TimePeace IOT!

Cognitive Assistance Technology

Internet of Things Applied to time & location
Using a Raspberry Pi
To offer reassurance in the early stages of Alzheimer's disease

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or click on
https://www.meetup.com/Raspberry-Pint-London/
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Presentation to "Raspberry Pint London"
28th February 2017 by David Penney

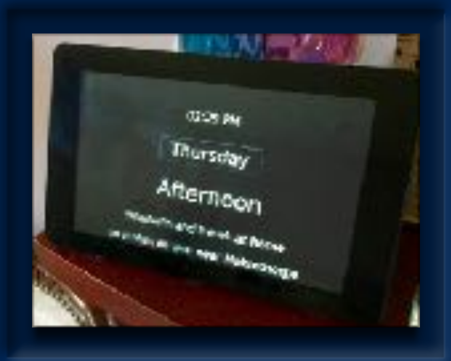
Definition:
Cognitive Assistance Technology

“use of technology (usually high tech) to augment and assist cognitive processes such as attention, **memory**, self-regulation, navigation, emotion recognition and management, planning, and sequencing activity”

Source: LoPresti, E.F., Mihailidis, A. & Kirsch, N. (2004).
Assistive Technology for cognitive rehabilitation: State of the art.
Neuropsychological Rehabilitation, 14, 5-39

3 projects to reassure a relative diagnosed with early stage Alzheimer’s disease

- TimePeace Clock
  shows time of day &
  day of week



- TimePeace AlexaPi
  ask who is visiting

- TimePeace CalendarTV
  see who is visiting

Raspberry Pint London: Project of the year 2017
https://github.com/dpenney5/Raspberry-Pint-London/blob/master/TimePeace Presentation to Raspberry Pint London 29 Nov 2016.pdf

Last time I spoke about “Potential next projects”

- Link the AlexaPi to the CalendarTV with NodeRed/MQTT
  - Send common commands using the CalendarTV remote control to the AlexaPi
  - Common commands from remote control “What day is it today?”, “What is happening today?”
  - Possibly also apply Alexa Skills to use voice via AlexaPi to control CalendarTV & TimePeace using Node-Red
- An easy to manipulate timeline of personal history& photos in the context of historical events, music, TV, Film

Internet of Things Infrastructure

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  - Easy to use
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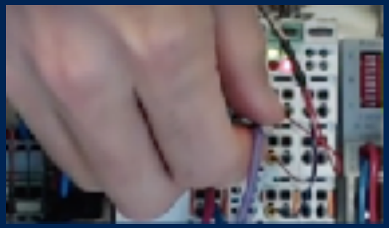
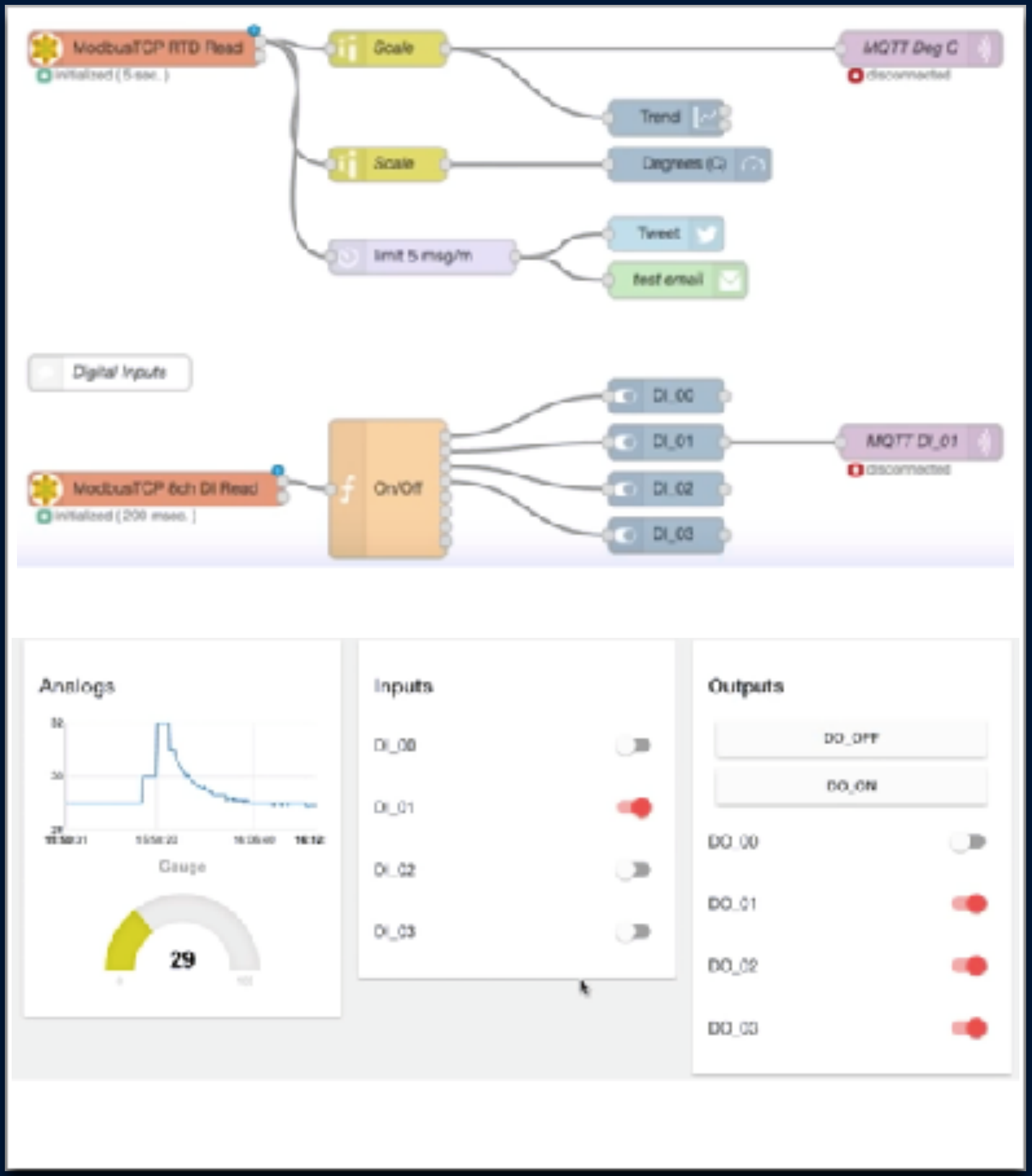




Task at hand is to add MQTT (Mosquitto) & a Node-Red Dashboard

- One computer is designated as a broker node to act as the central clearing house for topic updates (Easy)

- Define the topic structure for publication (Critical)

- Methodically instrument applications (Painstaking)

- Design a Node-Red test schematic (Easy - its installed in every Raspberry Pi & works everywhere - or you can use the IBM Blue-Mix Cloud (a global MQTT Broker :)

Methodically Test

- Used Node-Red to test messages
- Install Node-Red package for Dashboards
- Built a Dashboard
- Once you figure it out - takes a minute to drag & drop a dashboard & one click deploys it live!

MQTT load modules

```
from memcache import Client
import paho.mqtt.client as matt
```

MQTT Define Parameters

```
from memcache import Client
import paho.mqtt.client as matt

# Define Variables for MQTT
MQTT_BROKER = "dev10.local" # dev10.local"
MQTT_PORT = 1883
MQTT_KEEPALIVE_INTERVAL = 45
MQTT_Device="%s/" % socket.gethostname() # this should be changed to use the node name
MQTT_Application="Application/TimePeace-Clock/"

#Topics
MQTT_Status_TOPIC  = "Status/"  + MQTT_Device                                 # Status/dev10
MQTT_State_TOPIC   = "State/"   + MQTT_Device + MQTT_Application   # State/dev10/Clock
MQTT_Command_TOPIC = "Command/" + MQTT_Device + MQTT_Application
MQTT_Metrics_TOPIC = "Metrics/" + MQTT_Device + devname + “/"   # Metrics/dev10/wlan0/Rx
```

MQTT Initialise

```
# Define MQTT on_connect event Handler
def on_connect(mosq, obj, rc):
    print "Connected to MQTT Broker"
    return

# Define MQTT on_publish event Handler
def on_publish(client, userdata, mid):
    print "Message Published..."
    return

# Initiate MQTT Client
mqttc = mqtt.Client()

# Register Event Handlers
mqttc.on_publish = on_publish
mqttc.on_connect = on_connect

# Connect with MQTT Broker
mqttc.connect_async(MQTT_BROKER, MQTT_PORT, MQTT_KEEPALIVE_INTERVAL)
mqttc.loop_start()

# Publish message to MQTT Topic
print "MQTT:: Starting up on ",MQTT_Status_TOPIC
mqttc.publish(MQTT_Status_TOPIC,"Starting up")
```

MQTT Publish information

```
ldt = datetime.datetime.now()
mqttc.publish(MQTT_State_TOPIC,
              '%s %s %s'
               % (self.time,
                  timesofday[ldt.hour],
                  ldt.strftime('%A %d-%B-%Y’)))
```

Topic:

State/dev10/Clock/

Payload:

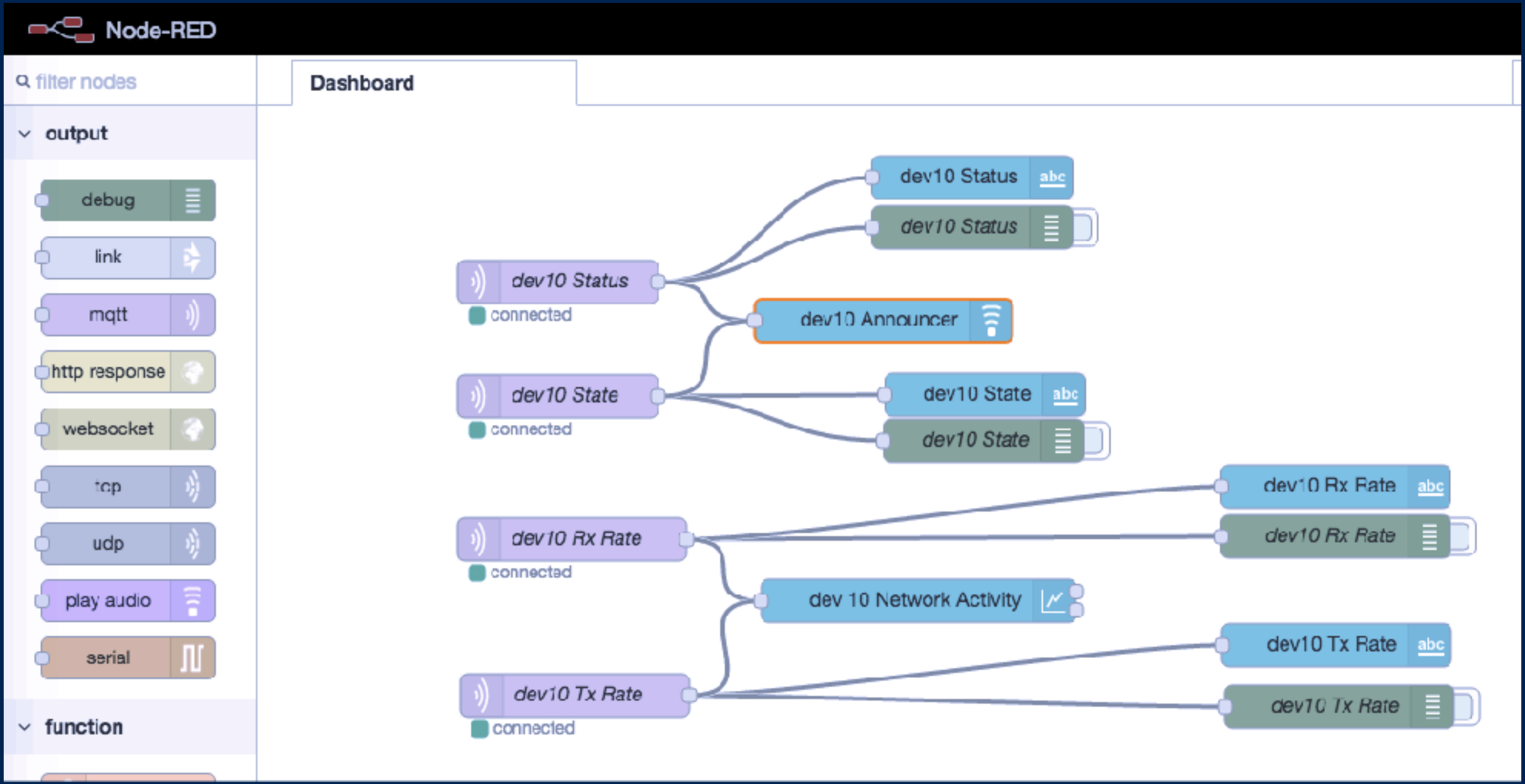
“10:38 Nearly lunchtime Tuesday 28-February-2017”

MQTT Close Down

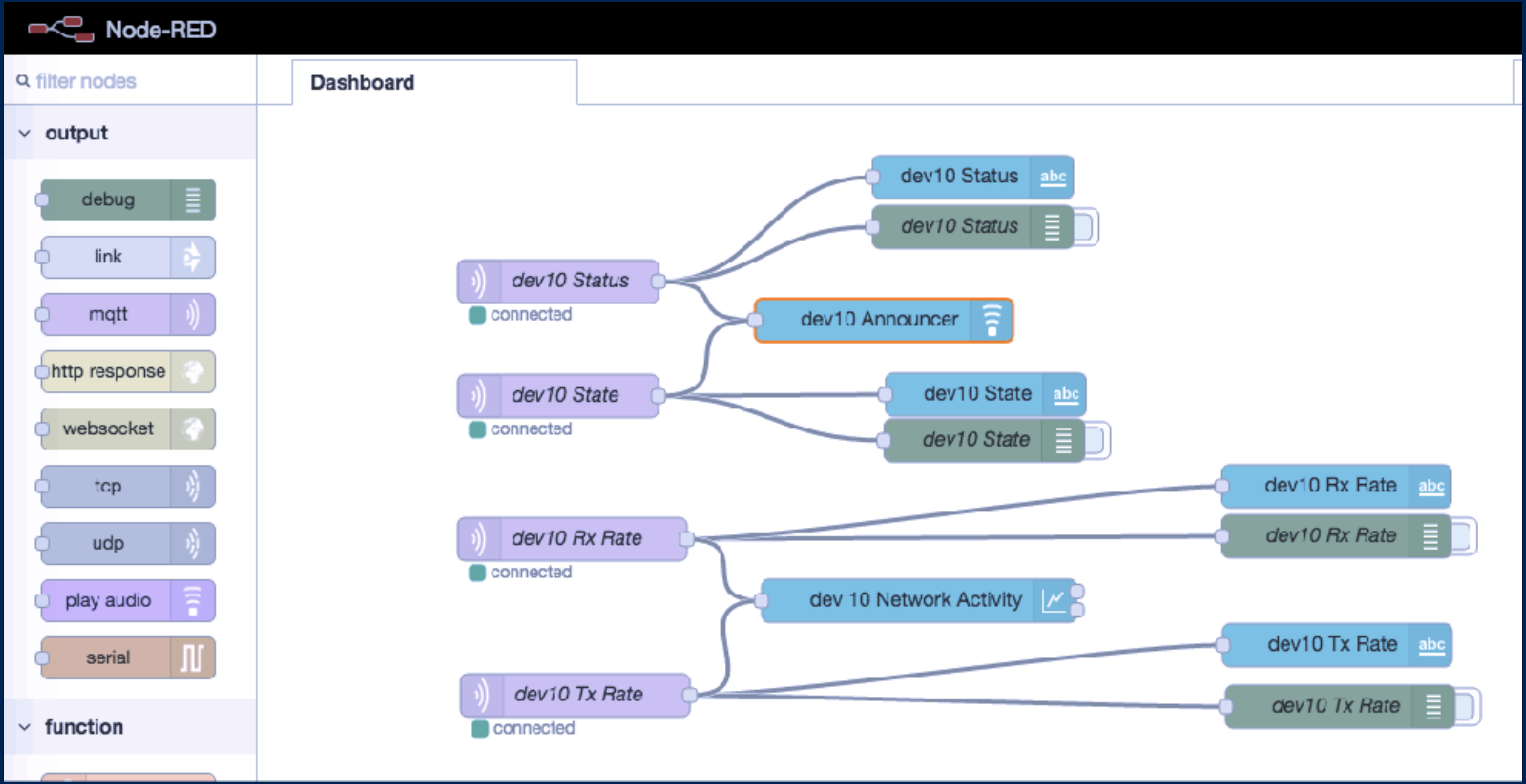
```
mqttc.publish(MQTT_Status_TOPIC,"Stopping")
mqttc.loop_stop()

# Disconnect from MQTT_Broker
mqttc.disconnect()
```

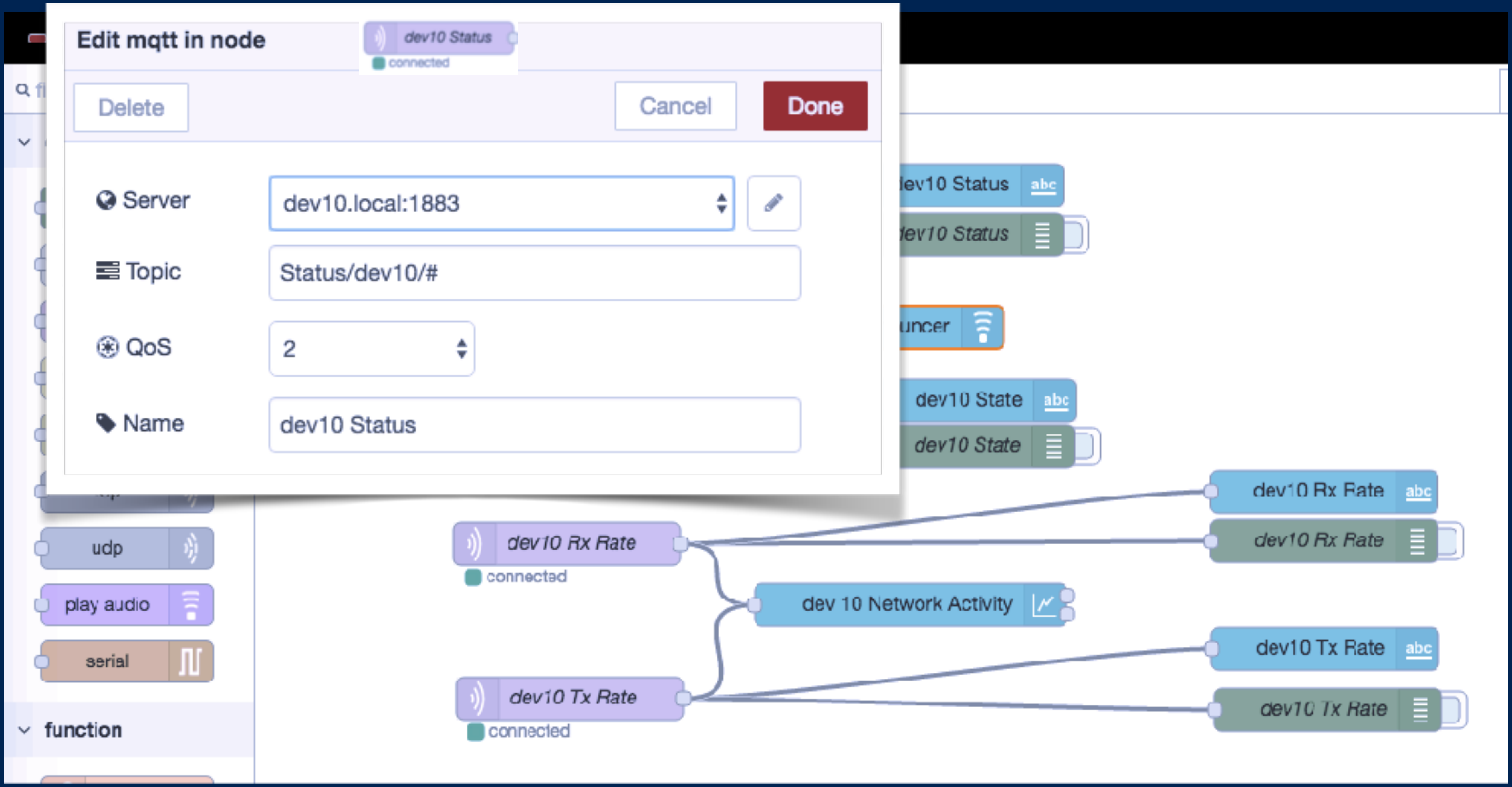
Node-Red Dashboard - Port 1880



Node-Red Dashboard



Node-Red Dashboard



Edit mqtt in node

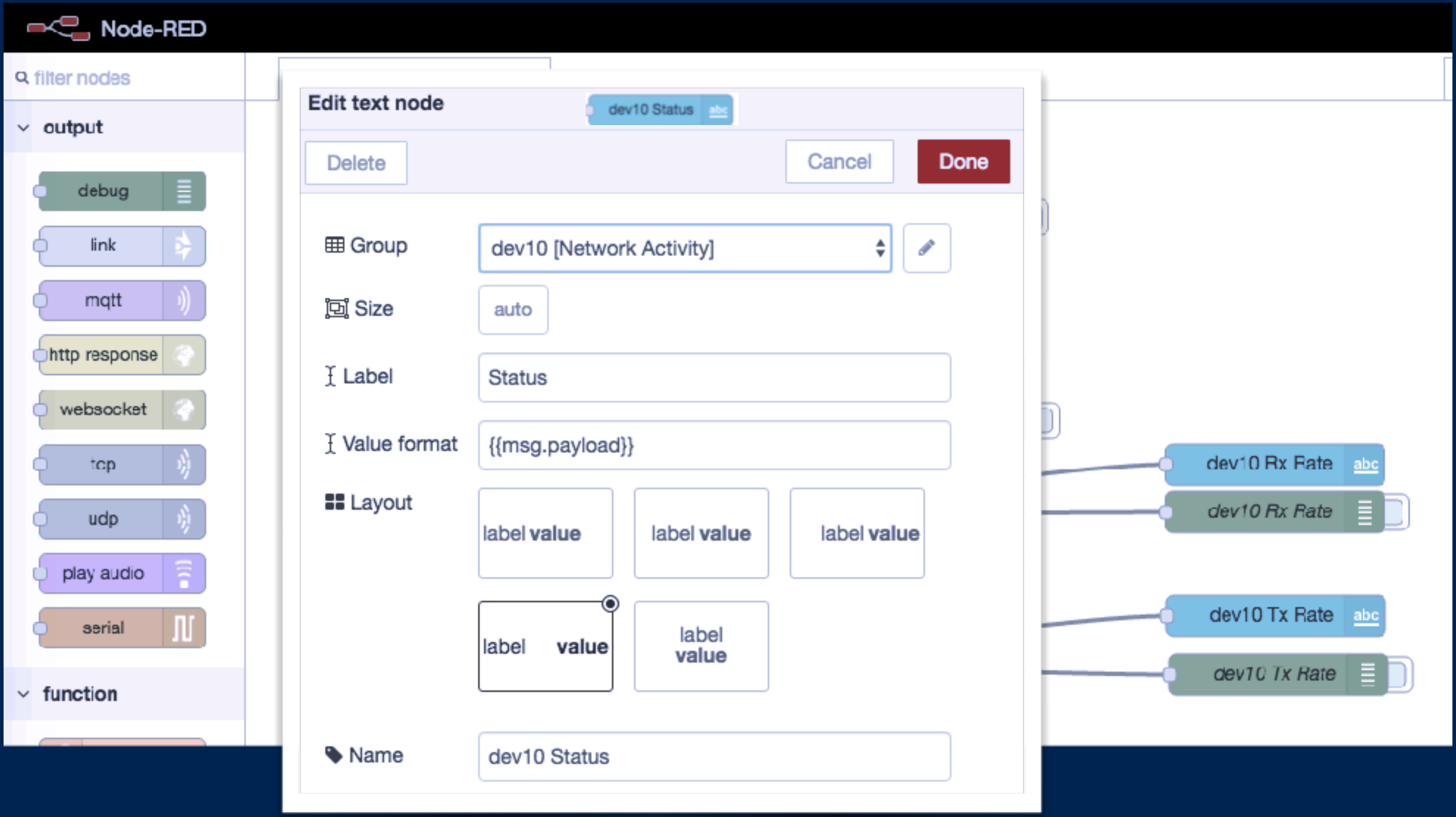
Server: dev10.local:1883

Topic: Status/dev10/#

QoS: 2

Name: dev10 Status

Node-Red Dashboard



Edit text node

Group: dev10 [Network Activity]

Size: auto

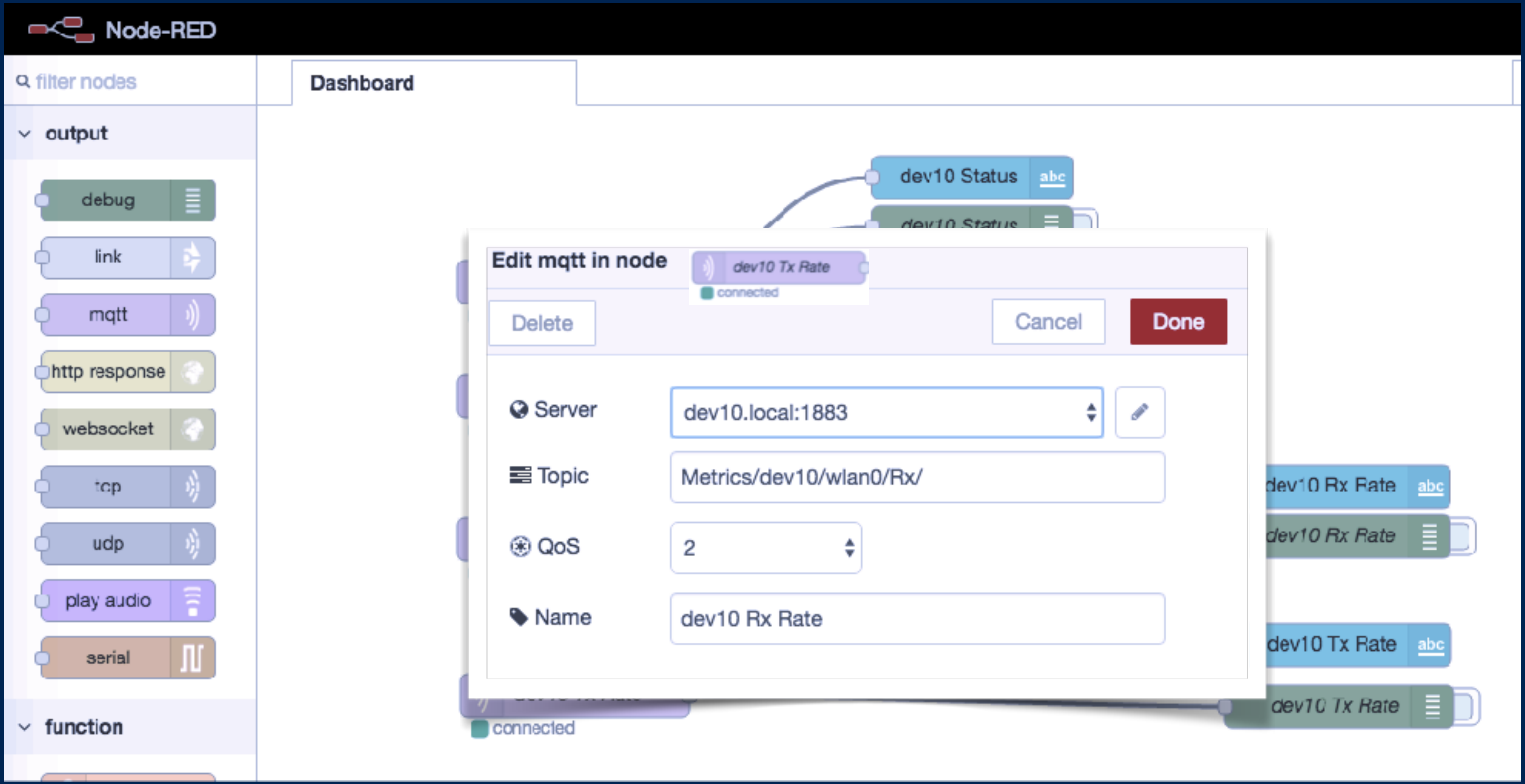
Label: Status

Value format: {{msg.payload}}

Layout

Name: dev10 Status

Node-Red Dashboard



Edit mqtt in node

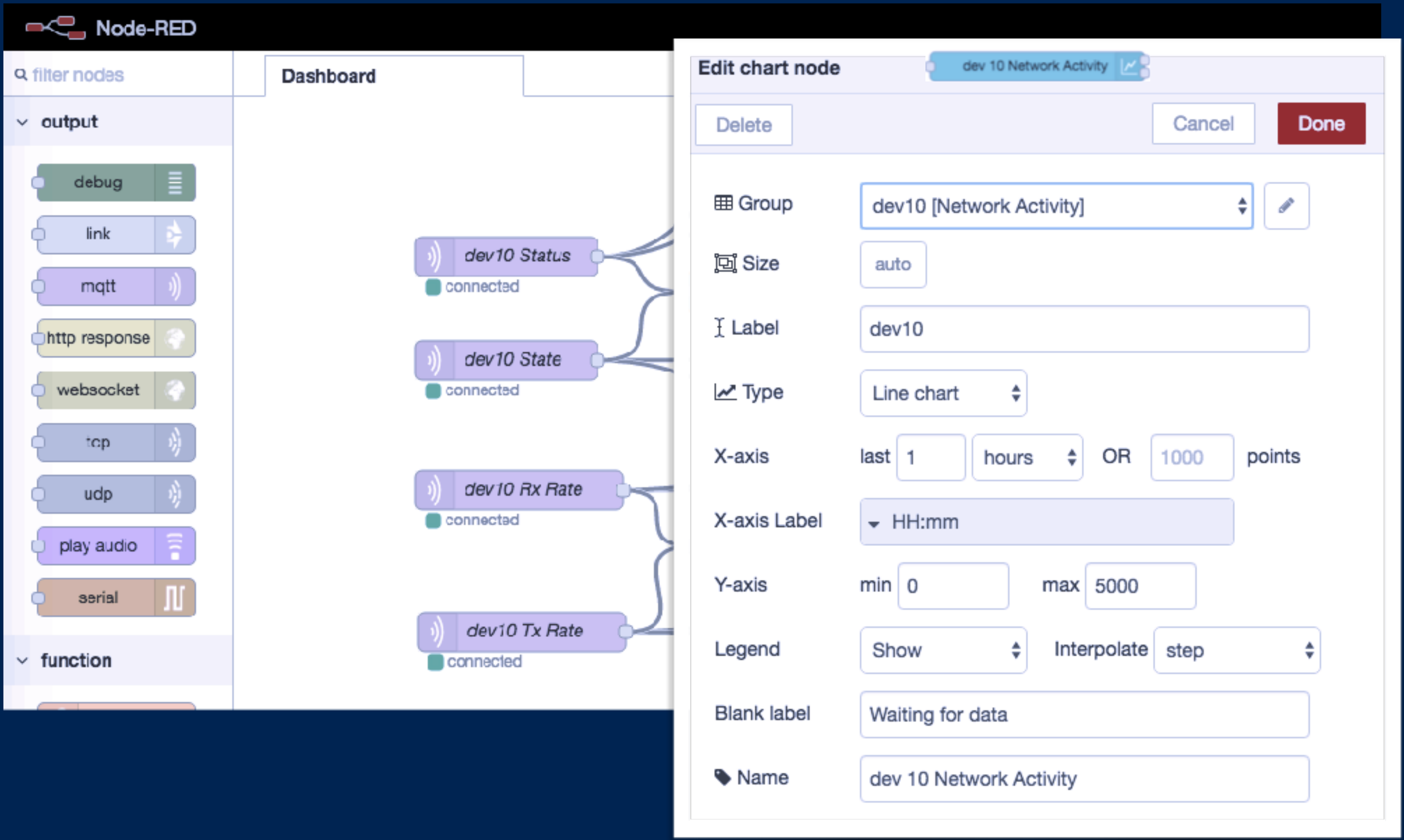
Server: dev10.local:1883

Topic: Metrics/dev10/wlan0/Rx/

QoS: 2

Name: dev10 Rx Rate

Node-Red Dashboard



Edit chart node

Group: dev10 [Network Activity]

Size: auto

Label: dev10

Type: Line chart

X-axis last 1 hours OR 1000 points

X-axis Label HH:mm

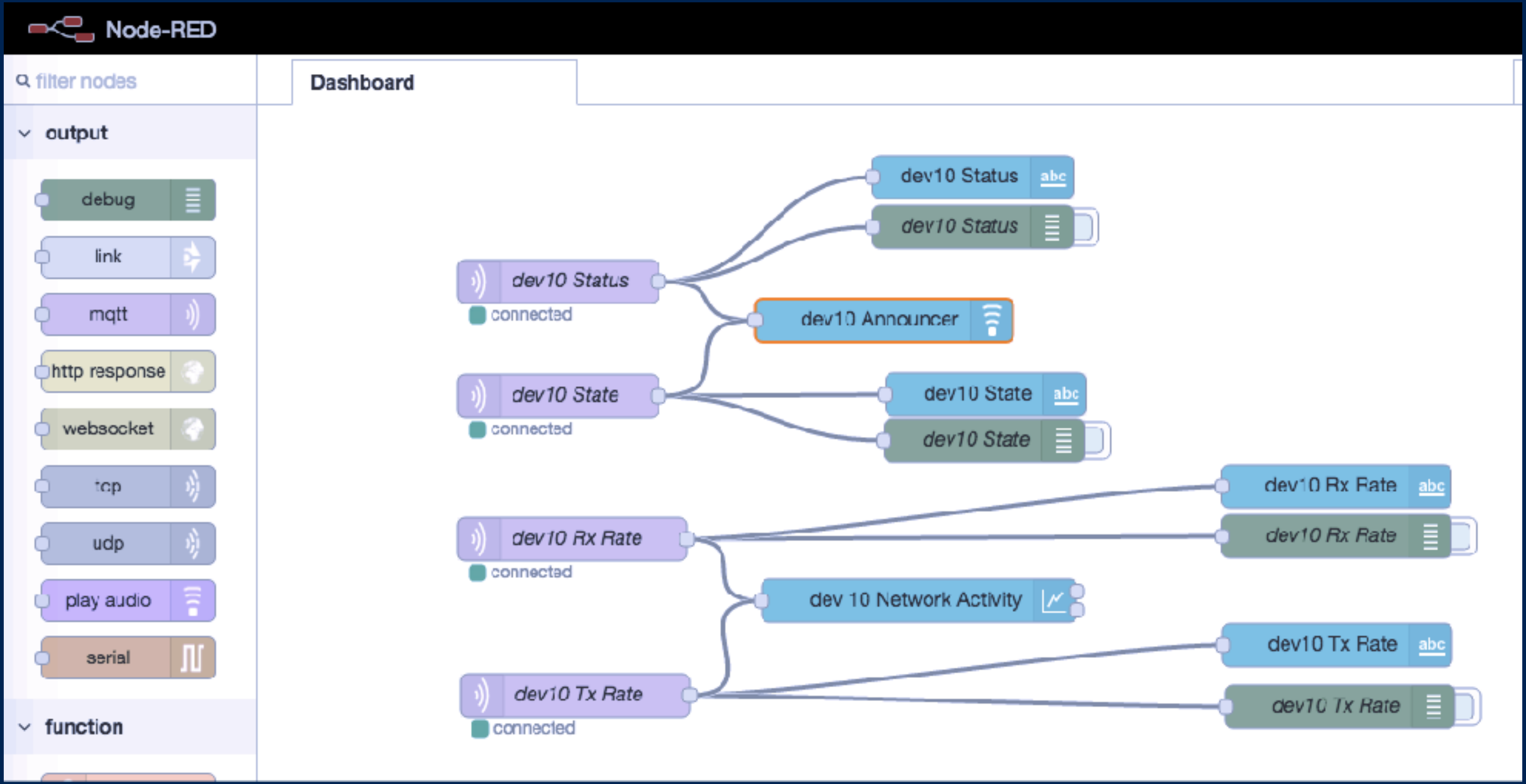
Y-axis min 0 max 5000

Legend: Show Interpolate: step

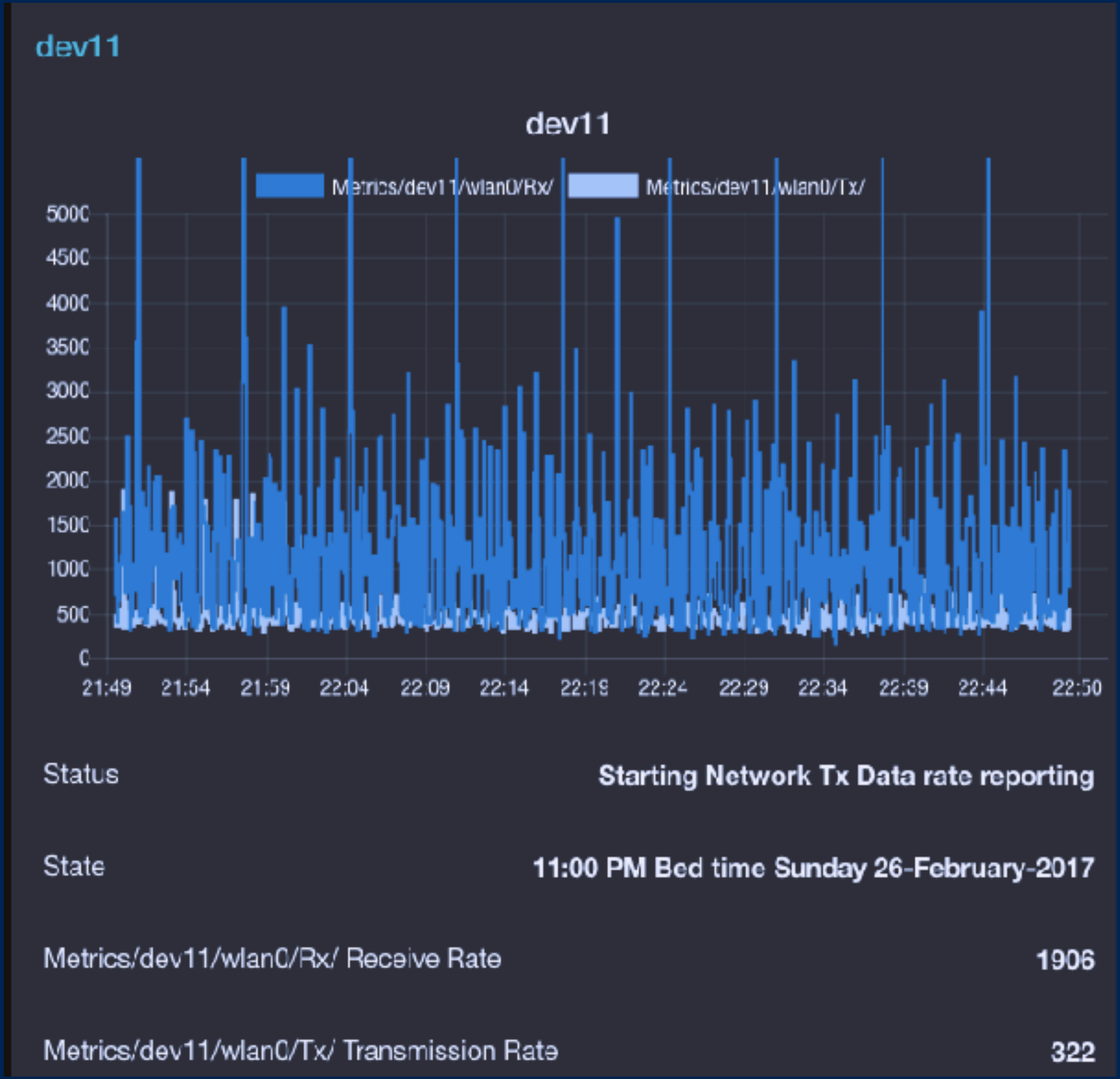
Blank label: Waiting for data

Name: dev 10 Network Activity

Node-Red Dashboard



Dashboard Output



dev11

Status	**Starting Network Tx Data rate reporting**
State	**11:00 PM Bed time Sunday 26-February-2017**
Metrics/dev11/wlan0/Rx/ Receive Rate	**1906**
Metrics/dev11/wlan0/Tx/ Transmission Rate	**322**

What comes next?

- Add code to subscribe to Command topics and act upon commands
- Add code to applications to send commands to each other
- Use a Dashboard to take control!

Meanwhile I was side tracked by an Amazon Alexa Voice Skills Workshop

- That means I have been building voice skills
  - Tell Siri (working)
    e.g. David would like Siri to go buy some chocolate
    ==> “Hey Siri! Buy some chocolate”
  - Full Moon (in progress)
    e.g. interrogate the US Navy online service for the full moon in a particular month
  - Mindful Meditations (not started)
    e.g. do a relaxing meditation
    follow the breath

Meanwhile still planning on TimePeace II

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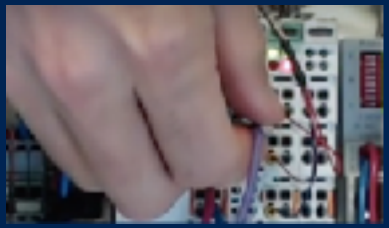

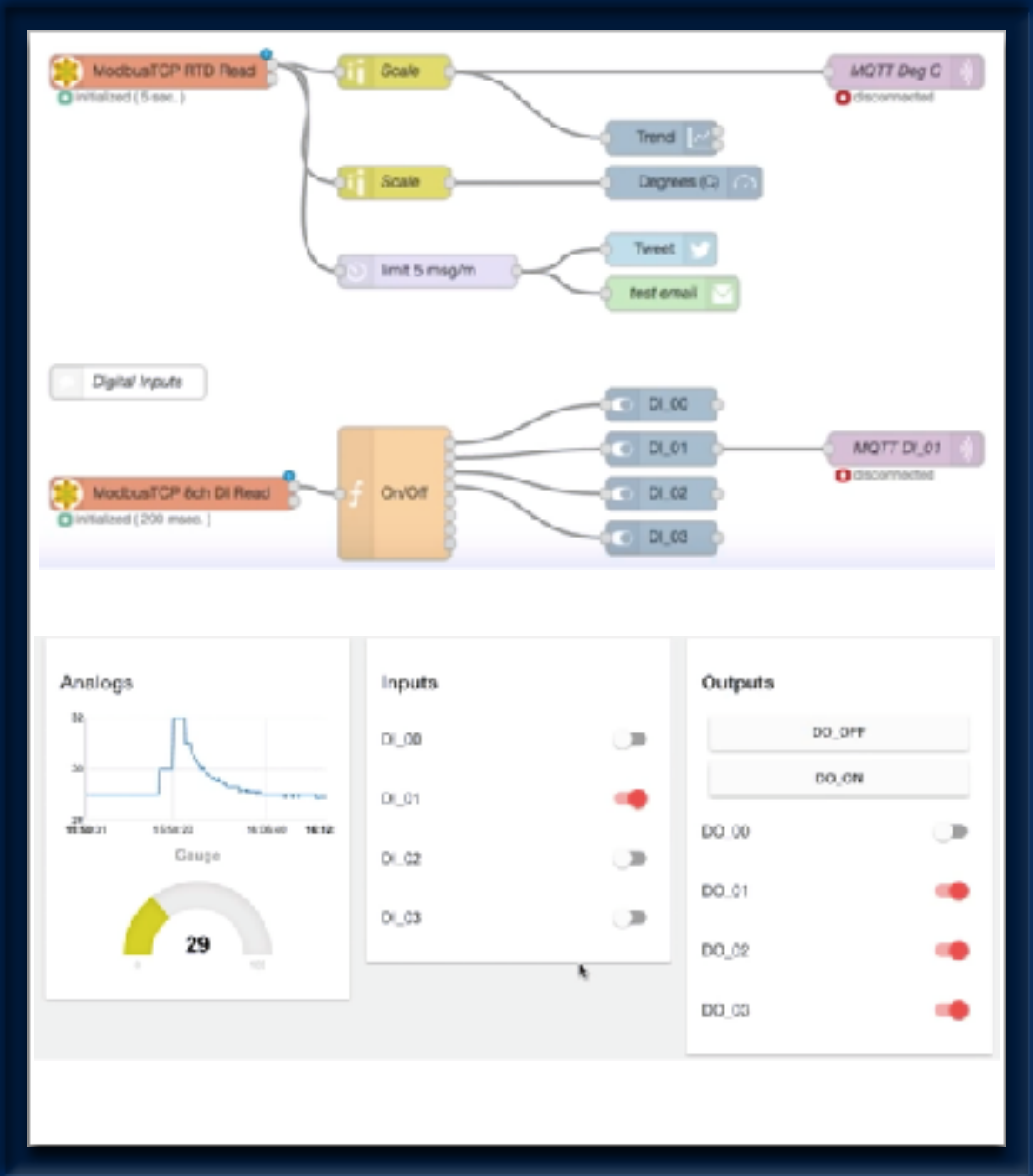

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(note two underscores)

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29th November 2016 by David Penney

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