Prepwork: Setup accounts if needed

Github.com

Gitpod.io

HACK(H)ER 413

Your Code Brightens the Room

Learning to use MQTT + IOT to control lights

Agenda

- Introduction / Who am I
- Workshop Overview
- IOT Architecture
- Message Queues / Brokers
- IOT Device details (Sonoff Tasmota)
- Hack on stuff

Dan Rowe

Principle Engineer at Wayfair

Ally to Women and Non-Binary people in tech & bio fields

- 2 great kids and a superhero wife
- Vice President of the NEHS
- President of Rowe Reptiles
- Have a building full of Reptiles

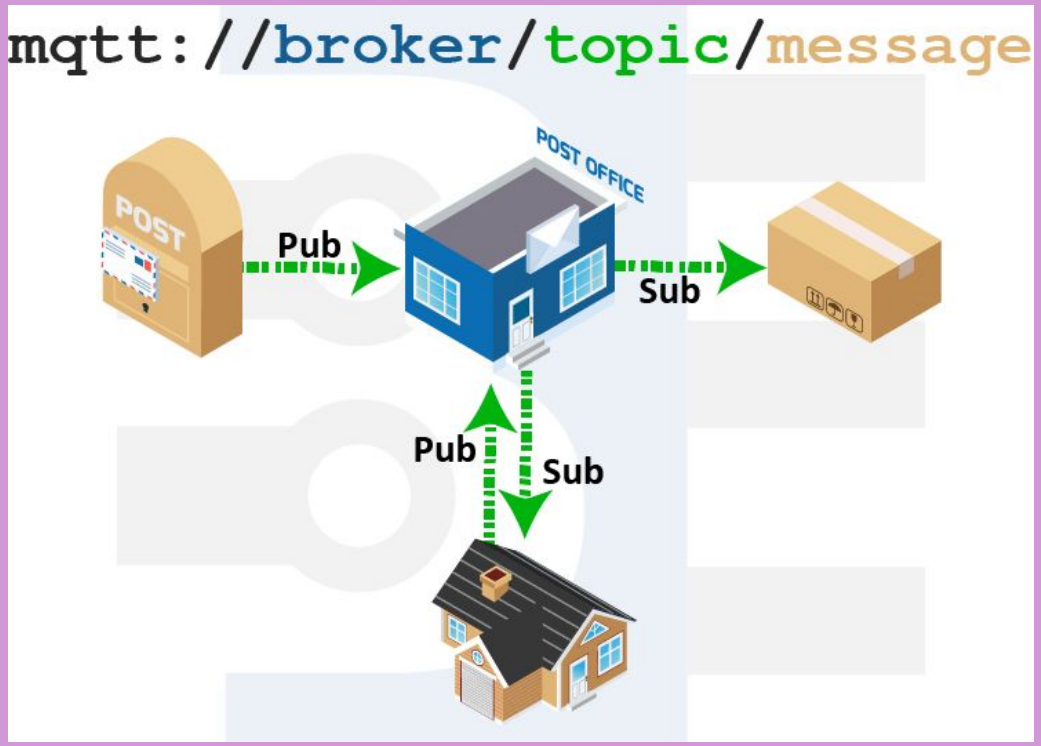
Overview of workshop

I'm going to teach you how to turn on/off a light..

... from the couch or the other side of the world

IOT Architecture : PubSub Layout

Similar Apps:
Redis PubSub
Kafka
RabbitMQ



Term definitions from: https://www.baldengineer.com/mqtt-introduction.html

IOT Architecture : MQTT Terms

- **MQTT:** Message Queuing Telemetry Transport
- **IOT**: Internet of Things, typically internet connected “Smart” devices
- **Broker**: The broker accepts messages from clients and then delivers them to any interested clients. Messages belong to a topic. (Sometimes brokers are called “servers.”)
- **Client**: A “device” that either publishes a message to a topic, subscribes to a topic, or both.
- **Topic**: A namespace (or place) for messages on the broker. Clients subscribe and publish to a topic.
- **Publish**: A client sending a message to the broker, using a topic name.
- **Subscribe**: A client tells the broker which topics interest it. Once subscribed, the broker sends messages published to that topic. (In some configurations the broker sends “missed” messages.) A client can subscribe to multiple topics.
- **Relay:** An electronic component that opens and closes an electrical circuit.

Term definitions from: https://www.baldengineer.com/mqtt-introduction.html

MQTT Topic Subscription Syntax

Wildcards:
is multi level
+ is single level

Topic example:
chats/room1
chats/hotel/room2
stats/light1/power
stats/light2/power

Subscribe to all chat rooms:
chats/#

Subscribe to the power status of all lights:
stats/+/power

MQTT Playground

http://hackher413.danrowe.com/

Connection

connected

Publish

Topic: chats/1

QoS: 0

Retain

Publish

Message: Hello World

Subscriptions

Add New Topic Subscription

Qos: 2 — chats/# — x

Messages

2019-02-07 13:40:36 Topic: chats/1 Qos: 0

Hello World

IOT Device overview

We’re going to be playing with Sonoff devices today

Arduino based Wifi enabled Relays with alternative firmware

Sonoff MQTT details

The name of the deviceid is on the bottom. Something like: hackher00X
If you subscribe to the following topic you'll get status updates:
stat/hackher00X/#

To send the device commands:
You use the topic: **cmnd/hackher00X/power**
Available messages for that topic are in the chart below

Message	Function
0 / off	Turn power off
1 / on	Turn power on
2 / toggle	Toggle power of relay

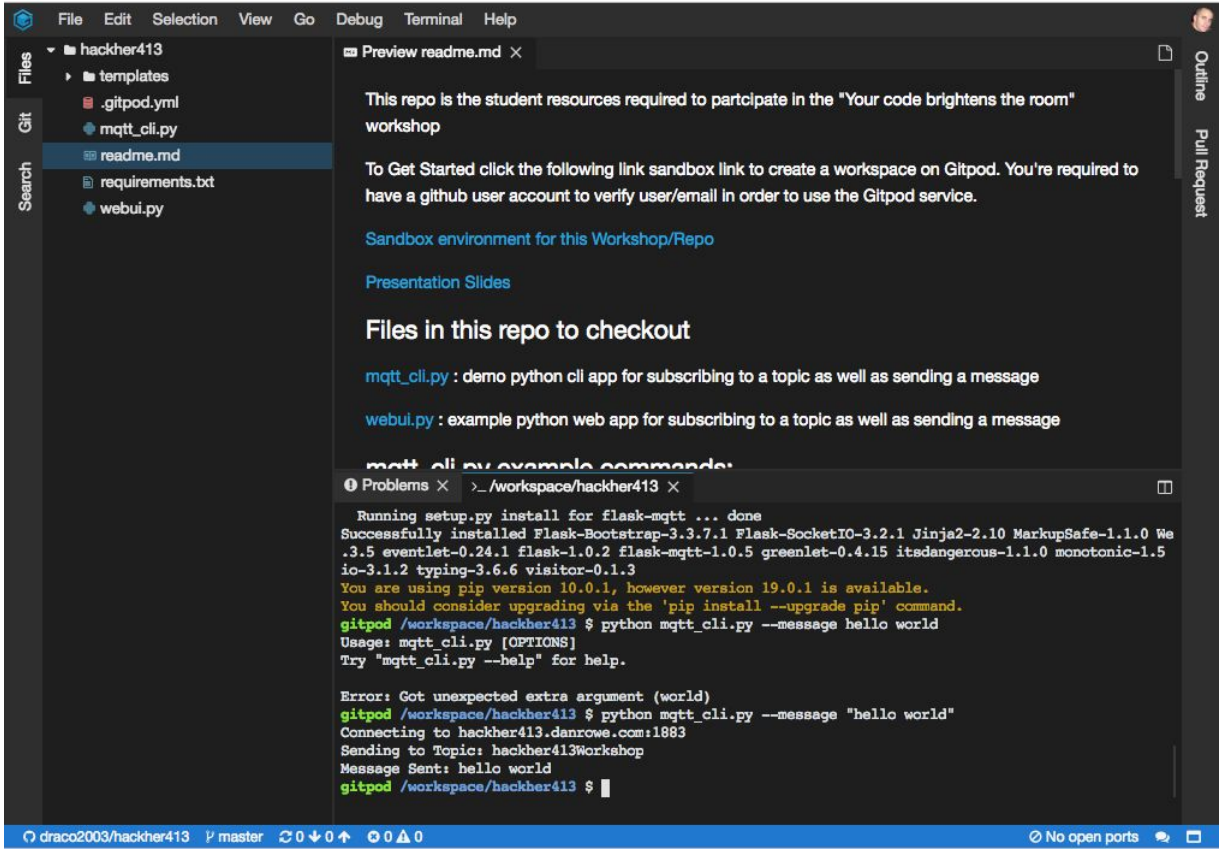
MQTT With Python

Workshop Repo
https://github.com/draco2003/hackher413

Has links to the slides, sandbox environment and sample code

Now it's time to hack!

Gitpod.io IDE



Editor

Terminal

Commands to run demo

Cli demo code:

Subscribe - python mqtt_cli.py
Send message - python mqtt_cli.py --message “hello world”

WebUI demo code:

python webui.py