RFLink Gateway & Weather on HomeSeer HS3 using Node-Red and MQTT

This is a guide to integrate the following with HomeSeer HS3 using Node-Red and the mcsMQTT plugin:

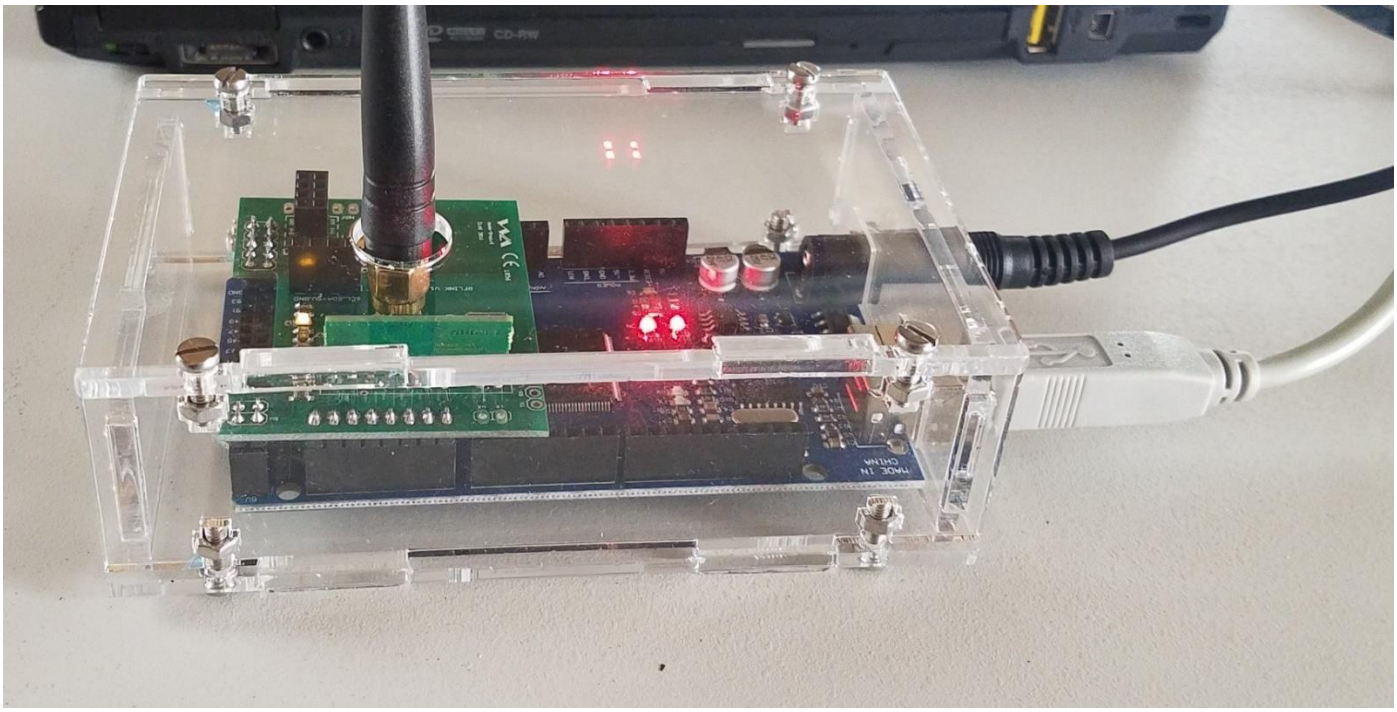
- RFLink Gateway with 433Mhz temperature/humidity sensors.
- Weather Underground API for current weather. (New free WU API keys are not available. Existing free API keys still work for now)
- Dark Sky API for next day forecast

Also shown is a way to easily visualize the live weather data with the Node-Red Dashboard

Step 1:

Assemble the RFLink Gateway and install firmware.

RFLink is a low cost 433Mhz RF gateway that has extensive protocol and device support. The gateway can be put together using one of the kits available here. They also have a soldering service if you do not want to do it yourself. I used this kit with the acrylic enclosure. Here is a picture of the assembled gateway:



Download and install the RFLink firmware on the gateway. I used a Windows 10 PC and the RFLink Loader software included in the downloaded files.

Make sure the 433Mhz sensors you are planning to use are supported by the gateway. I used the AcuRite 592TXR temp/humidity sensors. You will know that the gateway can decode the sensor's data if you see something like this when the Serial Port logging in the RFLink Loader software is turned on:

```
20;01;AcuriteV2;ID=29f4;TEMP=00f1;HUM=50;BAT=OK;
```

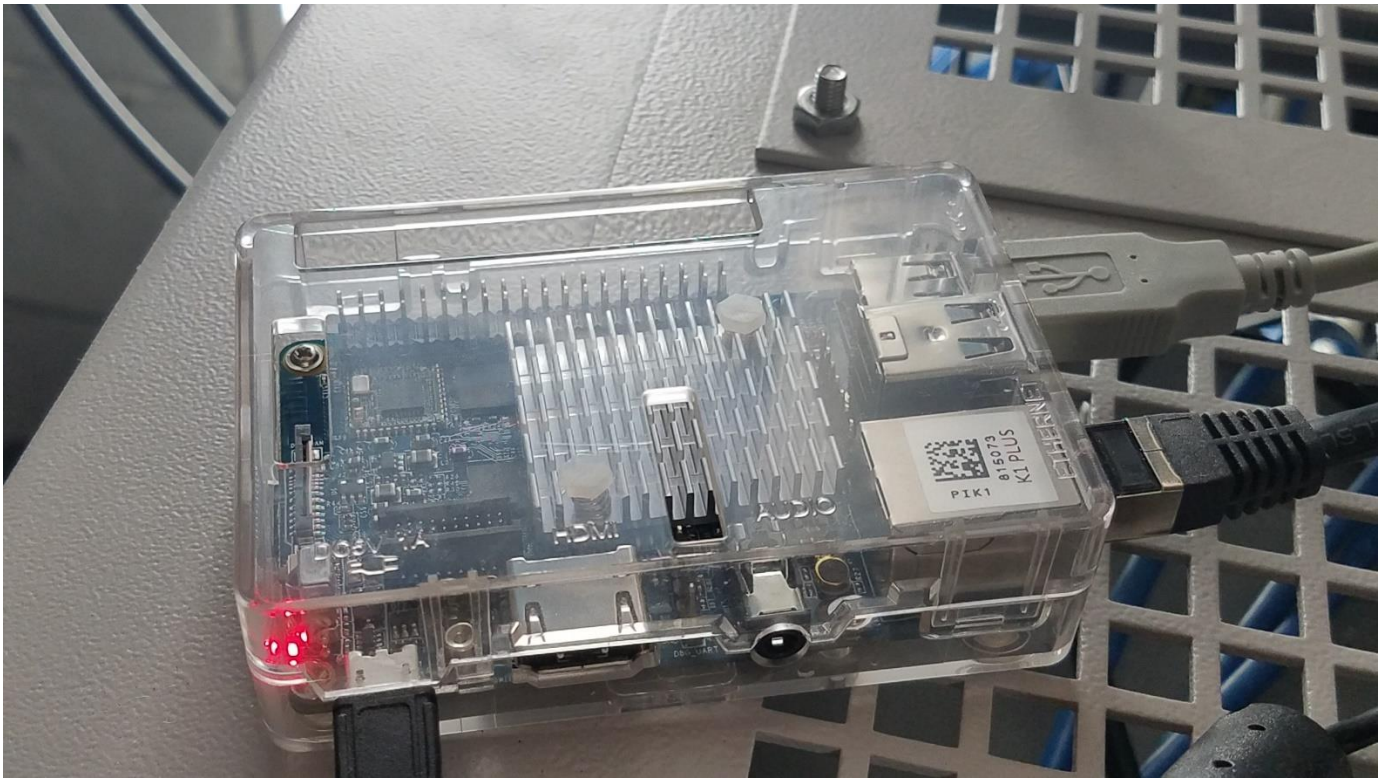
Step 2:

Install Node-Red and Mosquitto MQTT Broker.

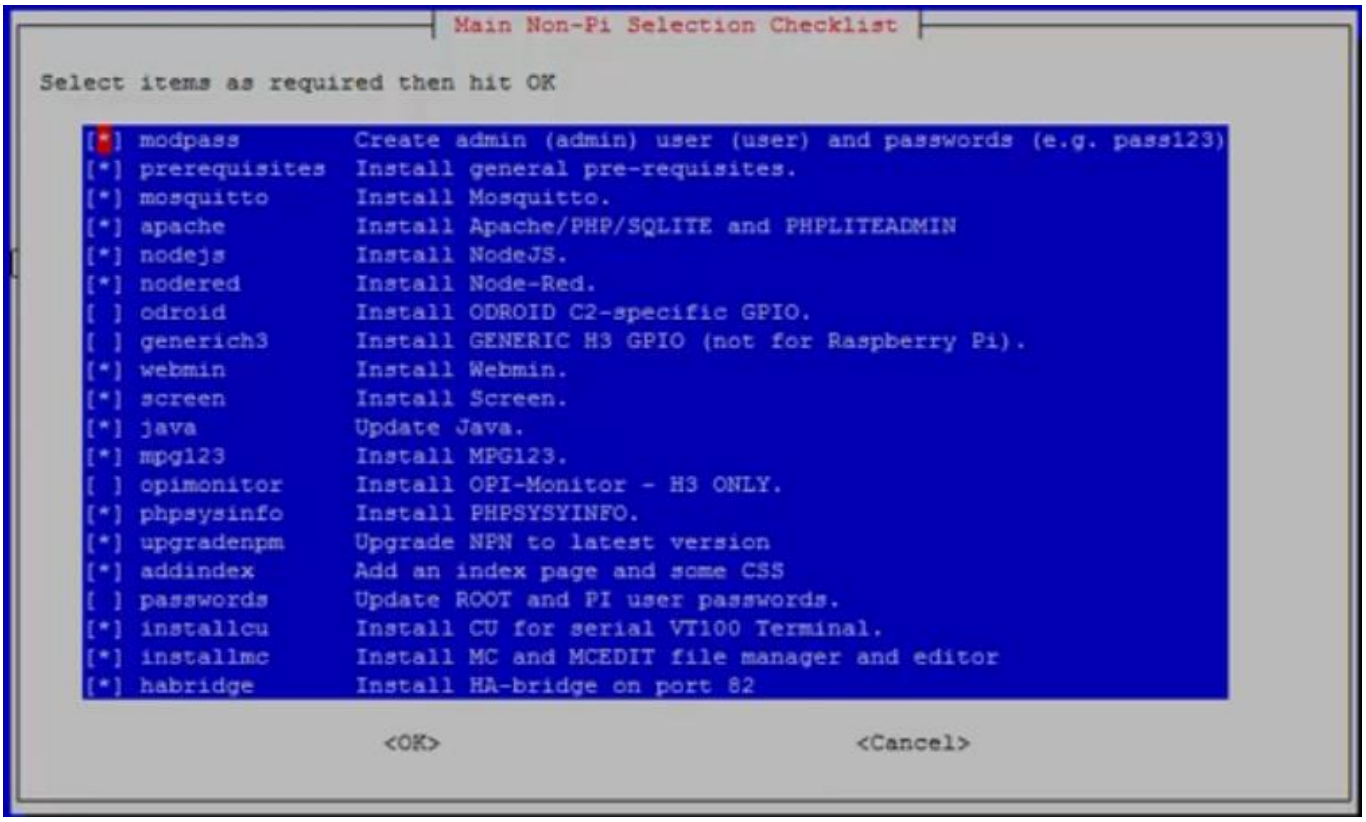
Node-Red is an easy to use open-source flow based programming tool for IoT. I am not a coder and have zero programming experience, yet after some reading on the internet and tinkering with the tool have found it to be very powerful and flexible. For one thing, Node-Red together with the MQTT protocol and the mcsMQTT plugin makes it possible to build integrations to HomeSeer for many devices and services that have no available HS3 plugins.

Mosquitto is an MQTT Broker that works with the HS3 mcsMQTT Plugin. A very good explanation of how MQTT works is available here.

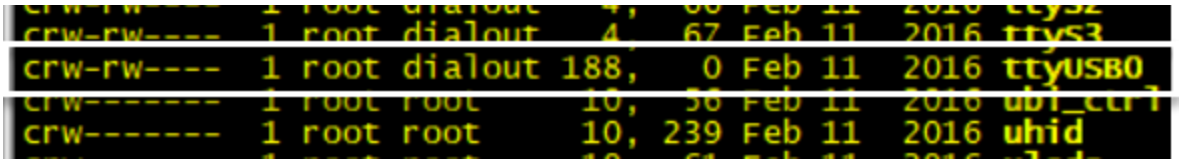
An easy way to install Node-Red and Mosquitto is to use Pete Scargill's "The Script" on a Raspberry Pi or Pi clone. I deployed Node-Red and Mosquitto on a Nano Pi K1 Plus running the FriendlyArm version of Ubuntu 16.04 LTS. Here's the installation wiki. A picture of the device is below:



“The Script” has options to install other software in addition to Node-Red and Mosquitto and you can make the choices from the main menu. The script runs unattended and can take between 20 min to 3 hours to complete depending on the software being installed, speed of the device and internet connection. Pay close attention to setting up usernames and passwords at the beginning of the script.



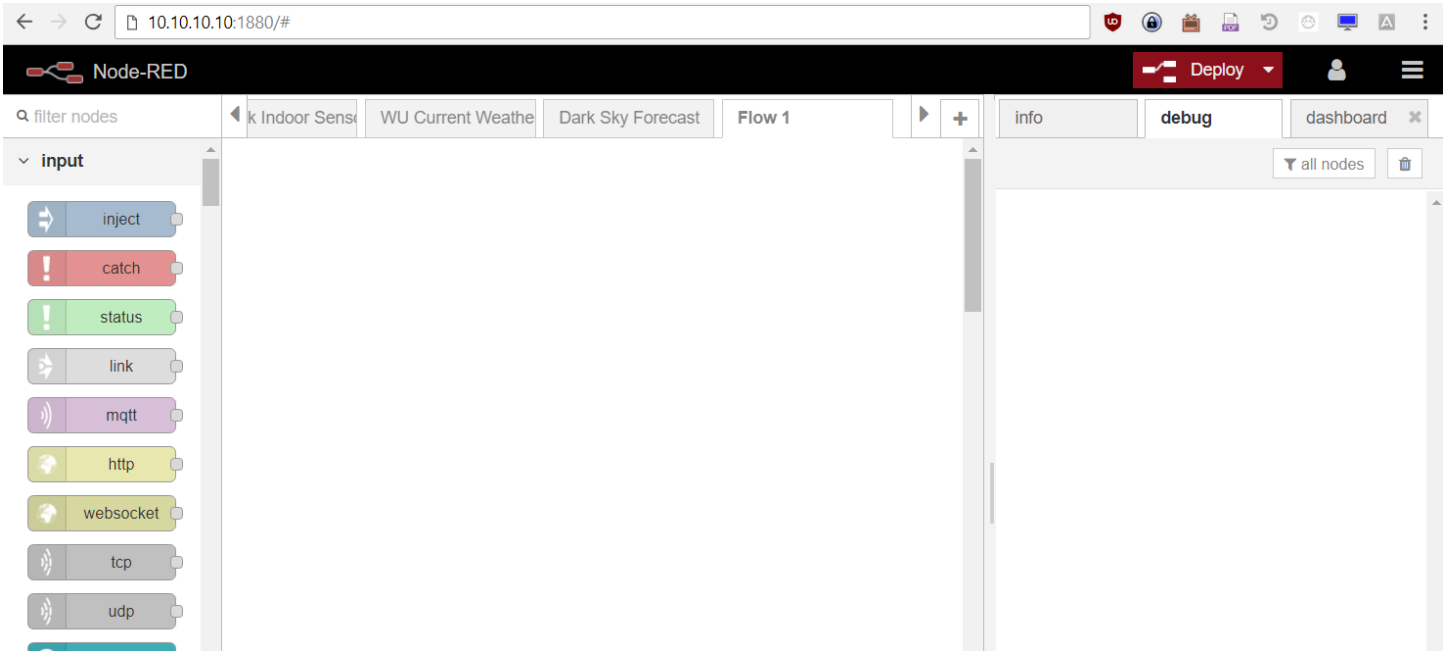
Connect the RFLink gateway to the Node-Red server’s USB port. Make note of the USB port that RFLink is connected to (typically /dev/ttyUSB0 or /dev/ttyUSB1) and make sure that RW permissions to the port are given to the non-root user.



Step 3:

Configure Node-Red Flows

Browse to the IP address of the Node-Red/Mosquitto server on port 1880 to see the Node-Red interface as shown below:

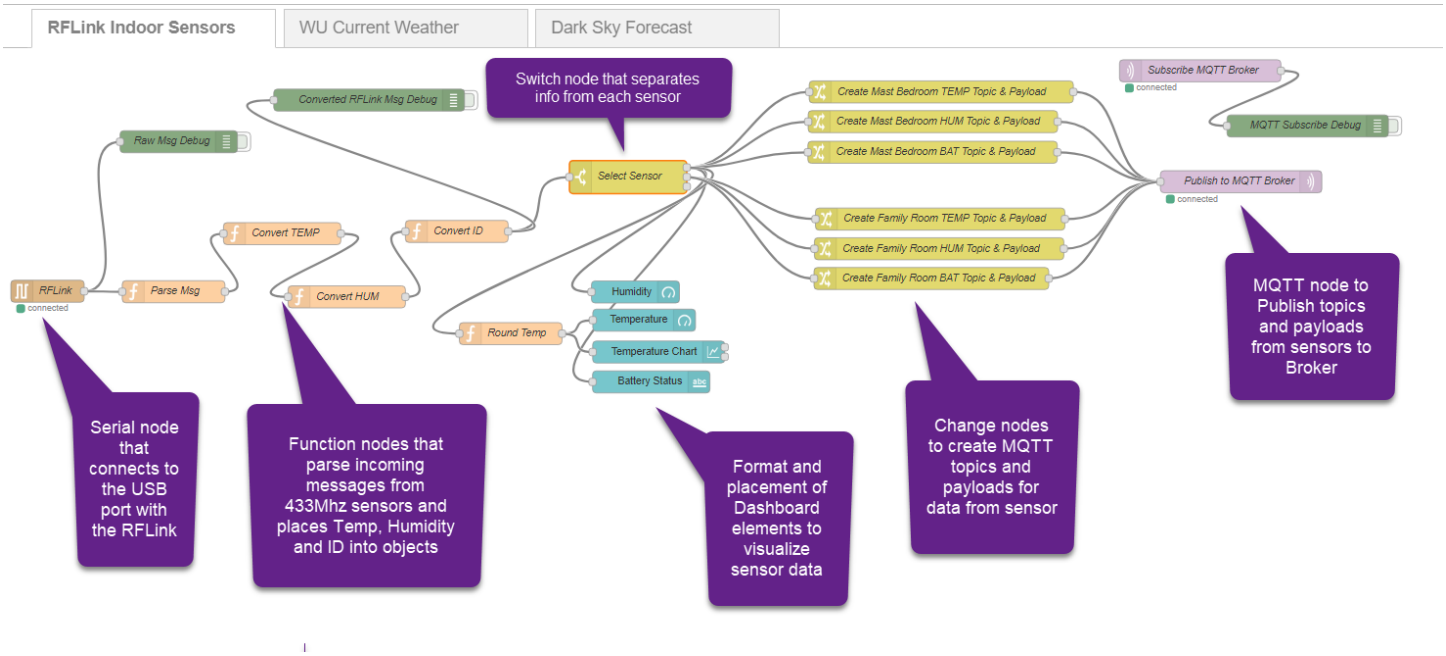


Demonstrating the usage of Node-Red is out of the scope of this guide, but there are many excellent resources on the web that do a great job of this. Here is a good one on Node-Red Basics.

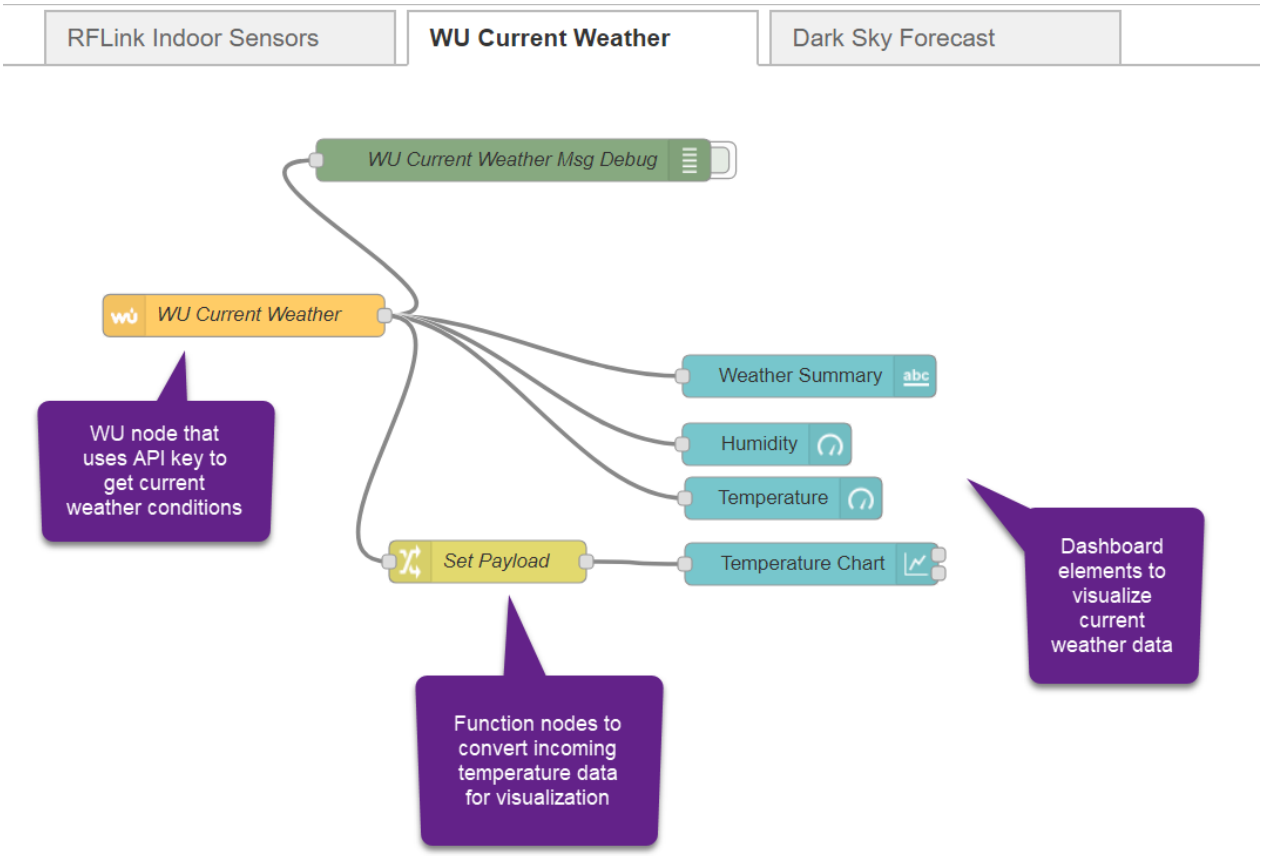
Following are annotated screenshots of the three Node-Red flows that are utilized to process the AcuRite 433Mhz sensor data, Weather Underground current weather and Dark Sky forecast for visualization and MQTT publishing. The parsing, conversion and sensor selection flows come from Pete Scargill's RFLink blog post and is explained in this YouTube video

These flows can be downloaded from here and imported into your Node-Red instance.

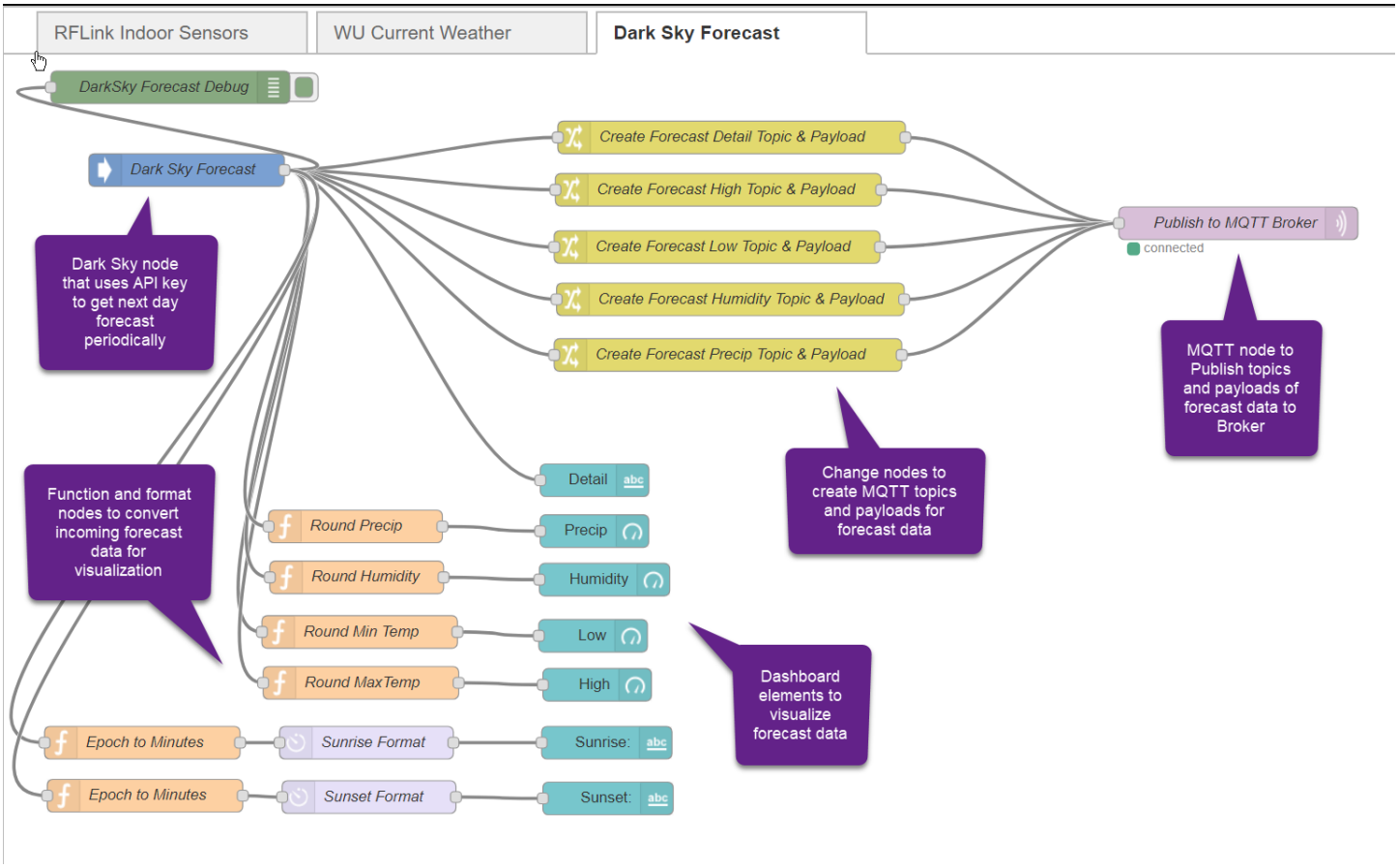
RFLink Indoor Sensors



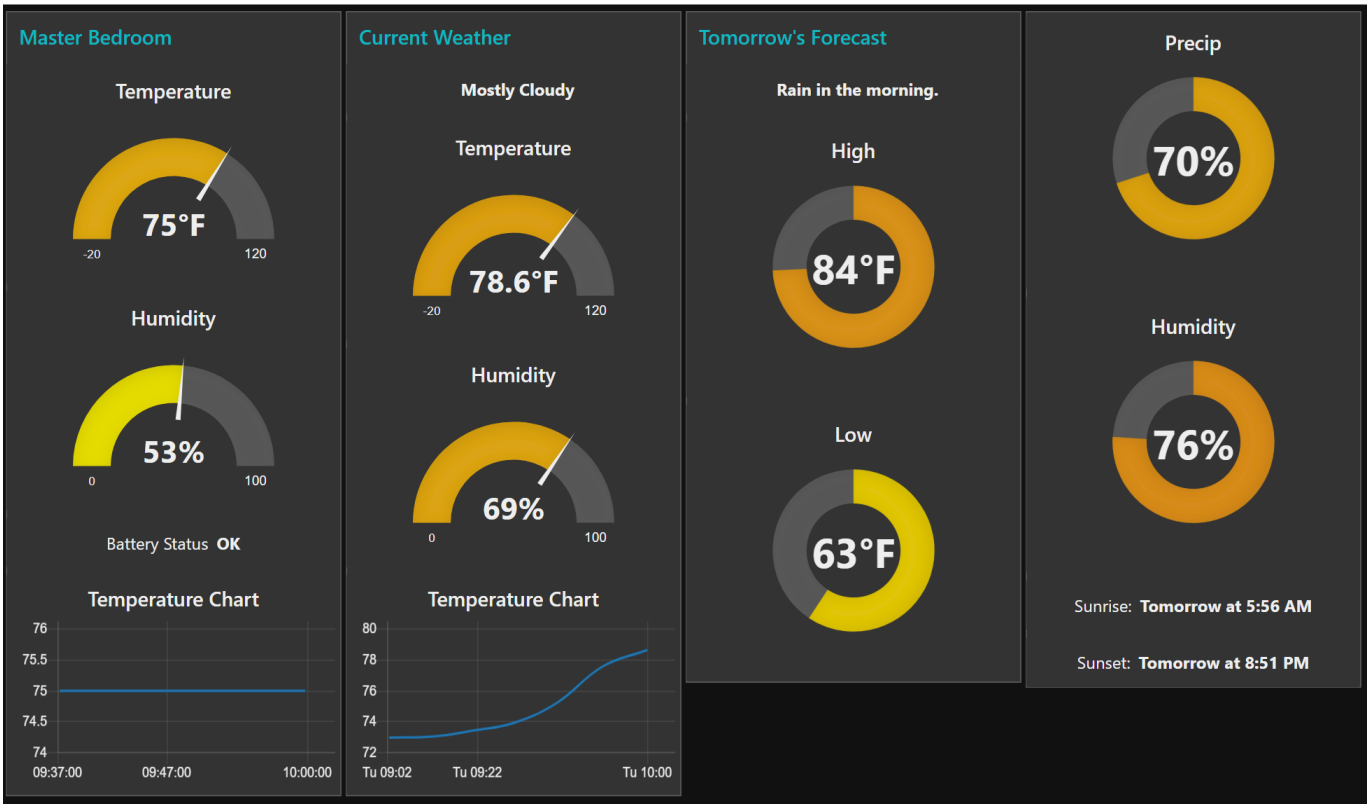
Weather Underground Current Weather



Dark Sky Forecast



Browse to this Node-Red URL to see the Node-Red Dashboard: http://node-red-ip-address:1880/ui



Step 4:

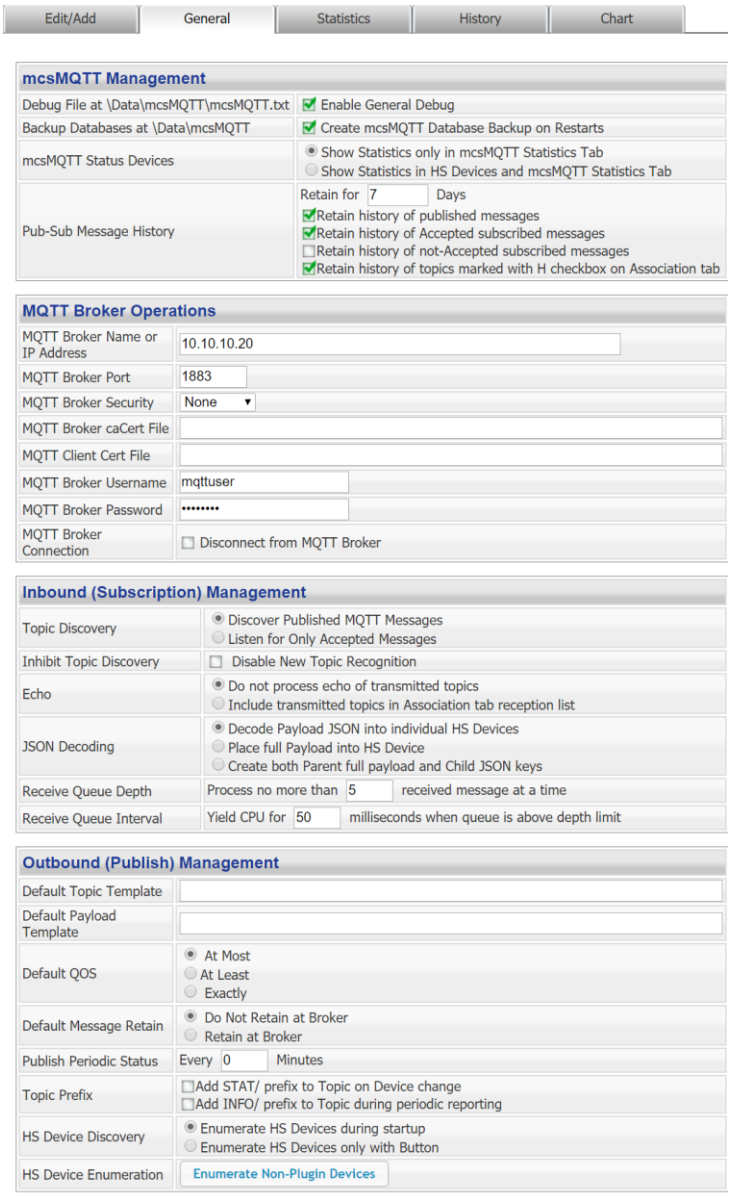
Install the HS3 mcsMQTT plugin and create sensor data devices.

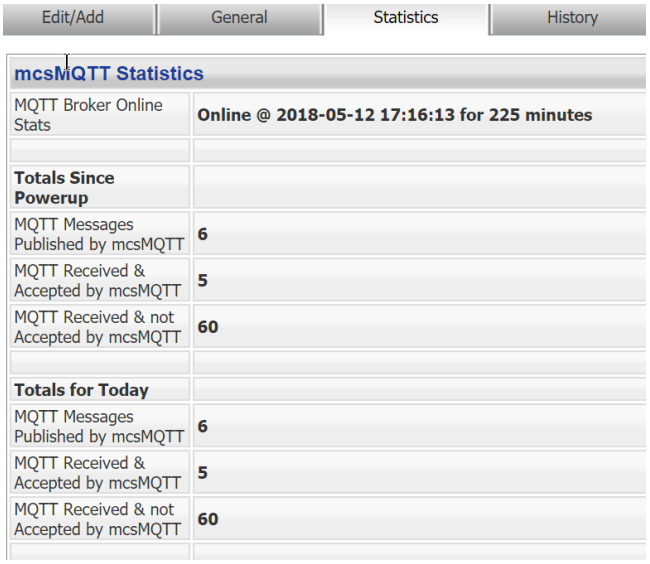
The mcsMQTT Plugin is free and available under the “Lighting and Primary Technology” section of the HS3 Updater. There are many options available with this plugin that are beyond the scope of this guide. Refer to the plugin manual for all the details.

	LutronRA2 Release Info	Plug-in		3.0.0.97	Free to try $59.95 to buy BUY NOW	donmor
	mcsMQTT Release Info	Plug-in	3.4.1.0	3.4.1.0	Free	Michael McSharry
	mcsXap Release Info	Plug-in		3.0.0.69	Free	Michael McSharry

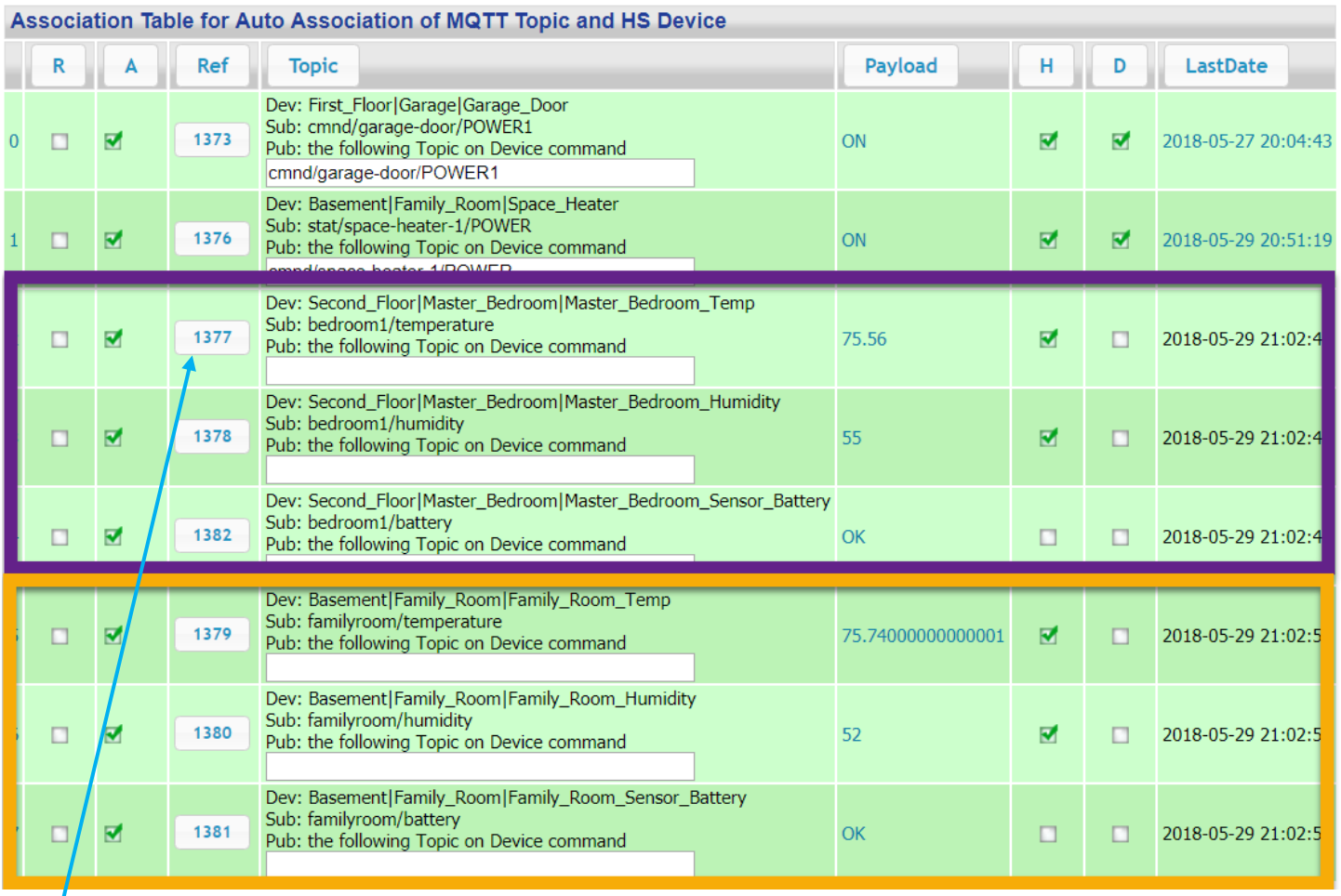
Here are the General and Statistics tabs of the mcsMQTT Plugin Setup page.

- Input the MQTT Broker details in the “MQTT Broker Operations” section to connect to it.





- Go to the “Associations” tab and refresh the page. The sensor topics and payloads for Temperature, Humidity and Battery from each sensor published by the Node-Red RFLink flow should now be seen.
- Click on the “A” checkbox corresponding to each Topic. This will create a device in HS3 and display the Device Ref # on the same row – as shown below.
- The Association table should now look like this:



Association Table for Auto Association of MQTT Topic and HS Device

	R	A	Ref	Topic	Payload	H	D	LastDate
0	☐	☑	1373	Dev: First_Floor|Garage|Garage_Door Sub: cmnd/garage-door/POWER1 Pub: the following Topic on Device command cmnd/garage-door/POWER1	ON	☑	☑	2018-05-27 20:04:43
1	☐	☑	1376	Dev: Basement|Family_Room|Space_Heater Sub: stat/space-heater-1/POWER Pub: the following Topic on Device command	ON	☑	☑	2018-05-29 20:51:19
	☐	☑	1377	Dev: Second_Floor|Master_Bedroom|Master_Bedroom_Temp Sub: bedroom1/temperature Pub: the following Topic on Device command	75.56	☑	☐	2018-05-29 21:02:4
	☐	☑	1378	Dev: Second_Floor|Master_Bedroom|Master_Bedroom_Humidity Sub: bedroom1/humidity Pub: the following Topic on Device command	55	☑	☐	2018-05-29 21:02:4
	☐	☑	1382	Dev: Second_Floor|Master_Bedroom|Master_Bedroom_Sensor_Battery Sub: bedroom1/battery Pub: the following Topic on Device command	OK	☐	☐	2018-05-29 21:02:4
	☐	☑	1379	Dev: Basement|Family_Room|Family_Room_Temp Sub: familyroom/temperature Pub: the following Topic on Device command	75.74000000000001	☑	☐	2018-05-29 21:02:5
	☐	☑	1380	Dev: Basement|Family_Room|Family_Room_Humidity Sub: familyroom/humidity Pub: the following Topic on Device command	52	☑	☐	2018-05-29 21:02:5
	☐	☑	1381	Dev: Basement|Family_Room|Family_Room_Sensor_Battery Sub: familyroom/battery Pub: the following Topic on Device command	OK	☐	☐	2018-05-29 21:02:5

Clicking on the Ref # button will bring up the page below. I added an Expression to round up the Temp number to one decimal point. This can also done in the Status Graphics tab of the HS3 Device Configuration. I also chose to display a graphic in the Device List page for the Temp device – so I unchecked the “No Graphics Display” box.

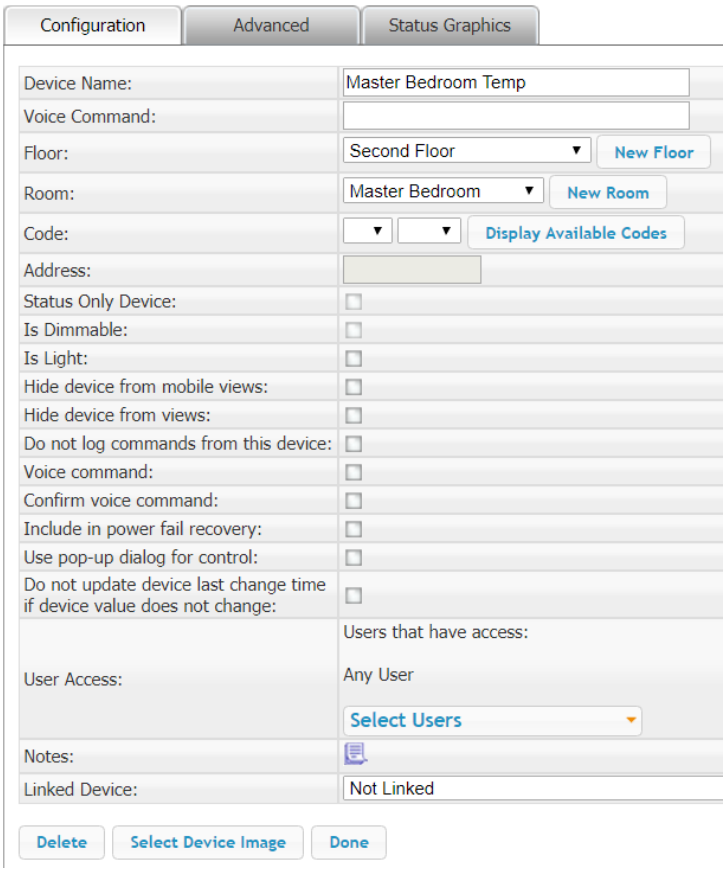
Start with Either Existing Device Ref or Subscribe Topic

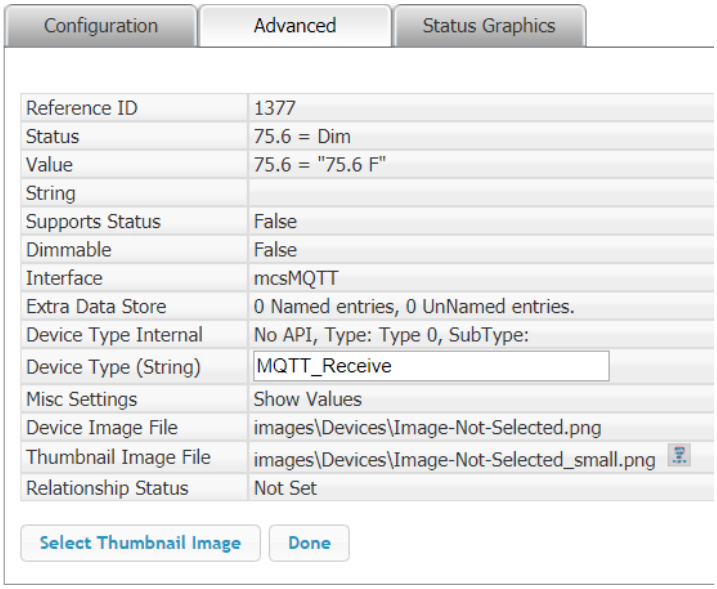
Ref: 1377	Sub: bedroom1/temperature	Delete Sub and Ref

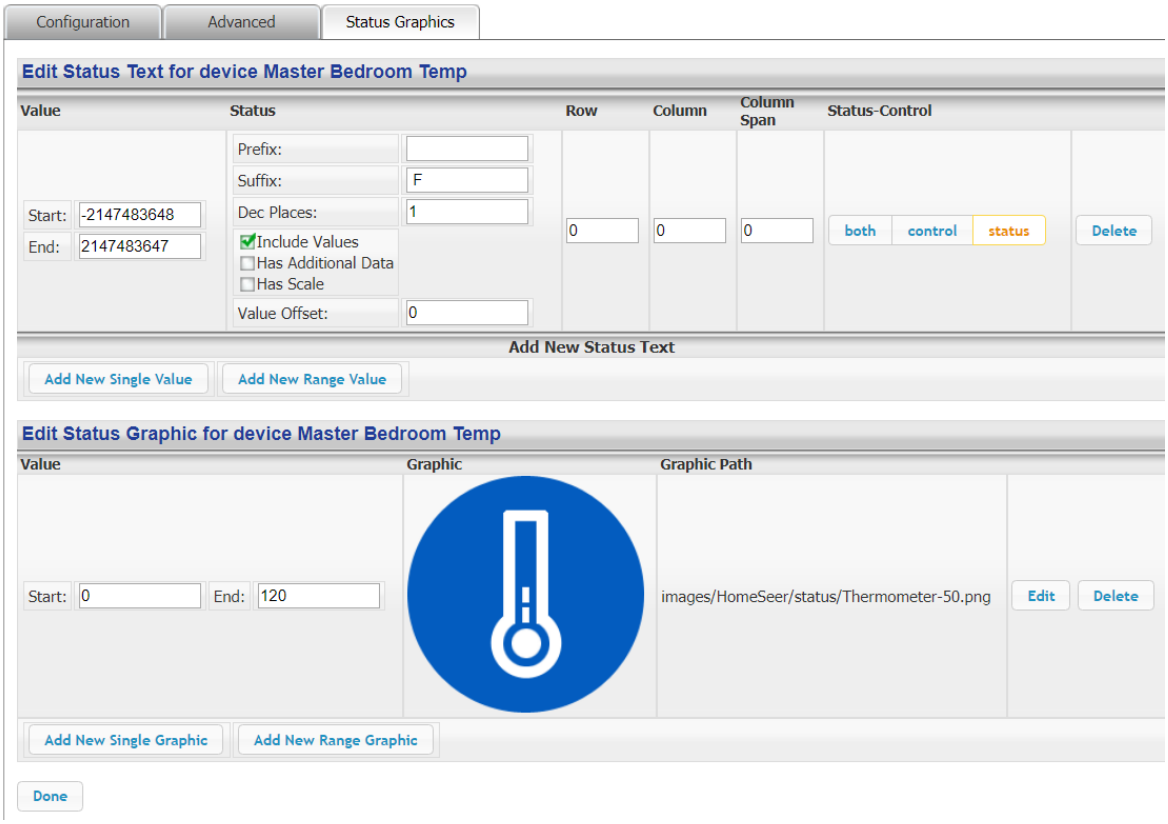
Edit Setup or Edit of Subscription (Inbound) to a MQTT Topic

MQTT Subscribe Topic	bedroom1/temperature
Payload RegEx Match Pattern	
Payload RegEx Replace Pattern	
Payload RegEx Operation	(•) Replace Match Pattern with Replace Pattern ( ) Extract Match Pattern
Low Pass Filter	Filter sensitivity of 1 (range is 0.00 to 1.00 (most sensitive))
Expression	round($$PAYLOAD:,1)
Add Rate Device	☐ Create a HS Rate Device with rate sensitivity of 0.75 (Range 0.00 to 1.00) ( ) Per Second ( ) Per Minute (•) Per Hour
Add Accum Device	☐ Create a HS Accum Device ( ) No Reset ( ) Accumulation Since Midnight (•) Delta Since Midnight
Settings for Plugin Device	
HS Device Publish Topic	
HS Device Control/Status UI	( ) Unspecified ( ) Button (•) Number ( ) Text ( ) List ( ) ColorPicker
HS Device VSP List	
HS Device MISC Properties	☐ NO_STATUS_DISPLAY ☐ NO_GRAPHICS_DISPLAY ☐ AUTO_VOICE_COMMAND ☐ SET_DOES_NOT_CHANGE_LAST_CHANGE ☑ SHOW_VALUES ☐ STATUS_ONLY
Publish Payload Template	
Publish QOS	( ) At Most ( ) At Least (•) Exactly
Publish Retain Flag	(•) Do not retain ( ) Retain at broker
Settings for Non-Plugin Device	
Control non-Plugin	

Here are the Device Configuration tabs for the **Master Bedroom Temp** device:







Here are the resulting devices for the Master Bedroom sensor:

☐	55 %	Second Floor	Master Bedroom	Master Bedroom Humidity	Today 9:28:34 PM
☐	OK	Second Floor	Master Bedroom	Master Bedroom Sensor Battery	Today 9:28:34 PM
☐	75.6 F	Second Floor	Master Bedroom	Master Bedroom Temp	Today 9:28:34 PM

The process for adding the Dark Sky forecast devices is similar to the previous steps.

Please ask questions and discuss on the HS3 Forums.

Enjoy!!

-taylormia