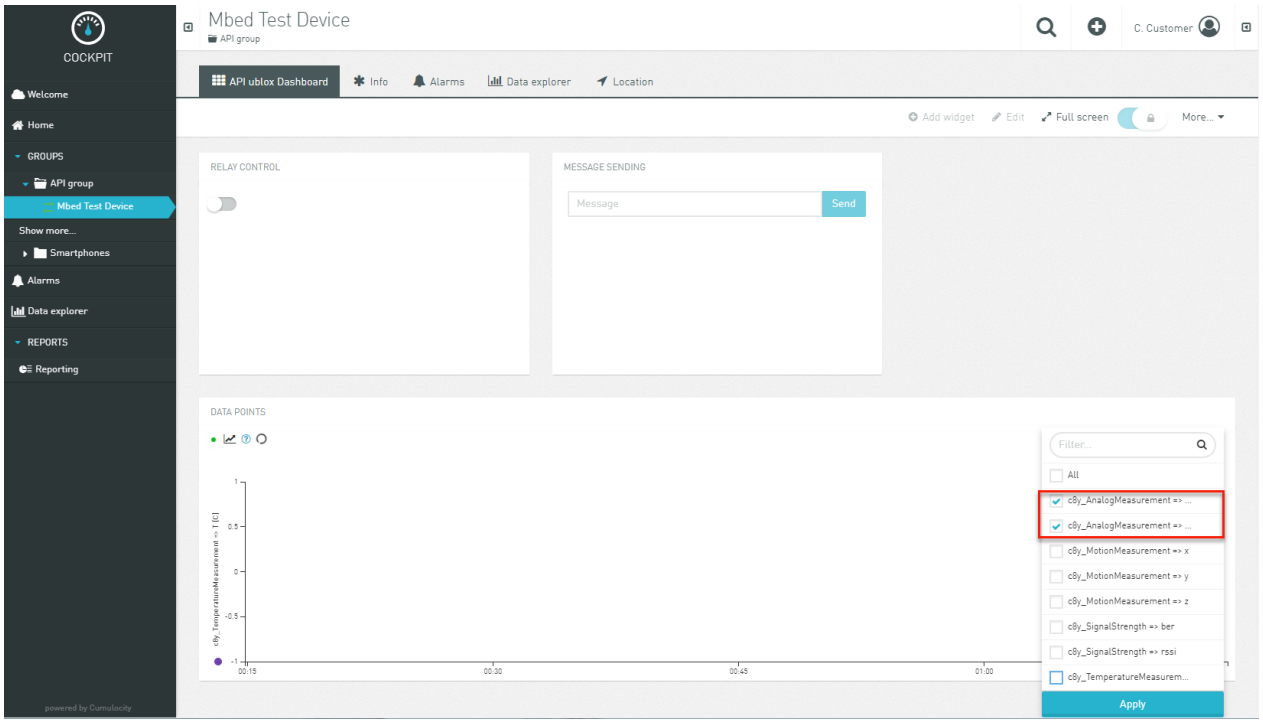
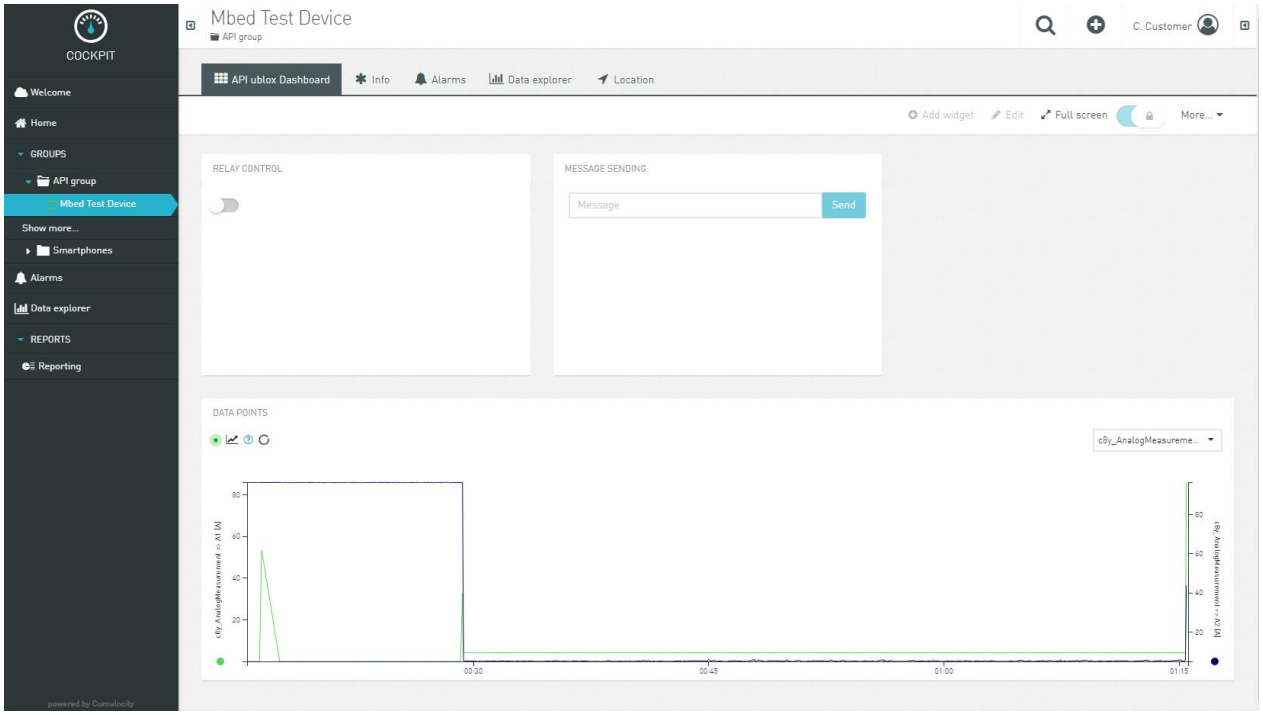


Click **Apply.**

14. The Data Point widget will show **AnalogMeasurement =>A1** and **AnalogMeasurement =>A2**.



15. Navigate to Alarms widget. You will again get an error, because we haven't assign privileges to see alarms.

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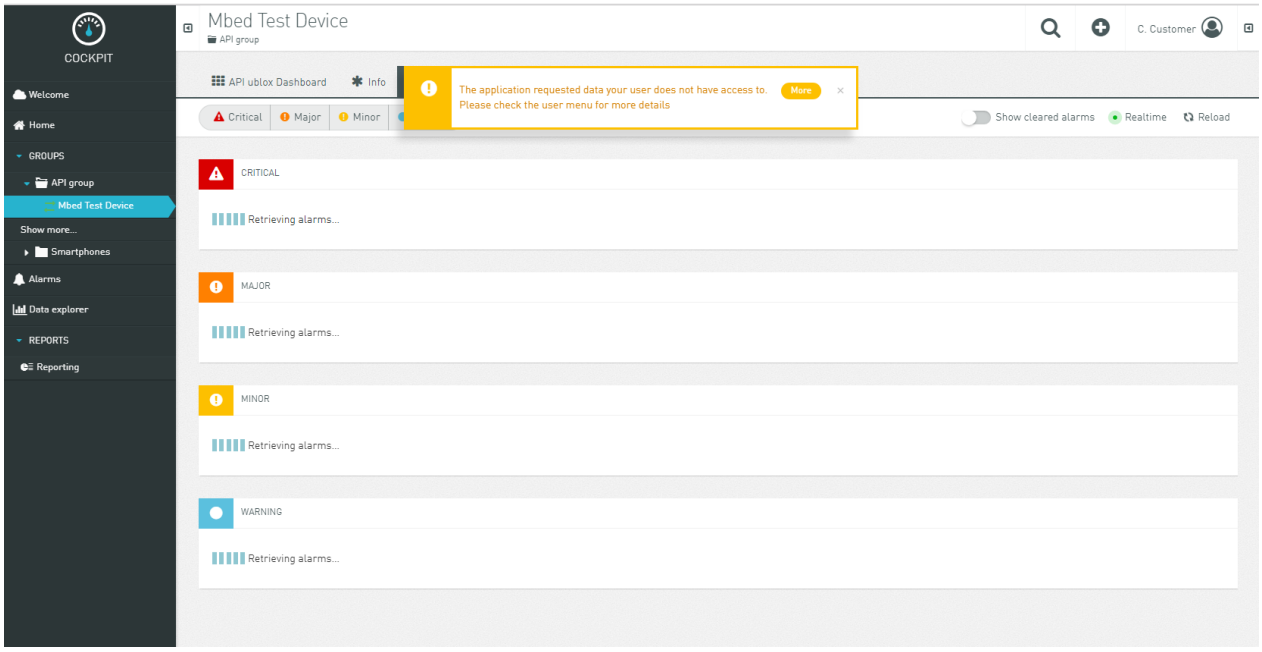
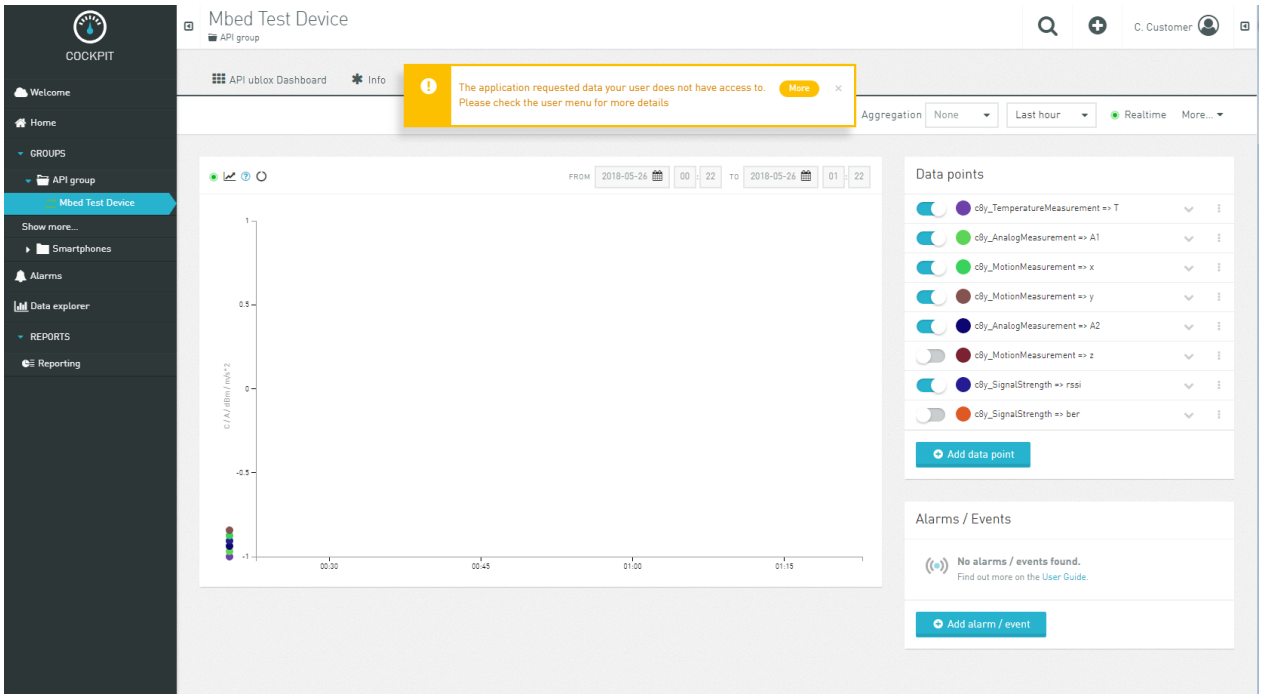


16. Navigate to Data explorer widget. Add additional data points to the widgets. This will lead into a warning, because in the inventory role we gave users assign to this rile only access to **c8y_AnalogMeasurement.**



If a user has inventory access to a group of devices, the user will also have that access to all dashboards for that group of devices in the **Cockpit** application.

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Exercise 10:
Create a Simulator

Objectives

In this exercise, you will work with the Cumulocity Simulator which provides you with the feature to simulate all aspects of IoT devices. Following steps are covered:

- Setup up a simulated device and specify which operations the device can process
- Create work instructions based on predefined message templates and schedule work steps
- Create a number of devices (up to ten) of a defined type
- Generate messages for measurements, alarms, events and inventory

Steps

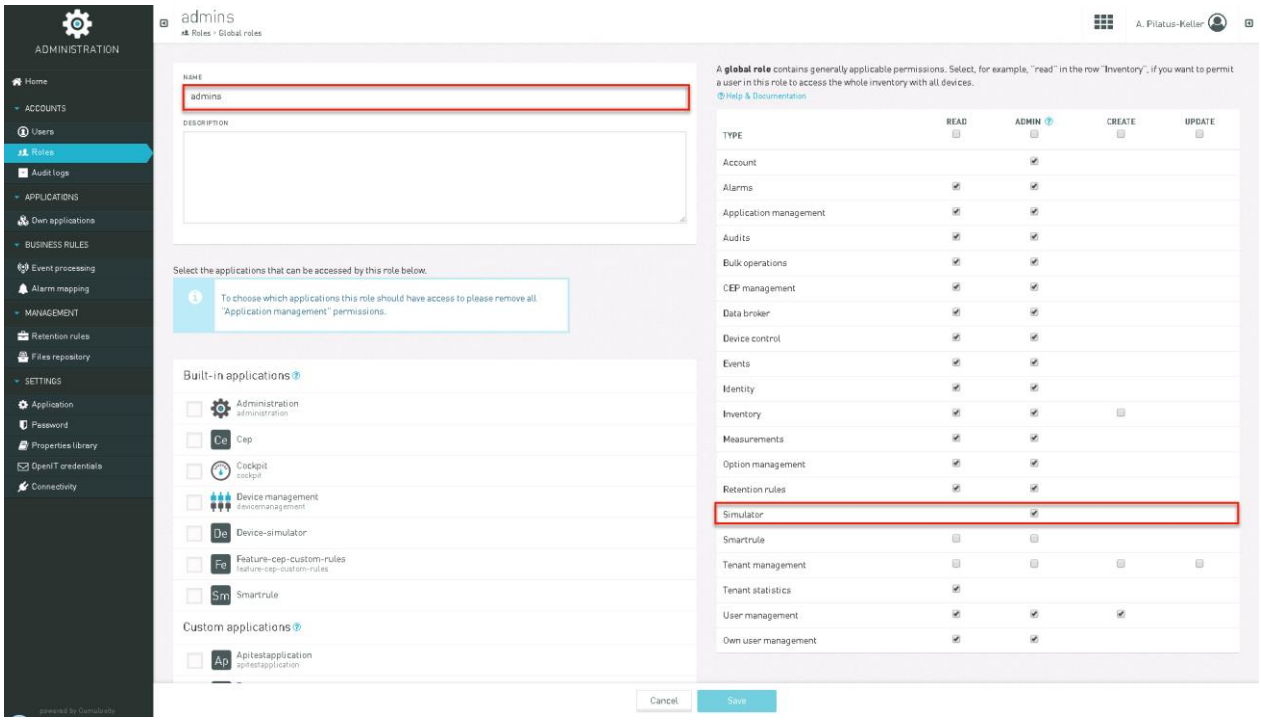
1. Login to **Cumulocity** tenant with your credentials. Open the URL **<Cumulocity tenant url>.**

   <Cumulocity tenant url> - as provided by the instructor.

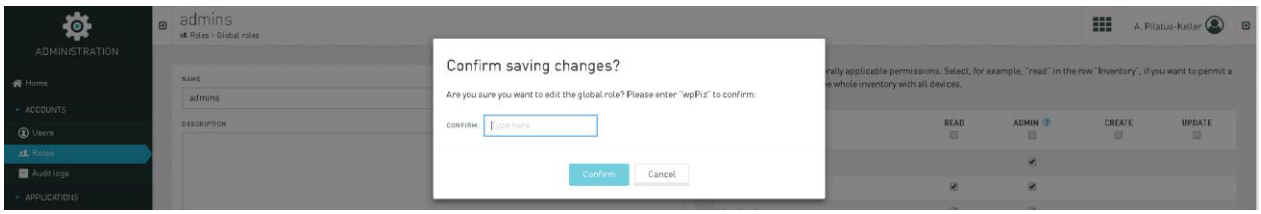
   Username: - as defined in exercise 3 step 5 -

   Password: - as provided in exercise 3 step 5 -

2. Select the **Administration** application. Navigate to **Roles**. Select the **admins** role. Within the list of permissions select the type **Simulator** and click the **Admin** permission. This is the only available check box.



   Click **Save**. Confirm saving changes.



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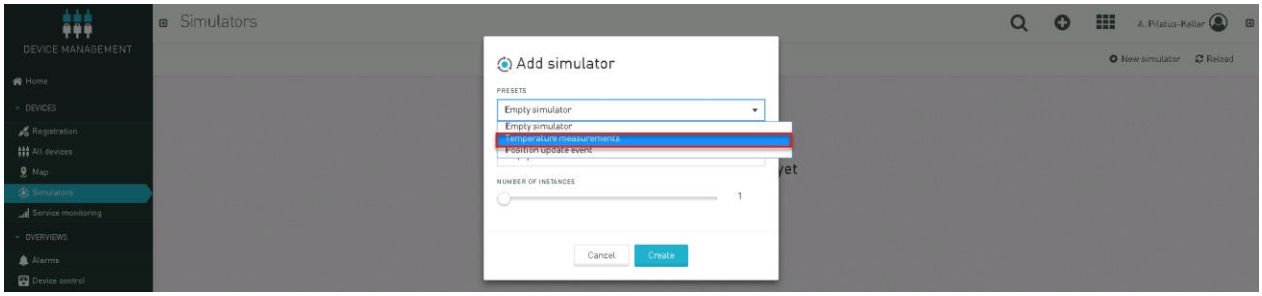
3. Switch over to **Device Management** application. Navigate to **Simulators.** If case you don't the **Simulators** in the navigation menu refresh the page.

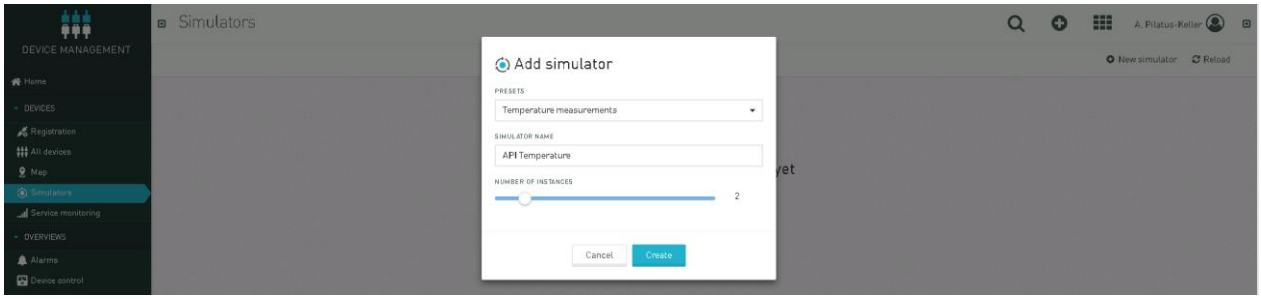
4. Click **New Simulator.** From the list of different simulator types select the Temperature Simulator.



Provide the following properties:

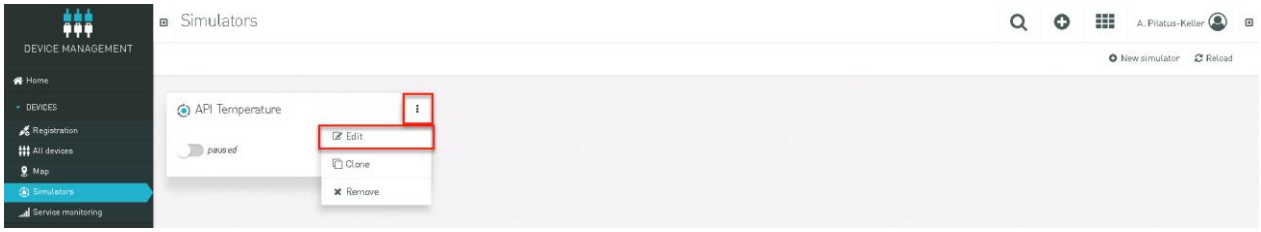
Simulator Name: <softwareag userid> Temperature

Number of instances: 2

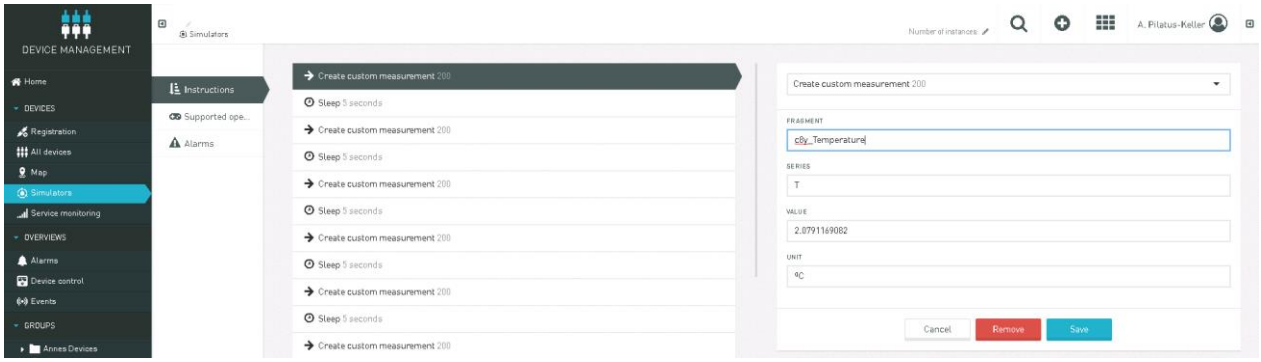


Click **Create.**

5. From the list of Simulators select the one you have just created. Open the Actions menu and select Edit.



Review the playlist. Select one of the instructions **Create custom Measurement 200.**



6. Next you want to configure a simulator with your own playlist. Go back to the list of Simulators and click **New Simulator** and provide the following properties:

   a. **Type:** Empty Simulator

   b. **Name:** <softwareag userid> First Simulator

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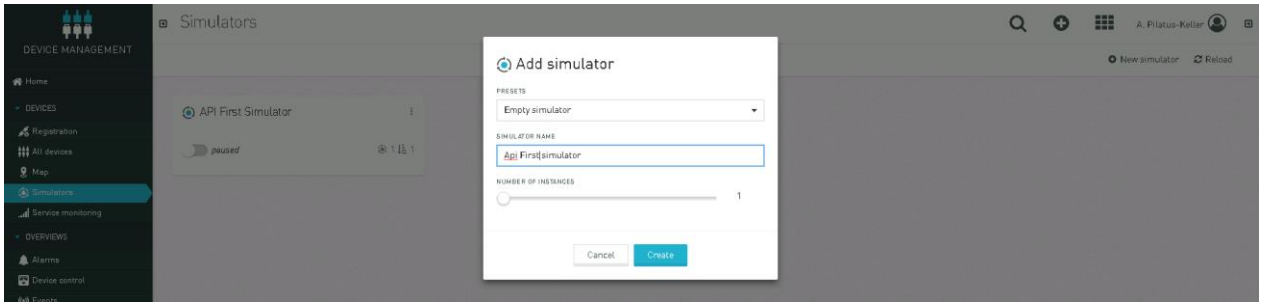
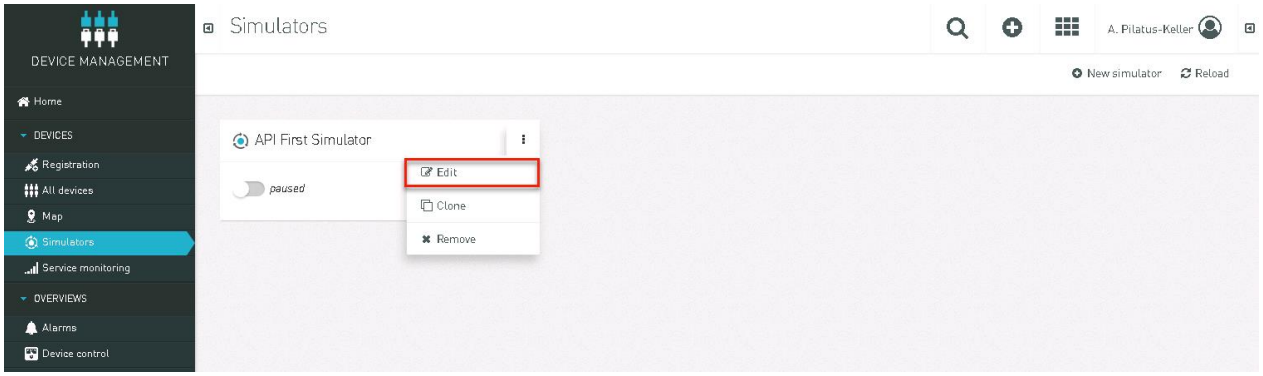
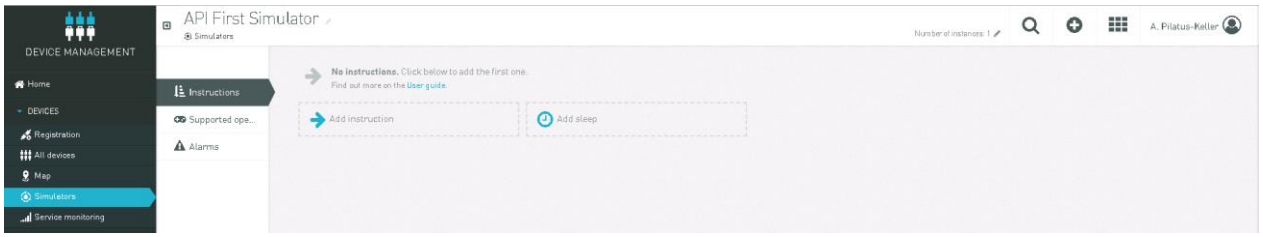
c. **Number of instances:** 1



7. Select the new simulator open the menu and select **Edit**.



8. Within edit mode you can add instructions which define what your simulator is supposed to do. Instructions are single tasks added to a playlist through which the simulator will work.



a. Open the file **C:\Training\231-70E\Exercise8\SimulatorInstructions.txt**. This contains a set of instructions which you can use as a suggestion to configure your Simulator.

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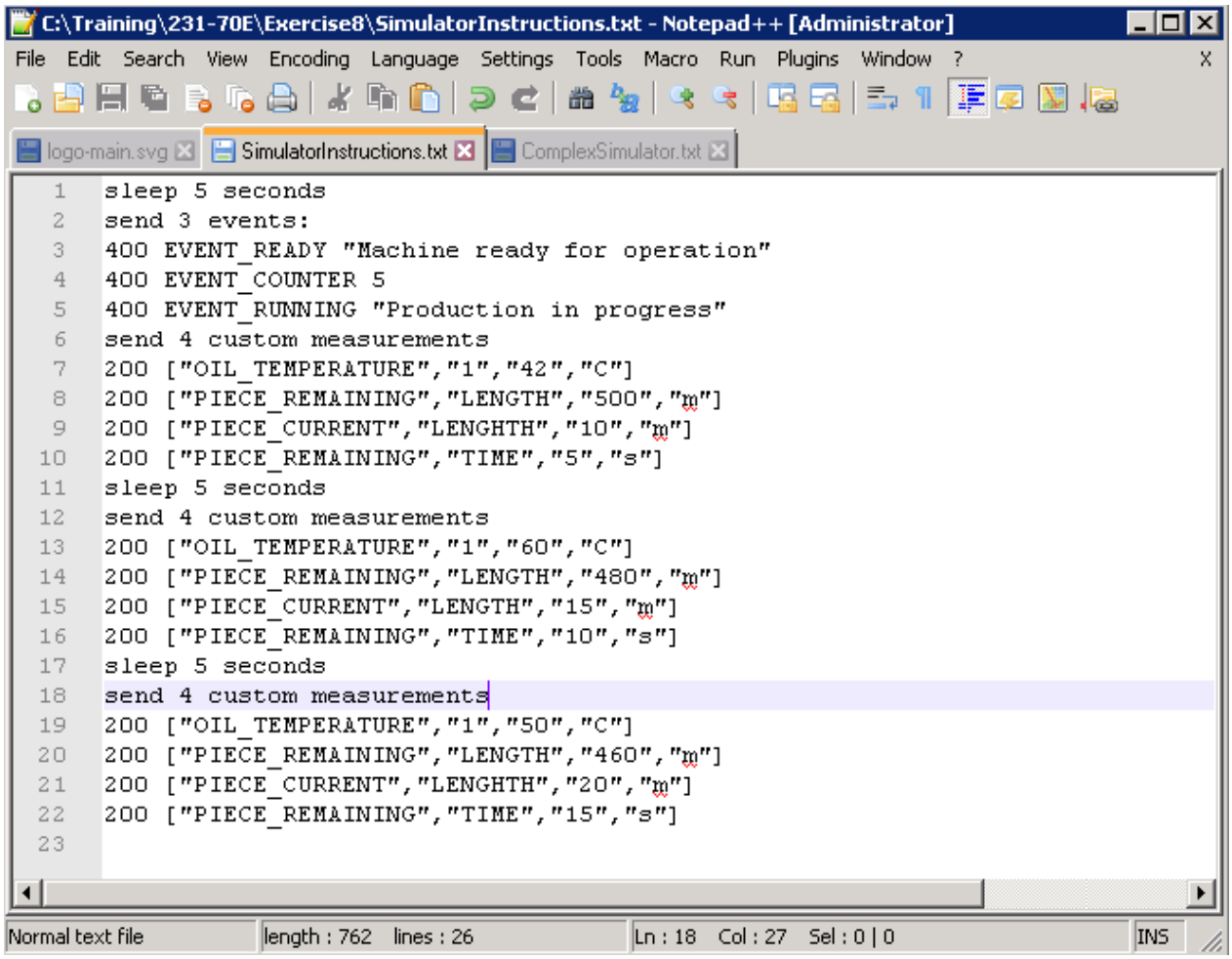
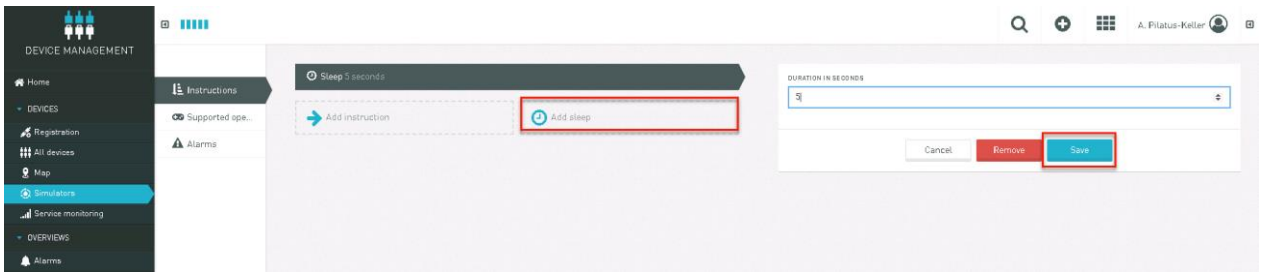
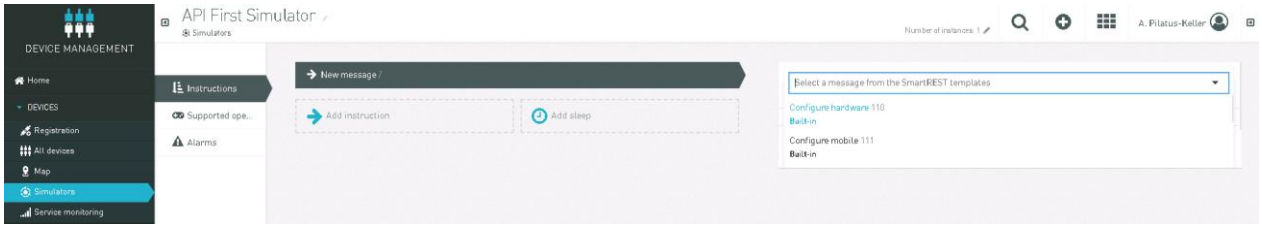


b. Click **Add sleep**. Leave the default setting.



c. Click **Add instructions**. Open the drop down menu.



d. Select **Create basic event 400** and provide the properties. You can use the instructions for events as listed in file **C:\Training\231-70E\Exercise8\SimulatorInstructions.txt** which you have opened in step 8a.

   i. **Type:** EVENT_READY

   ii. **Text:** Machine ready for operation

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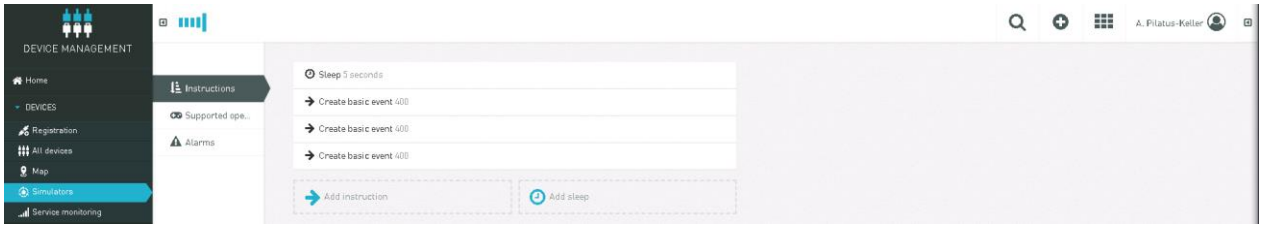
EVENT

Click **Save.**

e. Add the 3 events to the playlist as listed in file.



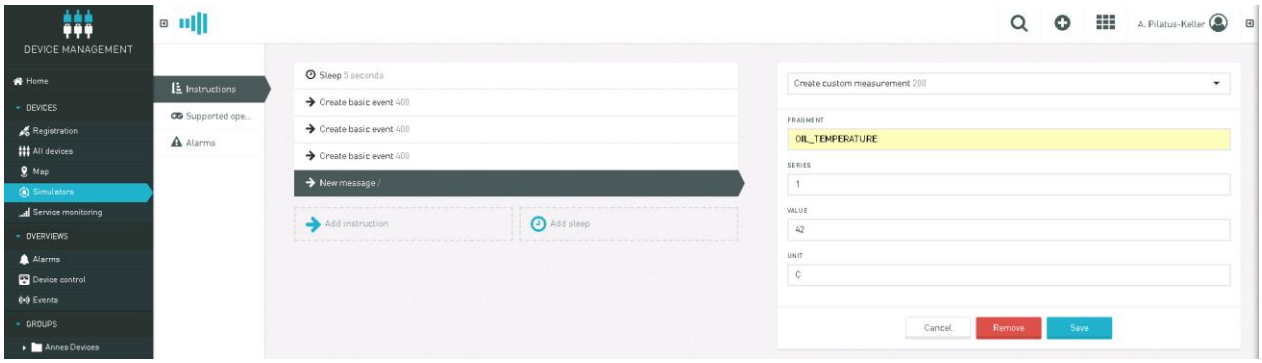
9. Next you want to add some measurements. Select **Create custom measurement 200** and provide the properties. You can use the instructions as listed in file **C:\Training\231-70E\Exercise8\SimulatorInstructions.txt** which you have used already:

   i. **Fragment**: OIL_TEMPERATURE

   ii. **Series**: 1

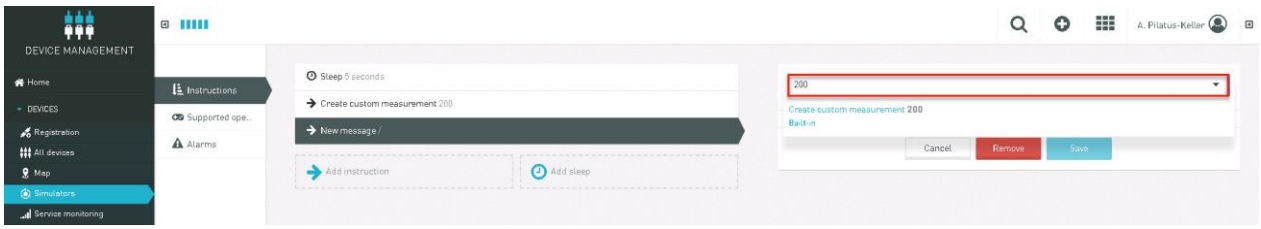
   iii. **Value:** 42

   iv. **Unit:** C



Click **Save.**

10. Provide the set of instructions of type **Create custom Measurement 200** as listed in the file. When adding an instruction you can use the type **200** as search criteria.



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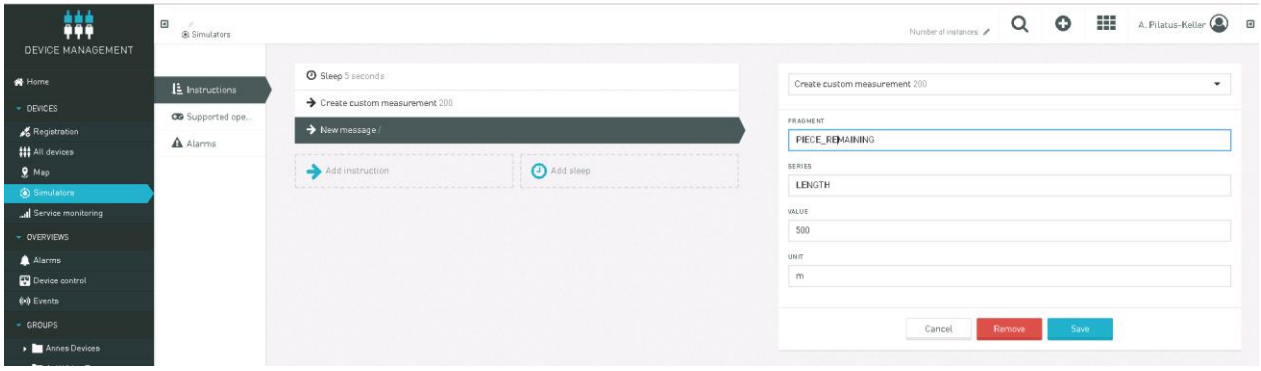
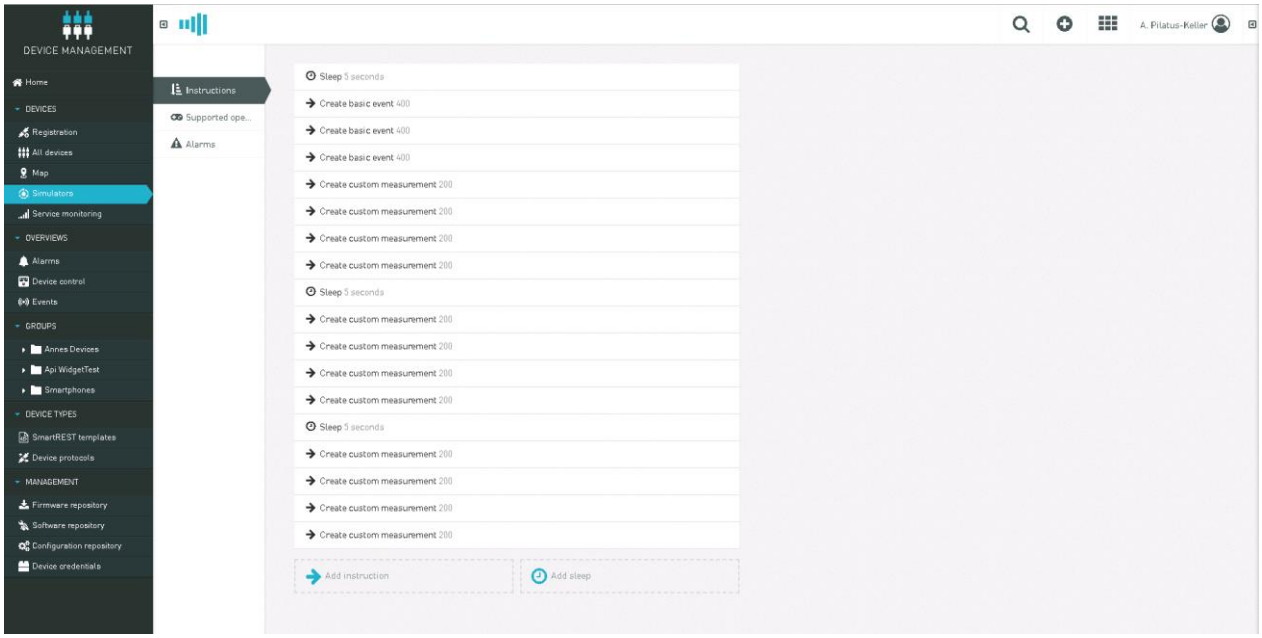
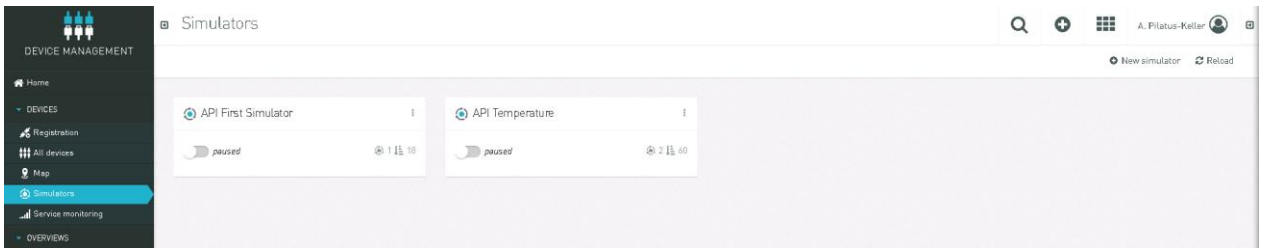


After adding all the custom measurements yours simulator should look like the following.

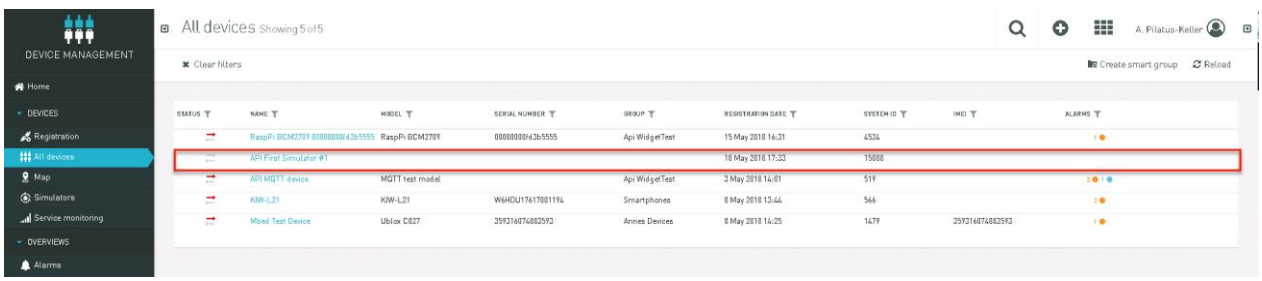


11. Navigate back to the list of all **Simulators**. Your simulator is listed with the number of actions and the number of instances you have configured. Start the simulator using the slider.

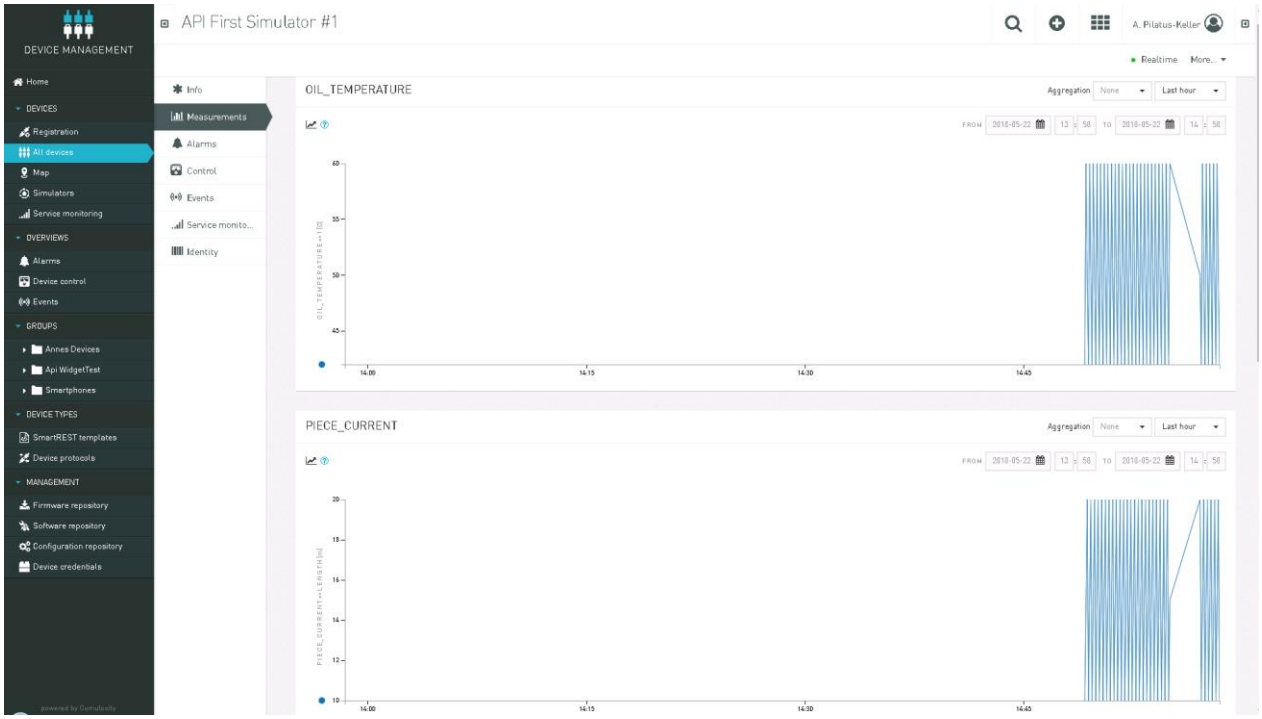


This will run the events and the measurements as you have configured. When the end of the list is reached, the simulator will start from the beginning of the list.

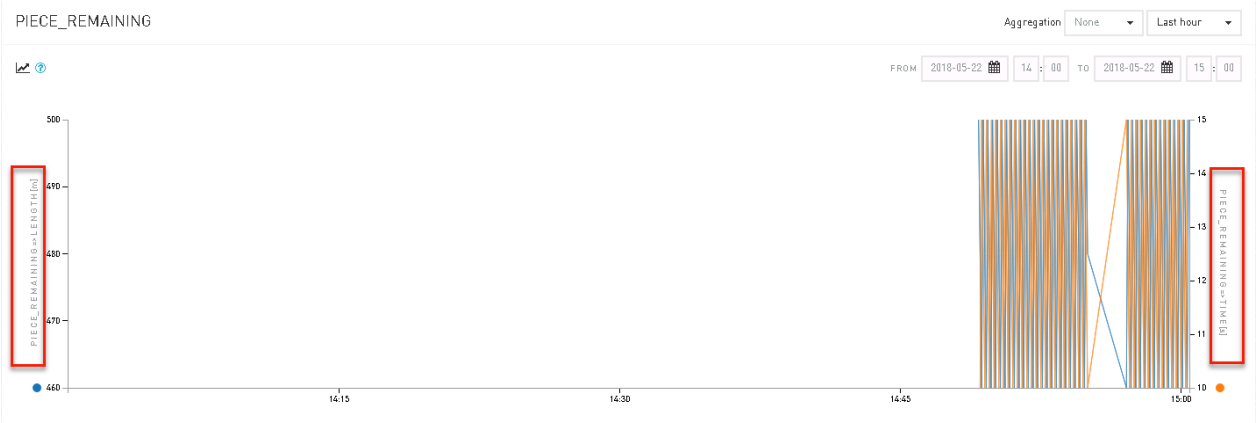
12. Review the Simulator shown under **All devices**. In case you don't see the simulator refresh the page. Your simulator is listed with its name followed by #1 which represents the first instance of the simulator.



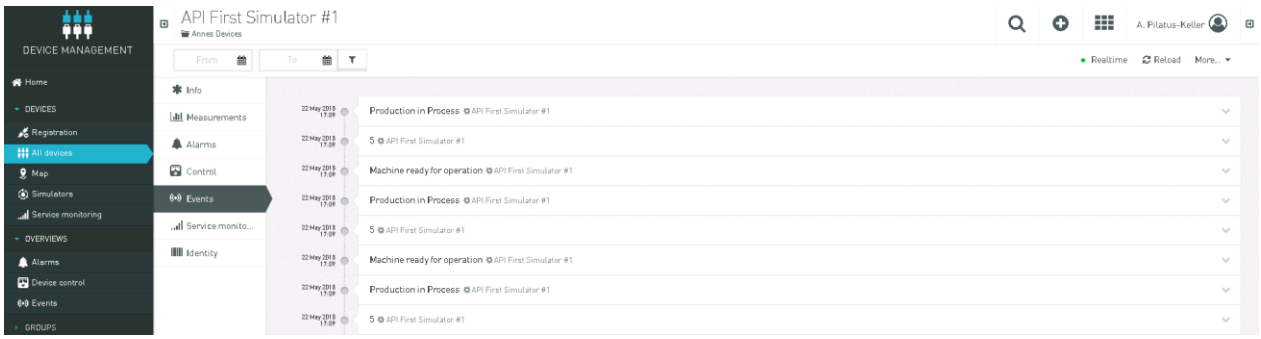
13. Select the simulator and navigate to **Measurements**. This will show the custom measurements.



The graph which shows the values for the fragment PIECE_REMAINING shows both series: LEGNTH and TIME.



14. Navigate to **Events**. This will show the 3 events which you have added to the beginning of your playlist. The list shows the event based on time, the newest one at the beginning of the list.



15. Next you will use this simulated device as a normal device. Navigate to **Cockpit** and open one of your groups. Add the simulator to this group. Navigate to **Sub-assets** and click **Assign devices**.

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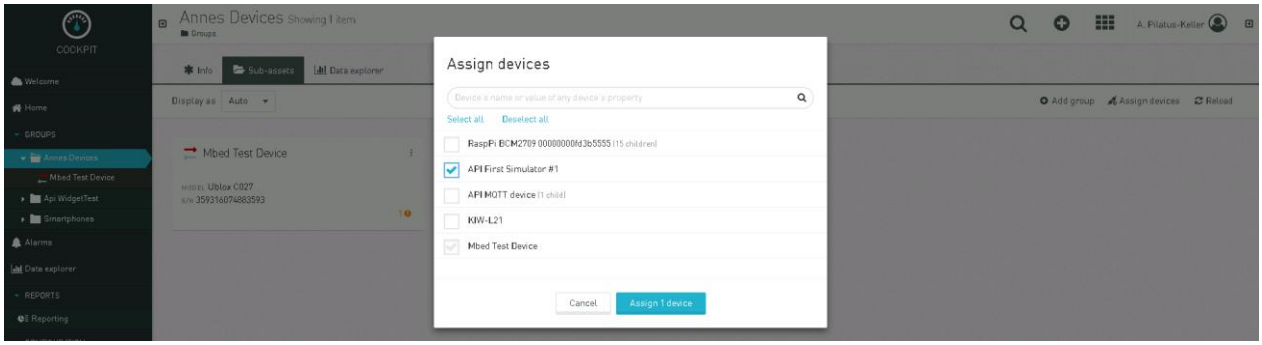
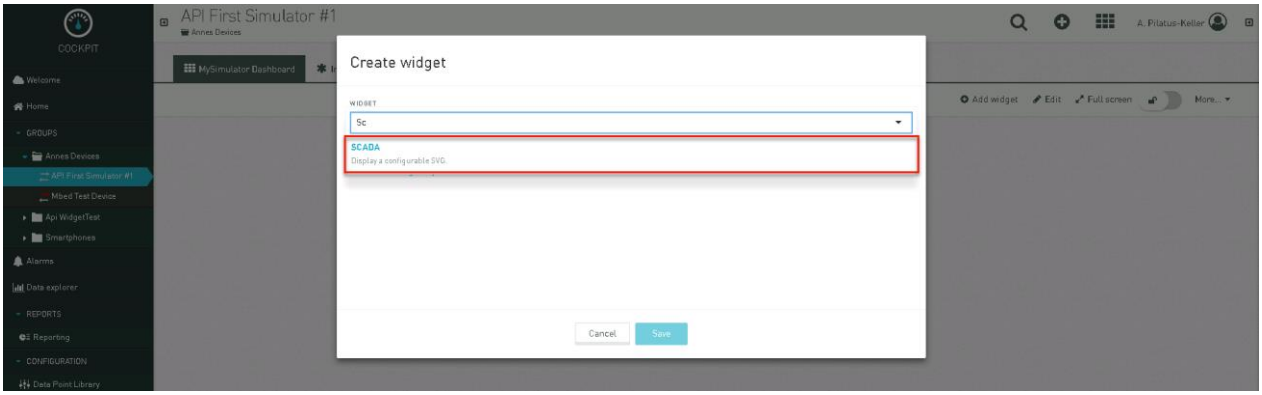
Select the simulator.



Click **Assign device**.

16. Select the simulator and create a new dashboard: **MySimulatorDashboard.**

17. Add a **SCADA** Widget to your device dashboard. A **SCADA** widget is a dashboard with animation. Select your device dashboard. Click the **Add widget** button to add a widget. Search for **SCADA**



a. Provide the following porperties:

   i. **Title:** < Cumulocity login id > Scada

b. Browse to the location **C:\Training\231-70E\Exercise8** where you find the file **windmill.svg**. The instructor provides you with information where to find the file.

c. Configure the 5 placeholders. You need to choose a device and map device information. Hover the mouse over one of the placeholders. You will find the edit icon on the right hand side of the placeholder section. Click the edit icon.

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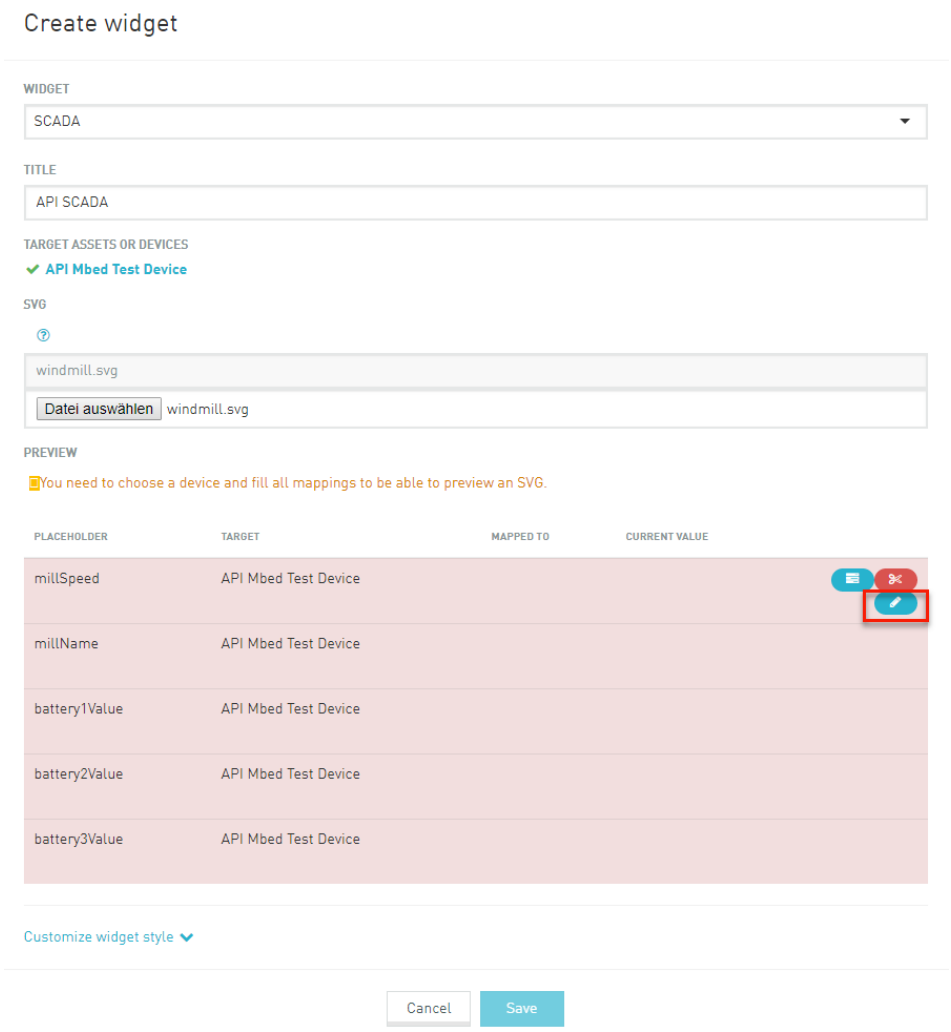

This will show the list of available device properties.

i. Battery1Value

1. Within the **Select proper**ties dialog scroll down to **LastMeasurement**

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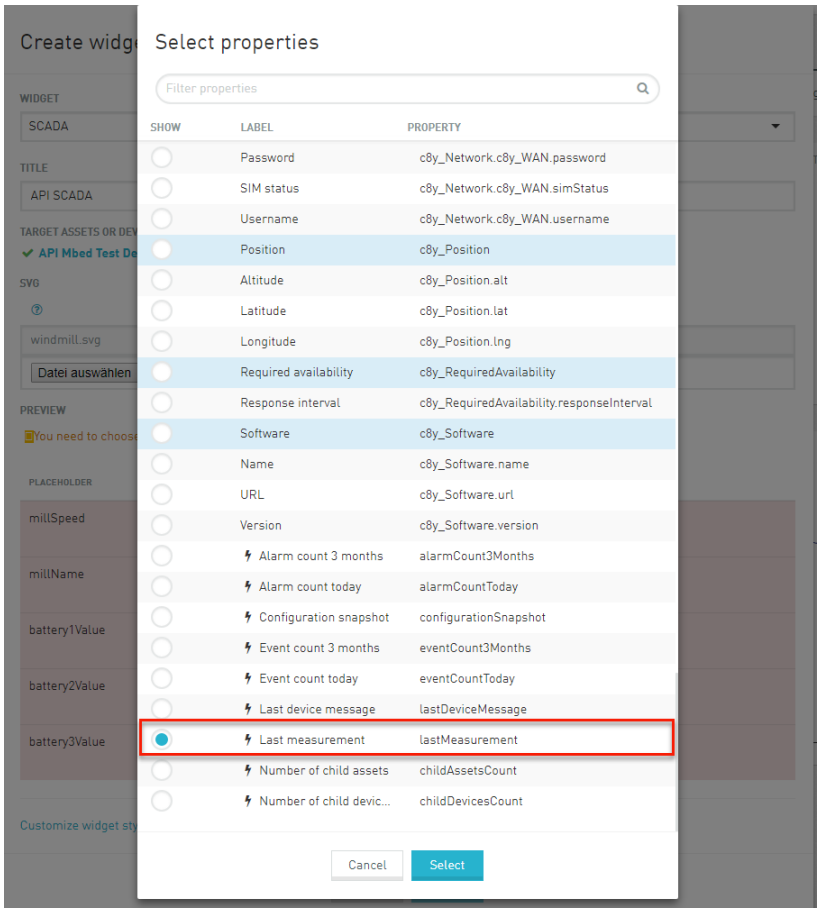
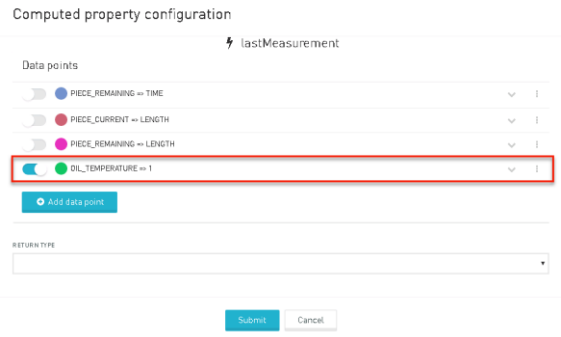


Click **Select.**

2. From the list of data points in the **Computer property configuration**, select **OIL_TEMPERATURE**



Click **Submit.**

ii. Battery2Value

1. Follow the steps as described above to map **PIECE_REMAINING => LENGTH.**

iii. Battery3Value

1. Follow the steps as described above to map **PIECE_CURRENT => LENGTH.**

iv. millSpeed

1.

v. millName

1. Follow the steps as described above to map **PIECE_REMAINING => Time**

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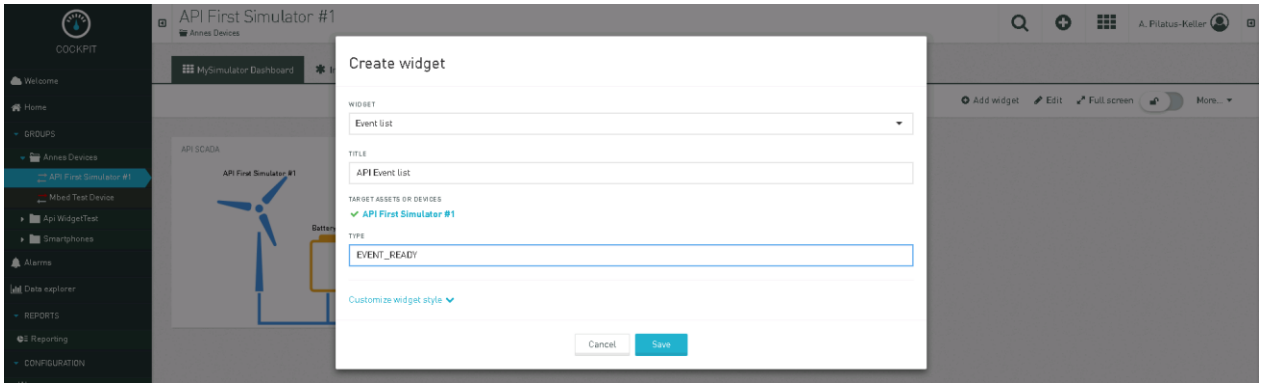
Click **Save**. Move the widget wherever you want.

18. Add another widget to show the events. From the list of widgets select **Event list**. Provide the following properties:

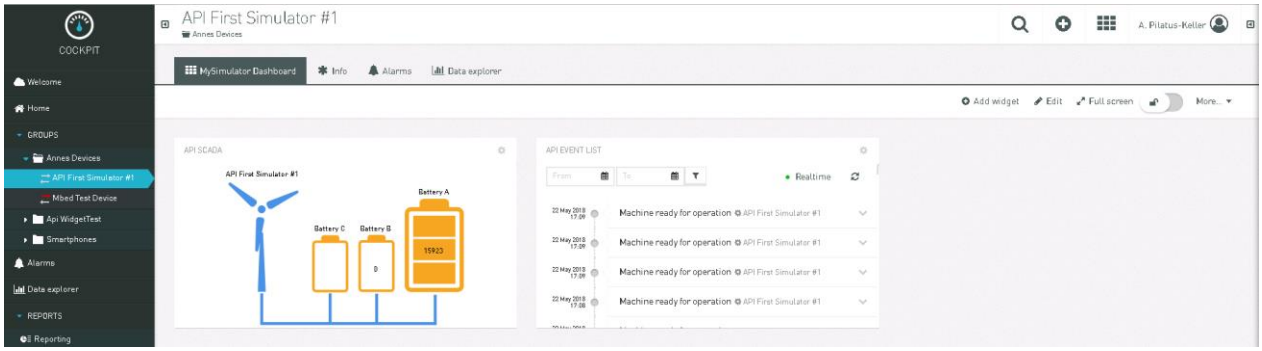
    a. **Widget:** Event List

    b. **Title:** <softwareag userid> Event list

    c. **Type:** EVENT_READY



Click **Save**.



19. Stop the Simulator.

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