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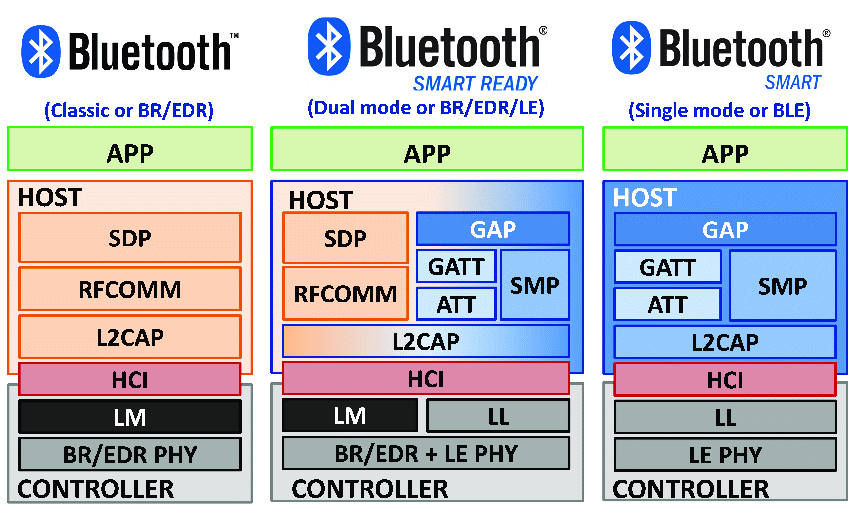
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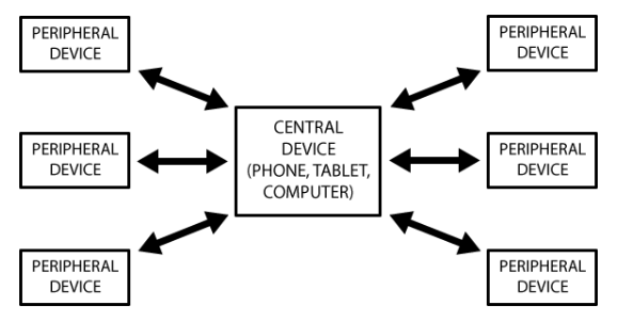
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# I. Bluetooth overview



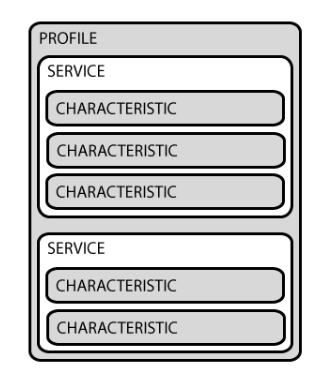
* GAP: defines procedures concerned with device discovery and establishing connections between 2 devices
* GATT: defines higher-level data types based on the attributes held in the attribute table
* ATT: contains a handle, a Universally Unique Identifier (UUID), a value and a set of permission.
* SMP: A protocol used during the execution of security procedures such as pairing
* L2CAP: responsible for protocol multiplexing, flow control and segmentation and reassembly of service data units (SDUs)
* HCI: defines a standardized interface via which a host can issue commands to the controller and a controller can communicate with the host

## 1. Bluetooh Device roles



### 1.1. Peripheral

Usually acts as a server



* Characteristic composed of
* A single value (int, float, string)
* Many discriptors
* Profile: Group of services
* Service: Group of related characteristics
* Identified using UUIDs

Ex: Smart Watch

* Profile: Heart rate
* Services: Heart rate
* Characteristics:

- Current heart rate (read/subcribe)

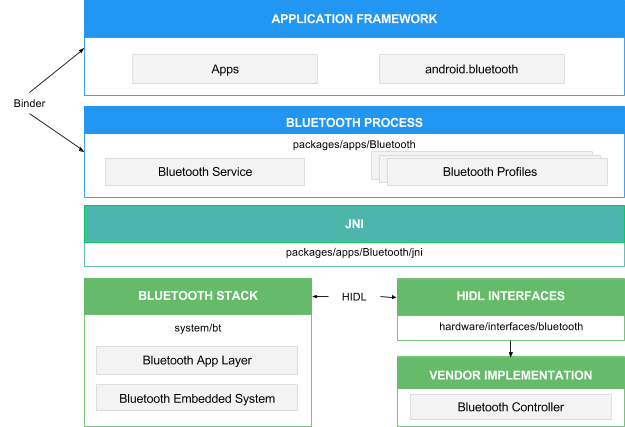
- Settings (read/write)

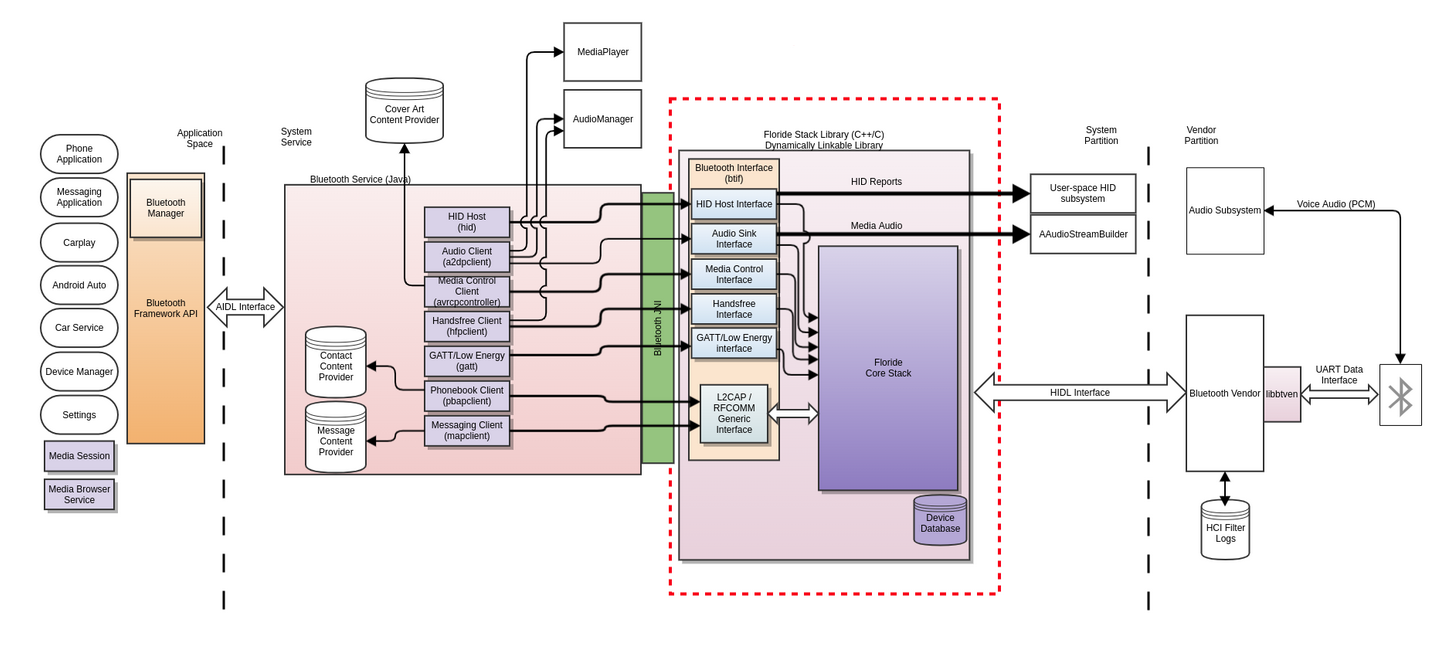
### 1.2 Central

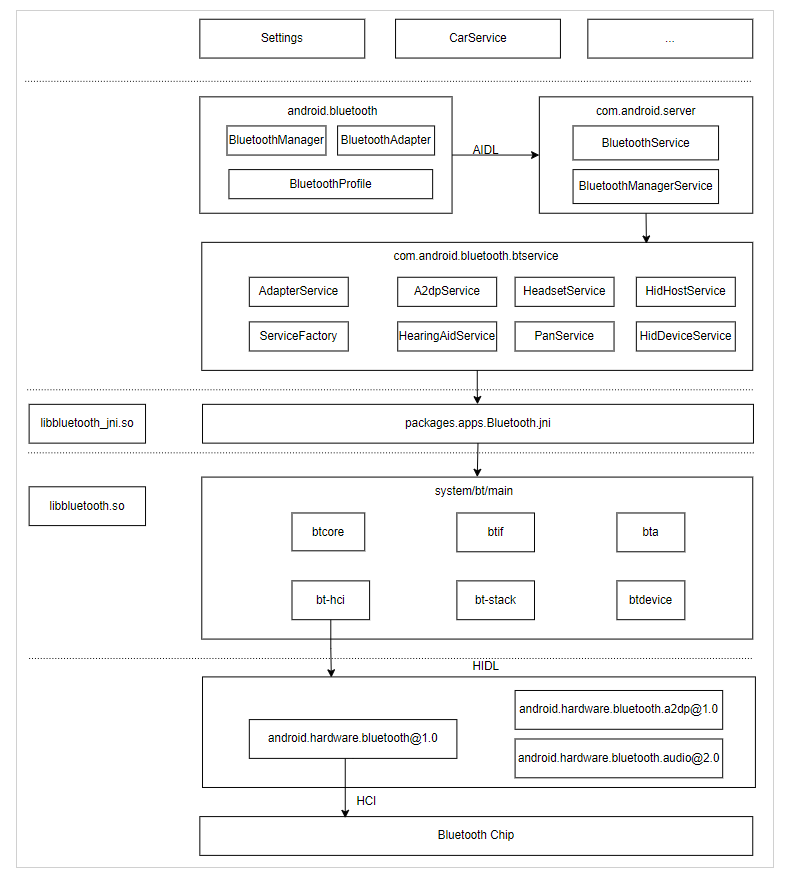
Usually acts as a client

* Can connect to up to 7 BLE servers simultaneously
* Reads/Writes/Subscribes to characteristics

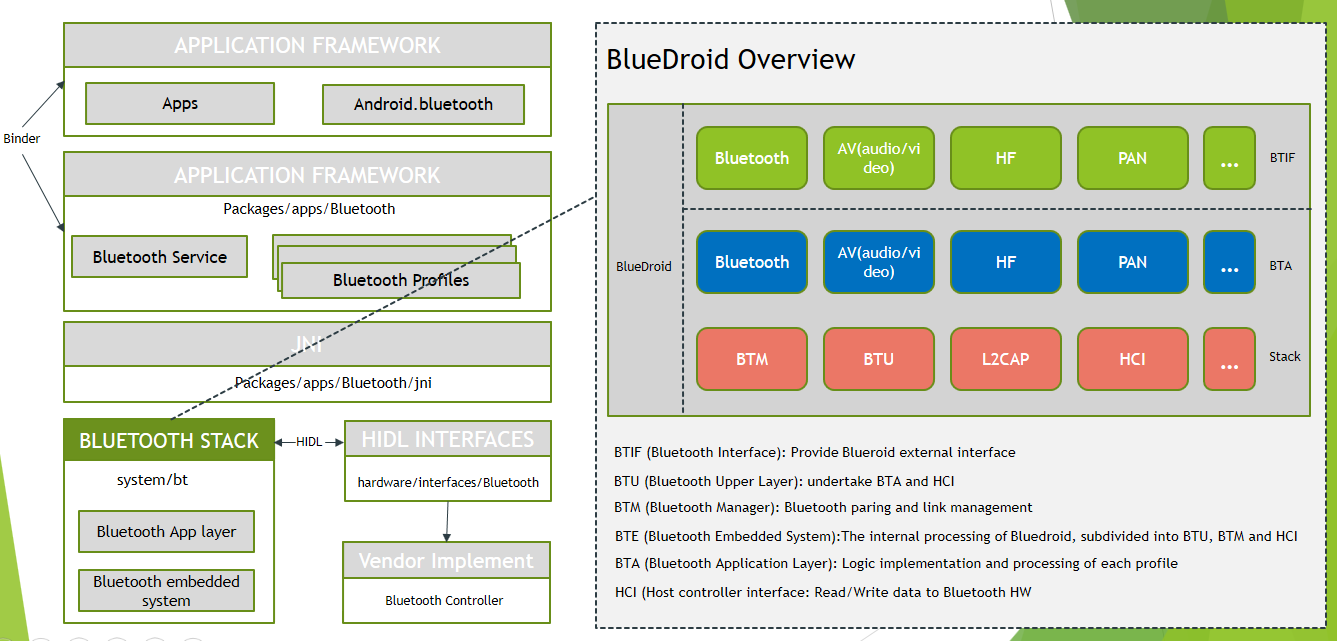
# II. Android Bluetooth Architecture



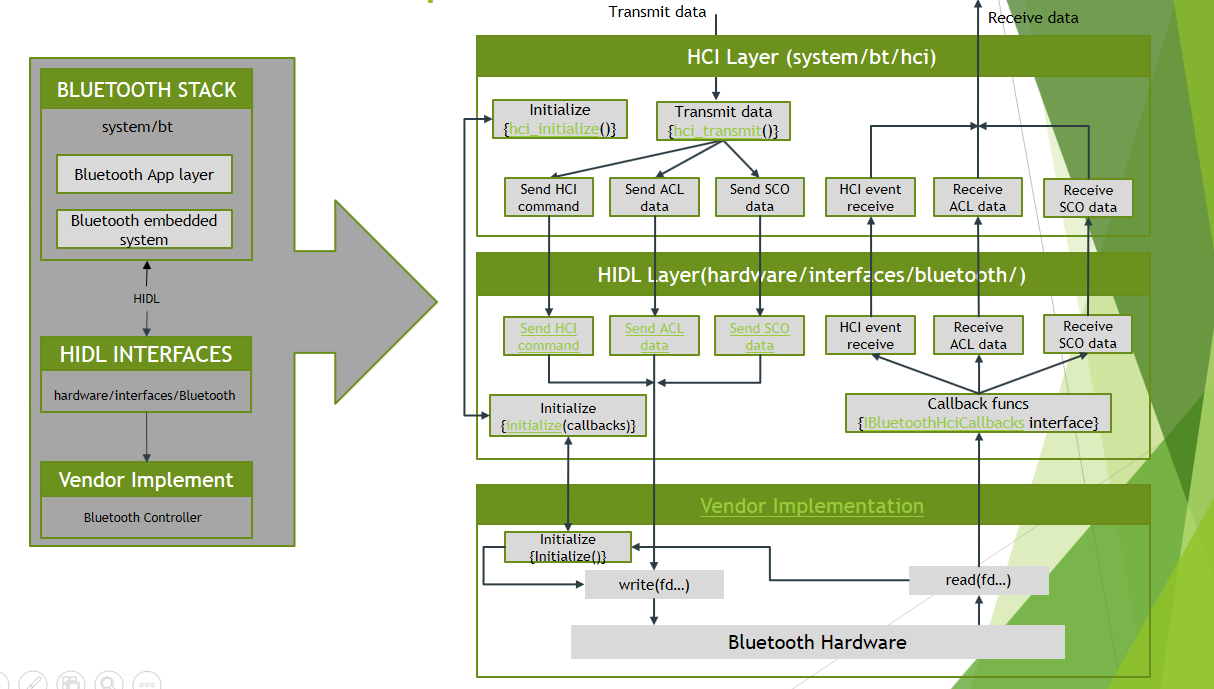




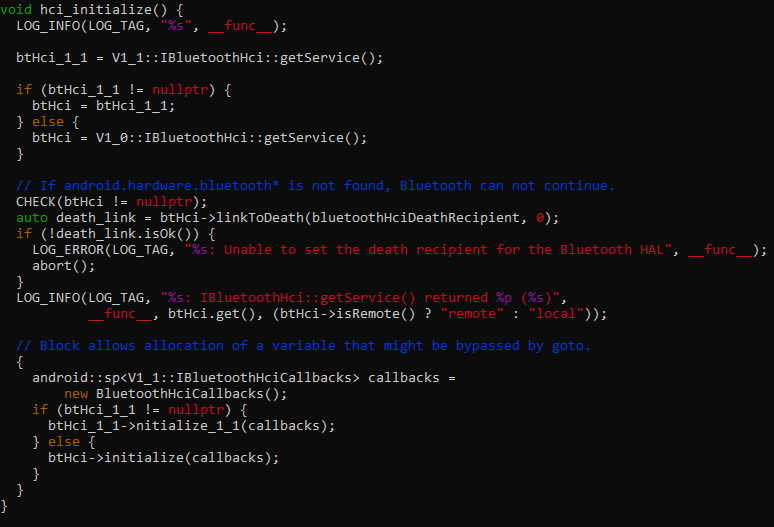
## 1. Bluetooth stack



# III. HCI Layer



## 1. Initialize



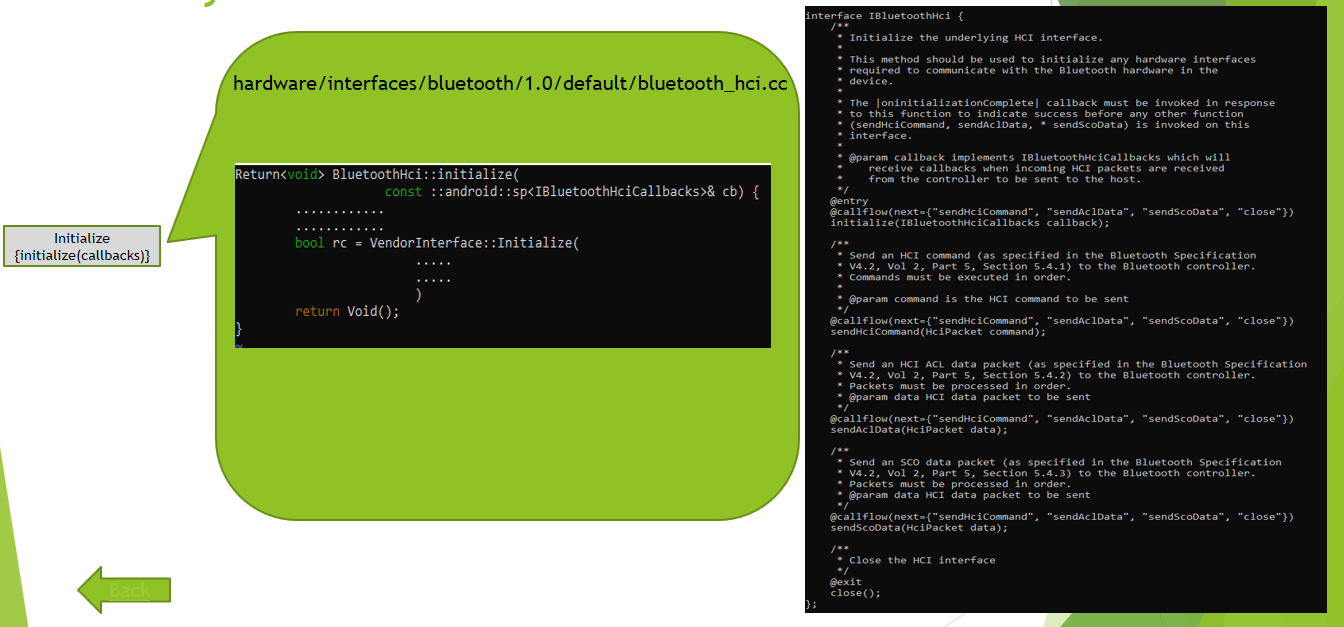
system/bt/hci/src/hci\_layer\_android.cc

## 2. Transmit data

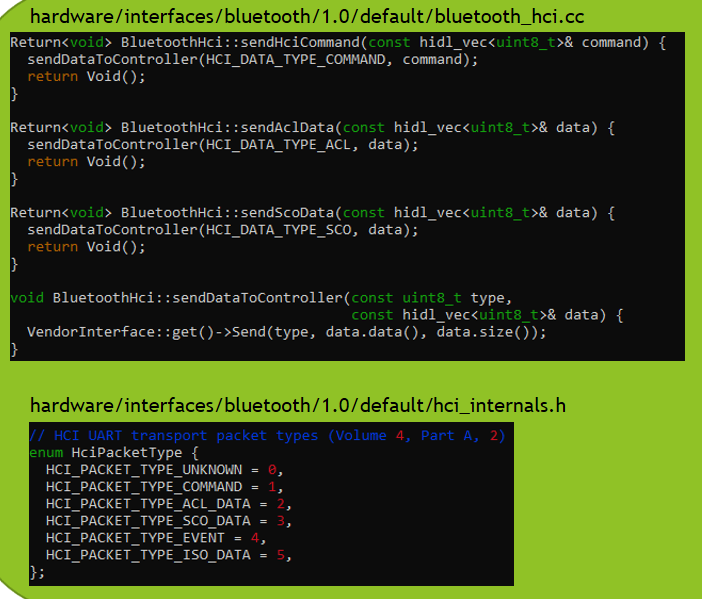


# IV. HIDL Layer

## 1. Initialize



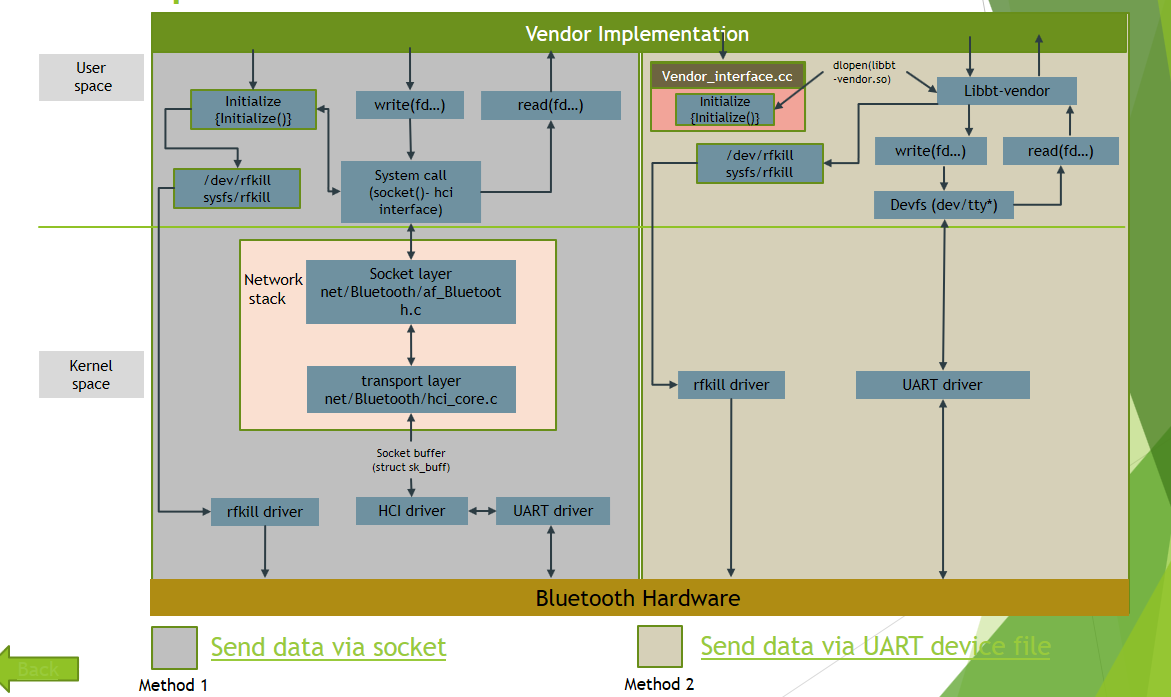
## 2. Send data



## 3. Callback functions



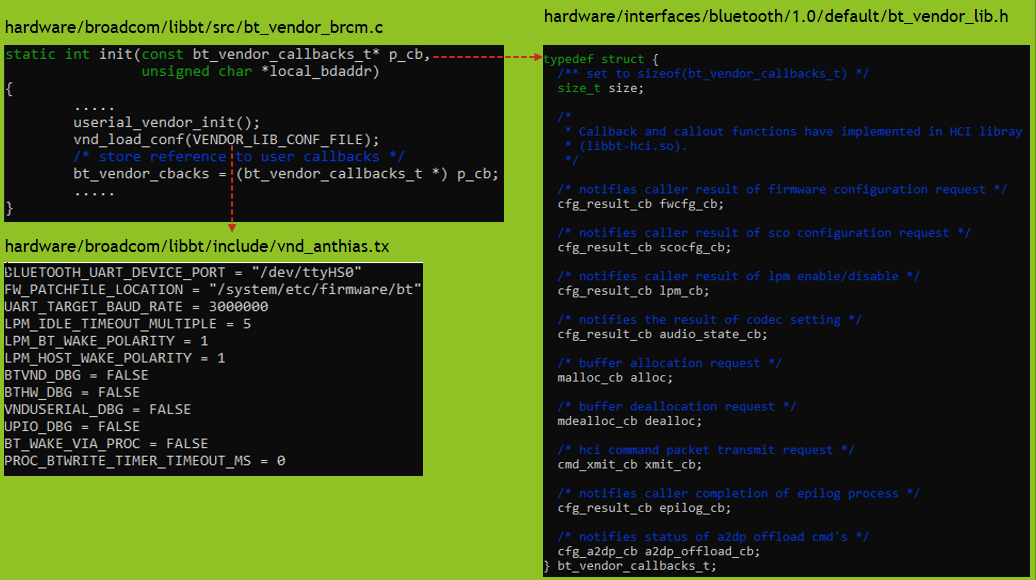
# V. Vendor implementation



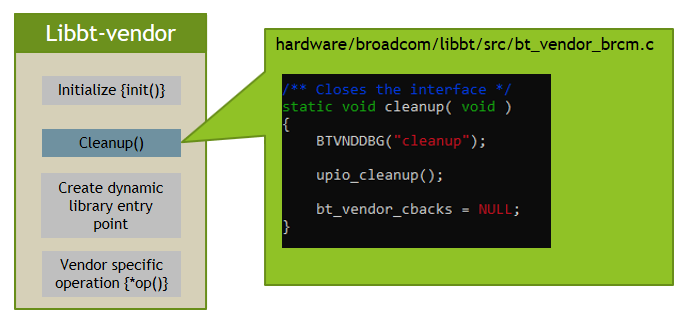
In this part, we discuss the ***lib-bt*** and ***Vendor\_interface.cc***. With the kernel space part, we have a UART document to refenrence.

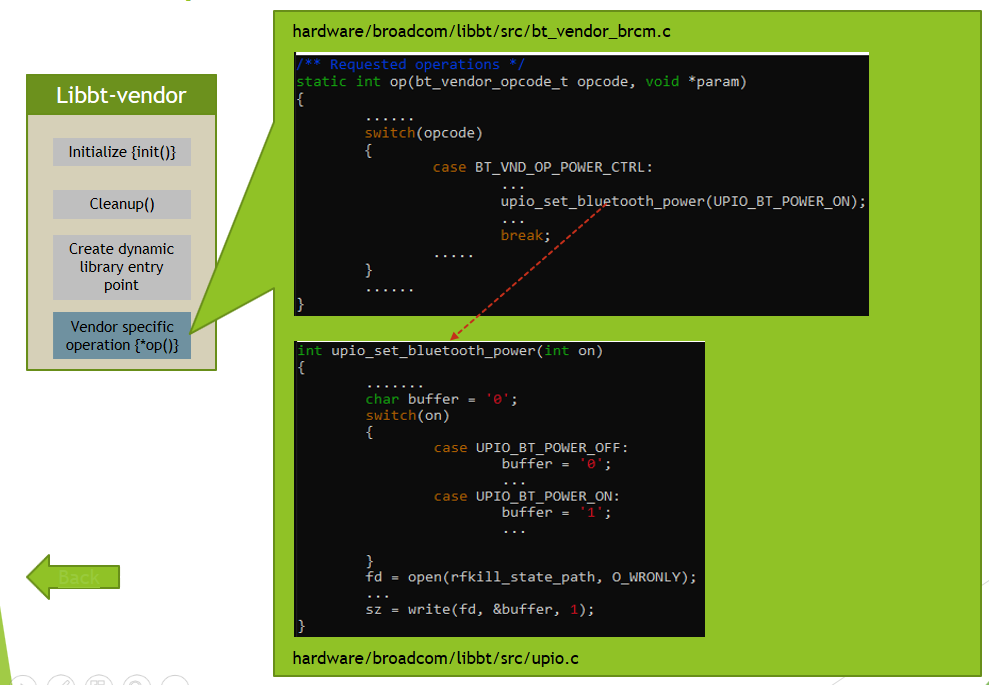
## 1. Lib-bt

### 1.1. Initialized

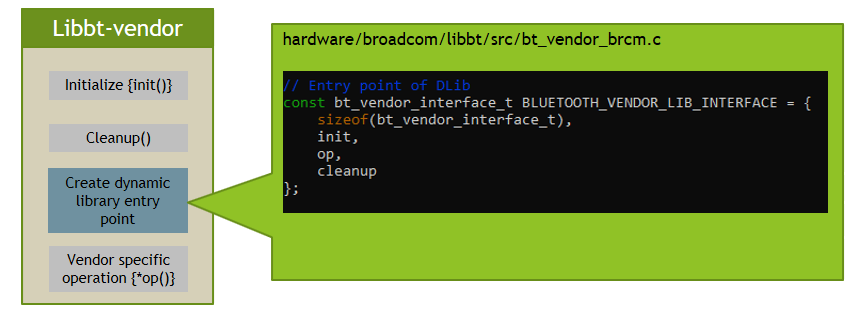


### 1.2. Cleanup

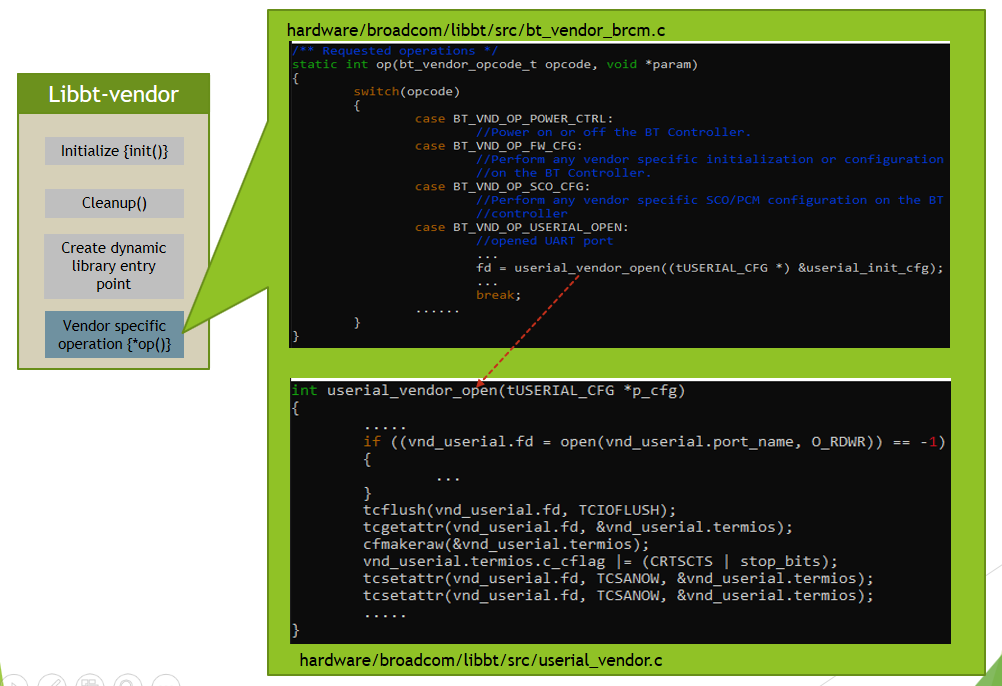




### 1.3. Create dynamic library entry point



### 1.4. Vendor specific operation



## 2. Vendor\_interface.cc

### 2.1 Initialize



### 2.2 Send data functions



# VI. Application

# VII. Appendx - Where is the bluetooth components directory

**A2SP software encoding**

**audio\_hearing\_aid\_hw**

**binder**

**device**

**conf**

**utils**

**bta**

**btcore**

**btif**

**common**

**device directory**

**embdrv**

**gd**

**The HCI**

**Include**

**internal\_include**

**Main**

**The OSI**

**Packet**

**Profile**

**Proto**

**The service**

**The stack**

1. a2dp

|  |  |
| --- | --- |
| File name | Function |
| a2dp\_acc.cc |  |
| a2dp\_aac\_decoder.cc |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Test (Bluetooth test function and script)**

**Types**

**udrv**

**utils: bt utils**

**vendor\_libs**

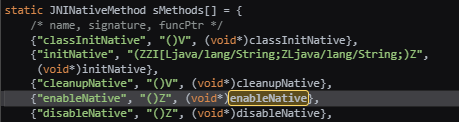
**vnd directory**

**VIII. Native layer**

The application part calls the enableNative function

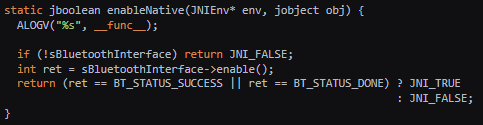
packages/modules/Bluetooth/android/app/src/com/android/bluetooth/btservice/AdapterState.java

Define enableNative method



packages/modules/Bluetooth/android/app/jni/com\_android\_bluetooth\_btservice\_AdapterService.cpp

Implementation of JNI functions



packages/modules/Bluetooth/android/app/jni/com\_android\_bluetooth\_btservice\_AdapterService.cpp

The implementation of the enable function in the C function. This part is the same as the init process

The implementation of btif\_enable\_bluetooth function. Performs chip power on and kickstarts OS scheduler

bt\_main\_enable function. This function is the specific implementation of the enable function.

The BTEMAIN api creates all the BTE tasks. Should be called part of the Bluetooth stack enable sequence

1. Initialize the BTE control block

2. Create BTU\_TASK process

3. bte\_hci\_enable. Enable HCI and vendor modules

The implementation process of opening HCI and vendor module bte\_hci\_enable is shown in the figure

**Refer**

https://blog.csdn.net/xiaojsj111/article/details/12647923?spm=1001.2101.3001.6650.11&utm\_medium=distribute.pc\_relevant.none-task-blog-2%7Edefault%7ECTRLIST%7ERate-11-12647923-blog-115728286.235%5Ev27%5Epc\_relevant\_3mothn\_strategy\_recovery&depth\_1-utm\_source=distribute.pc\_relevant.none-task-blog-2%7Edefault%7ECTRLIST%7ERate-11-12647923-blog-115728286.235%5Ev27%5Epc\_relevant\_3mothn\_strategy\_recovery&utm\_relevant\_index=19

<https://blog.csdn.net/kv110/article/details/117457151?spm=1001.2101.3001.6650.14&utm_medium=distribute.pc_relevant.none-task-blog-2%7Edefault%7ECTRLIST%7ERate-14-117457151-blog-115728286.235%5Ev27%5Epc_relevant_3mothn_strategy_recovery&depth_1-utm_source=distribute.pc_relevant.none-task-blog-2%7Edefault%7ECTRLIST%7ERate-14-117457151-blog-115728286.235%5Ev27%5Epc_relevant_3mothn_strategy_recovery&utm_relevant_index=22>

<https://blog.csdn.net/edmond999/article/details/115728286>

https://blog.csdn.net/u011279649/article/details/119606531?spm=1001.2101.3001.6650.19&utm\_medium=distribute.pc\_relevant.none-task-blog-2%7Edefault%7EBlogCommendFromBaidu%7ERate-19-119606531-blog-115728286.235%5Ev27%5Epc\_relevant\_3mothn\_strategy\_recovery&depth\_1-utm\_source=distribute.pc\_relevant.none-task-blog-2%7Edefault%7EBlogCommendFromBaidu%7ERate-19-119606531-blog-115728286.235%5Ev27%5Epc\_relevant\_3mothn\_strategy\_recovery&utm\_relevant\_index=27