

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:

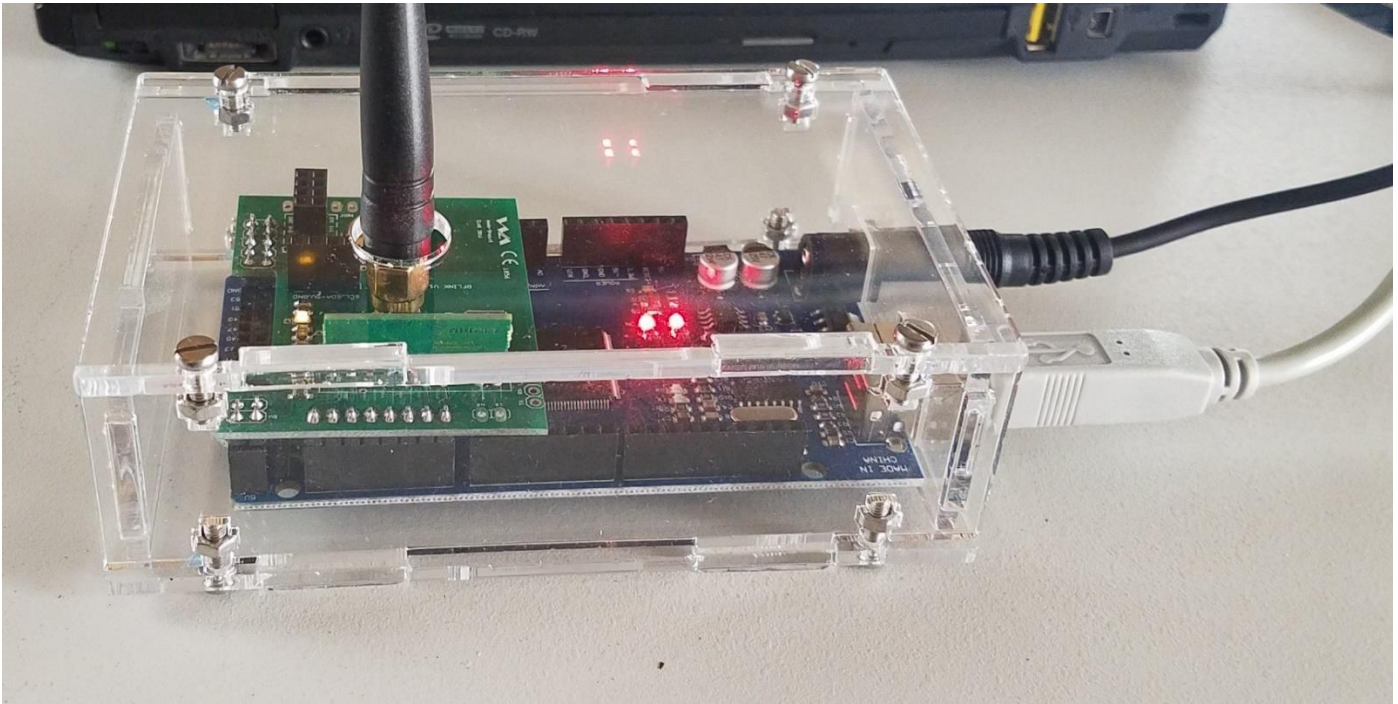
- [RFLink Gateway](#) with 433Mhz temperature/humidity sensors.
- Weather Underground API for current weather. (New free WU API keys are not available. Existing free API keys still work for now)
- [Dark Sky API](#) for next day forecast

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;
```

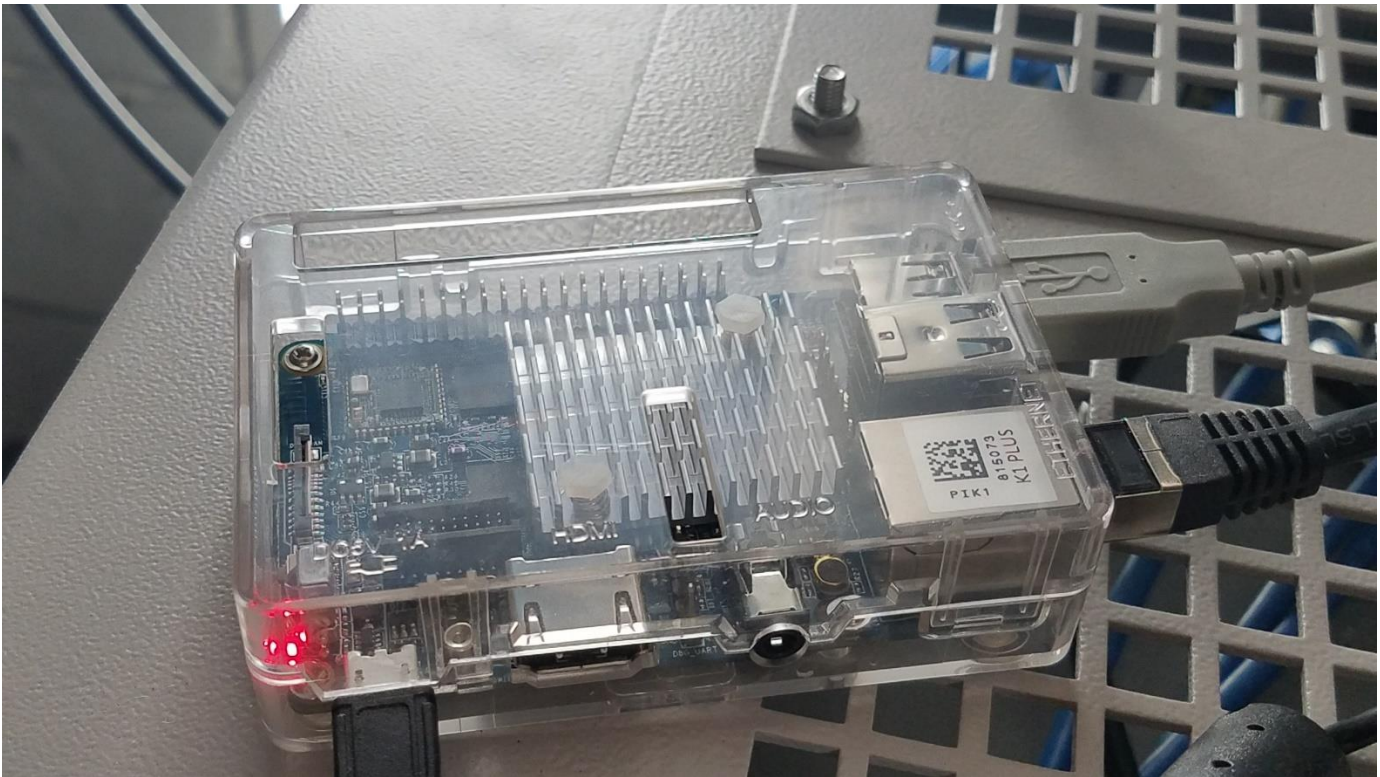
Step 2:

Install Node-Red and Mosquitto MQTT Broker.

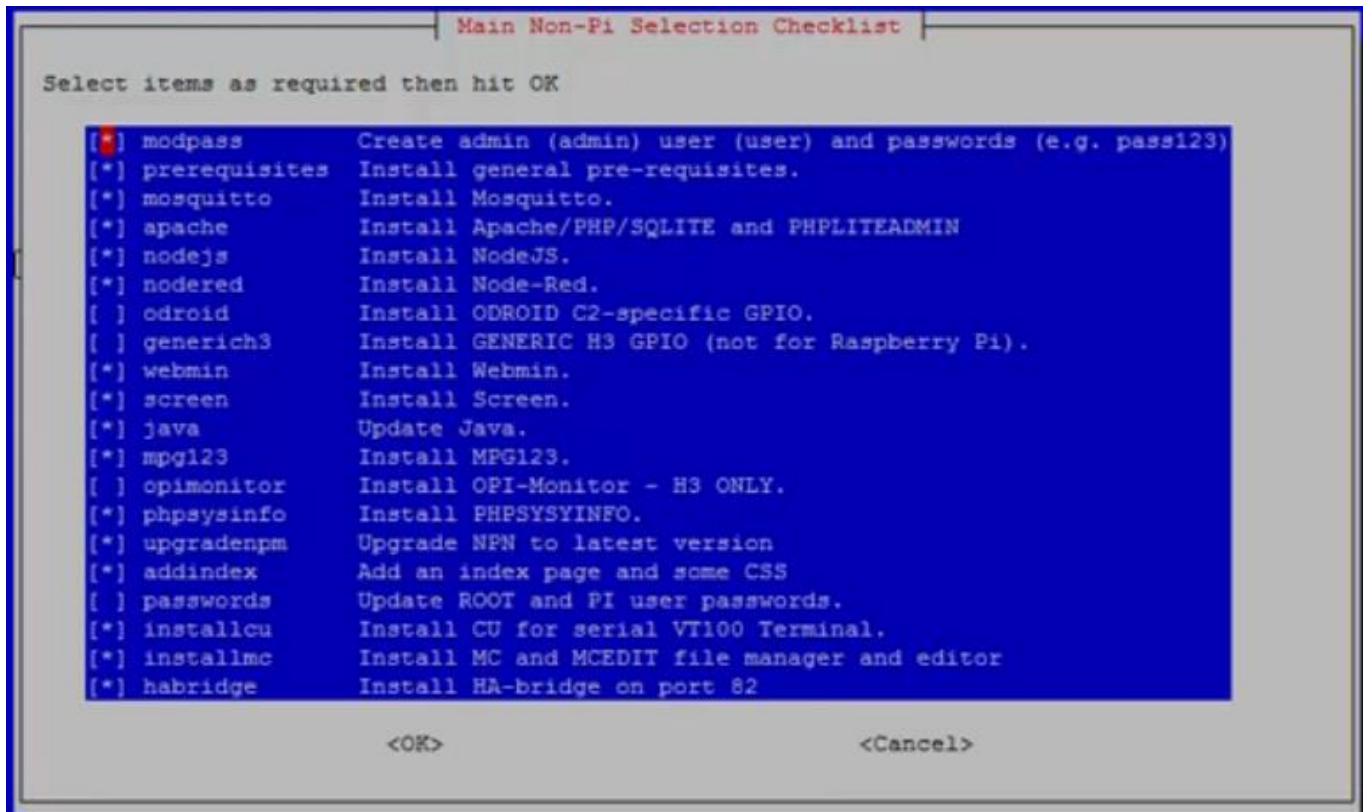
[Node-Red](#) is an easy to use open-source flow based programming tool for IoT. I am not a coder and have zero programming experience, yet after some reading on the internet and tinkering with the tool have found it to be very powerful and flexible. For one thing, Node-Red together with the MQTT protocol 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.



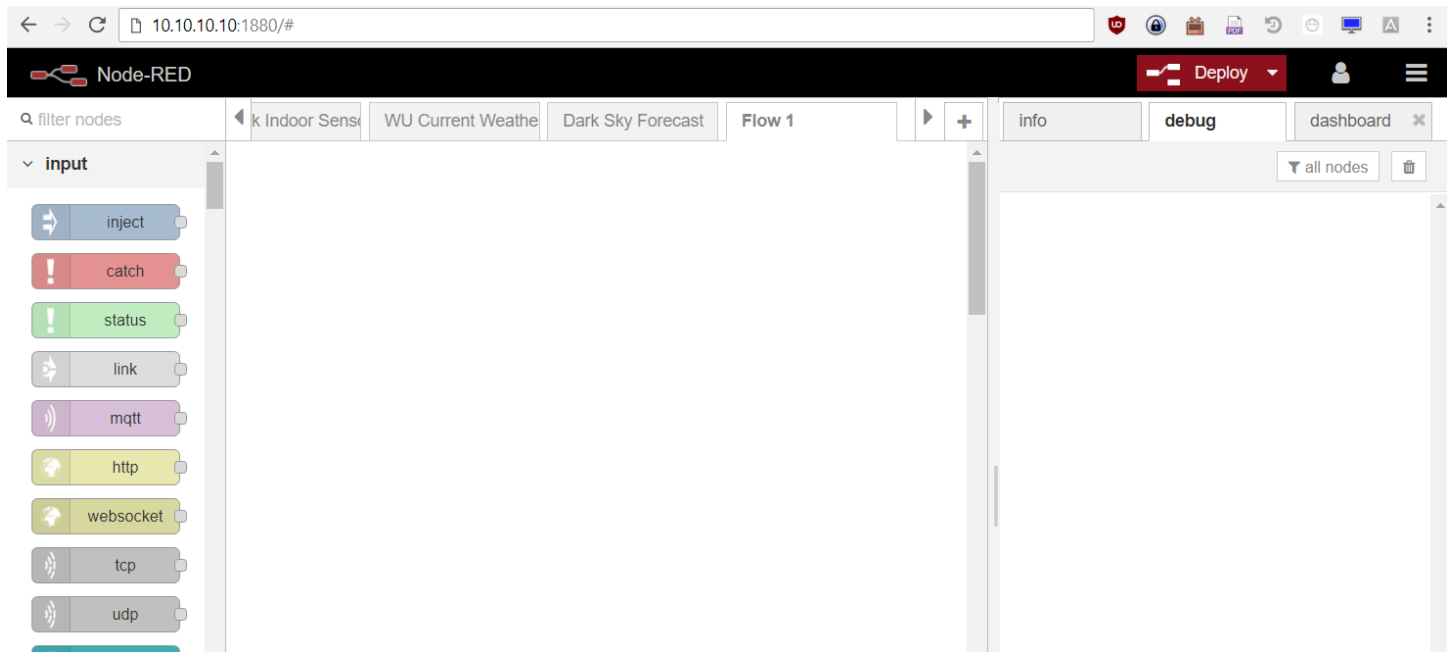
Connect the RFLink gateway to the Node-Red server’s USB port. Make note of the USB port that RFLink is connected to (typically /dev/ttyUSB0 or /dev/ttyUSB1) and make sure that RW permissions to the port are given to the non-root user.

```
crw-rw---- 1 root dialout 4, 66 Feb 11 2016 ttyS2
crw-rw---- 1 root dialout 4, 67 Feb 11 2016 ttyS3
crw-rw---- 1 root dialout 188, 0 Feb 11 2016 ttyUSB0
crw-rw---- 1 root root 10, 58 Feb 11 2016 ubi_ctrl
crw-rw---- 1 root root 10, 239 Feb 11 2016 uhid
```

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:

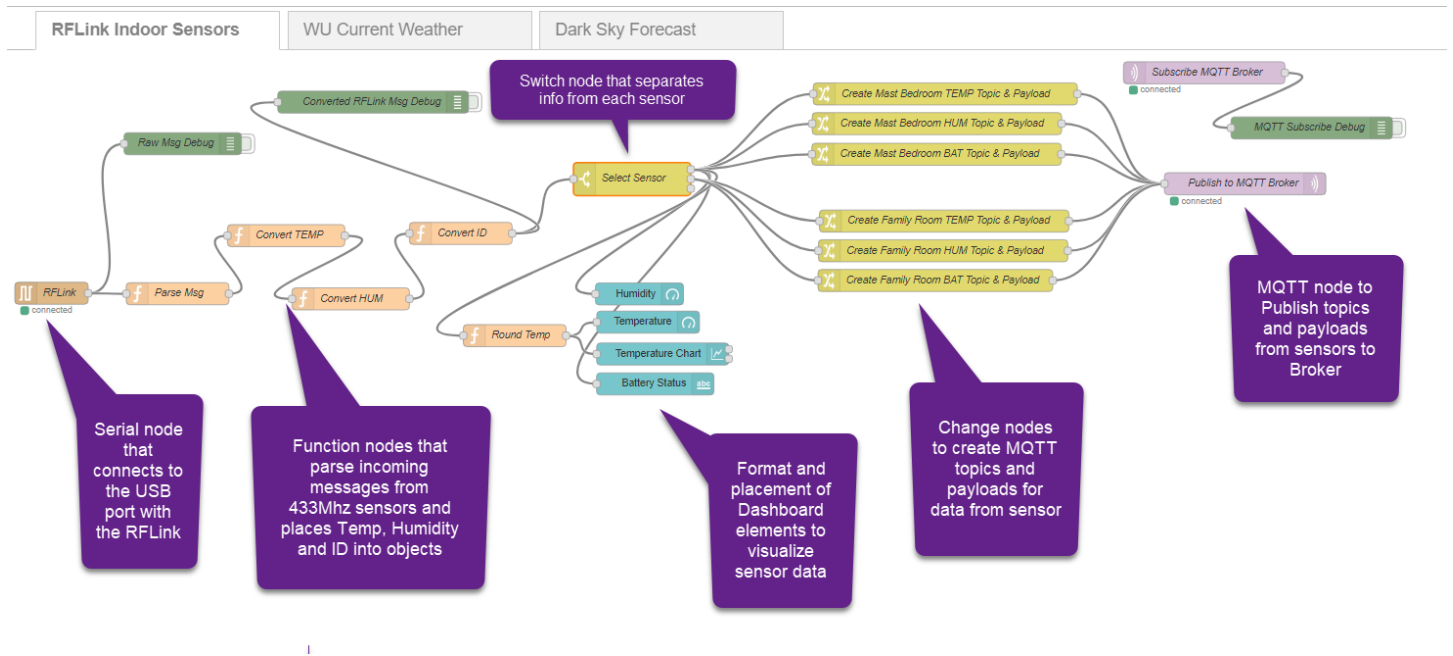


Demonstrating the usage of Node-Red is out of the scope of this guide, but there are many excellent resources on the web that do a great job of this. Here is a good one on [Node-Red Basics](#).

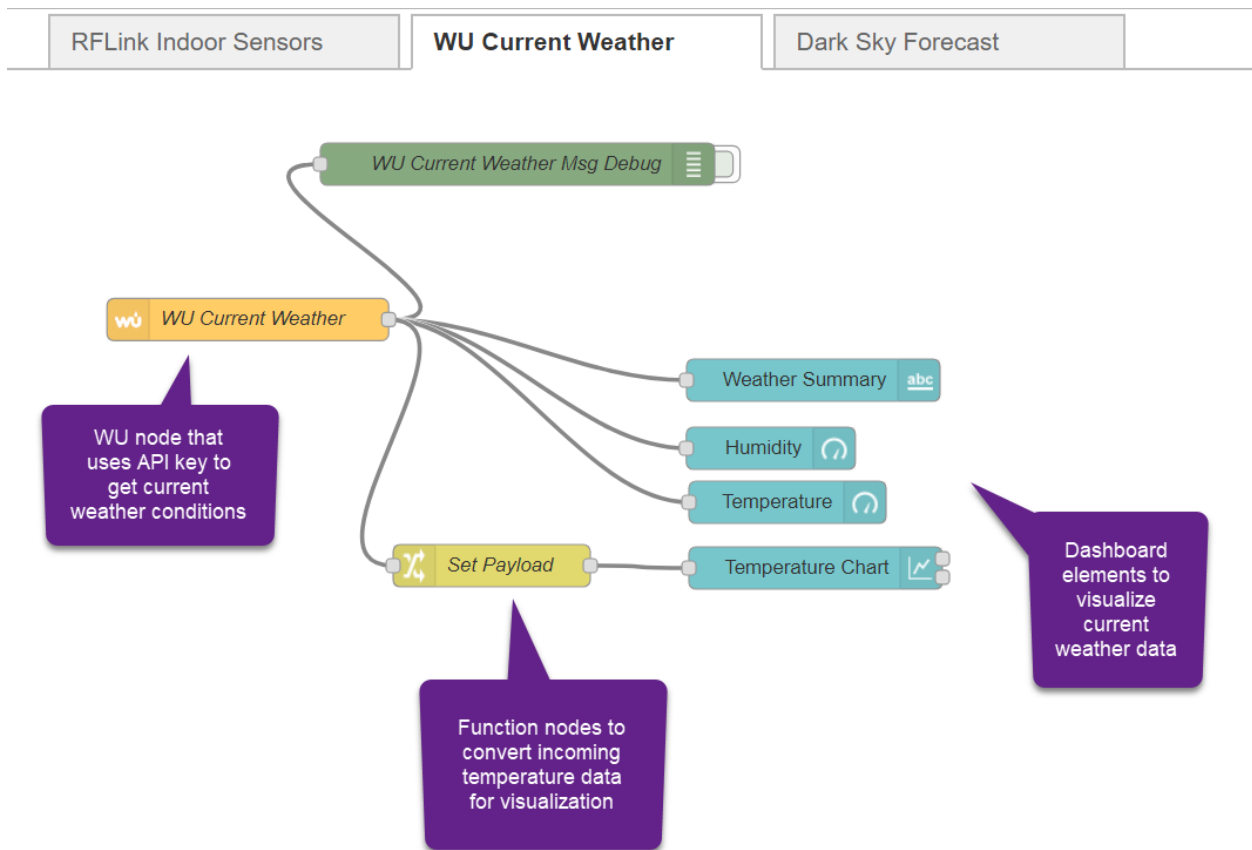
Following are annotated screenshots of the three Node-Red flows that are utilized to process the AcuRite 433Mhz sensor data, Weather Underground current weather and Dark Sky forecast for visualization and MQTT publishing. The parsing, conversion and sensor selection flows come from Pete Scargill's [RFLink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

These flows can be [downloaded from here](#) and imported into your Node-Red instance.

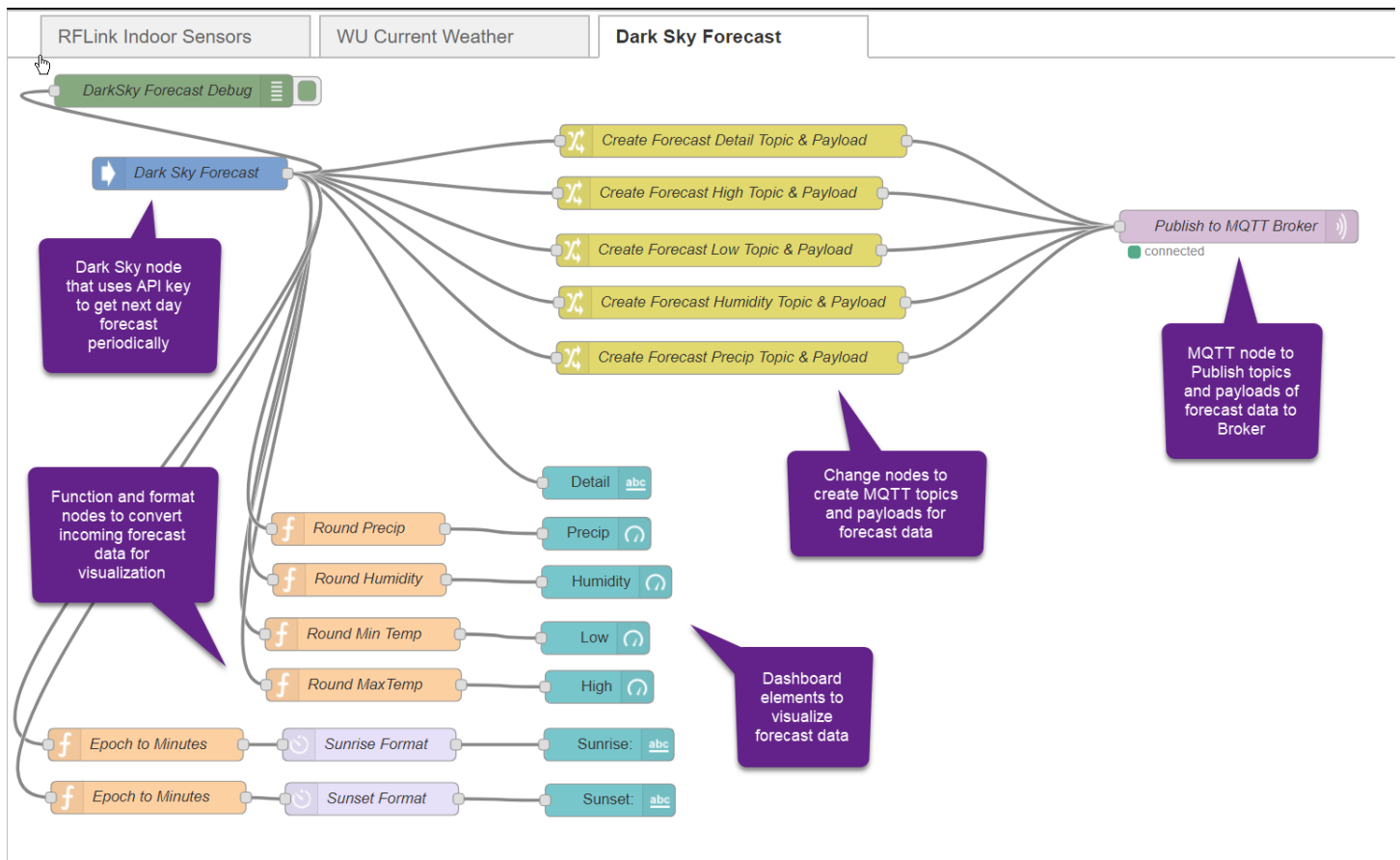
RFLink Indoor Sensors



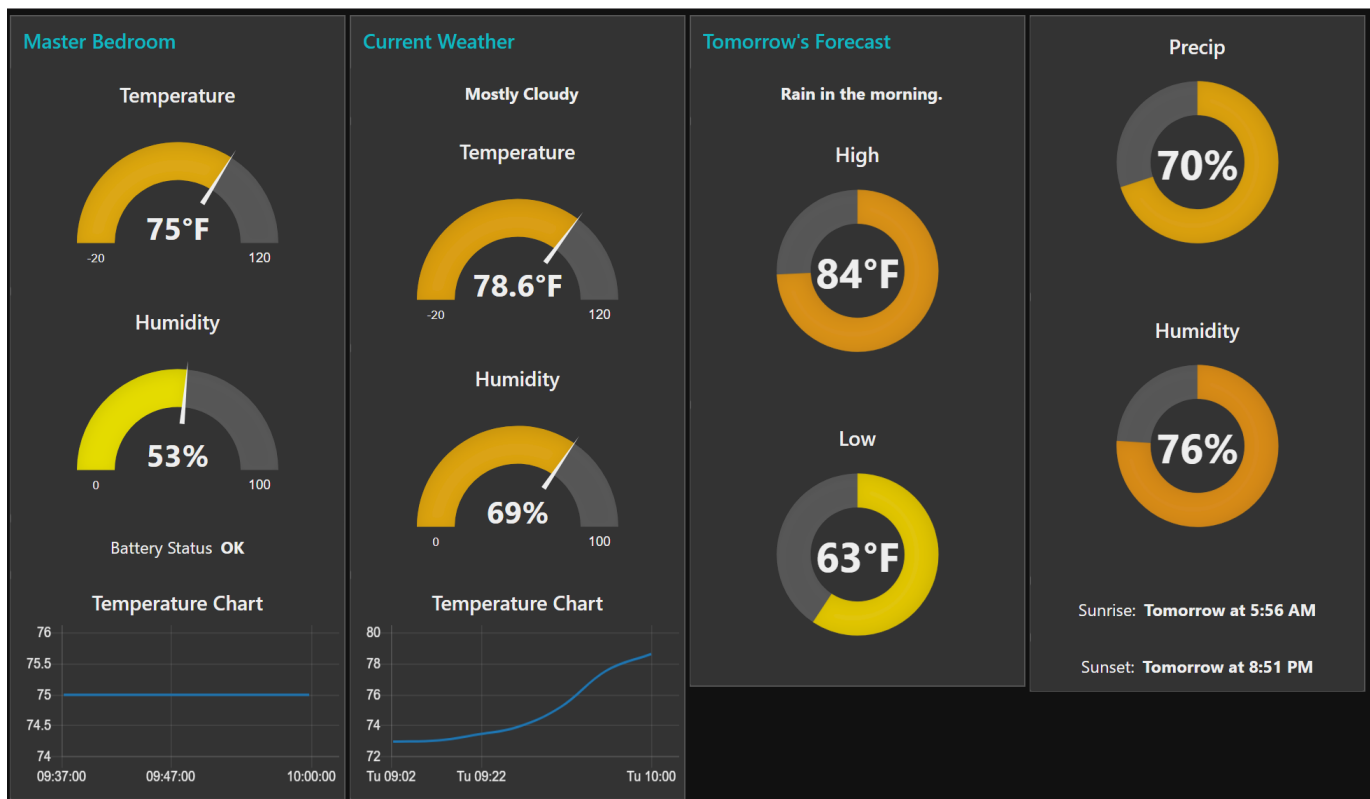
Weather Underground Current Weather



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.

Edit/Add	General	Statistics	History	Chart
mcsMQTT Management				
Debug File at \Data\mcsMQTT\mcsMQTT.txt <input checked="" type="checkbox"/> Enable General Debug				
Backup Databases at \Data\mcsMQTT <input checked="" type="checkbox"/> Create mcsMQTT Database Backup on Restarts				
mcsMQTT Status Devices <input checked="" type="radio"/> Show Statistics only in mcsMQTT Statistics Tab <input type="radio"/> Show Statistics in HS Devices and mcsMQTT Statistics Tab				
Retain for 7 Days				
<input checked="" type="checkbox"/> Retain history of published messages				
<input checked="" type="checkbox"/> Retain history of Accepted subscribed messages				
<input type="checkbox"/> Retain history of not-Accepted subscribed messages				
<input checked="" type="checkbox"/> Retain history of topics marked with H checkbox on Association tab				
Pub-Sub Message History				
MQTT Broker Operations				
MQTT Broker Name or IP Address 10.10.10.20				
MQTT Broker Port 1883				
MQTT Broker Security None				
MQTT Broker caCert File				
MQTT Client Cert File				
MQTT Broker Username mqttuser				
MQTT Broker Password *****				
MQTT Broker Connection <input type="checkbox"/> Disconnect from MQTT Broker				
Inbound (Subscription) Management				
Topic Discovery <input checked="" type="radio"/> Discover Published MQTT Messages <input type="radio"/> Listen for Only Accepted Messages				
Inhibit Topic Discovery <input type="checkbox"/> Disable New Topic Recognition				
Echo <input checked="" type="radio"/> Do not process echo of transmitted topics <input type="radio"/> Include transmitted topics in Association tab reception list				
JSON Decoding <input checked="" type="radio"/> Decode Payload JSON into individual HS Devices <input type="radio"/> Place full Payload into HS Device <input type="radio"/> Create both Parent full payload and Child JSON keys				
Receive Queue Depth Process no more than 5 received message at a time				
Receive Queue Interval Yield CPU for 50 milliseconds when queue is above depth limit				
Outbound (Publish) Management				
Default Topic Template				
Default Payload Template				
Default QOS <input checked="" type="radio"/> At Most <input type="radio"/> At Least <input type="radio"/> Exactly				
Default Message Retain <input checked="" type="radio"/> Do Not Retain at Broker <input type="radio"/> Retain at Broker				
Publish Periodic Status Every 0 Minutes				
Topic Prefix <input type="checkbox"/> Add STAT/ prefix to Topic on Device change <input type="checkbox"/> Add INFO/ prefix to Topic during periodic reporting				
HS Device Discovery <input checked="" type="radio"/> Enumerate HS Devices during startup <input type="radio"/> Enumerate HS Devices only with Button				
HS Device Enumeration Enumerate Non-Plugin Devices				

Edit/Add	General	Statistics	History
mcsMQTT Statistics			
MQTT Broker Online Stats		Online @ 2018-05-12 17:16:13 for 225 minutes	
Totals Since Powerup			
MQTT Messages Published by mcsMQTT		6	
MQTT Received & Accepted by mcsMQTT		5	
MQTT Received & not Accepted by mcsMQTT		60	
Totals for Today			
MQTT Messages Published by mcsMQTT		6	
MQTT Received & Accepted by mcsMQTT		5	
MQTT Received & not Accepted by mcsMQTT		60	

- 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	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1373	Dev: First_Floor Garage Garage_Door Sub: cmdnd/garage-door/POWER1 Pub: the following Topic on Device command cmdnd/garage-door/POWER1	ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2018-05-27 20:04:43
1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1376	Dev: Basement Family_Room Space_Heater Sub: stat/space-heater-1/POWER Pub: the following Topic on Device command cmdnd/space-heater-1/POWER1	ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2018-05-29 20:51:19
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1377	Dev: Second_Floor Master_Bedroom Master_Bedroom_Temp Sub: bedroom1/temperature Pub: the following Topic on Device command	75.56	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2018-05-29 21:02:4
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1378	Dev: Second_Floor Master_Bedroom Master_Bedroom_Humidity Sub: bedroom1/humidity Pub: the following Topic on Device command	55	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2018-05-29 21:02:4
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1382	Dev: Second_Floor Master_Bedroom Master_Bedroom_Sensor_Battery Sub: bedroom1/battery Pub: the following Topic on Device command	OK	<input type="checkbox"/>	<input type="checkbox"/>	2018-05-29 21:02:4
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1379	Dev: Basement Family_Room Family_Room_Temp Sub: familyroom/temperature Pub: the following Topic on Device command	75.74000000000001	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2018-05-29 21:02:5
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1380	Dev: Basement Family_Room Family_Room_Humidity Sub: familyroom/humidity Pub: the following Topic on Device command	52	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2018-05-29 21:02:5
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1381	Dev: Basement Family_Room Family_Room_Sensor_Battery Sub: familyroom/battery Pub: the following Topic on Device command	OK	<input type="checkbox"/>	<input type="checkbox"/>	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 be 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	<input type="text" value="bedroom1/temperature"/>
Payload RegEx Match Pattern	<input type="text"/>
Payload RegEx Replace Pattern	<input type="text"/>
Payload RegEx Operation	<input checked="" type="radio"/> Replace Match Pattern with Replace Pattern <input type="radio"/> Extract Match Pattern
Low Pass Filter	Filter sensitivity of <input type="text" value="1"/> (range is 0.00 to 1.00 (most sensitive))
Expression	<input type="text" value="round(\$\$PAYLOAD:,1)"/>
Add Rate Device	<input type="checkbox"/> Create a HS Rate Device with rate sensitivity of <input type="text" value="0.75"/> (Range 0.00 to 1.00) <input type="radio"/> Per Second <input type="radio"/> Per Minute <input checked="" type="radio"/> Per Hour
Add Accum Device	<input type="checkbox"/> Create a HS Accum Device <input type="radio"/> No Reset <input type="radio"/> Accumulation Since Midnight <input checked="" type="radio"/> Delta Since Midnight
Settings for Plugin Device	
HS Device Publish Topic	<input type="text"/>
HS Device Control/Status UI	<input type="radio"/> Unspecified <input type="radio"/> Button <input checked="" type="radio"/> Number <input type="radio"/> Text <input type="radio"/> List <input type="radio"/> ColorPicker
HS Device VSP List	
HS Device MISC Properties	<input type="checkbox"/> NO_STATUS_DISPLAY <input type="checkbox"/> NO_GRAPHICS_DISPLAY <input type="checkbox"/> AUTO_VOICE_COMMAND <input type="checkbox"/> SET_DOES_NOT_CHANGE_LAST_CHANGE <input checked="" type="checkbox"/> SHOW_VALUES <input type="checkbox"/> STATUS_ONLY
Publish Payload Template	<input type="text"/>
Publish QOS	<input type="radio"/> At Most <input type="radio"/> At Least <input checked="" type="radio"/> Exactly
Publish Retain Flag	<input checked="" type="radio"/> Do not retain <input type="radio"/> Retain at broker
Settings for Non-Plugin Device	
Control non-Plugin	<input type="text"/>

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

Configuration	Advanced	Status Graphics
Device Name:	Master Bedroom Temp	
Voice Command:		
Floor:	Second Floor	New Floor
Room:	Master Bedroom	New Room
Code:	Display Available Codes	
Address:		
Status Only Device:	<input type="checkbox"/>	
Is Dimmable:	<input type="checkbox"/>	
Is Light:	<input type="checkbox"/>	
Hide device from mobile views:	<input type="checkbox"/>	
Hide device from views:	<input type="checkbox"/>	
Do not log commands from this device:	<input type="checkbox"/>	
Voice command:	<input type="checkbox"/>	
Confirm voice command:	<input type="checkbox"/>	
Include in power fail recovery:	<input type="checkbox"/>	
Use pop-up dialog for control:	<input type="checkbox"/>	
Do not update device last change time if device value does not change:	<input type="checkbox"/>	
User Access:	Users that have access: Any User Select Users	
Notes:		
Linked Device:	Not Linked	
Delete Select Device Image Done		

Configuration	Advanced	Status Graphics
Reference ID	1377	
Status	75.6 = Dim	
Value	75.6 = "75.6 F"	
String		
Supports Status	False	
Dimmable	False	
Interface	mcsMQTT	
Extra Data Store	0 Named entries, 0 UnNamed entries.	
Device Type Internal	No API, Type: Type 0, SubType:	
Device Type (String)	MQTT_Receive	
Misc Settings	Show Values	
Device Image File	images\Devices\Image-Not-Selected.png	
Thumbnail Image File	images\Devices\Image-Not-Selected_small.png	
Relationship Status	Not Set	
Select Thumbnail Image Done		

Configuration	Advanced	Status Graphics
Edit Status Text for device Master Bedroom Temp		
Value	Status	Row Column Column Span Status-Control
Prefix:		
Suffix:	F	
Start: -2147483648	Dec Places: 1	
End: 2147483647	<input checked="" type="checkbox"/> Include Values	
	<input type="checkbox"/> Has Additional Data	
	<input type="checkbox"/> Has Scale	
	Value Offset: 0	
Delete		
Add New Status Text		
Add New Single Value Add New Range Value		
Edit Status Graphic for device Master Bedroom Temp		
Value	Graphic	Graphic Path
Start: 0	End: 120	
		
images/HomeSeer/status/Thermometer-50.png		
Edit Delete		
Add New Single Graphic Add New Range Graphic		
Done		

Here are the resulting devices for the Master Bedroom sensor:

<input type="checkbox"/>	 55 %	Second Floor	Master Bedroom	Master Bedroom Humidity	Today 9:28:34 PM
<input type="checkbox"/>	 OK	Second Floor	Master Bedroom	Master Bedroom Sensor Battery	Today 9:28:34 PM
<input type="checkbox"/>	 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