Department of Electronic & Telecommunications Engineering

University of Moratuwa

EN3271 Internet of Things Systems Engineering

Node-Red Lab

2018 Batch **Semester 6**

Configuring RPi GPIO output

1. Connect two injector nodes injecting 1 & 0 via a dashboard switch to the RPi GPIO output

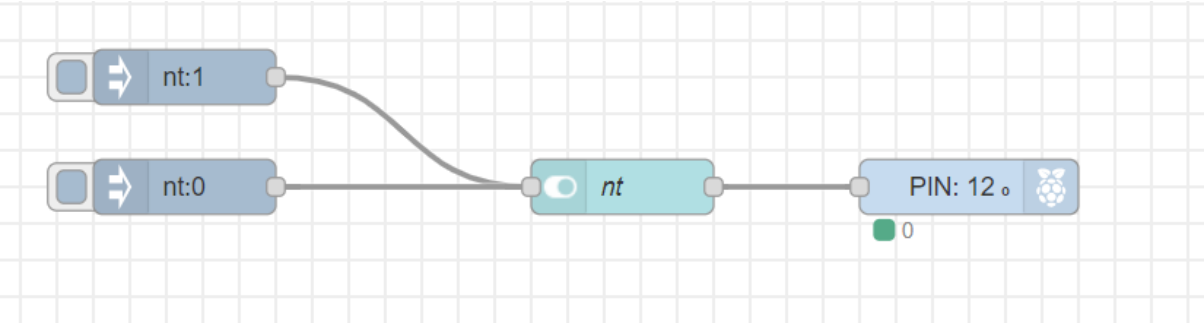


Figure 1

2. Configure RPi GPIO Out node with the relevant LED pin.
3. Add gauge and line chart to the flow and visualize the state of the GPIO pin.

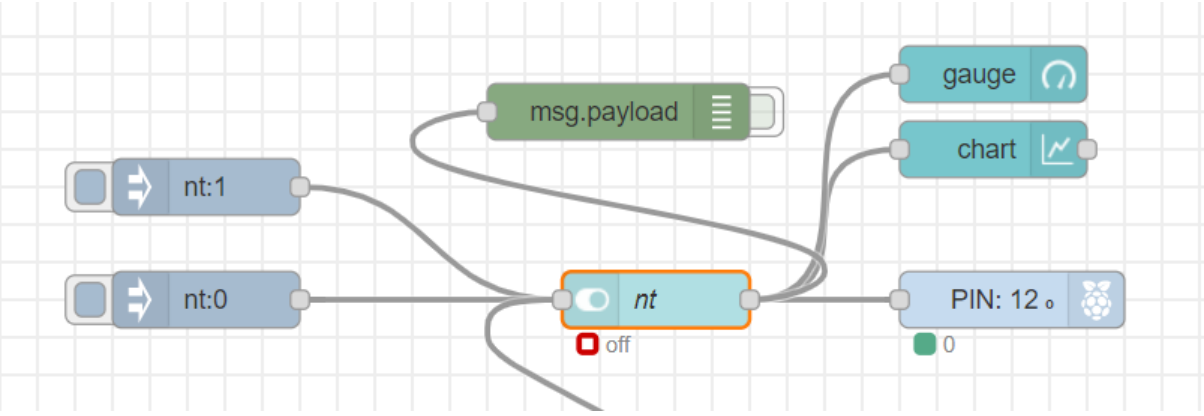


Figure 2

Exercise 01 – Use pushbutton input to control LED

1. Use RPi-GPIO-IN node to modify above flow to work with Pushbutton input.
2. Configure GPIO-IN node where the above LED to be controlled as following.
    a. Pushbutton pressed → LED On
    b. Pushbutton released → LED Off

MQTT Configuration

1. Add MQTT-IN node to the flow.
2. Configure HIVE public MQTT broker in the node configuration as following (figure 03)

   Open configuration of MQTT-IN node → Server → Add new MQTT broker

   https://www.hivemq.com/public-mqtt-broker/
   Broker: broker.hivemq.com
   TCP Port: 1883
   Websocket Port: 8000

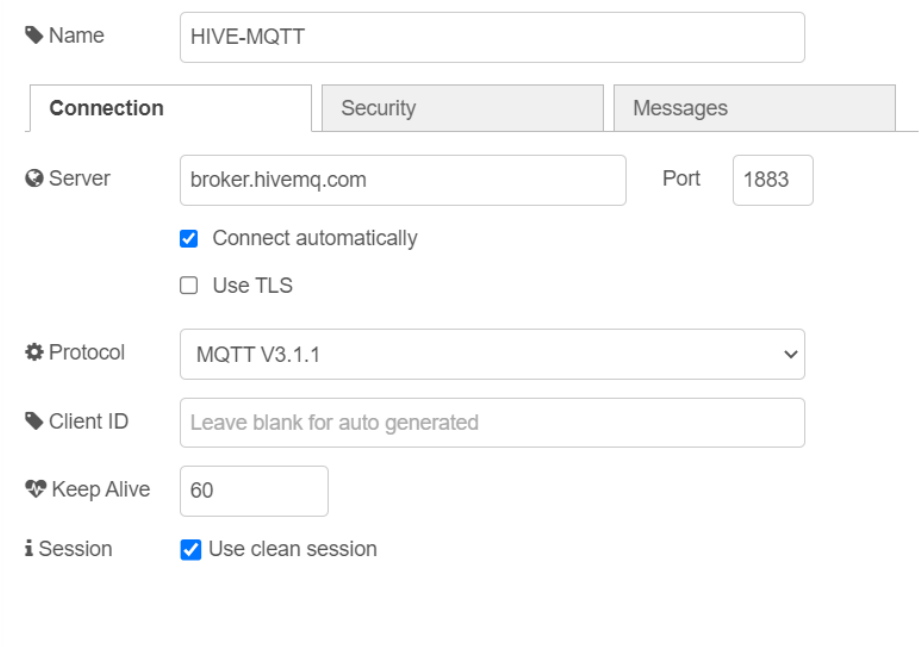


Figure 3

3. Configure Topic of the MQTT node as **NodeRED/<your index number>**

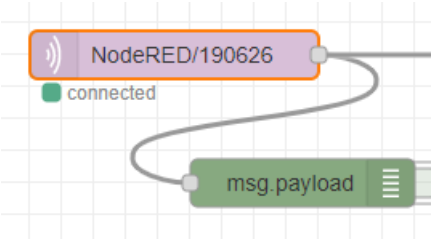


Figure 4

Controlling LED via MQTT

1. Combine above flows and modify the flow to control the LED with following values
    a. MQTT topic payload = 1 → LED On
    b. MQTT topic payload = 0 → LED Off

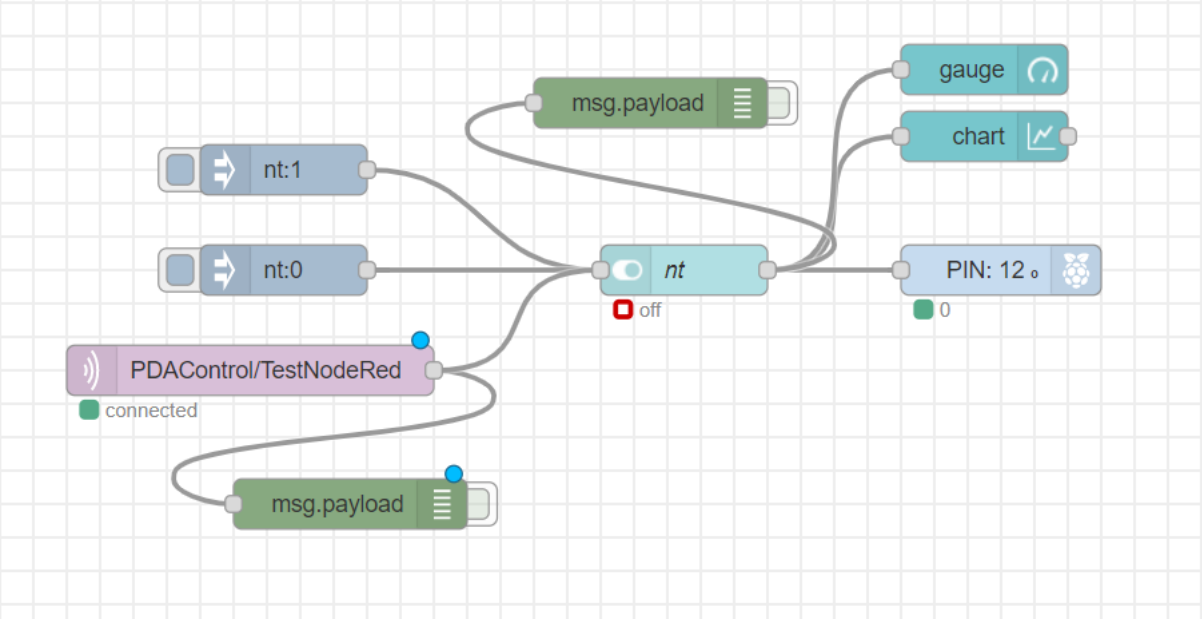
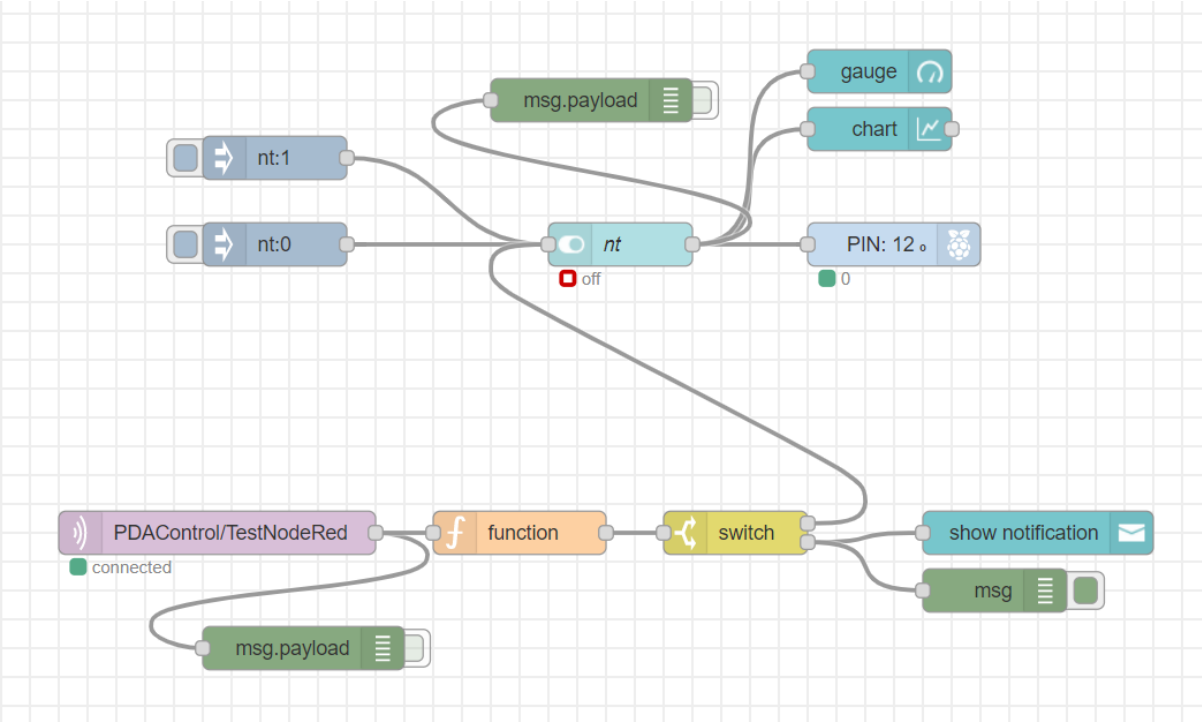


Figure 5

2. Define a function to filter out non-numeric & out of range values published via MQTT. If the message is not numeric show a notification on the UI.



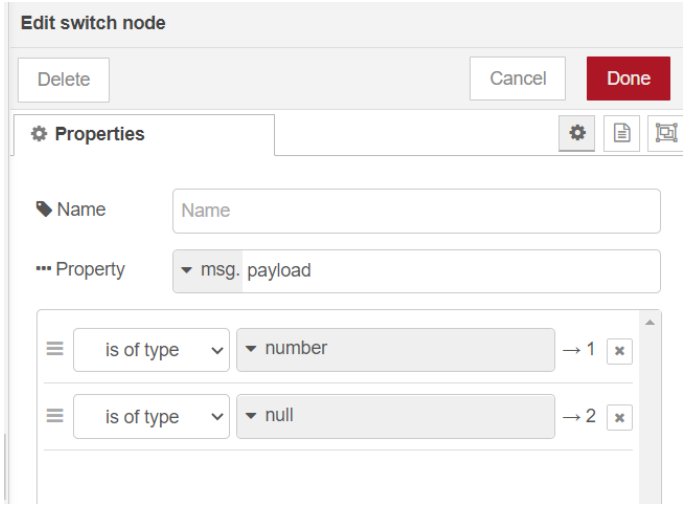
Function’s code (Parse String to Int)

```
msg.payload = parseInt(msg.payload);

if (isNaN(msg.payload)){
   msg.payload = null;
   msg.topic = "Invalid Data";
   msg.retain = true;
}

return msg;
```

Switch Node Properties



Exercise 02 – Turn on LEDs based on the Duration of Pushbutton Press

1. Design a Node-Red flow to indicate the duration after pushbutton has been pressed.
2. Use 5 LEDs with relevant resistors and pushbutton (pull-down).
3. Indication should be done as following

Pushbutton (Press duration) (seconds)	Indication
2	LEDs on = 1
4	LEDs on = 2
6	LEDs on = 3
8	LEDs on = 4
10	LEDs on = 5

4. Add a feature to turn off LEDs after the pushbutton is released. (All LEDs should be turned off once the pushbutton is released)
5. Add feature to replicate pushbutton's action using MQTT. (MQTT payload of 1 represent pushbutton press & payload of 0 represent pushbutton release)