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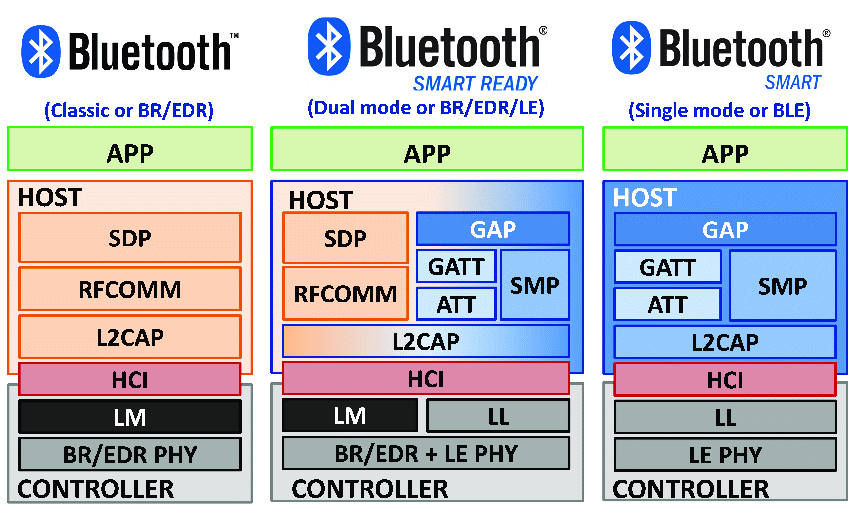
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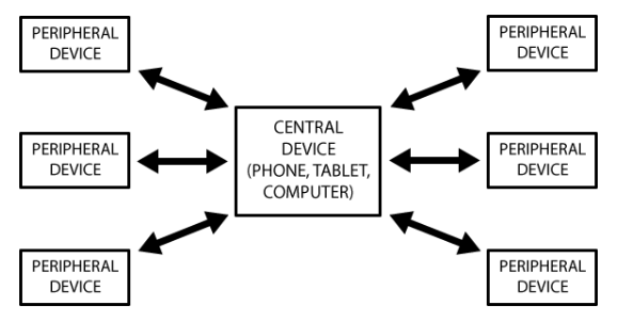
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# I. Bluetooth overview



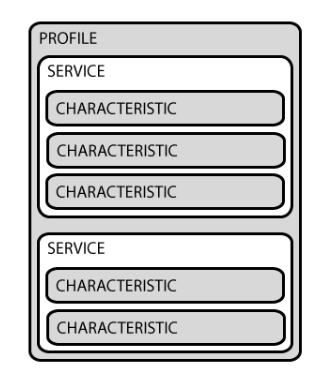
* GAP: defines procedures concerned with device discovery and establishing connections between 2 devices
* GATT: defines higher-level data types based on the attributes held in the attribute table
* ATT: contains a handle, a Universally Unique Identifier (UUID), a value and a set of permission.
* SMP: 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)

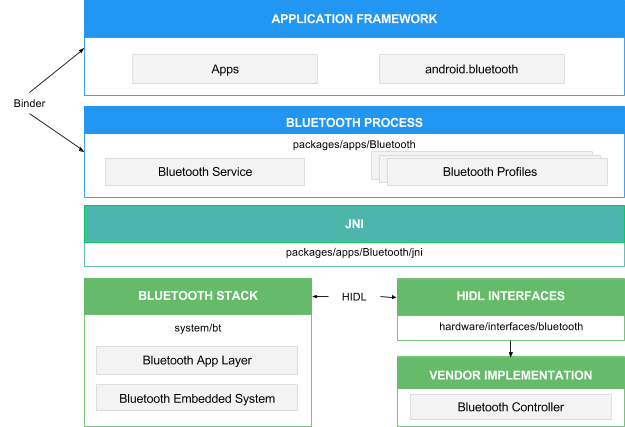
- Settings (read/write)

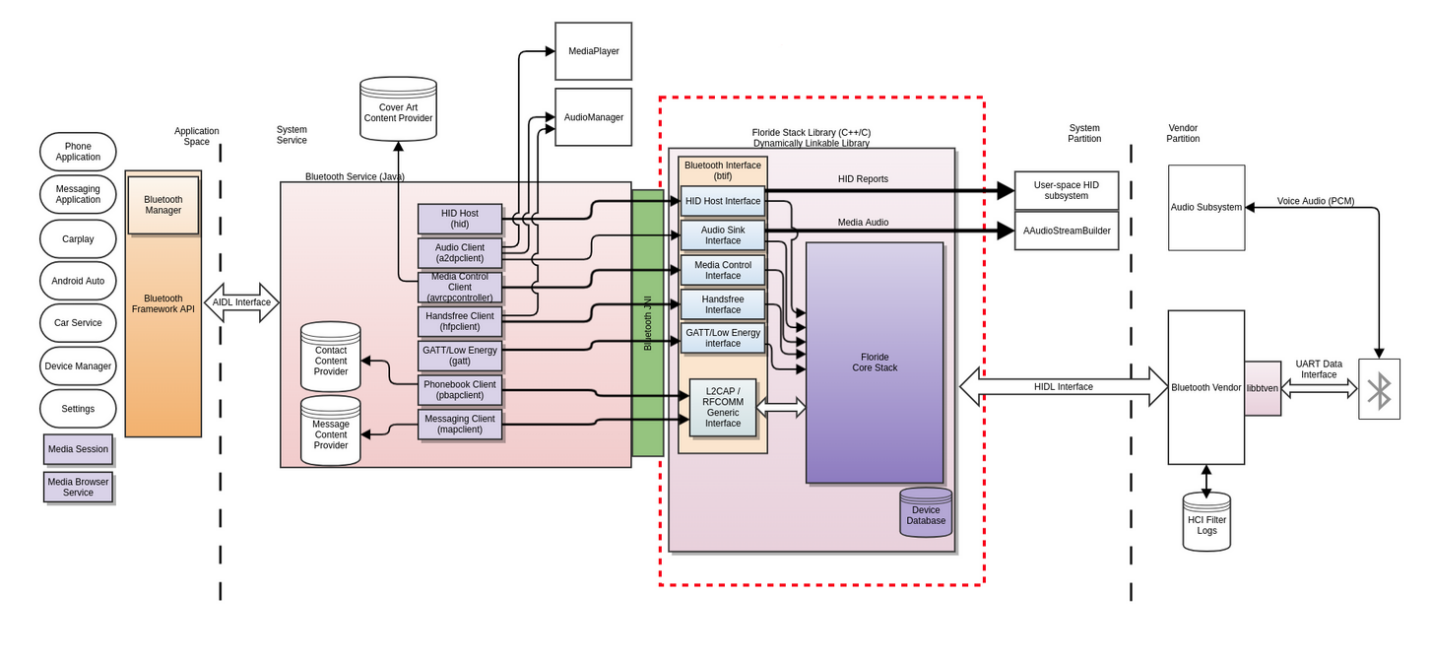
### 1.2 Central

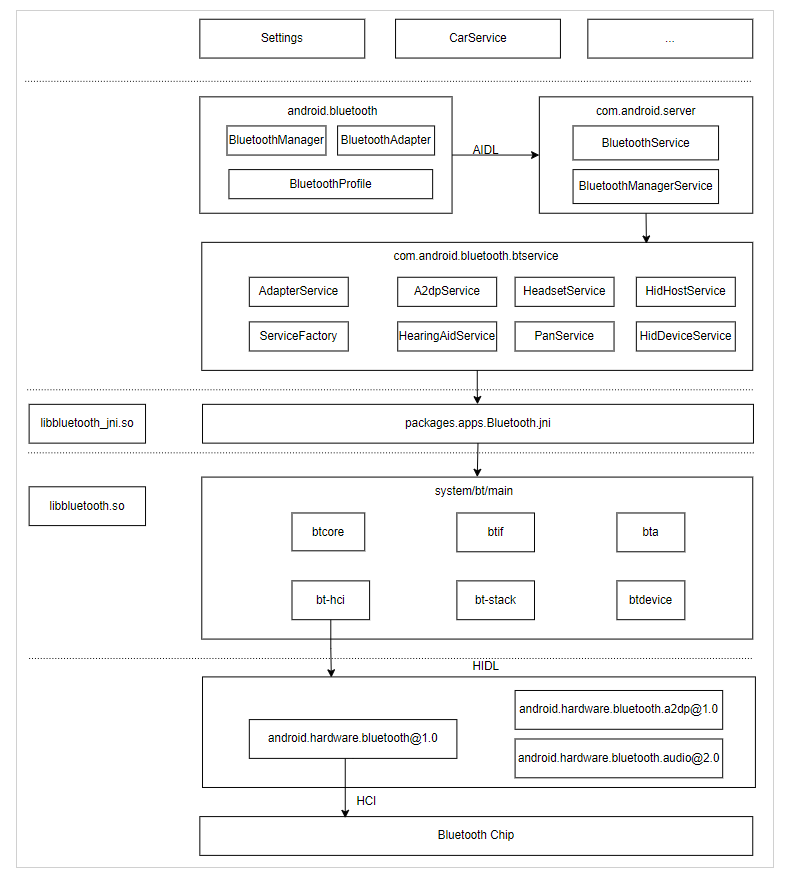
Usually acts as a client

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

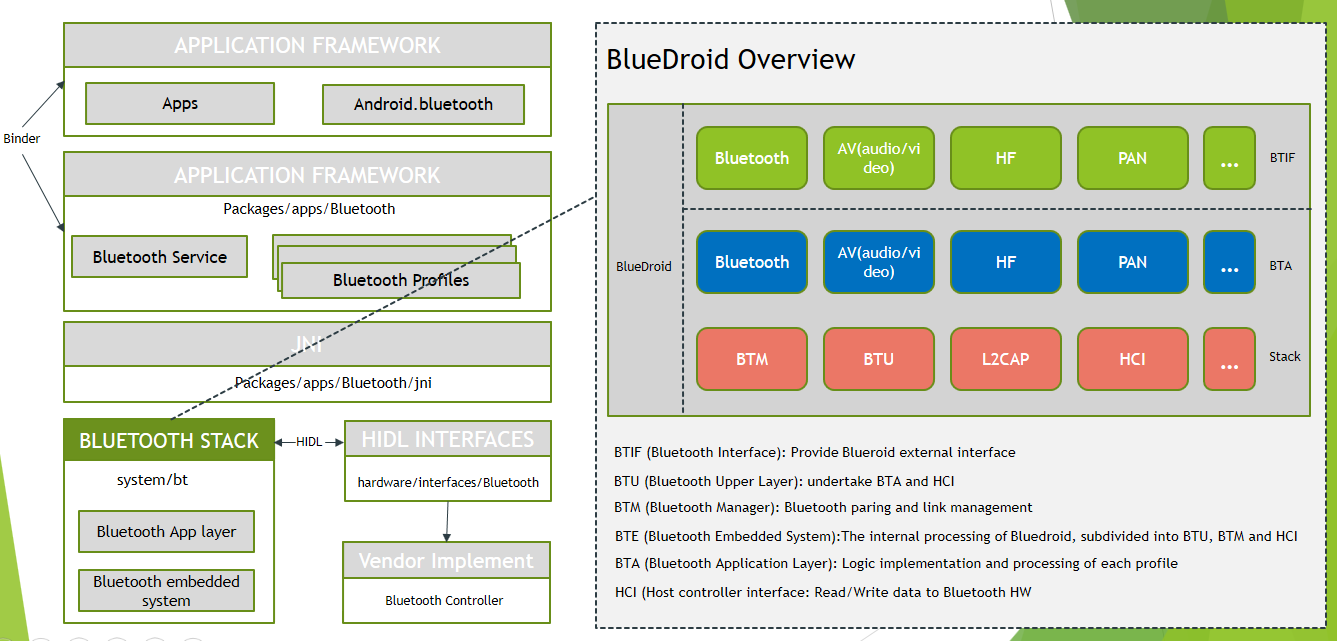
# II. Android Bluetooth Architecture



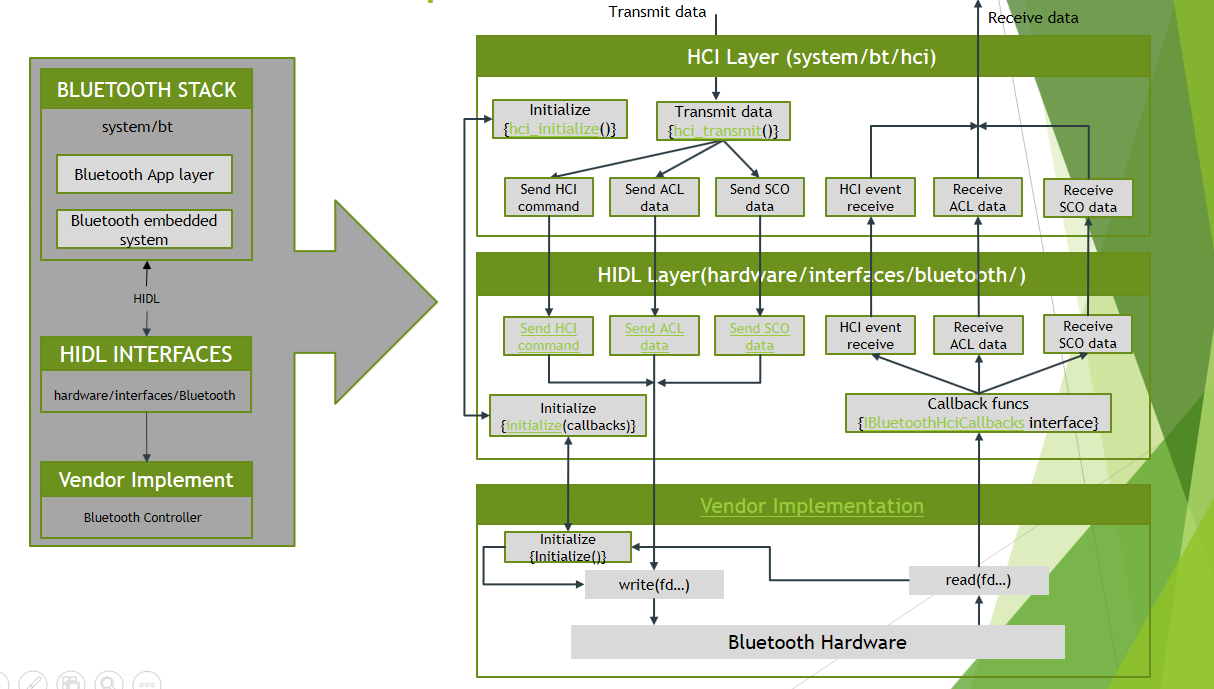




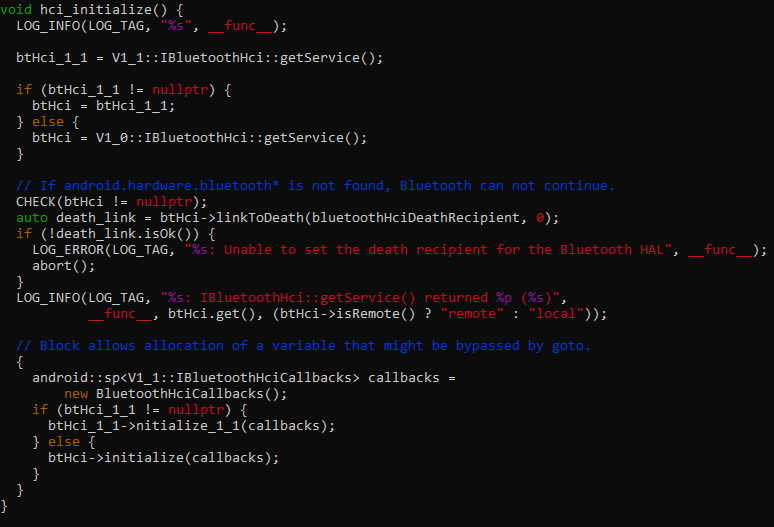
## 1. Bluetooth stack



# III. HCI Layer



## 1. Initialize



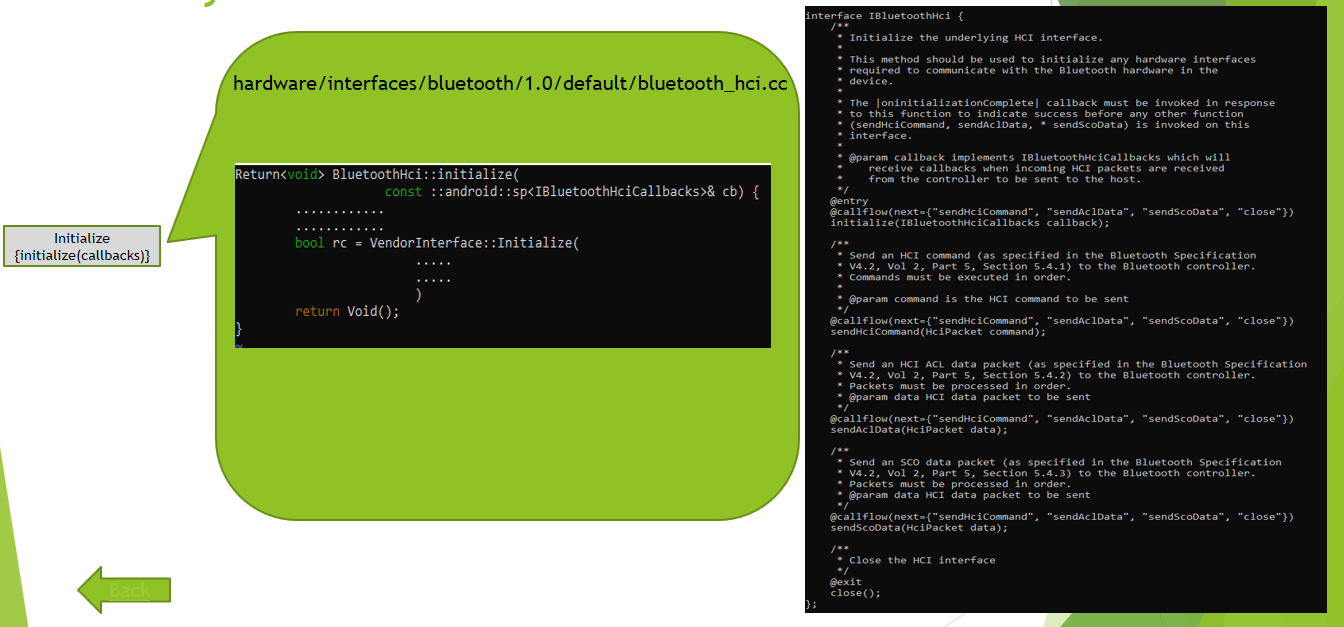
system/bt/hci/src/hci\_layer\_android.cc

## 2. Transmit data

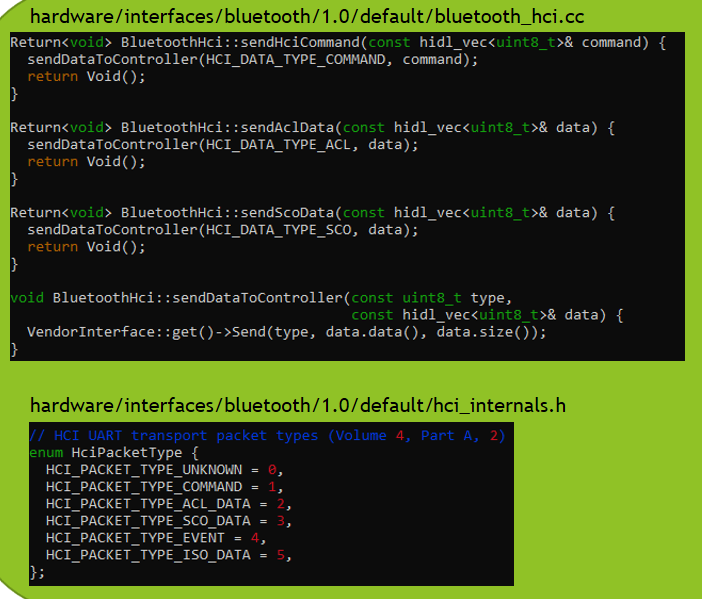


# IV. HIDL Layer

## 1. Initialize



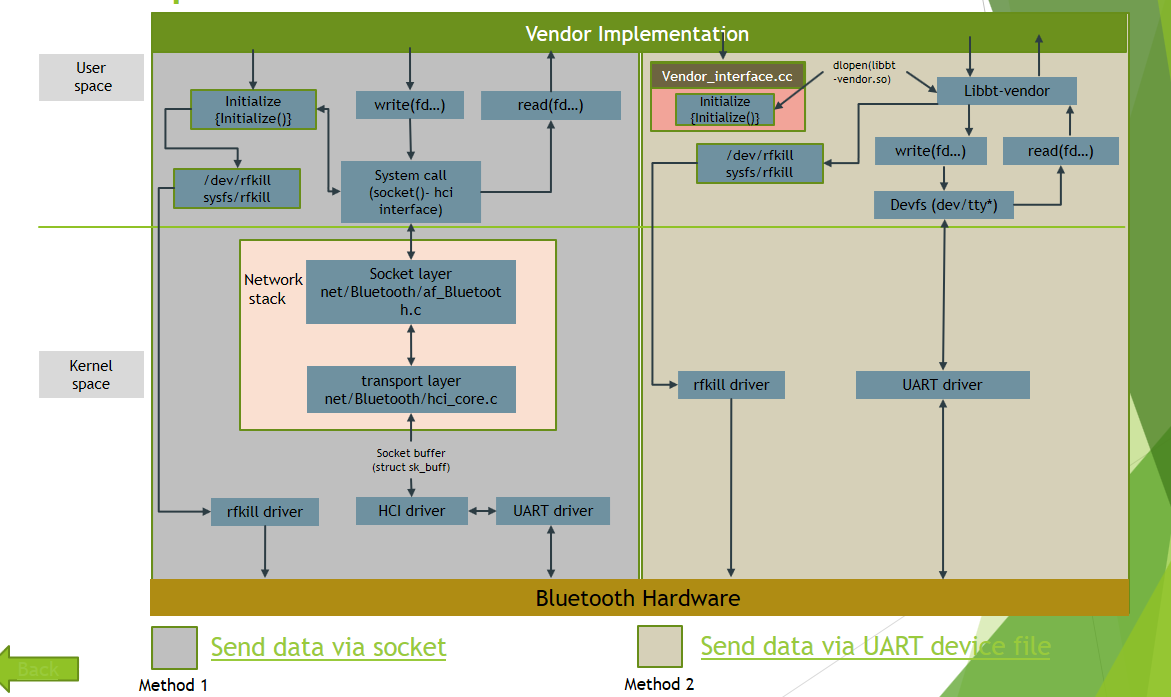
## 2. Send data



## 3. Callback functions



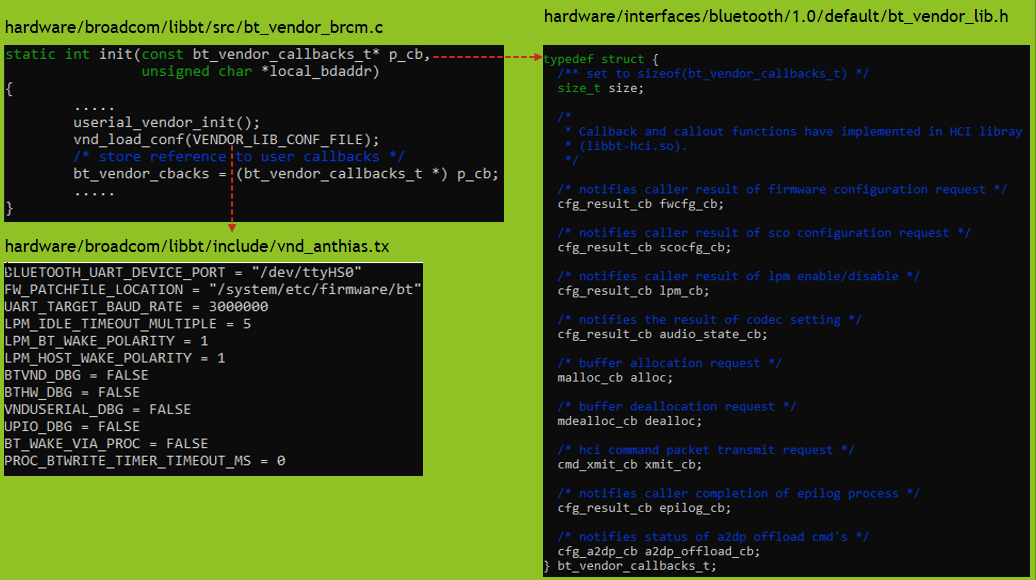
# V. Vendor implementation



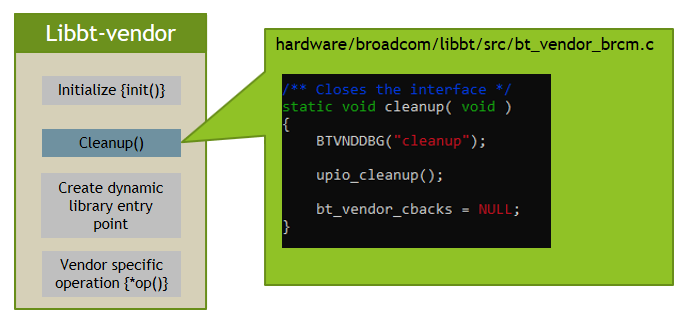
In this part, we discuss the ***lib-bt*** and ***Vendor\_interface.cc***. With the kernel space part, we have a UART document to refenrence.

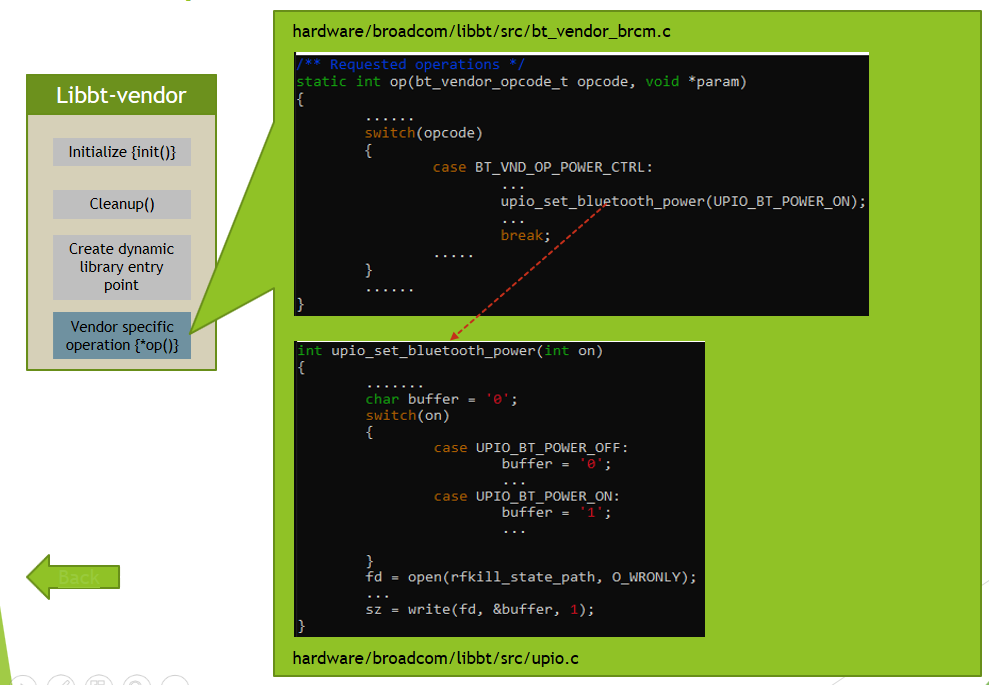
## 1. Lib-bt

### 1.1. Initialized

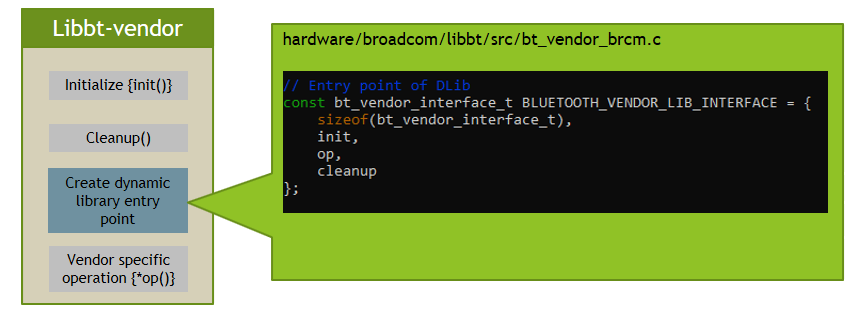


### 1.2. Cleanup

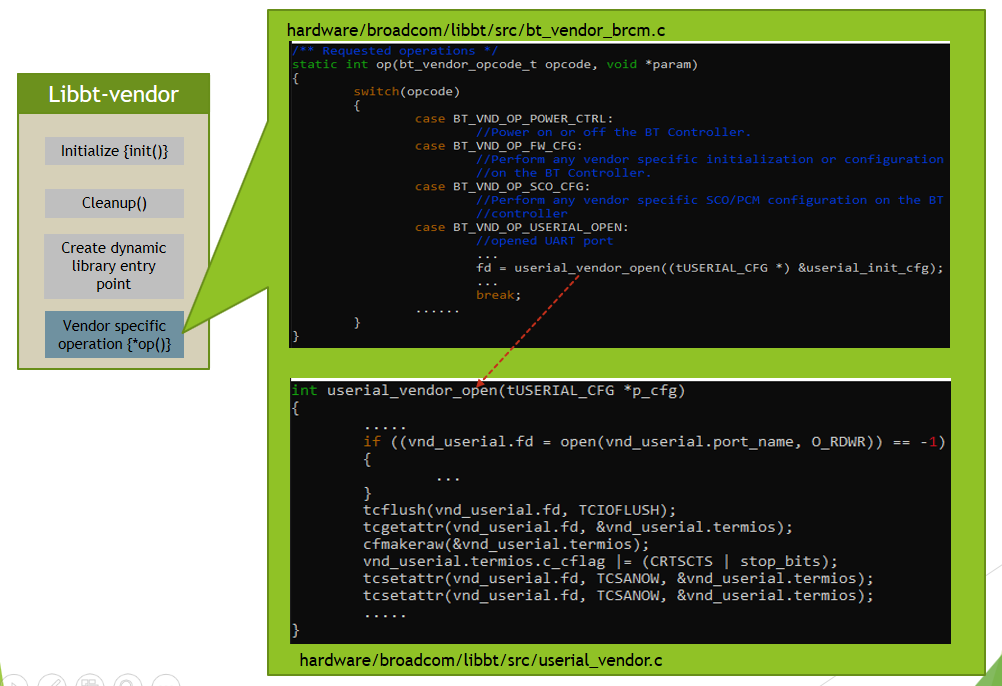




### 1.3. Create dynamic library entry point



### 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** |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
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|  |  |
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|  |  |
|  |  |

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

**Types**

**udrv**

**utils: bt utils**

**vendor\_libs**

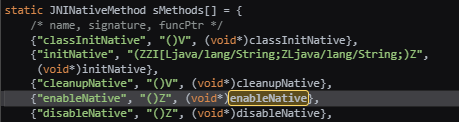
**vnd directory**

**VIII. Native layer**

The application part calls the enableNative function

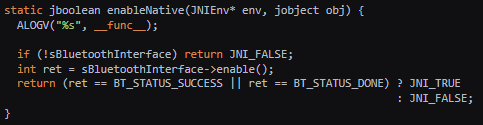
packages/modules/Bluetooth/android/app/src/com/android/bluetooth/btservice/AdapterState.java

Define enableNative method

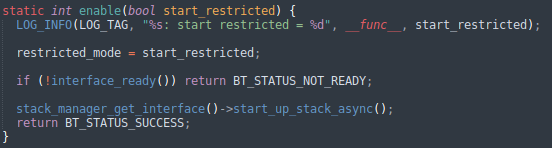


packages/modules/Bluetooth/android/app/jni/com\_android\_bluetooth\_btservice\_AdapterService.cpp

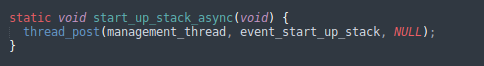
Implementation of JNI functions



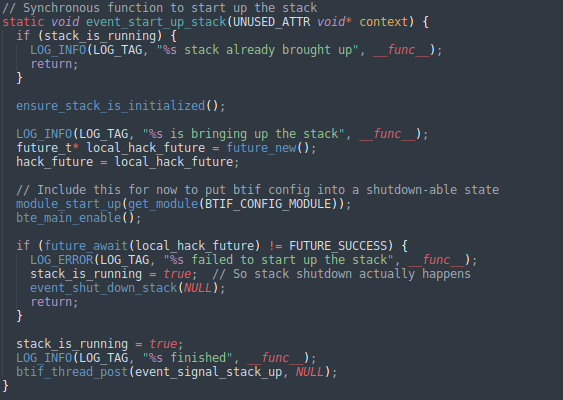
packages/modules/Bluetooth/android/app/jni/com\_android\_bluetooth\_btservice\_AdapterService.cpp



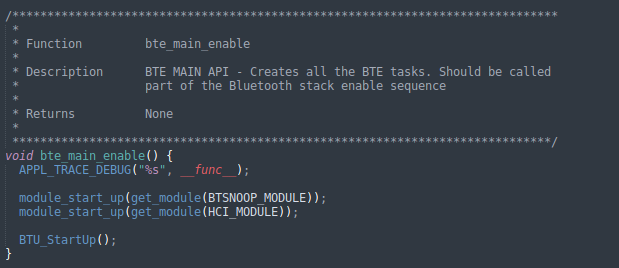
system/bt/btif/src/bluetooth.cc



system/bt/btif/src/stack\_manager.cc

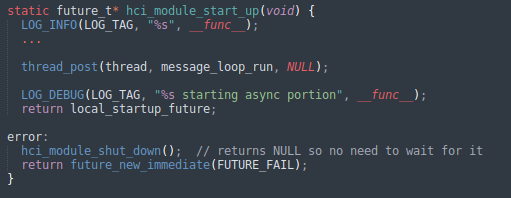


system/bt/btif/src/stack\_manager.cc



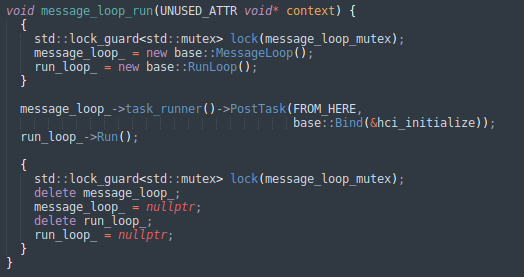
system/bt/main/bte\_main.cc

module\_start\_up(get\_module(HCI\_MODULE) will convert to call to hci\_layer.cc. In this file, hci\_module\_start\_up function will be called to init bluetooth hci.

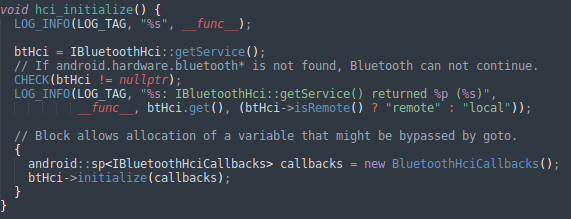


/system/bt/hci/src/hci\_layer.cc

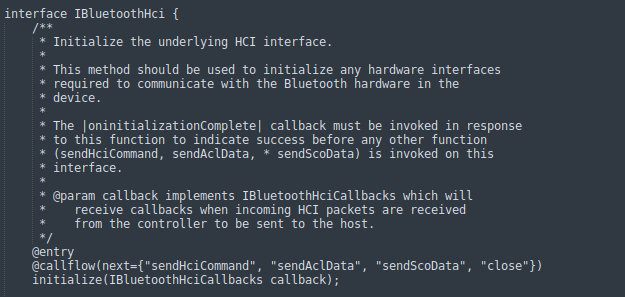
message\_loop\_run will call to hci\_initialize



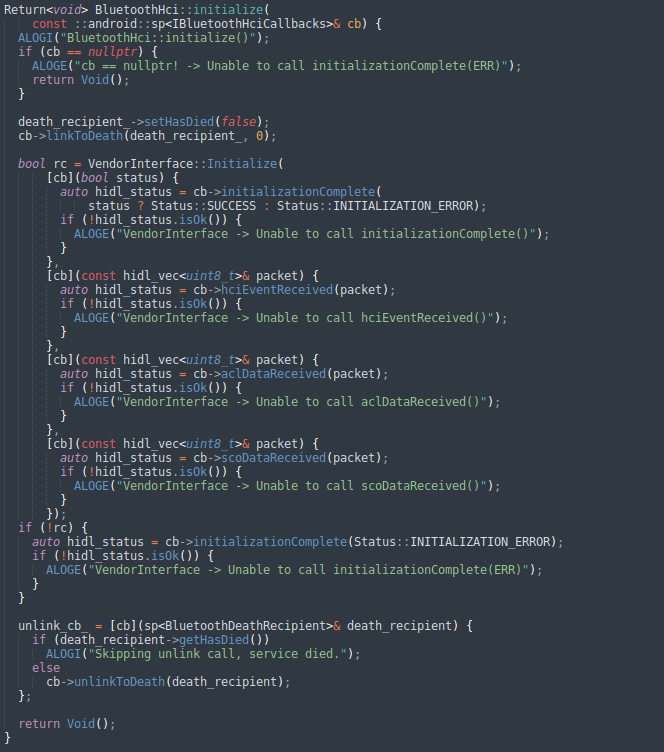
/system/bt/hci/src/hci\_layer.cc



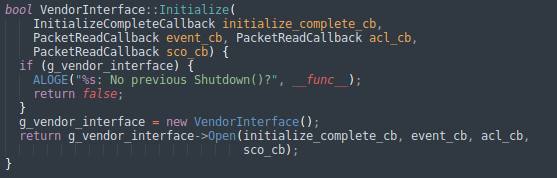
system/bt/hci/src/hci\_layer\_android.cc



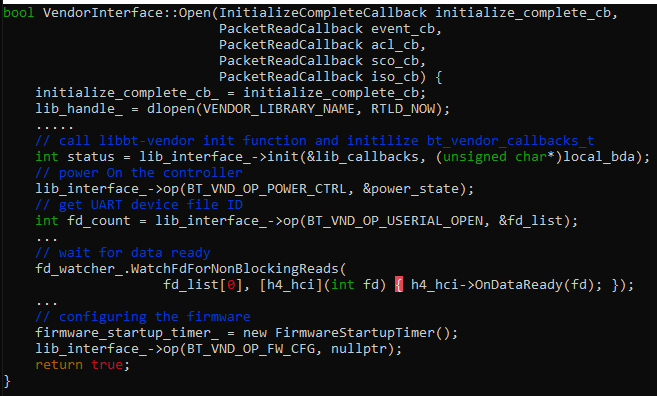
hardware/interfaces/bluetooth/1.0/IBluetoothHci.hal



hardware/interfaces/bluetooth/1.0/default/bluetooth\_hci.cc



hardware/interfaces/bluetooth/1.0/default/vendor\_interface.cc



hardware/interfaces/bluetooth/1.0/default/vendor\_interface.cc

**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