Session 17 Lecture Notes

Announcements

1. Parts are on the way
2. Reading:
   (a) MQTT Version 5.0 Standard
   (b) MQTT Version 3.1.1 Standard (used by Adafruit)
   (c) MQTT tutorial at Adafruit
3. Supplemental materials:
   (a) Adafruit IO

The Internet of Things

The **internet of things** (IoT) has two elements:

- Things
- The internet

An IoT Communications Protocol

Message Queueing Telemetry Transport (MQTT)

- An open **standard**
- Has server/client architecture
- Lightweight publish/subscribe protocol
- Supports different quality of service (QoS) levels

MQTT Messages

Information communicated in **messages**, or **packets**.

- A **message** is a **byte string**.
- The MQTT standard defines the message types.
- Each message type has a **fixed header**.
- A message may have a **variable header**.
- A message may have a **payload**.

MQTT Housekeeping Message Types

Message types we will may use:

CONNECT	Client connects to server
CONNACK	Server acknowledges connection
PINGREQ	Client pings server
PINGACK	Server acknowledges ping

MQTT Telemetry Messages

Message types we will may use:

PUBLISH	Client or server will provide *topic* data
PUBACK	Server or client acknowledges
SUBSCRIBE	Client wants *topic* data
SUBACK	Server acknowledges

AT Command to Send Data

To send an MQTT message through the ESP-01:

AT+CIPSEND=<link id>,<length>

- **link id** is the link number if you used CIPMUX=1 to allow multiple links (usually 0 for us)
- **length** is the total number of characters that you want to send, as a decimal value

  Note that you **do not** append any kind of EOL marker to an MQTT packet. The length value here is just the length of the packet bytes themselves.

The ESP-01 responds with
>

You can then send the message packet bytes to the ESP-01. When the ESP-01 receives exactly **length** bytes it will send the packet to the MQTT server.

The ESP-01 responds with
SEND OK