# A Python Library for Interacting with BLE-GATT via D-Bus

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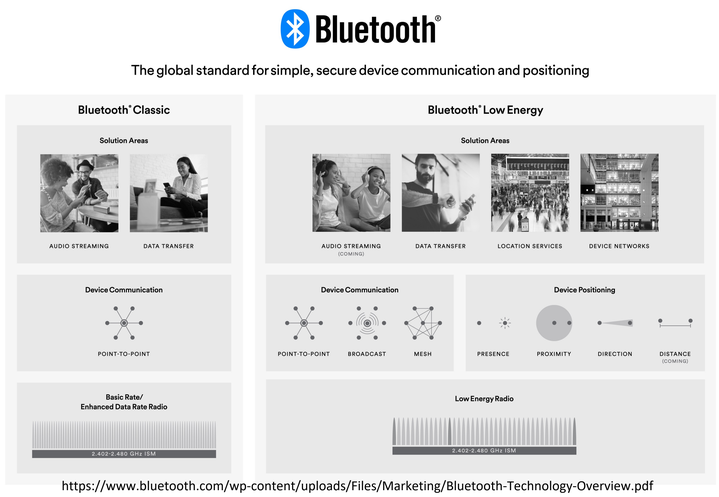
## How does Bluetooth work?

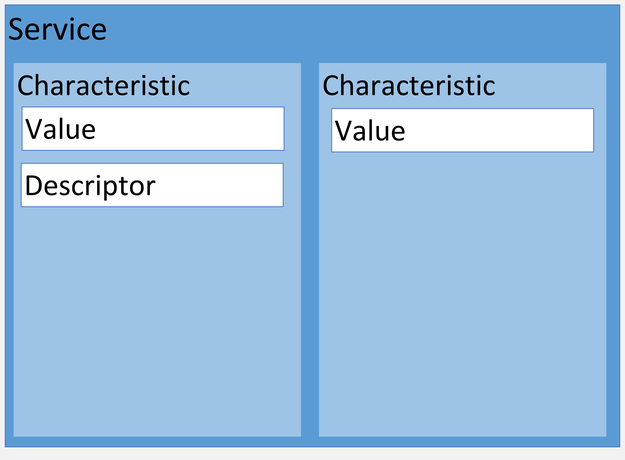



https://www.bluetooth.com/wp-content/uploads/Files/Marketing/Bluetooth-Technology-Overview.pdf

### Terms

**BLE** – Bluetooth Low Energy
**GATT** – Generic Attribute Profile. Defines a table of values called an Attribute Table that can be read and written to over a BLE connection.
**GAP** – Generic Access Profile. Used for discovering devices, creating connections, and closing connections.
**GAP Peripheral** – Sends out advertisements and accepts connections from GAP Central devices.
**Service** – Logical containers that usually correspond to a device's feature.
**Characteristic** – An individual piece of data used to support a service.
**Descriptor** – Optional metadata about a characteristic.
**UUID** – 128 bit universally unique identifier used to identify services and characteristics.
**GAP Central** – Scans for advertisements and connects to GAP Peripheral devices.
**GATT Server** – A device that hosts a set of services, characteristics, and descriptors.
**GATT Client** – A device that accesses services, characteristics, and descriptors on another device over a BLE connection.

### GATT Hierarchy

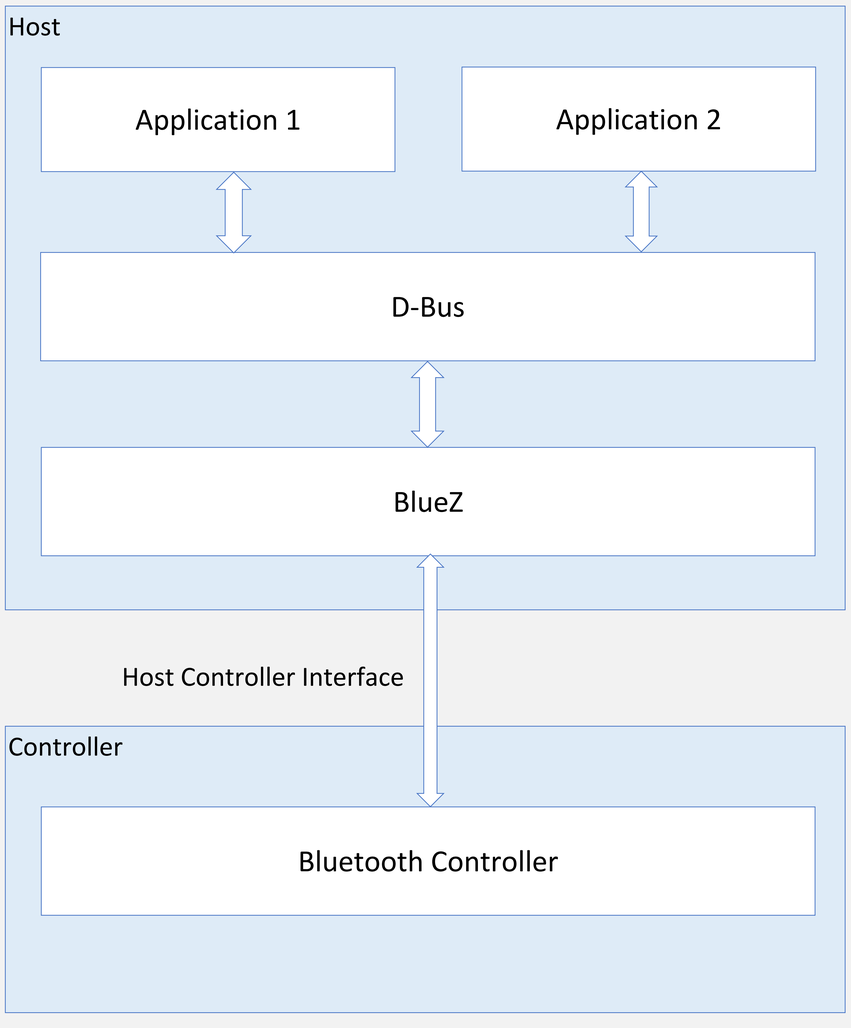



## Linux D-Bus Overview

### Terms

**BlueZ** - The official Linux Bluetooth protocol stack
**HCI** – Host Controller Interface.
**System bus** – Message bus used for system wide communications. BlueZ uses this bus.
**Session bus** – One session bus is created for each user session. Usually used for session specific messages.
**D-Bus Client** – A process that connected to a bus.
**D-Bus Server** – A process that listens for and accepts connections on the bus.
**D-Bus Object** – Represents an application connected to the bus.
**Interface** – A series of one or more methods that can be carried out on a object. Identified by dot-separated names.
**Path** – Identifies a D-Bus object.
**Signal** – A special type of unprompted D-Bus message usually used for event notifications.
**Proxy Object** – represents a remote D-Bus object. Methods of the remote object can be called directly in an application and D-Bus messages are automatically crafted.

### Linux Bluetooth Stack Architecture




## gatt_dbus Library

### API

discover(characteristic, timeout)

Scan for BLE devices with a matching characteristic and timeout after a specified amount of time.

read_characteristic(address, characteristic, buffer, length)

After calling discover, read characteristic data from a GATT Server over a BLE connection.

write_characteristic(address, characteristic, buffer, length)

After calling discover, write characteristic data to a GATT Server over a BLE connection.

### References

"Bluetooth GATT: How to Design Custom Services & Characteristics" NovelBits. https://novelbits.io/bluetooth-gatt-services-characteristics/ (accessed Dec. 4, 2022).
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