



Bluetooth for Linux Developers Study Guide

Orientation Guide

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1. Revision History

Version	Date	Author	Changes
1.0.0	16th November 2021	Martin Woolley Bluetooth SIG	Release: Initial release. Document: This document is new in this release.
1.0.1	11 th January 2022	Martin Woolley Bluetooth SIG	Release: Document: Fixed typo in list of modules. Module 04 was listed as Module 04.

2. Introduction and Orientation

Welcome to the Bluetooth® for Linux Developers Study Guide.

This is a self-paced, educational resource for software developers. It aims to introduce the reader to the architecture, concepts and code required to exploit Bluetooth on a Linux device using the [BlueZ](#) Bluetooth stack.

The study guide is modular in design and this orientation guide will help you decide where to start and what path to follow, depending on your current knowledge and goals.

Module 02 - Bluetooth LE Primer introduces those aspects of Bluetooth Low Energy (LE) that must be understood for the remainder of this resource to make sense.

Module 03 - Linux and Bluetooth explains BlueZ, the Bluetooth stack for Linux in terms of its architecture, interfaces and tools commonly used. It also explains how to install and configure BlueZ ready for use in the modules which follow. Finally, languages and language bindings available for developing Bluetooth applications on Linux are considered and evaluated.

Module 04 - Mastering DBus Basics using Python covers implementing DBus applications using Python but does not consider Bluetooth. This allows the reader to master the basics of DBus programming without needing to also learn about those issues that relate specifically to Bluetooth.

Module 05 - Developing LE Central Devices using Python explains how to write Python code which acts in the Bluetooth GAP Central role and after connecting to a remote device, as a GATT client. If the terms *GAP Central* and *GATT client* don't mean anything to you, don't worry because they're explained in module 02. Example code is included and you'll also have the opportunity to write code of your own and test it on a suitable computer.

Module 06 - Developing LE Peripheral Devices using Python explains how to write code which acts in the Bluetooth GAP Peripheral role, advertises and after being connecting to by a remote device, as a GATT server. The terms *GAP Peripheral* and *GATT server* are also explained in module 02.

Module A1 - Installation and Configuration provides step by step instructions for installing and setting up BlueZ for use with either GAP/GATT applications or Bluetooth mesh node development. Offers some tips on troubleshooting.

3. Goals

After completing the work in this study guide, you should:

- Be able to explain basic Bluetooth LE concepts and terminology such as *GAP Central* and *GATT client*.
- Be able to explain what BlueZ is, how applications use BlueZ in terms of architecture, services and communication.
- Understand the fundamentals of developing applications which use DBus inter-process communication.
- Be able to implement key functionality, typically required by GAP Central/GATT client Bluetooth devices.

4. Module Sequence

The modules are designed to be followed in a largely linear sequence but obviously if you are already familiar with the subject of a module you should skip it and dive straight into the first module that you think will offer something of value to you. If you're only interested in LE Peripheral development then it's not strictly necessary to study module 05 on Central device development but it's still recommended. If you're only interested in Central device development then it's not necessary to study Peripheral development but once again, it's recommended.

Note that module A1 acts as an appendix to the main study guide modules and contains information about setting up your Linux environment and some tips on tools that might be useful in troubleshooting.

Good luck with your studies!

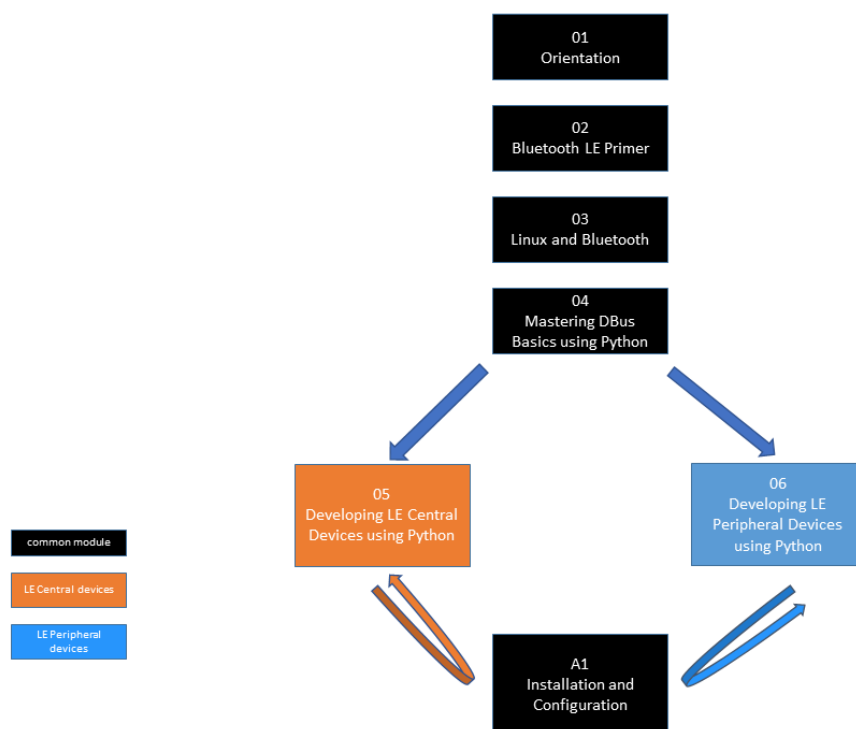


Figure 1 - Module order and dependencies

5. Equipment Required

To get the most out of this resource you should go *hands-on* whenever the opportunity arises and execute suggested commands, run all provided code examples and complete the coding exercises. To do so you will need a Linux computer which has a Bluetooth adapter either on-board or plugged into it, perhaps in the form of a Bluetooth USB dongle.

This study guide was developed using a Raspberry Pi 4.

What you use to edit code is up to you. All that's required is a text editor and we all have our favourites.