INF-743: IoT Communication Technologies

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Intel Edison as an Eddystone URL beacon

What is an Eddystone beacon:

Eddystone is a protocol specification by Google that allows a Bluetooth low energy device to broadcast one way messages. See https://github.com/google/eddystone. Currently the specification defines three types of messages that can be broadcasted: a UID, a URL, or telemetry.

The magic of the Eddystone beacon is on the app side where your phone listens for these broadcast messages and either displays an alert when it detects something or performs some kind of action.

This tutorial shows how to setup an Intel Edison to broadcast the URL for the Venturus Facebook page.

Setting up the Intel Edison

1. Access the device shell through SSH or using the USB cable.
2. Unlock the BLE interface:

```
root@edison:~# rfkill unblock bluetooth
root@edison:~# killall bluetoothd
               # (or, more permanently) systemctl disable bluetooth
```

3. Enable the Bluetooth device:

```
root@edison:~# hciconfig hci0 up
```

4. Set the Bluetooth device to “advertise and not-connectable”

```
root@edison:~# hciconfig hci0 leadv 3
```

5. Enter the Beacon Advertising Data

```
root@edison:~# hcitool -i hci0 cmd 0x08 0x0008 1c 02 01 06 03 03 aa fe 14
16 aa fe 10 00 02 62 69 74 2e 6c 79 2f 32 6b 6e 5a 4e 38 49 00 00 00
```

Here is a breakdown of the payload:

Option	Description
0x08	#OGF = Operation Group Field = Bluetooth Command Group = 0x08
0x0008	#OCF = Operation Command Field = HCI_LE_Set_Advertising_Data = 0x0008

1c	Length. The hexadecimal 1c converts to 28 decimal which is the number of bytes that follow
2	Length
1	Flags data type value
6	Flags data
3	Length
3	Complete list of 16-bit Service UUIDs data type value
aa	16-bit Eddystone UUID
fe	16-bit Eddystone UUID
14	Length. The hexadecimal 14 converts to 20 decimal which is the number of bytes that follow
16	Service Data data type value
aa	16-bit Eddystone UUID
fe	16-bit Eddystone UUID
10	Frame Type = URL
0	TX Power (this should be calibrated)
02	URL Scheme (http:// = 0x02)(https:// = 0x03).
62	‘b’ in hexadecimal
69	‘i’ in hexadecimal
74	‘t’ in hexadecimal
2e	‘.’ in hexadecimal
6c	‘l’ in hexadecimal
79	‘y’ in hexadecimal
2f	‘/’ in hexadecimal
32	‘2’ in hexadecimal
6b	‘k’ in hexadecimal
6e	‘n’ in hexadecimal
5a	‘Z’ in hexadecimal
4e	‘N’ in hexadecimal
38	‘8’ in hexadecimal
49	‘I’ in hexadecimal
0	
0	
0	

Obs.: The length of the encoded URL is limited to 17 bytes, so we have used a URL-shortener (https://bitly.com/).

Now, advertize a different URL. Use the link below to generate the Eddystone data for the URL that you want to advertize.
http://yencarnacion.github.io/eddystone-url-calculator/

On Android, your phone should detect the URL if you have Android 4.3.2 or higher with Bluetooth turned on, location turned on, and Chrome location runtime permission turned on.
See https://support.google.com/chrome/answer/6239299?hl=en.
Google requires HTTPS in order for Chrome to detect the URL Beacon.
So in order to fix, change the URL Scheme from http:// = 0x02 to https:// = 0x03.
However, you may have to install the Physical Web App from https://play.google.com/store/apps/details?id=physical_web.org.physicalweb&hl=en to make it work.