Lab2: BLE advertisements

Github Code:

https://github.com/jtschuster/nu-wirelessiot-base/tree/main/software/apps/lab2

Scanning Application

In ble_scan, I implemented a few filters, one that searches for the name field, one that filters on the peer address, and one that filters on the EddyStone marker being present.

Advanced advertising

In ble_adv_raw, I sent a URI in the BLE advertizement with the 'http:' abbreviated to 0x16. The Field data type value for URI's is 0x24. I used bing.com because it was a short enough URI to fit in the advertisement. To do this, I appended to the payload (1) the length of the URL + 1 for the field type byte, (2) the URI data type value (0x24), and (3), the URL with the shortening byte to not have to use "http:".

EddyStone advertising

In the advertisement, there is flags (header 0x01), "Complete List of 16-bit Service Class UUIDs" (header 0x03), and Service Data (0x16), followed by the URL. The simple_ble implementation automatically appends the "https://" prefix by putting 0x03. In particular, the bytes were:

Flags:
0x02 0x01 0x06

Complete List of 16-bit Service Class UUIDs:
0x03 0x03 0xaa 0xfe

Service Data:
0x10 0x16 0xaa 0xfe 0x10 0xba 0x03 0x67 (g) 0x6f (o) 0x6f (o) 0x67 (g) 0x6c (l) 0x65 (e) 0x2e (.) 0x63 (c) 0x6f (o) 0x6d (m)

Secret message

The secret message is in a company specific data field. It is a University of Michigan company ID. The data after is UTF-8 encoding for moon phase emojis.

Hidden Message:

Issues:

I ran into a number of off by one errors with the size of the field not including the size byte, and with the first byte being the data type number of the field.

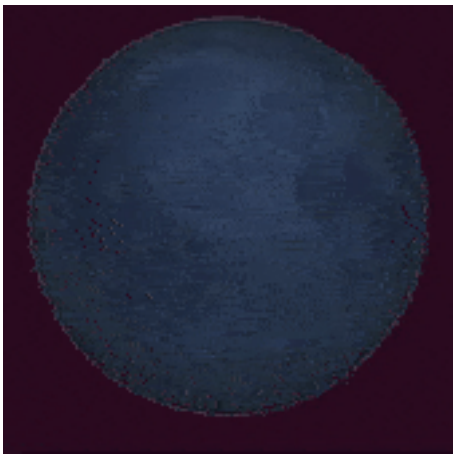

Figure 1: secret message