**Requirements**

We need a broker that is always available. Just one for the whole network. It can be a PC, a Raspberry Pi or even an EV3. If it is a Debian-based linux system we can use mosquitto

Now we are able to send and receive messages through the broker (by default mosquitto uses port 1883).

This tutorial uses python scripts so we need to install one python library:

sudo easy\_install paho-mqtt

All scripts were tested successully on a EV3 running the latest ev3dev version (as of 12 May 2016) and also on a Raspberry Pi 3 with a BrickPi running the same ev3dev version and a laptop running Ubuntu 16.04.

**Publisher example**

A very simple script to publish a message:

#!/usr/bin/env python

import paho.mqtt.client as mqtt

# This is the Publisher

client = mqtt.Client()

client.connect("localhost",1883,60)

client.publish("topic/test", "Hello world!");

client.disconnect();

Note: if using an external broker (i.e. the mosquitto deamon is not running in the EV3 that publishes messages) replace localhost with the IP address of the device that hosts the broker.

**Subscriber example**

Any MQTT client that is connected to our broker and has subscribed for “topic/test” will receive a MQTT message with “Hello world!” as the payload. We can test it with a mobile phone (there are several free MQTT client apps available) but we can also test it on our PC or on another EV3:

#!/usr/bin/env python

import paho.mqtt.client as mqtt

# This is the Subscriber

def on\_connect(client, userdata, flags, rc):

print("Connected with result code "+str(rc))

client.subscribe("topic/test")

def on\_message(client, userdata, msg):

if (msg.payload == "Hello world!"):

print("Yes!")

client.disconnect()

client = mqtt.Client()

client.connect("THE\_IP\_ADDRESS\_OF\_OUR\_BROKER",1883,60)

client.on\_connect = on\_connect

client.on\_message = on\_message

client.loop\_forever()

Note: the second EV3 (the “Subscriber”) just needs the “paho-mqtt” library, there is no need to install the “mosquitto” daemon.

**A more practical example**

We will use MQTT messages to control the speed of an EV3 motor on port A. We will do this by changing just one motor attribute: duty\_cycle\_sp so we define a topic for this purpose and susbcribe to it: topic/motor-A/dt

#!/usr/bin/env python

import paho.mqtt.client as mqtt

from ev3dev.auto import \*

# This is the Subscriber

m = MediumMotor(OUTPUT\_A)

def on\_connect(client, userdata, flags, rc):

print("Connected with result code "+str(rc))

client.subscribe("topic/motor-A/dt")

def on\_message(client, userdata, msg):

if (msg.payload == 'Q'):

m.stop()

client.disconnect()

elif (-100 <= int(msg.payload) <= 100):

m.duty\_cycle\_sp=msg.payload

client = mqtt.Client()

client.connect("THE\_IP\_ADDRESS\_OF\_OUR\_BROKER",1883,60)

client.on\_connect = on\_connect

client.on\_message = on\_message

m.run\_direct()

m.duty\_cycle\_sp=0

client.loop\_forever()

So whenever a device on our network publishes a message with topic topic/motor-A/dt our Subscriber will receive it and if the payload is a proper integer value it will change the motor speed. It will also stop the motor and quit if the payload is just Q.