SAS Solar Farm demo

**Setup instructions**

These are the steps to setup the demo environment once the NUC server is up and running:

1. Open a session on NUC either connecting directly or by an SSH session. The credentials are:
   * host name: iotshelf02
   * username: sbrcrs
   * password: sbrcrs123
2. There is a startup script that will start the ESP and Omnio containers. The same script can also be used to restart them in case the ESP dashboard stops streaming. The ESP project will stream repeatedly the input data in .csv file in a loop fashion for 50,000 times. Once this number of loops ends the server needs to be restarted.

* Turn on bash to see the active folder in the prompt. Use the command **bash**
* Make sure you are in the folder/home/sbrcrs(use the command **cd /home/sbrcrs** if necessary)
* Start/restart the containers running the script using the command: **./startup.sh .** This cleans up eventual previous running processes and starts up the ESP container and the IoT Toolbox server.

*(do not close the session, just minimize it!)*

* Open a browser (like Google Chrome) and open tabs for:
* Streamviewer: <http://iotshelf02:52500>
* Omnio webpage: <http://iotshelf02:80>
* IoT Toolbox: <http://iotshelf02:8090>

1. There are three streamviewer dashboards for this demo. Each one of them can be opened in a different page within the same browser session. For each one of them, start with the above-mentioned URL. Once the interface shows up change the dashboard to the desired one clicking on the left-most icon (‘ Show Dashboards’).

The three dashboards are:

* Data flow: Solar\_Farm\_from\_Modbus\_to ESP\_Server
* Operational management: Operational\_Dashboard
* Analytical view: Slow\_Degradation\_Analysis

Double click on the dashboard name to select it.

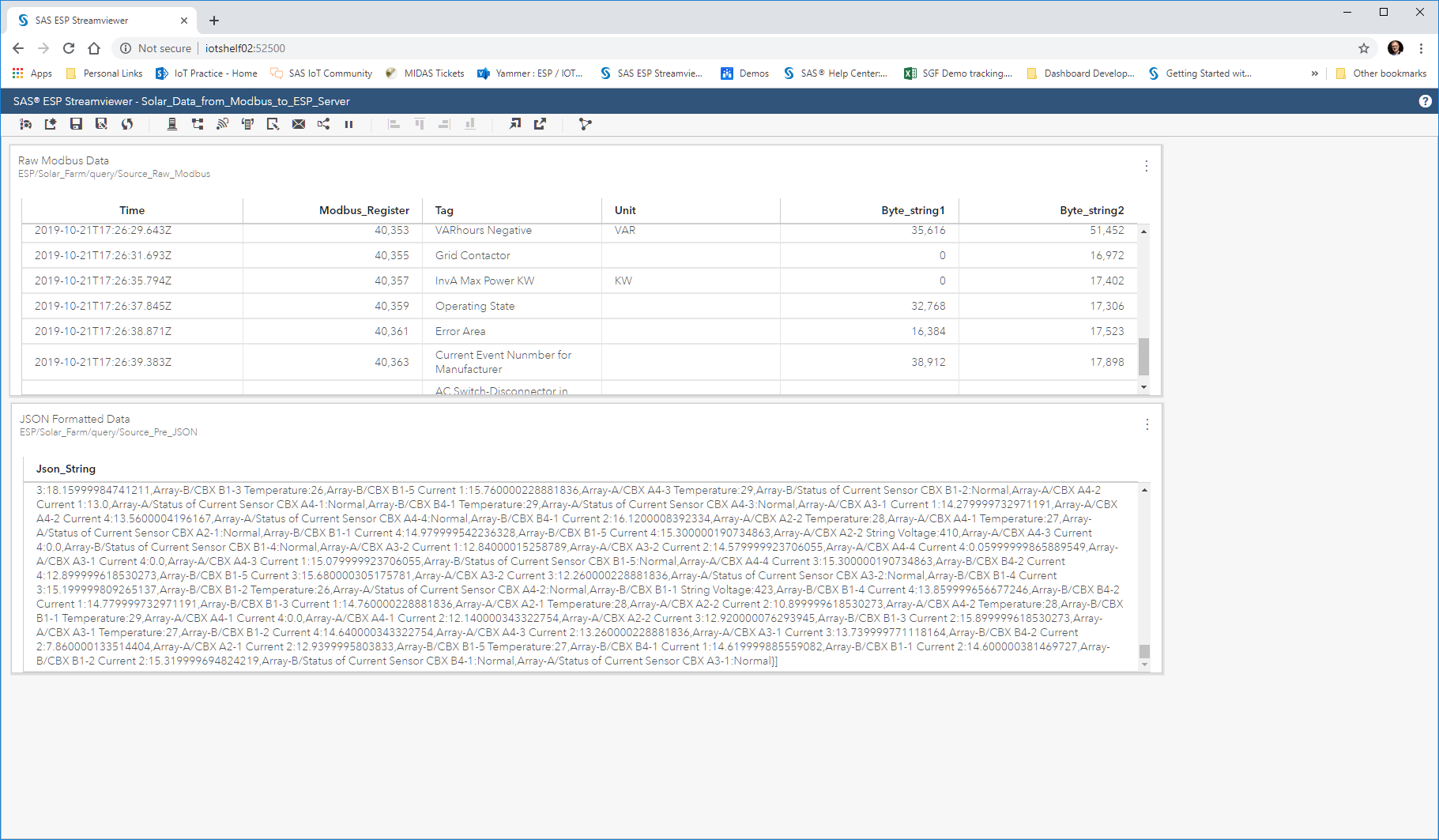
1. On the IoT Toolbox there are three dashboards that correspond to the ones in Streamviewer, but all can be selected from the same browser session. You can select the desired one from a drop box on the top-left side of the page.
2. Backup plan: All interfaces can be accessed through VPN on a NUC at the T Lab:

* Streamviewer: <http://iotnuc02:52500>
* Omnio webpage: <http://iotnuc02:80>
* IoT Toolbox: [http://iotnuc02:8090](http://iotshelf02:8090)

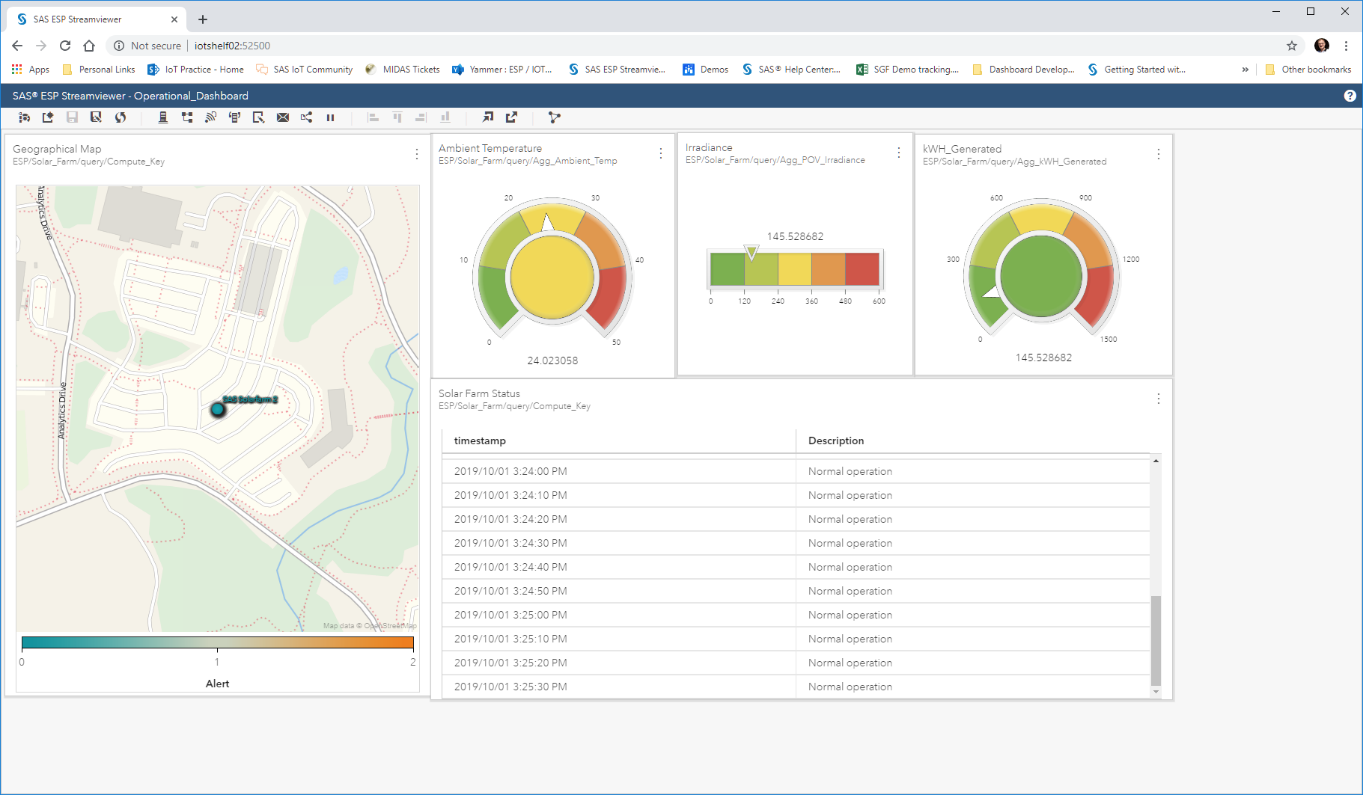
**Demo screenshots**

1. Streamviewer

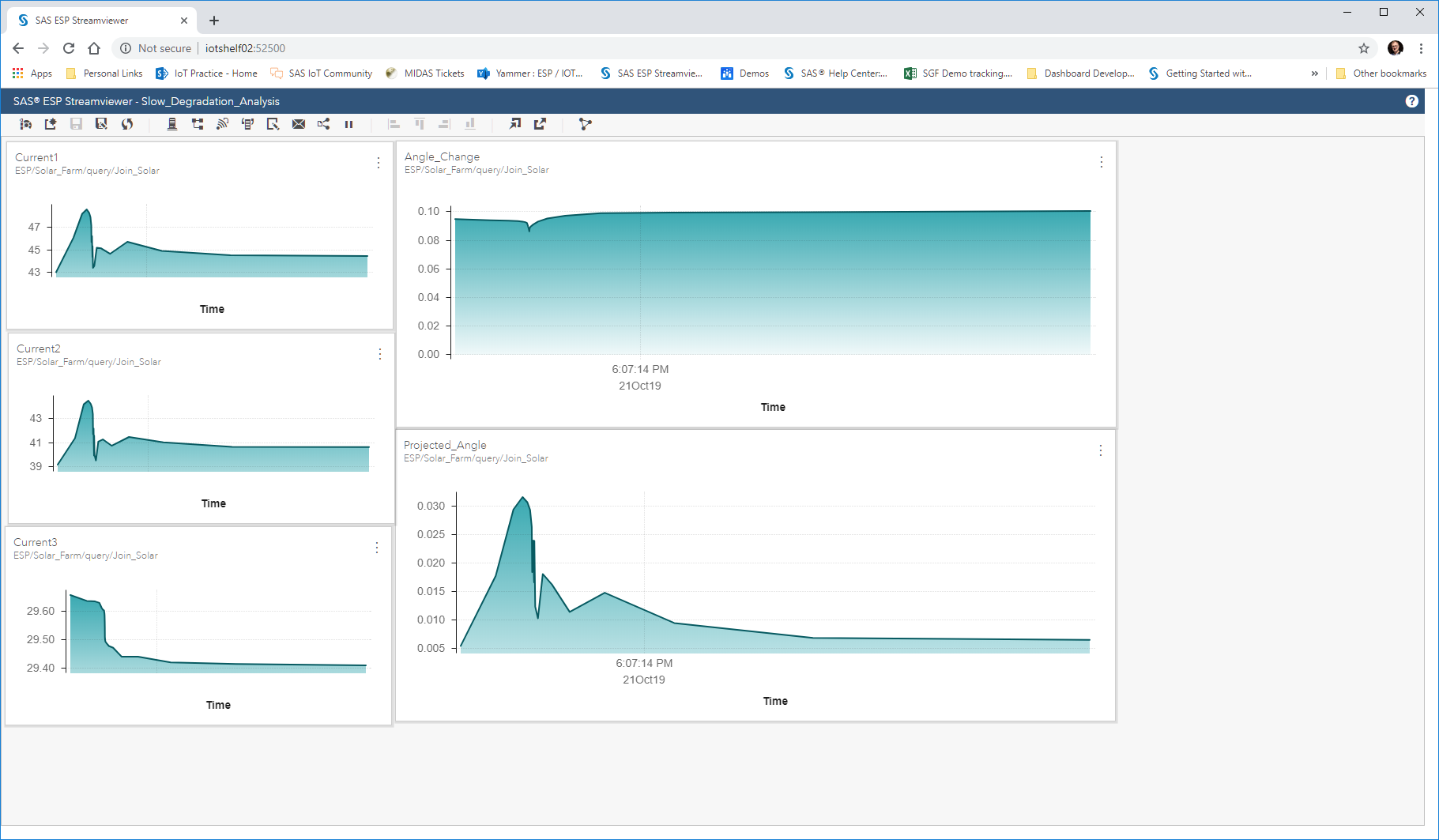
* Solar\_Farm\_from\_Modbus\_to ESP\_Server



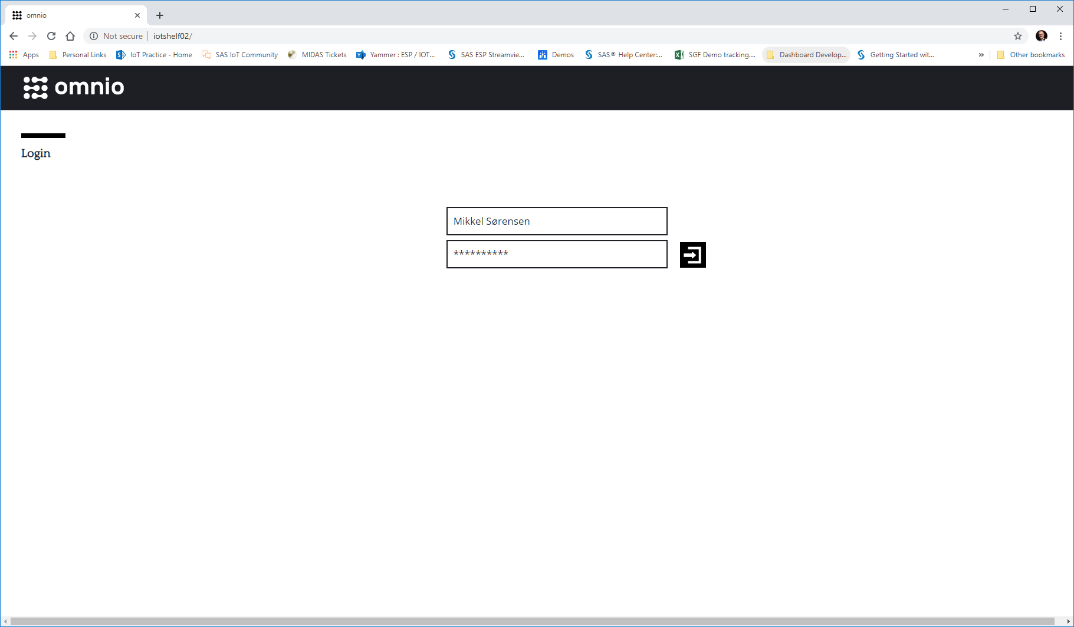
* Operational\_Dashboard

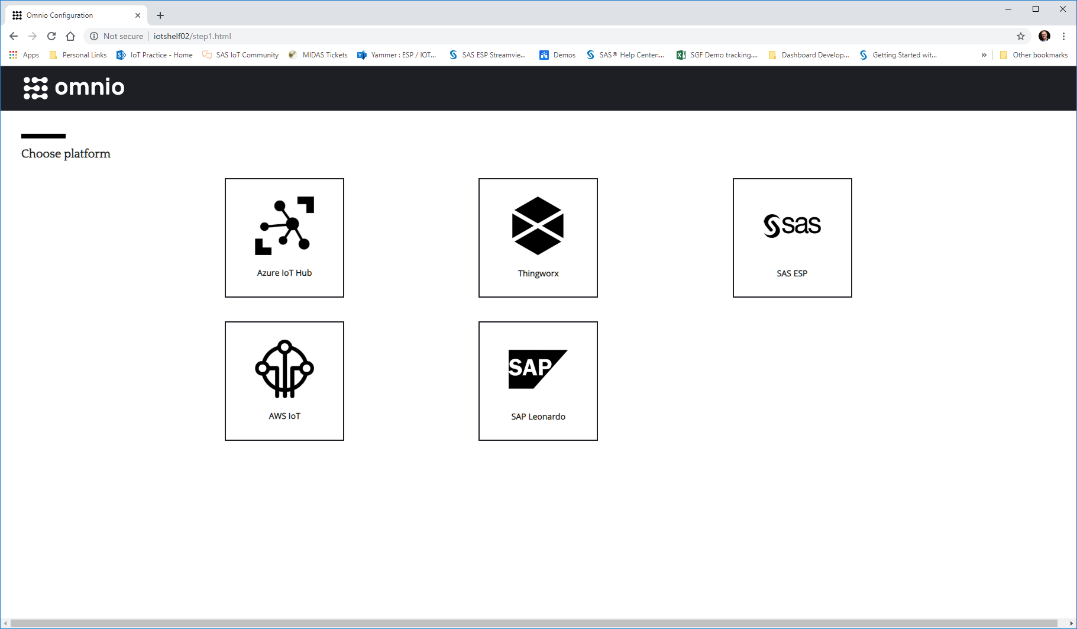


* Slow\_Degradation\_Analysis

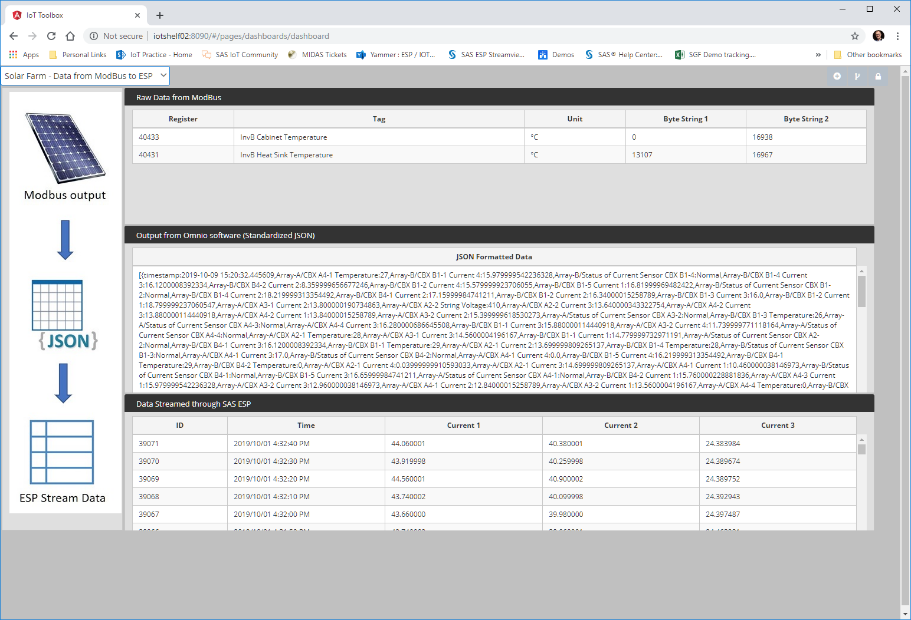
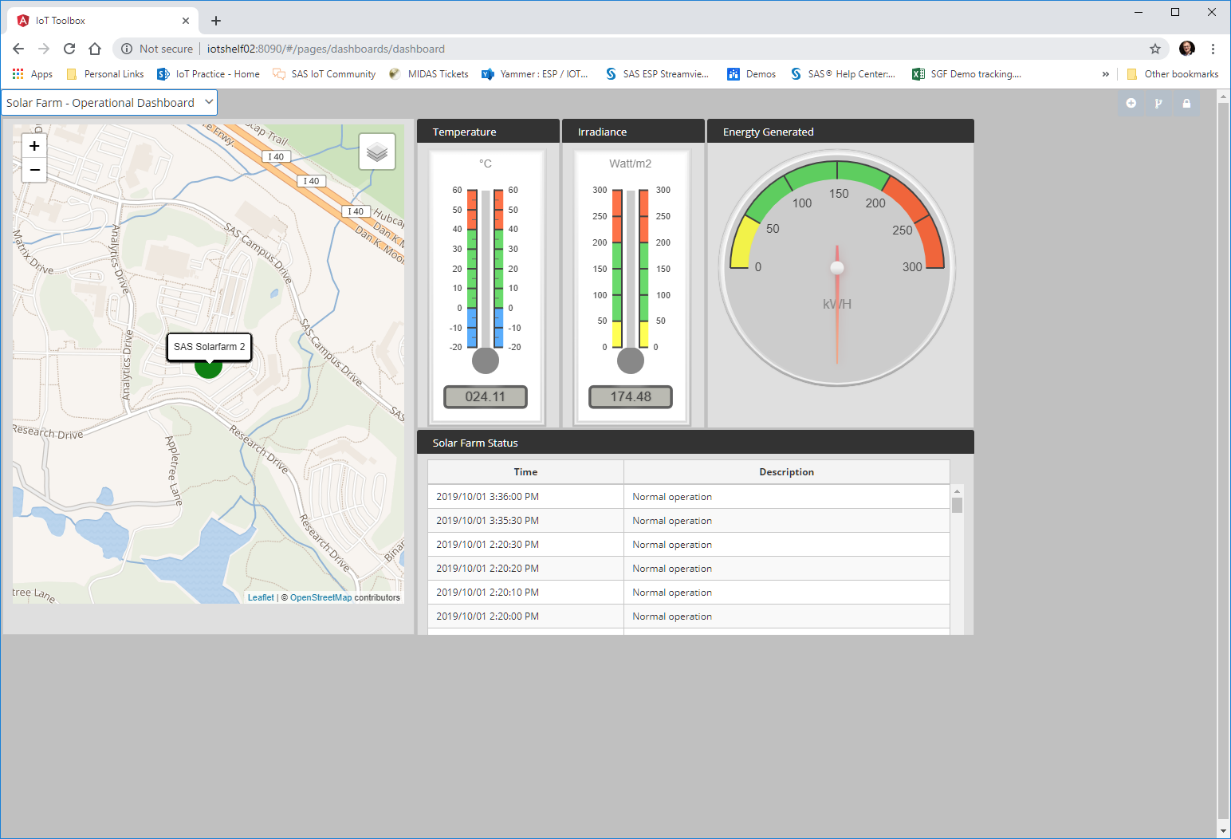


1. Omnio webpage

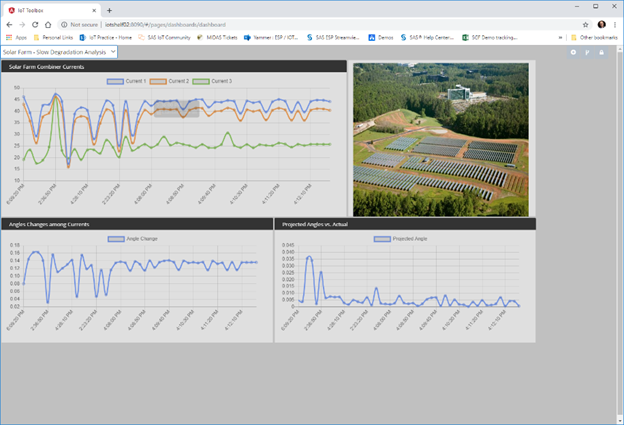


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1. IoT Toolbox Dashboard

* Solar Farm – Data from Modbus to ESP
* Solar Farm – Operational Dashboard

* Solar Farm – Slow Degradation Analysis

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**The Data**

In this demo we are using data collected from the SAS Solar Farm during a day. Due the nature of solar farm data we collected it only during the day hours as during night time the is no energy being produced and all data would be zero.

In the creation of this demo we used Omnio software to convert the data from the native format received from the Modbus to a standardized JSON format that is then ingested by the ESP input connector.

For the purpose of the demo being presented we are using data previously collected and stored in a .csv file. Data is read by ESP in a loop fashion.

Some facts about the data:

* Data contains information from a solar farm combiner (energy, current, etc.) collected from 8 am to 6 pm on a day in Oct 2019
  + .csv file has 1500 events (rows)
  + Data loops 50000 times until ESP needs to be restarted
  + Each loop takes 2-3 minutes
* Additional climate information was also collected for the same period and stored in a separate .csv file