

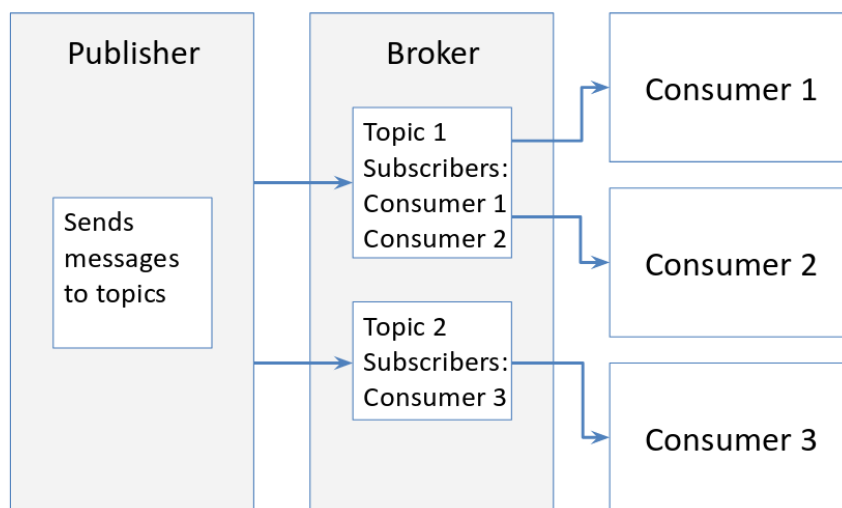
EE 629 – IoT using Raspberry Pi

Lesson 5 – Exercises - **Done**

Docker

Docker is a tool designed to make it easier to create, deploy, and run applications by using containers. Containers allow a developer to package up an application with all of the parts it needs, such as libraries and other dependencies, and ship it all out as one package. For developers, it means that they can focus on writing code without worrying about the system that it will ultimately be running on. For operations staff, Docker gives flexibility and potentially reduces the number of systems needed because of its small footprint and lower overhead.

Publish-Subscribe Communication



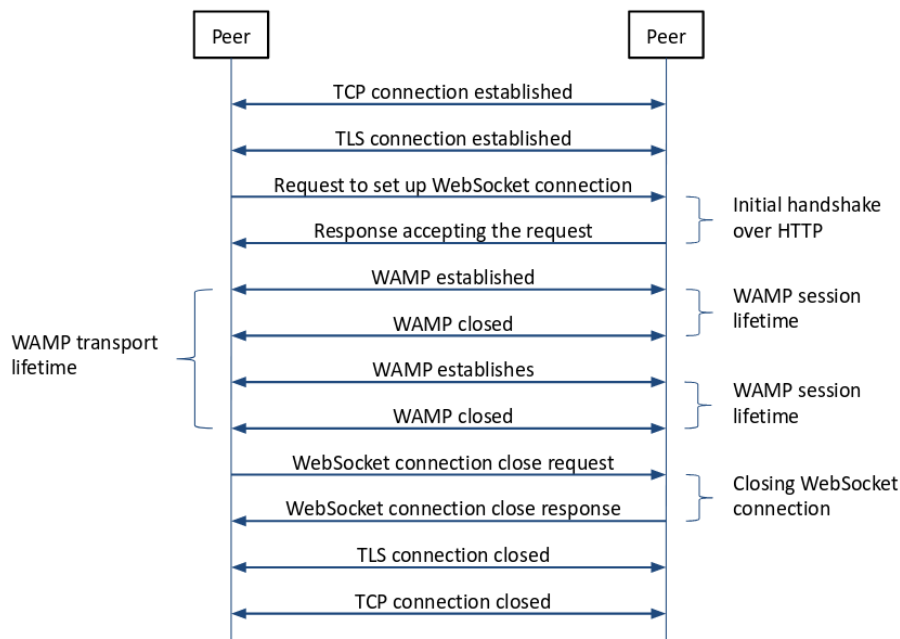
Docker Installation

Installed the docker on a Raspberry Pi and added pi to the Docker Group as a non-root user and logged out. Ran docker images designed to work on ARM and ran new image from Dockerfile

Crossbar:

Crossbar.io is an open source networking platform for distributed and microservice applications. It implements the open Web Application Messaging Protocol ([WAMP](#)), is feature rich, scalable, robust and secure. Let Crossbar.io take care of the hard parts of messaging so you can focus on your app's features.

WAMP



Lab A: Crossbar.io

Ran Crossbar.io router on Terminal 1

Ran publish-client on Terminal 2

Ran subscribe-client on Terminal 3

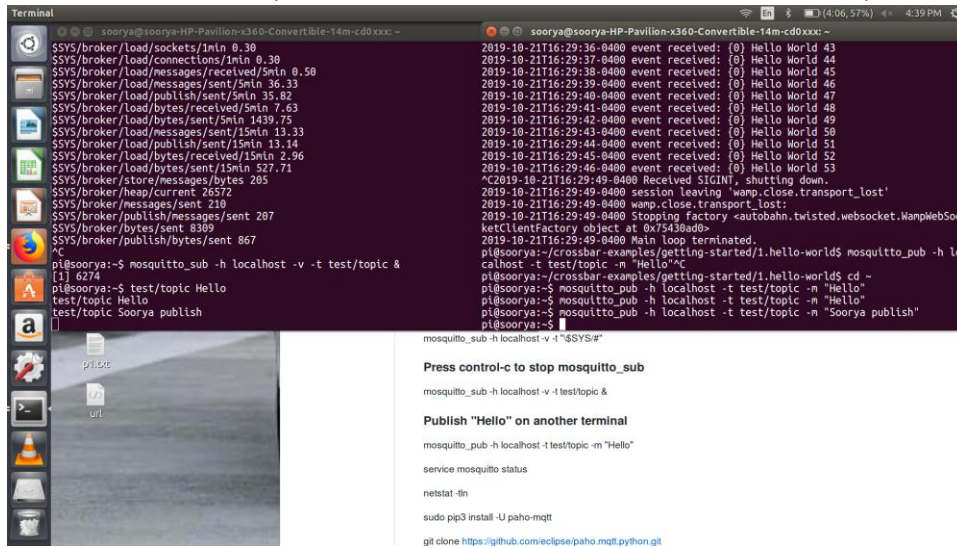
The screenshot shows three terminal windows. Terminal 1 (left) shows the Crossbar.io router logs, including starting the service, establishing connections, and attaching sessions. Terminal 2 (middle) shows the publish-client logs, including starting the service and publishing messages. Terminal 3 (right) shows the subscribe-client logs, including starting the service and subscribing to messages.

Mosquitto and Paho:

The Eclipse Paho project provides open-source client implementations of MQTT and MQTT-SN messaging protocols aimed at new, existing, and emerging applications for the Internet of Things (IoT)

Lab B: Mosquitto and Paho

Installed and ran Mosquitto and Paho to subscribe on one terminal and publish on another terminal



```
Terminal
soorya@soorya-HP-Pavilion-x360-Convertible-14m-cd0xxx:~$
$SYS/broker/load/sockets/1mIn 0.30
$SYS/broker/load/connections/1mIn 0.30
$SYS/broker/load/messages/received/5mIn 0.50
$SYS/broker/load/messages/sent/5mIn 36.33
$SYS/broker/load/publish/sent/5mIn 35.82
$SYS/broker/load/bytes/received/5mIn 7.63
$SYS/broker/load/bytes/sent/5mIn 1439.75
$SYS/broker/load/messages/sent/15mIn 13.33
$SYS/broker/load/bytes/received/15mIn 2.96
$SYS/broker/load/bytes/sent/15mIn 527.71
$SYS/broker/store/messages/bytes 205
$SYS/broker/heap/current 26572
$SYS/broker/messages/sent 210
$SYS/broker/publish/messages/sent 207
$SYS/broker/bytes/sent 8309
$SYS/broker/publish/bytes/sent 867
^C
pi@soorya:~$ mosquitto_sub -h localhost -v -t test/topic &
[1] 6274
pi@soorya:~$ test/topic Hello
test/topic Hello
test/topic Soorya publish
pi@soorya:~$

2019-10-21T16:29:36-0400 event received: (0) Hello World 43
2019-10-21T16:29:37-0400 event received: (0) Hello World 44
2019-10-21T16:29:38-0400 event received: (0) Hello World 45
2019-10-21T16:29:39-0400 event received: (0) Hello World 46
2019-10-21T16:29:40-0400 event received: (0) Hello World 47
2019-10-21T16:29:41-0400 event received: (0) Hello World 48
2019-10-21T16:29:42-0400 event received: (0) Hello World 49
2019-10-21T16:29:43-0400 event received: (0) Hello World 50
2019-10-21T16:29:44-0400 event received: (0) Hello World 51
2019-10-21T16:29:45-0400 event received: (0) Hello World 52
2019-10-21T16:29:46-0400 event received: (0) Hello World 53
^C2019-10-21T16:29:49-0400 Received SIGINT, shutting down.
2019-10-21T16:29:49-0400 session leaving 'wamp.close.transport_lost'
2019-10-21T16:29:49-0400 wamp.close.transport_lost:
2019-10-21T16:29:49-0400 Stopping factory <autobahn.twisted.websocket.WampWebSoc
ketClientFactory object at 0x75438adb>
2019-10-21T16:29:49-0400 Main loop terminated.
pi@soorya:~/crossbar-examples/getting-started/1.hello-world$ mosquitto_pub -h lo
calhost -t test/topic -m "Hello"
pi@soorya:~/crossbar-examples/getting-started/1.hello-world$ cd -
pi@soorya:~$ mosquitto_pub -h localhost -t test/topic -m "Hello"
pi@soorya:~$ mosquitto_pub -h localhost -t test/topic -m "Soorya publish"
pi@soorya:~$

mosquitto_sub -h localhost -v -t "$SYS/#"

Press control-c to stop mosquitto_sub

mosquitto_sub -h localhost -v -t test/topic &

Publish "Hello" on another terminal

mosquitto_pub -h localhost -t test/topic -m "Hello"

service mosquitto status

netstat -ln

sudo pip3 install -U paho-mqtt

git clone https://github.com/eclipse/paho.mqtt.python.git
```