CSE4352 IoT and Networking
CSE5352 IoT and Networking
CSE6351 Advanced Topics in Computer Engineering
Spring 2021 Project 1

1 Overview

The goal of this project is implementing an MQTT client based on the Ethernet stack code provided in class, implemented on a TM4C123GXL board connected to an ENC28J60 ethernet interface.

The solution will be able to publish topics and subscribe to topics on an MQTT broker, such as Mosquitto.

As the intent of this project is to understand the details of these simple elements, your code solution can be based only on provided class code and code you write. You should not be incorporating more than a few lines of code from other sources.

2 Command-line Interface Requirements

The solution must provide these additional command-line interface using UART0 and configuring the device and reading out the status. The command-line interface should support the following commands at a minimum:

reboot:
This command restarts the microcontroller.

status:
This command displays the IP and MQTT address, the MQTT connection state, and the TCP FSM state.

set IP w.x.y.z
This command sets the IP address and stores this address persistently in EEPROM.

set MQTT w.x.y.z
This command sets the IP address of the MQTT broker and stores this address persistently in EEPROM.

publish TOPIC DATA
This command publishes a topic and associated data to the MQTT broker.

subscribe TOPIC
This command subscribes to a topic.

unsubscribe TOPIC
This command unsubscribes from a topic.

connect
This command sends a connect message to the MQTT broker.

disconnect
The command disconnects from the MQTT broker.

When a connection is active and a subscription to a topic exists, the MQTT will publish information. When these topics are received, they should be displayed on the console interface.

3 Power-Up Requirements

On power-up, the solution must initialize the clocks, UART, ethernet controller, and timer service.

The MQTT address must be retrieved from EEPROM on power-up.

If a valid MQTT address is provided, them the MQTT client should try to connect.

4 Deadlines and Teams

The project can be completed by teams of 1 or 2 students. Both students must equally participate and contribute to the project.

When submitting your project, you should include all files in the project.

If any part of your project (even 3 lines of code) is determined to not be unique, your grade will be impacted.

Please include your name(s) clearly at the top of your program files except the class libraries. Please document your program well to maximize credit.

Code submissions are due at the time defenses begin indicated in the class syllabus with a defense. No late projects will be accepted.

Have fun!