Developer Study Guide: An introduction to Bluetooth Low Energy Development

Orientation Guide

Version: 5.1

Last updated: 28th March 2018

Contents

Revision History

Version	Date	Author	Changes
1.0.0	1st May 2013	Bluetooth SIG	Initial version
2.0.0	1st September 2014	Martin Woolley, Bluetooth SIG	Replaced Button Click custom service with the Proximity Monitoring Service. Introduced the Time Monitoring Service. Described implementation of link loss, link loss alert level change and immediate alert use cases and included Arduino code.
2.0.4	2nd February 2015	Martin Woolley, Bluetooth SIG	Fixed some minor issues with the contents of this document; unpackaging instructions incortrectly assumed the Arduino BLE library would be in a zip file, which it is not. The circuit diagram for the suggested circuit had an error.
3.0.0	7th July 2016	Martin Woolley, Bluetooth SIG	Replaced Arduino Uno with Arduino/Genuino 101 Introduced use of Bluetooth Developer Studio in the design of the lab profile and generation of skeleton code
3.1.0	3rd October 2016	Martin Woolley, Bluetooth SIG	Android 4.x based lab retired and replaced with completely new lab and solution based on Android 5+ APIs.
3.2.0	16th December 2016	Martin Woolley, Bluetooth SIG	iOS Objective-C based lab retired and replaced with completely new lab and solution written in Swift.
4.0.0	7th July 2017	Martin Woolley, Bluetooth SIG	Added Apache Cordova lab.

5.0.0	7th December 2017	Martin Woolley, Bluetooth SIG	Added support for Arduino Primo as server
			Added support for Raspberry Pi as server
			Added functionality involving Indications
			Split Arduino lab document into three documents; LE Theory, Profile Design and Profile Implementation and Testing - Arduino.
5.0.2	15th June 2018	Martin Woolley, Bluetooth SIG	Removed use of Bluetooth Developer Studio in design exercises.
5.0.3	17th December 2018	Martin Woolley Bluetooth SIG	Name changed to "Developer Study Guide: An introduction to Bluetooth Low Energy Development"
5.1.0	28th March 2019	Martin Woolley Bluetooth SIG	Arduino 101 and Primo moved to legacy folder. Devices are no longer available to purchase. Zephyr on micro:bit server lab added.

Overview

Bluetooth Low Energy

Bluetooth® Low Energy (LE) is the intelligent, power-friendly version of Bluetooth wireless technology. While the power-efficiency of Bluetooth Low Energy makes it perfect for devices needing to run off a tiny battery for long periods, the magic of Bluetooth Low Energy is its ability to work with an application on the smartphone or tablet you already own. Bluetooth makes it easy for developers and OEMs to create solutions that will work with the billions of Bluetooth enabled products already in the market today.

About the Bluetooth LE Developer Study Guide

The Bluetooth LE Developer Study Guide is a resource for developers who are looking for an effective, hands on way to learn about the technology and especially, how to exploit it. We don't spend too much time on theory, instead favouring practical experience and jumping right in!

There are multiple parts to this resource and you'll use them to create a complete, working Bluetooth system. You'll be able to study some basic theory, design a Bluetooth profile and then implement it in a peripheral device and client application. In fact if you want to you can create several client applications, one for each of the various platforms covered in the study guide.
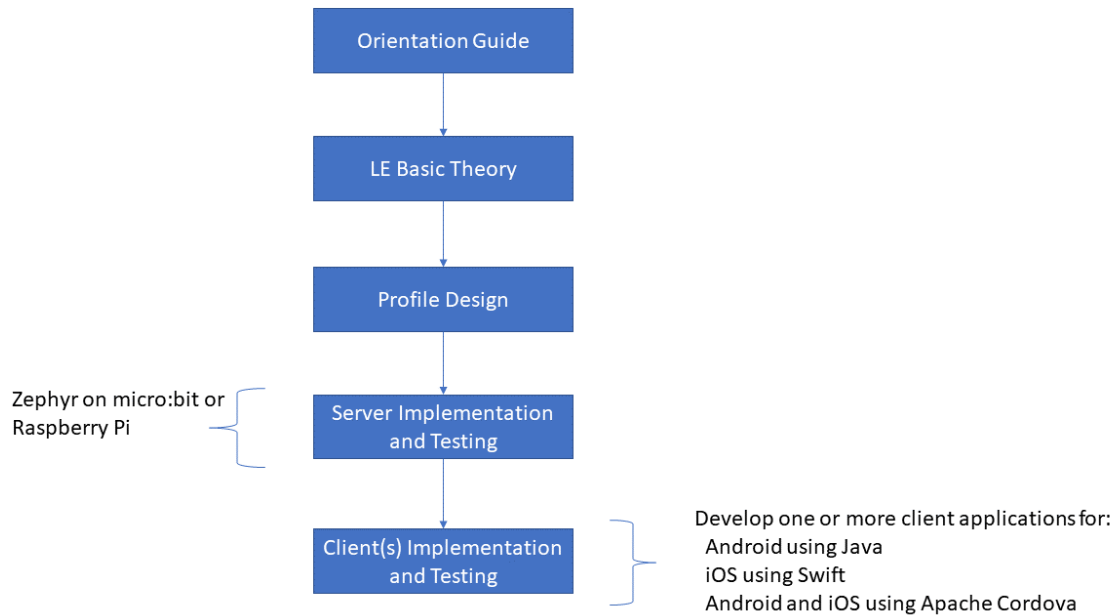
In each case you'll be guided through a hands-on project to create a given component of our system; either the peripheral device or a client application for one of the various platforms.

We provide full solutions including source code for each of the projects so don't worry if you have problems. Just take a look at the solution.

Resources are organised in the Clients and Servers folders. The Clients folder contains resources relating to the various client platforms we cover and the Servers folder contains resources for the peripheral, which in this release is based on either a Raspberry Pi or a BBC micro:bit using the [Zephyr RTOS](#).

Recommended Study Sequence

This study resource is modular in design and we recommend that you follow this sequence:

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        ┌─────────────────────┐
        │  Orientation Guide  │
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                  ▼
        ┌─────────────────────┐
        │   LE Basic Theory   │
        └─────────────────────┘
                  │
                  ▼
        ┌─────────────────────┐
        │    Profile Design   │
        └─────────────────────┘
                  │
                  ▼
Zephyr on micro:bit or  ┌─────────────────────┐
Raspberry Pi            │ Server Implementation│
                        │     and Testing      │
                        └─────────────────────┘
                                  │
                                  ▼
                        ┌─────────────────────┐   Develop one or more client applications for:
                        │ Client(s) Implementation│    Android using Java
                        │     and Testing      │    iOS using Swift
                        └─────────────────────┘    Android and iOS using Apache Cordova
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The Orientation Guide (this document), the LE Basic Theory document and the Profile Design document are each in the root folder of the study guide. You'll find documents relating to each of the supported clients and servers in the corresponding folder under the Clients\ and Servers\ folders respectively.

Good luck!