



and



What is MQTT

MQTT (Message Queuing Telemetry Transport) is a lightweight communications protocol developed by IBM for the control of machinery in connection with pipelines

The brief was to design a lightweight and reliable system to send and receive messages from remote areas which may have poor and/or unreliable communication links

How it works

It uses a Publish and Subscribe structure which involves a server, usually referred to as a Broker.

Messages are published to 'Topics' and other devices can 'Subscribe' to those topics to receive the messages.

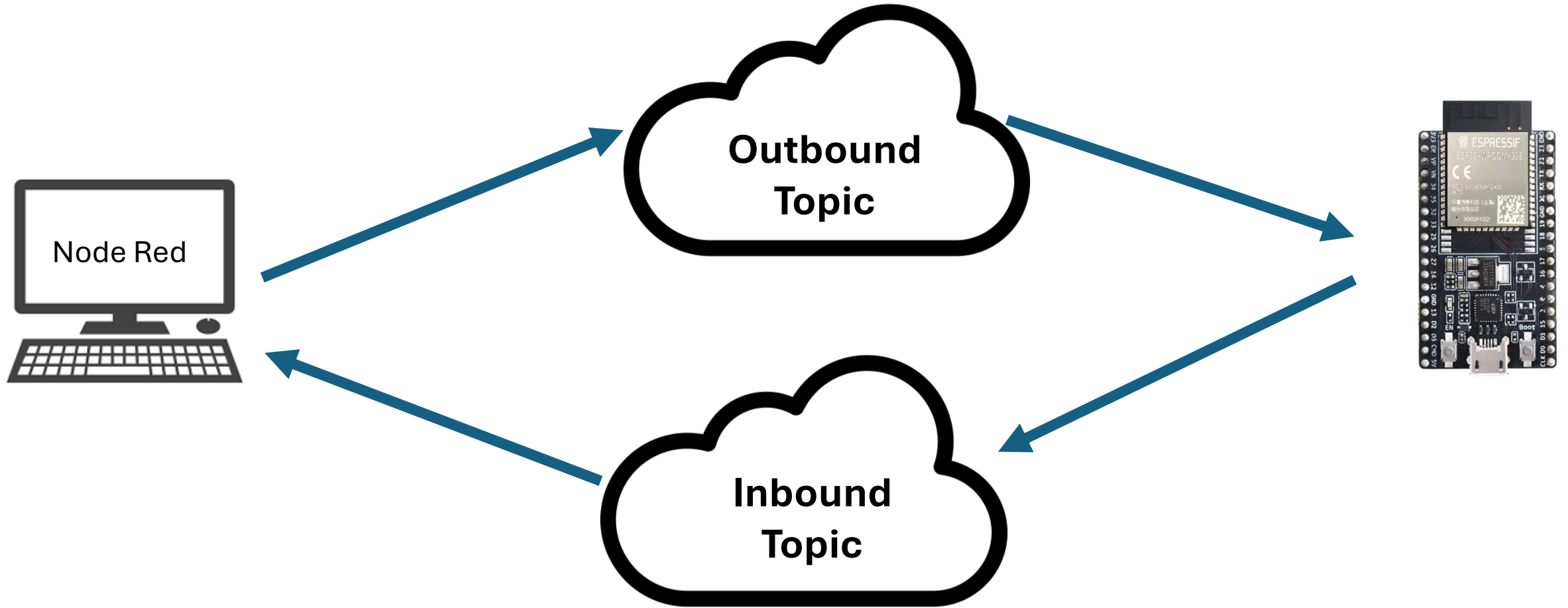
The benefit of this idea is that if the communication link to the subscriber is broken, any message published to the broker will be received when the link is re-established

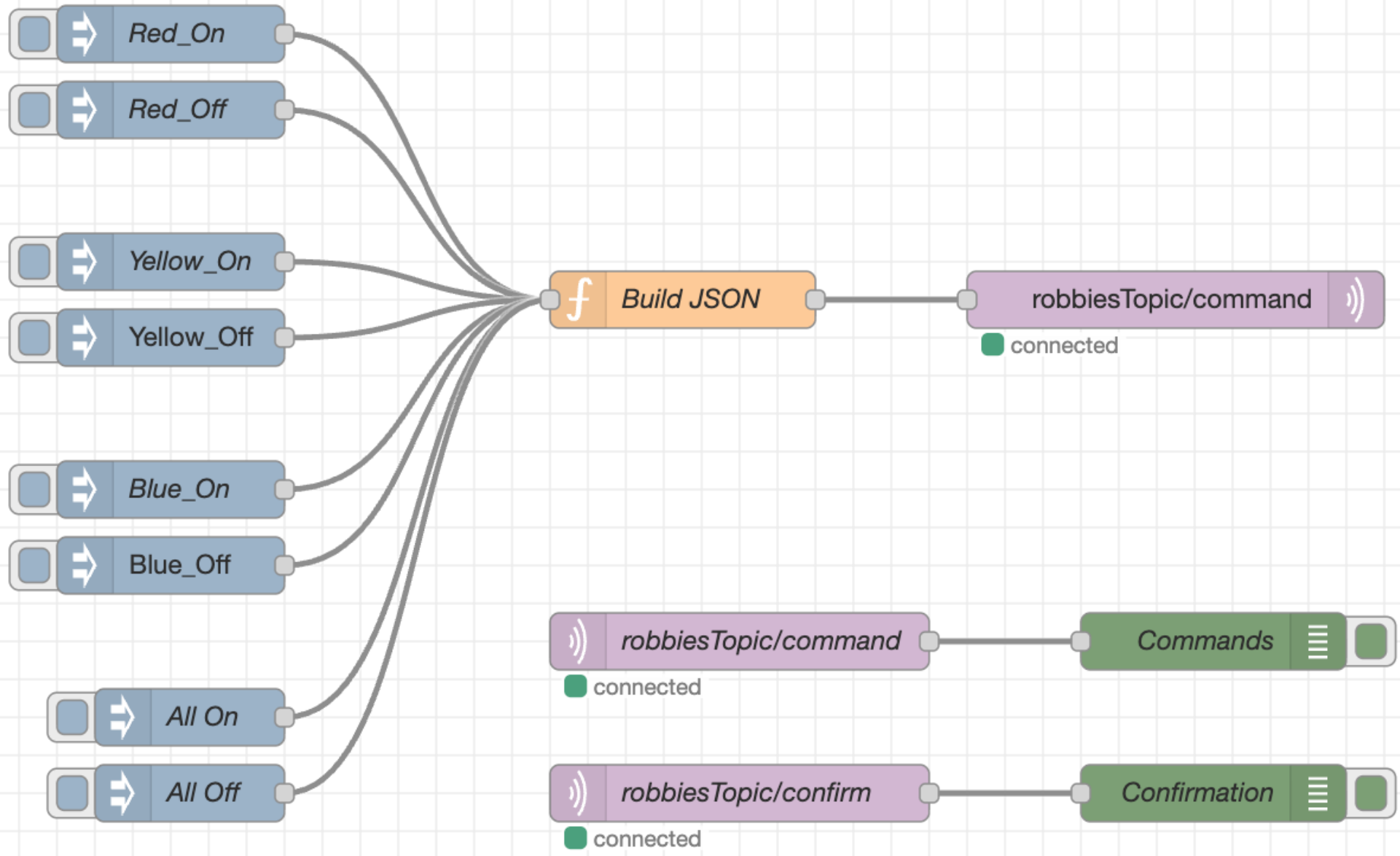
What is Node-Red

Node-RED is an open-source, low-code programming tool that uses a visual, drag-and-drop interface to connect hardware devices, APIs, and online services.

It allows both beginners and developers to build complex event-driven workflows (called "flows") without writing extensive lines of code.

LED Demo





Payload - JSON

```
{  
  "Red": "true",  
  "Yellow": "false",  
  "Green": "false"  
}
```

ESP Code

The code was written by Chat GPT which is something for us to chat about

The functions are

1. Subscribe to 'Command' topic
2. Decode the JSON payload
3. Control the LEDs
4. Encode a confirmation JSON payload
5. Publish to a 'confirmation' topic

Difficulties

There were no major difficulties involved
in getting this to work

Except

When loading Node-Red onto an older machine,
I had to find an older version of Node.js and Node Red

Conclusion

The proof that Node Red is easy to use occurred when it only took a fifteen minute phone call to James to talk him through the process on installing Node Red on his machine.

After loading the 'flow' that I emailed to him, he was able to control the device on my desk

How fantastic is that!

The Main Message is

Not that it CAN be done,

but

That Node-Red makes it

Quick and EASY

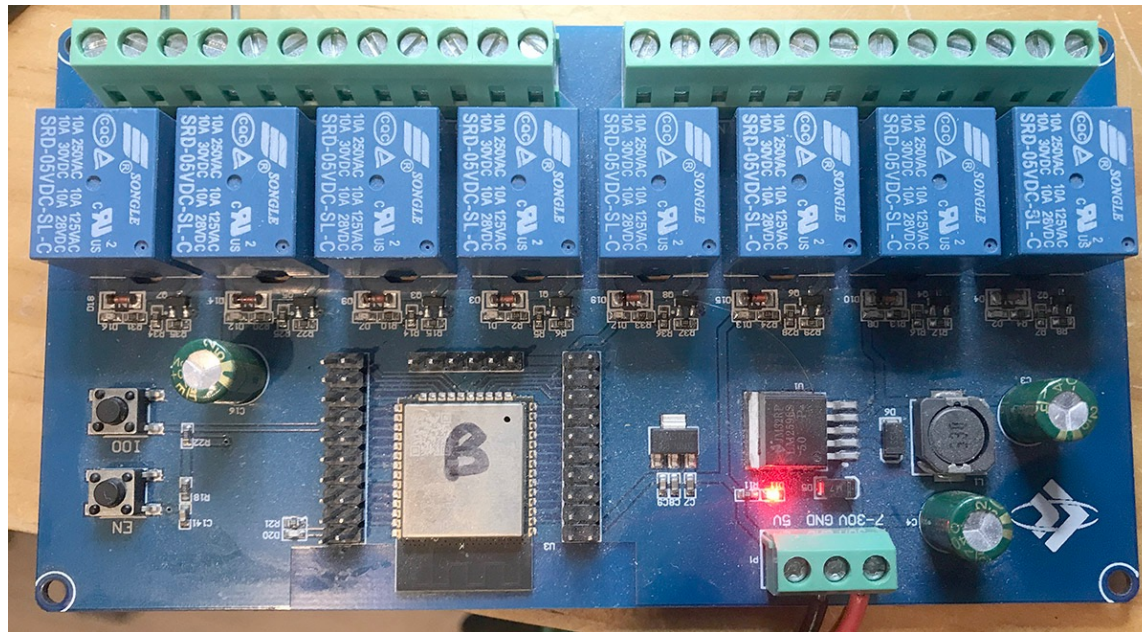
to do

But what about the real world

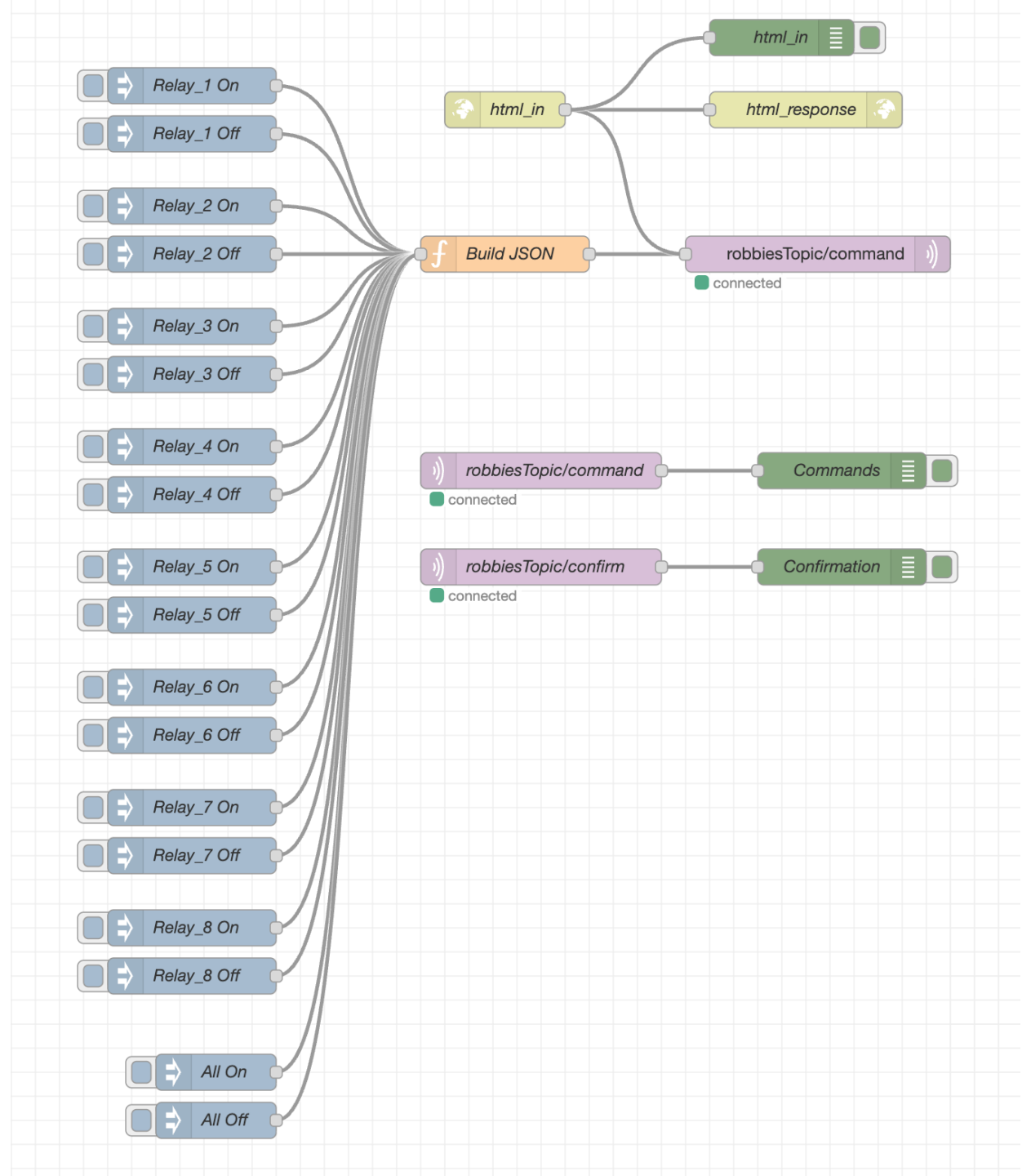
In practice turning on a few LEDs,
is not enough

Demo Two

8 Channel Relay Board



Node-Red Panel

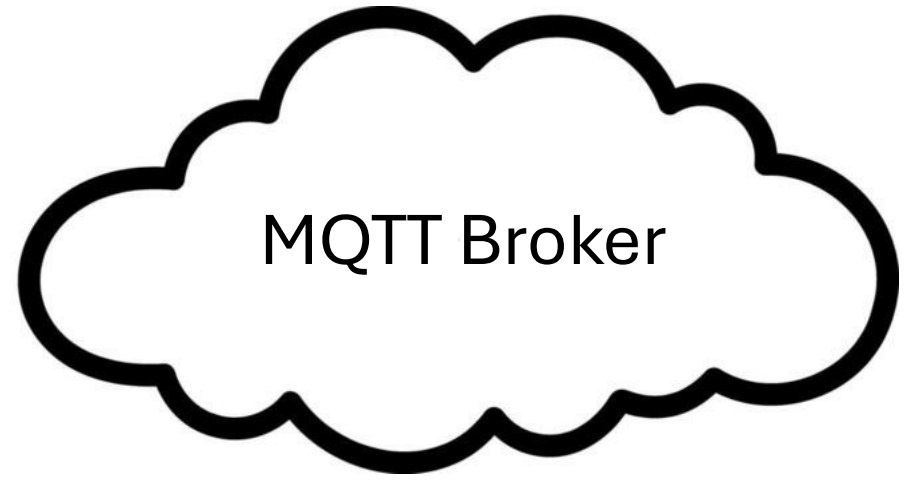


An HTML control panel to control the flow

MQTT Relay Control

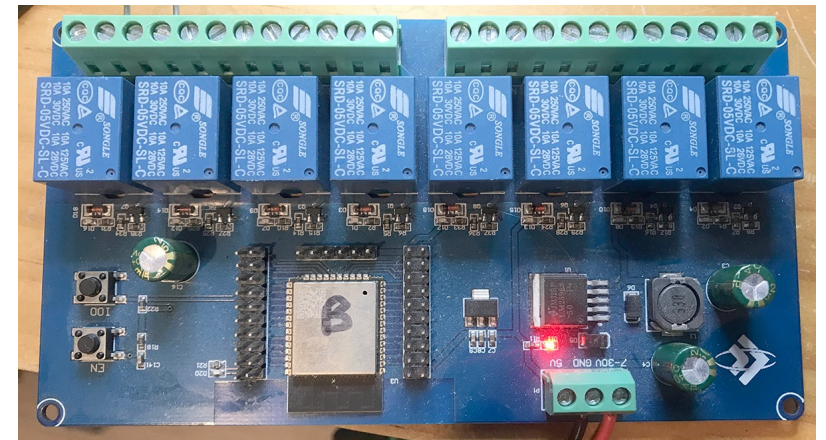
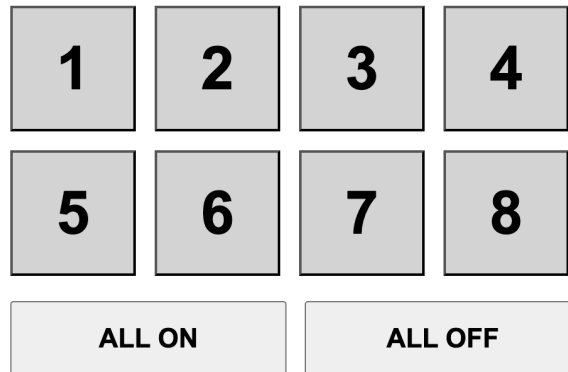
Connected

1	2	3	4
5	6	7	8
ALL ON		ALL OFF	

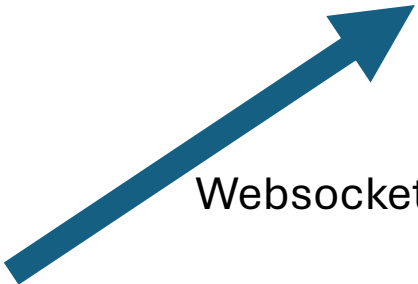
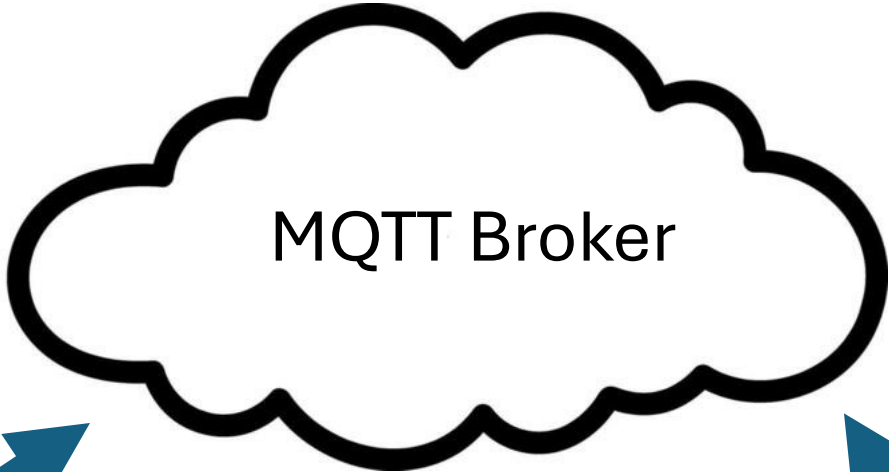


MQTT Relay Control

Connected



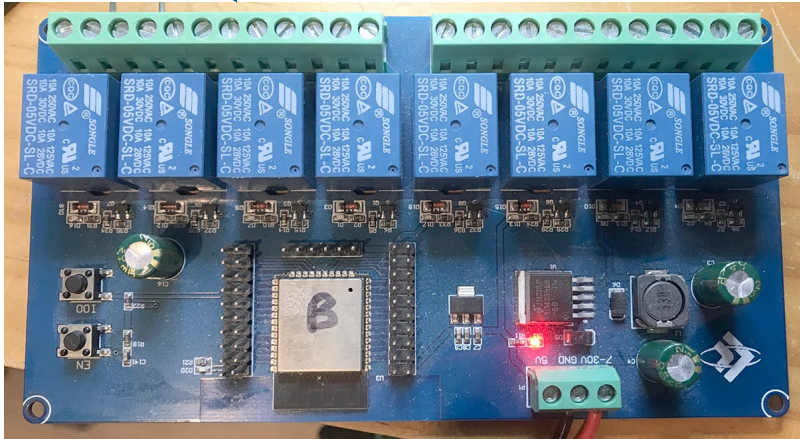




MQTT Relay Control

Connected

1	2	3	4
5	6	7	8
ALL ON		ALL OFF	



Relay Demo

At this point, we demonstrated how we could control a relay board from anywhere in the world. In addition, the relay board sent back a confirmation that the action had been carried out. This confirmation resulted in the buttons changing colour

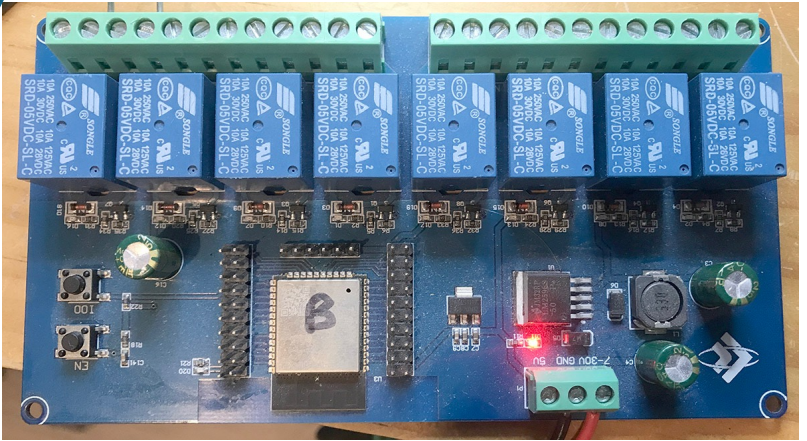


The fact that the MQTT broker was in the USA caused a delay in the 'confirm' signal.

MQTT Relay Control

Connected

1	2	3	4
5	6	7	8
ALL ON		ALL OFF	



Phone a Friend

This was a demonstration that a simple phone call made it possible for a third party to take control of a machine over the internet at a moments notice.

MQTT for the Bees Project

```
Hive236 = commands {  
    "oxalic": true,  
    "ribbonOpen: false,  
    "this": false,  
    "that": true,  
    "theOther: false  
},
```

```
Returns {  
    "temperature": 35C,  
    "Humidity": 80%,  
    "water": 400mm,  
    "weight": 91kilos  
}
```