Bohunt School (Wokingham)

Global Shutdown

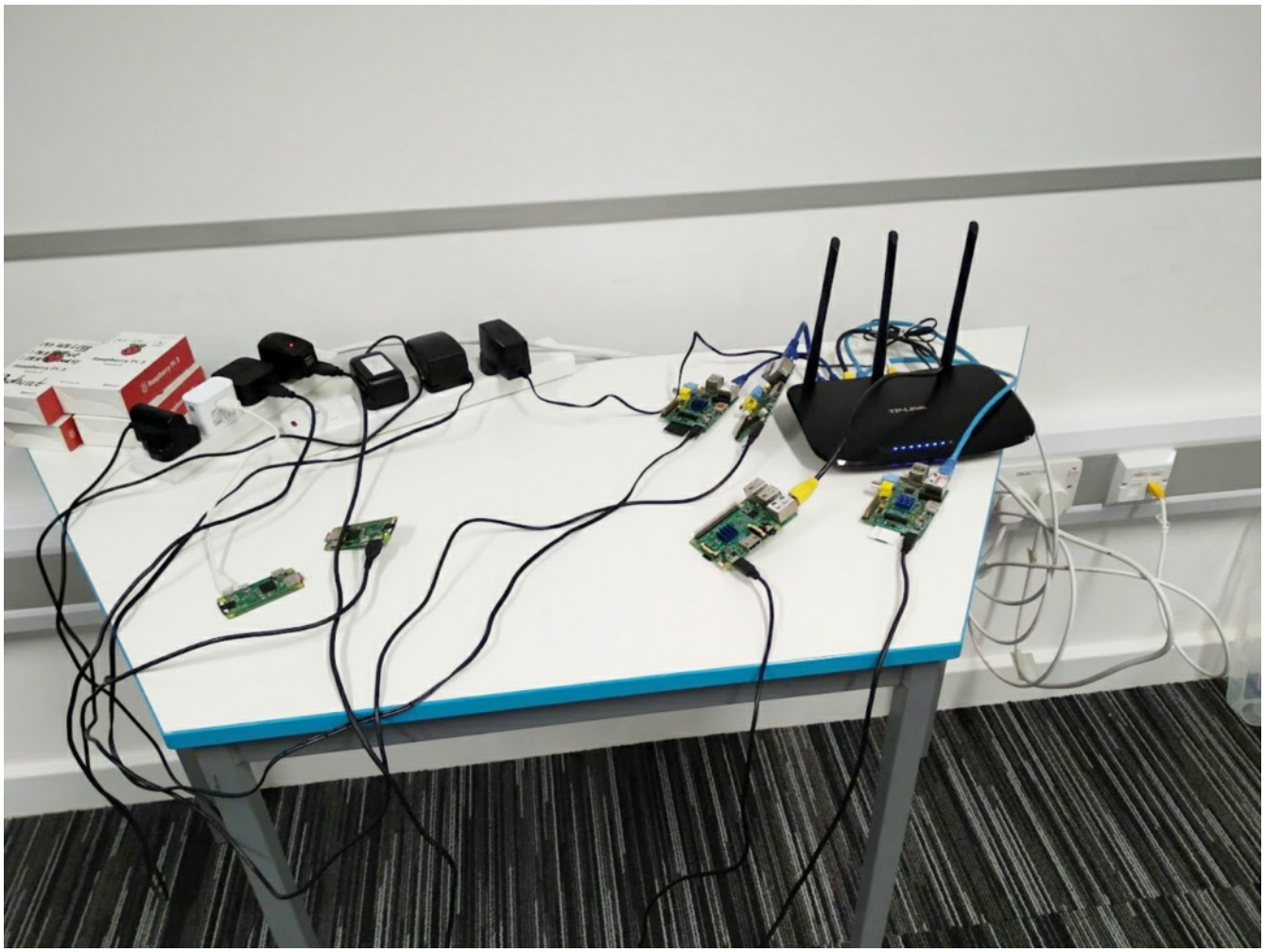
This is a simple project to shutdown the Raspberry Pi(es) in the IoT Club.

This idea came about because it used to take quite a few minutes (after the Club had finished) to login to each Raspberry Pi and invoke the shutdown procedure.

Some 'helpful' students thought that shutting-down a Raspberry Pi meant pulling out the USB power cable - but as Mr D can tell you - this can result in corrupting an SD card or damaging the Raspberry Pi.

The IoT Club's private network

Here's a photo of the Club's network consisting of a wireless router, RPi-3Bs, RPi-Zero-Ws, mains to 5V power supplies and various CAT cables.



As far as the shutdown procedure is concerned, one of the Raspberry Pi(es) (192.168.1.142) is nominated as a master all the others are classed as slaves.

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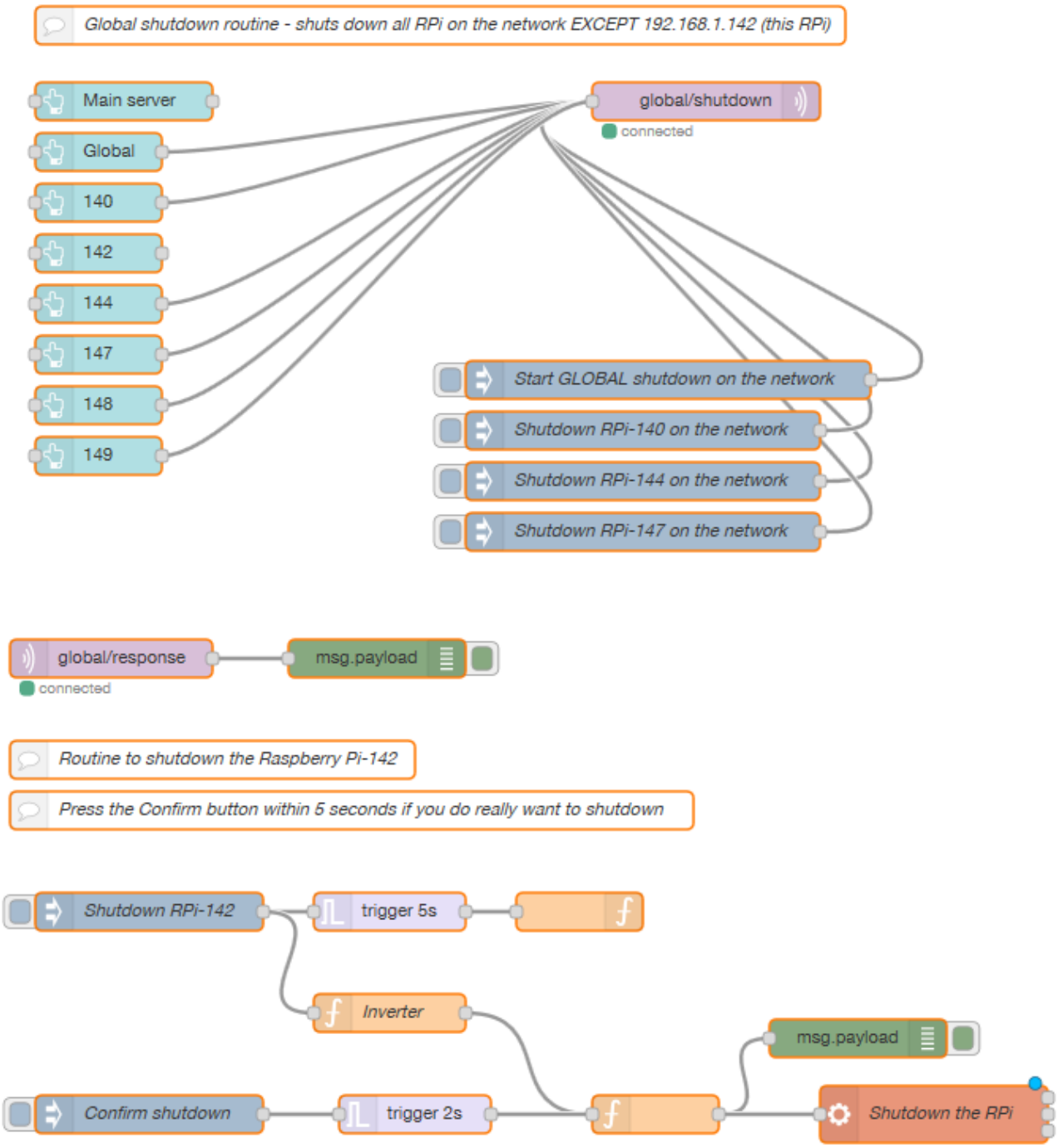
Here's a screen-shot of the Node-RED flow in the master Raspberry Pi.



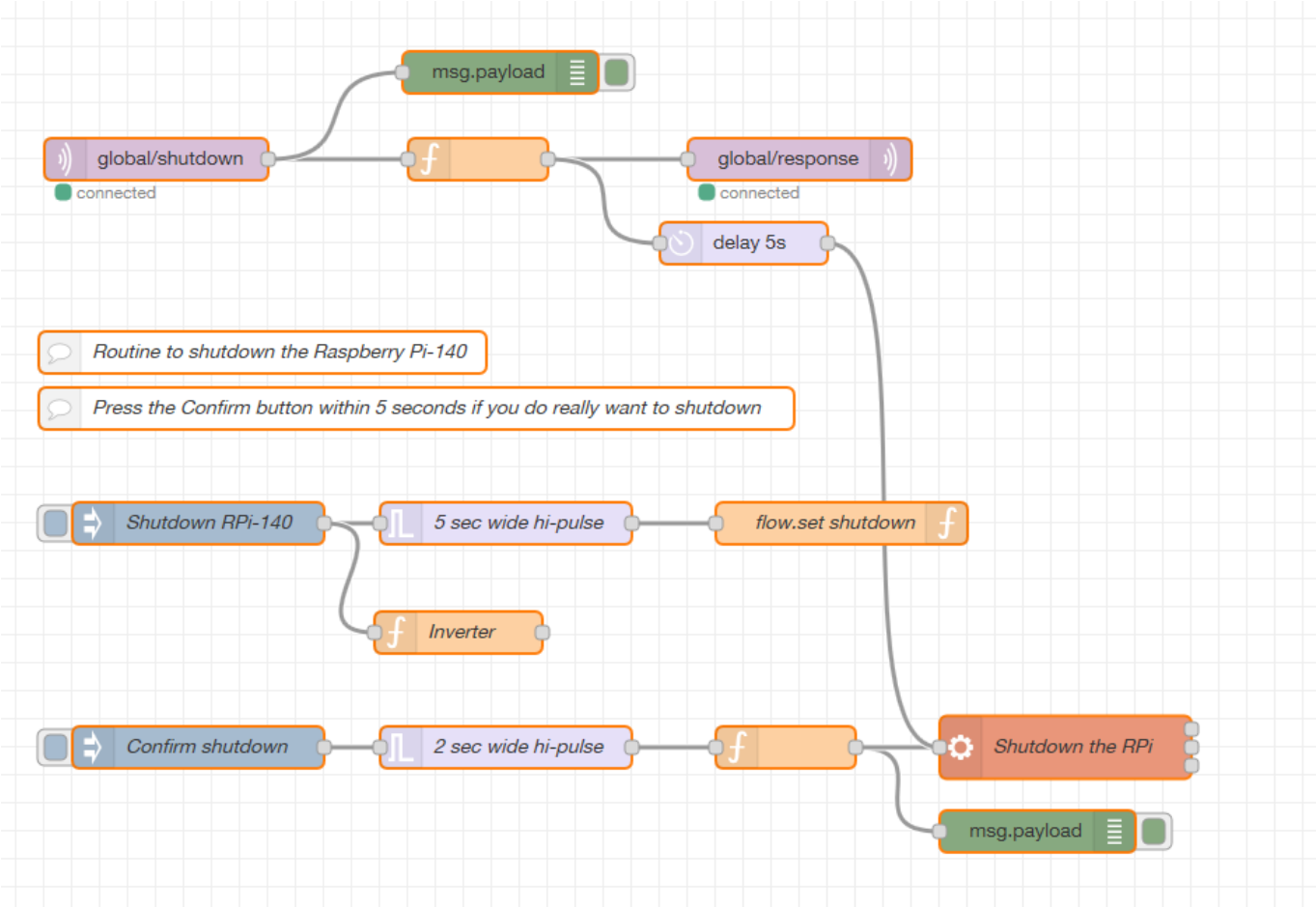
At the top of the flow are a set of UI-buttons that send a unique number when they are clicked. For example, the button labelled [140] sends numeric 140.

The button labelled [Global] sends the text string "all" to indicate that <u>all</u> the Raspberry Pi(es) on the network should be shutdown.

This information is published via a MQTT-out node as topic '*global/shutdown*'.

Slave Raspberry Pi(es)

Here's a screen-shot of the Node-RED flow in each slave.



At the top of the flow is a MQTT-In node that subscribes to the topic '*global/shutdown*'. So anything that is published to this topic will be received.

The function node (after the MQTT-In node) checks if the received message contains the numeric number 140 or the text string "all". If either of these conditions are true then a response is sent back to the master via the MQTT-Out node with the topic '*global/response*'. After a delay of 5-seconds the shutdown procedure is started using the 'exec' node.

As you might want to shutdown the slave Raspberry Pi independently, the lower part of the flow has two 'inject' nodes that start and confirm the shutdown sequence. Provided the 'Confirm' inject node is pressed within 5-seconds of pressing the 'Shutdown' inject node the sequence will continue the shutdown.

The above flow is for the Raspberry Pi with IP address 192.168.1.140
You may need to alter this to match your Raspberry Pi and you may want to duplicate the flow for any additional RPi(es) you may have on your network.

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Resources

Here are some links to the Node-RED flows.

Master flow

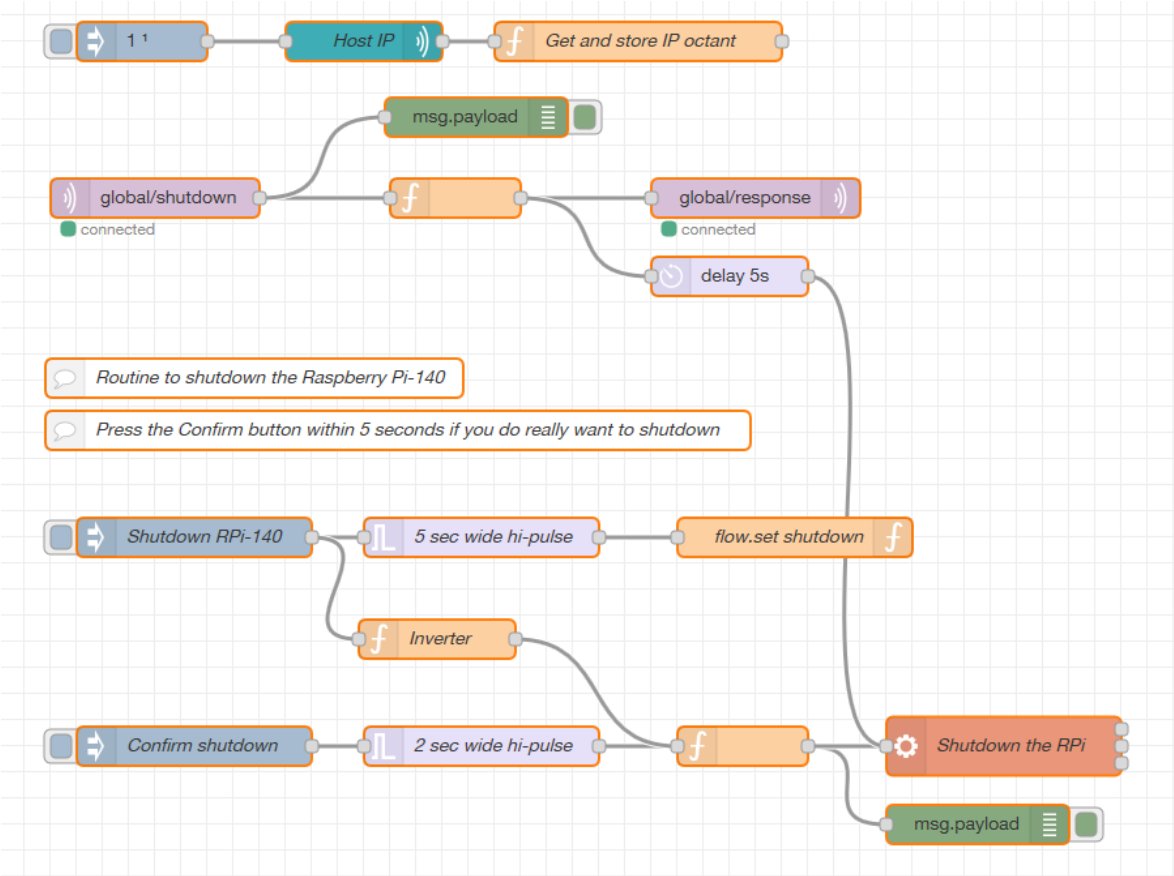
Slave flow

Slave flow (modified as per the NR-flow below)

Possible improvements

One obvious thing that could be implemented is to make all the 'slave' flows generic as the only real difference between them is the IP address.

This could easily be achieved by incorporating a node that gives the IP address of the host that is running Node-RED. For example, the Host-IP node.



The Host-IP node has been introduced at the top of the flow while the new function node strips-off the fourth octant of the IP address and saves it in a flow variable called 'ip_4'. The JavaScript in the function node adjacent to the MQTT-In node has been modified as per this link.

Although this is a rather short tutorial is should be useful if you need to control a set of Raspberry Pi(es) on a network.