“Learning AOSP”
Hardware Abstraction Layer

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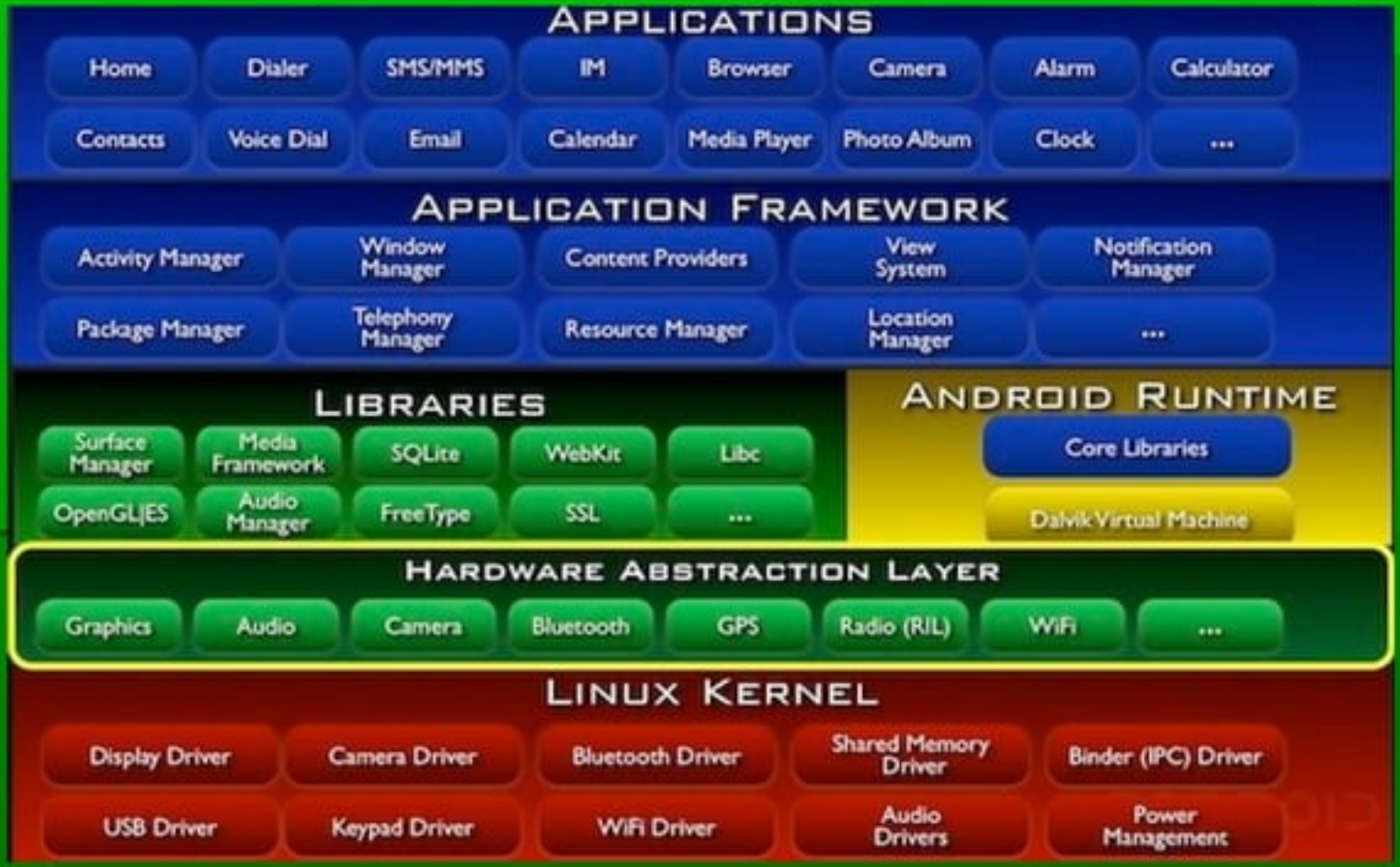
Thank You !

Architecture

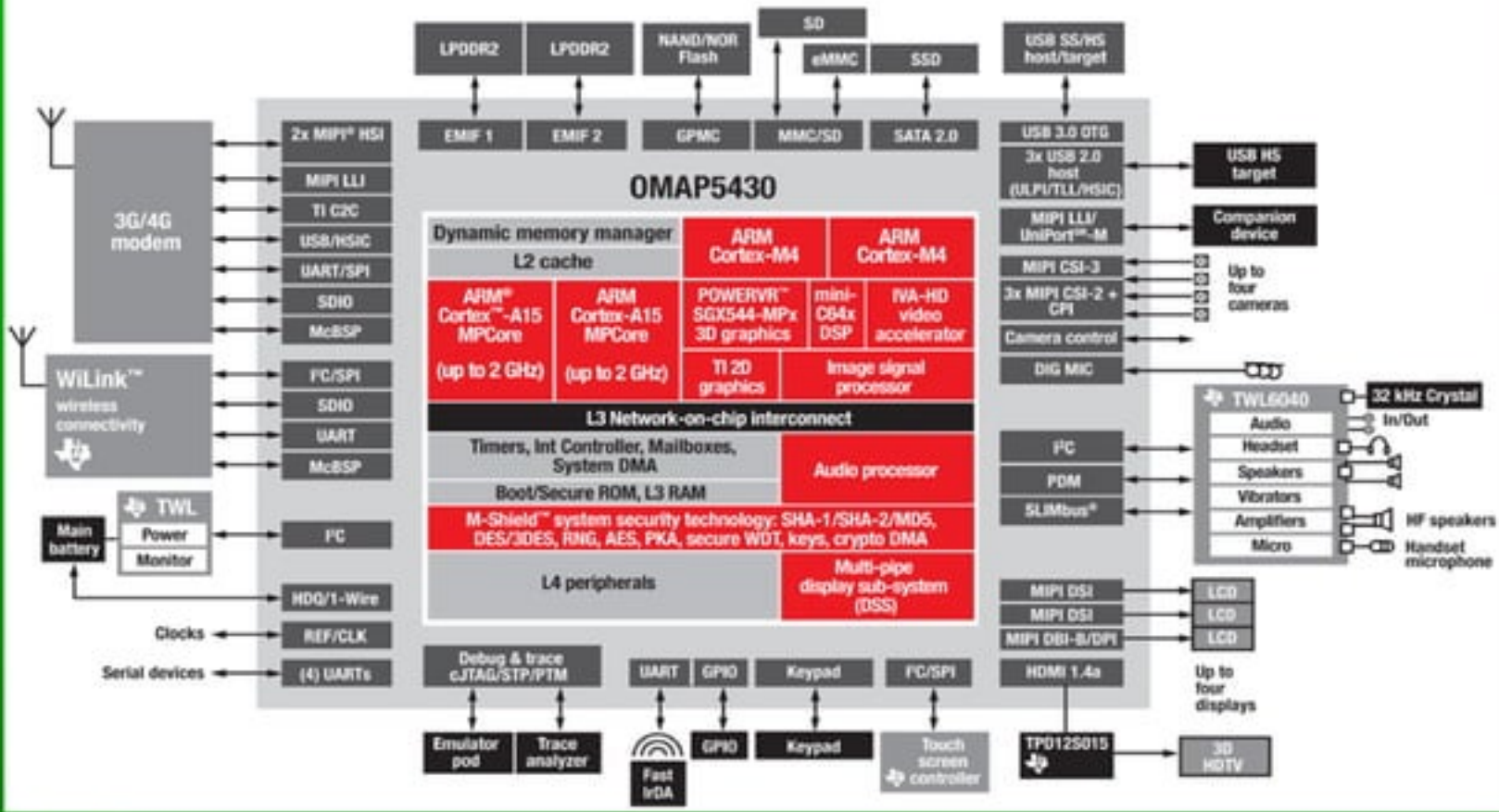


Questions !

- What is HAL ?
- Why is it such a big deal ?
- Why do we care ?
- What hardware is part of HAL ?
- What is relationship between Android and HAL ?

Hardware Layer

TI OMAP5430 SoC



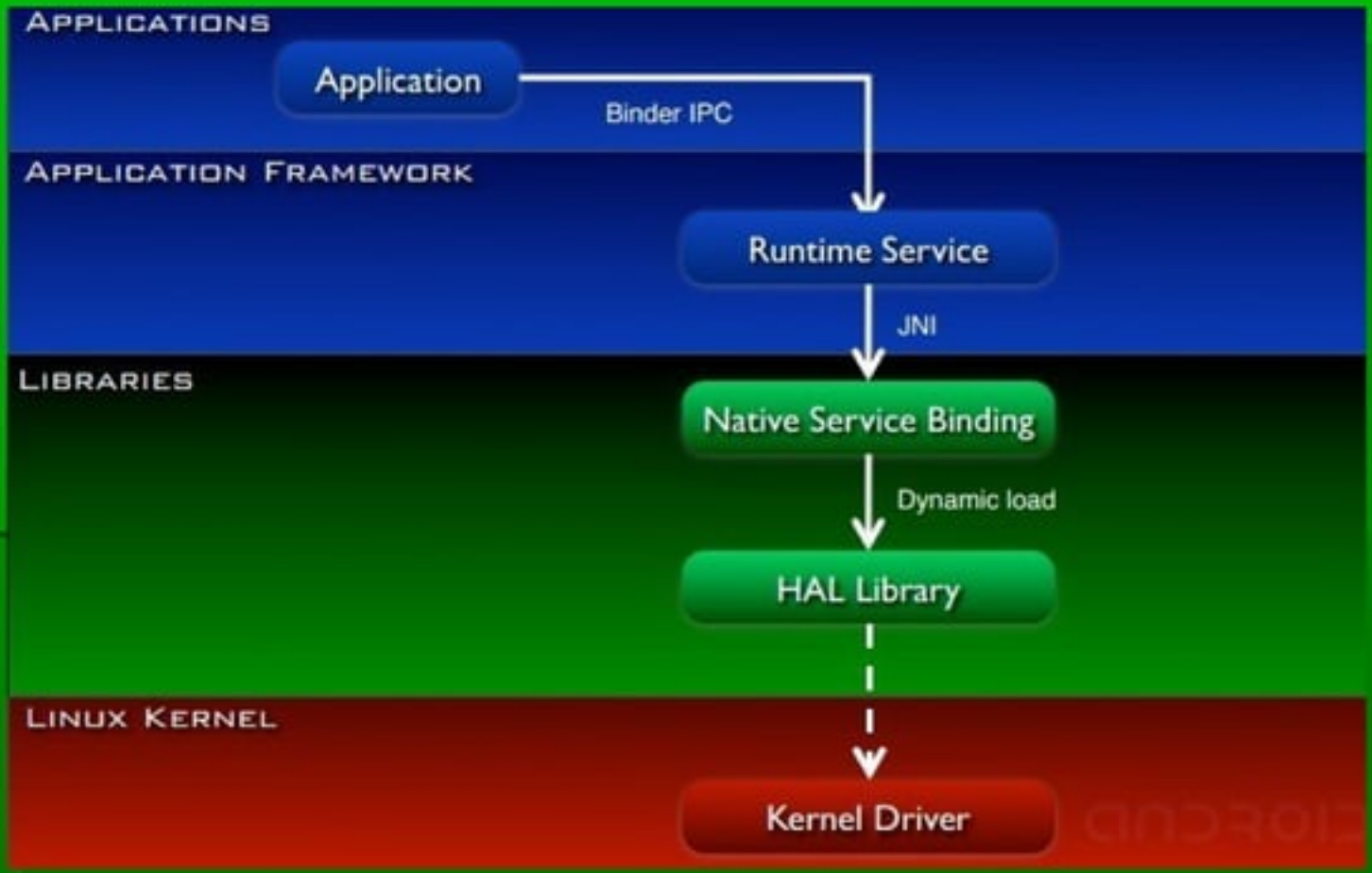
What is HAL ?

- Cater for non-GPL vendor code
- Included in Android image as blob (.so)
- Freeing developer to focus on their app (Camera3 multiple camera support - KitKat)
- Software layer that interact with kernel drivers *NOT* to hardware
- */system/lib/hw* and */vendor/lib/hw*

Hardware

- Nexus 7 (2012) [“grouper”] : Camera, Sensors, Wi-Fi, Bluetooth, GPS, Touch Panel, Orientation Sensor, Graphics, NFC, DRM
- Nexus 7 (2013) [“razor”] : Camera, Sensors, Wi-Fi, Bluetooth, GPS, Graphics, NFC, DRM, Audio, Sensors, Media, DSP, USB
- Nexus 5 [“hammerhead”] : Camera, Sensors, Wi-Fi, Bluetooth, GPS, Graphics, NFC, Audio, GSM, Camera, Media, DSP, USB

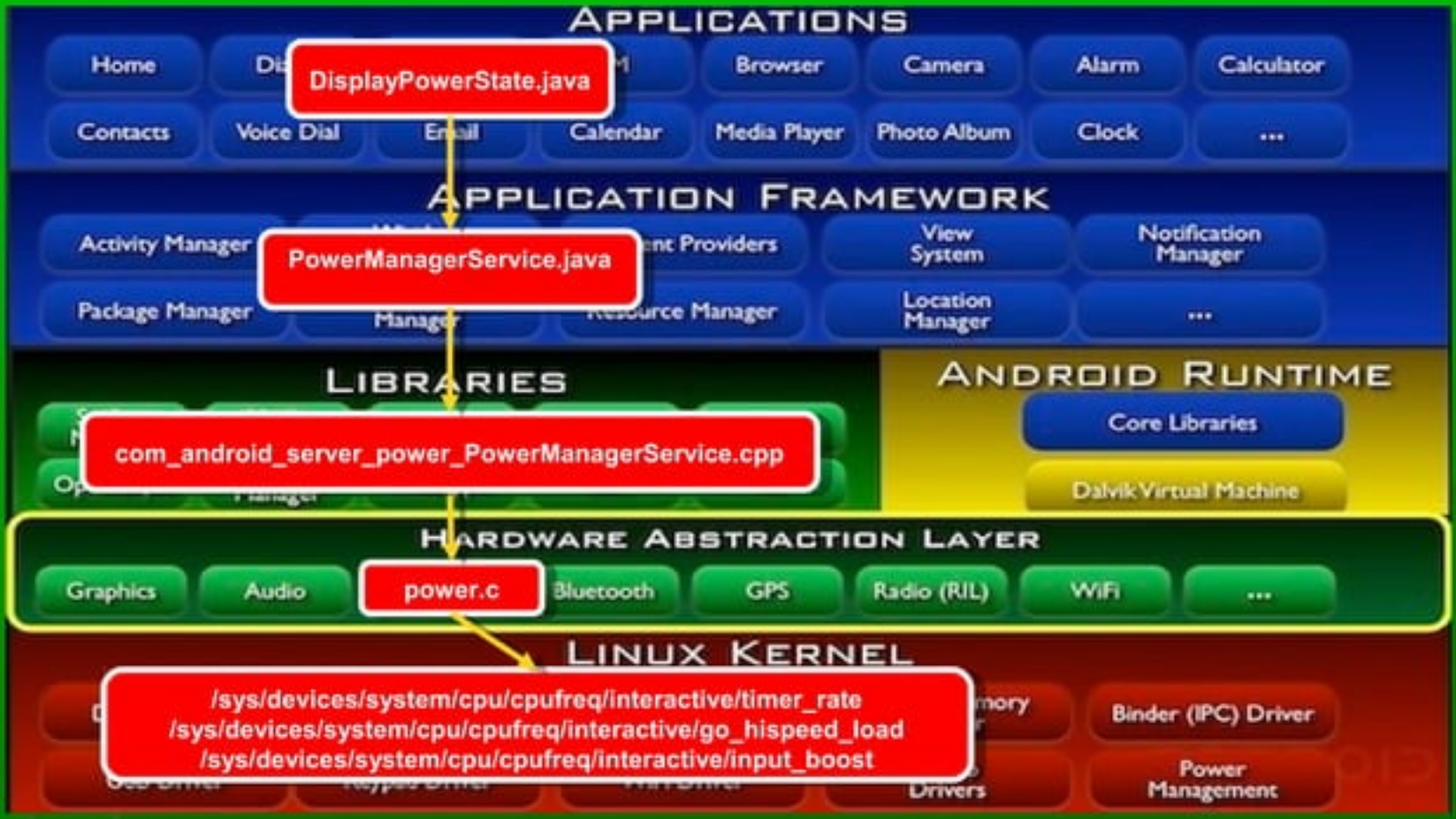
Framework and HAL



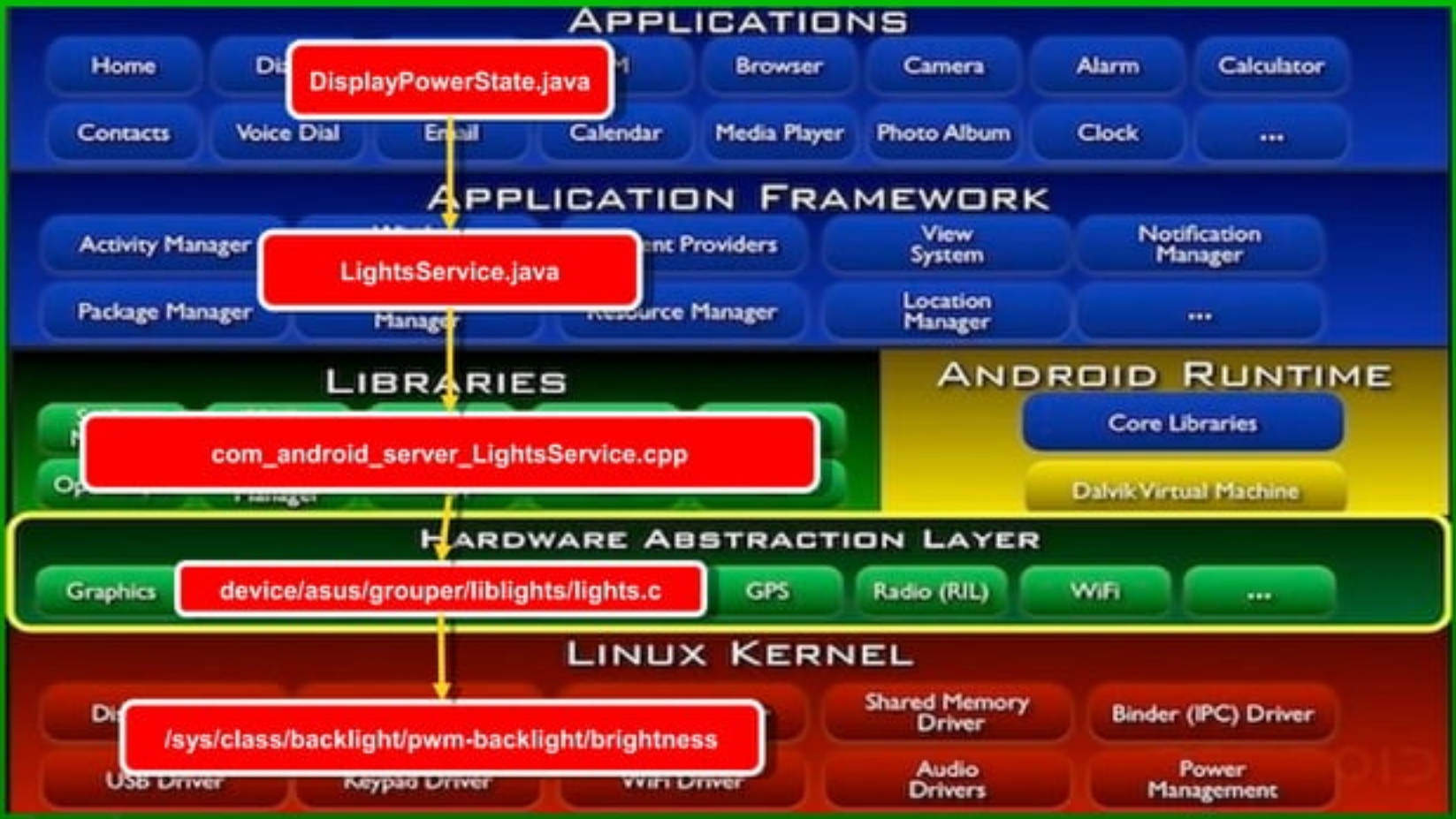
HAL Stubs

- Android provides the interface that vendors must implement (*/hardware/libhardware/include/hardware*)
- HAL process
    1. Java application call hardware framework service API
    2. Framework service call internal API
    3. HAL framework loads hardware library
    4. Obtain device structure from memory
    5. Call HAL stub function

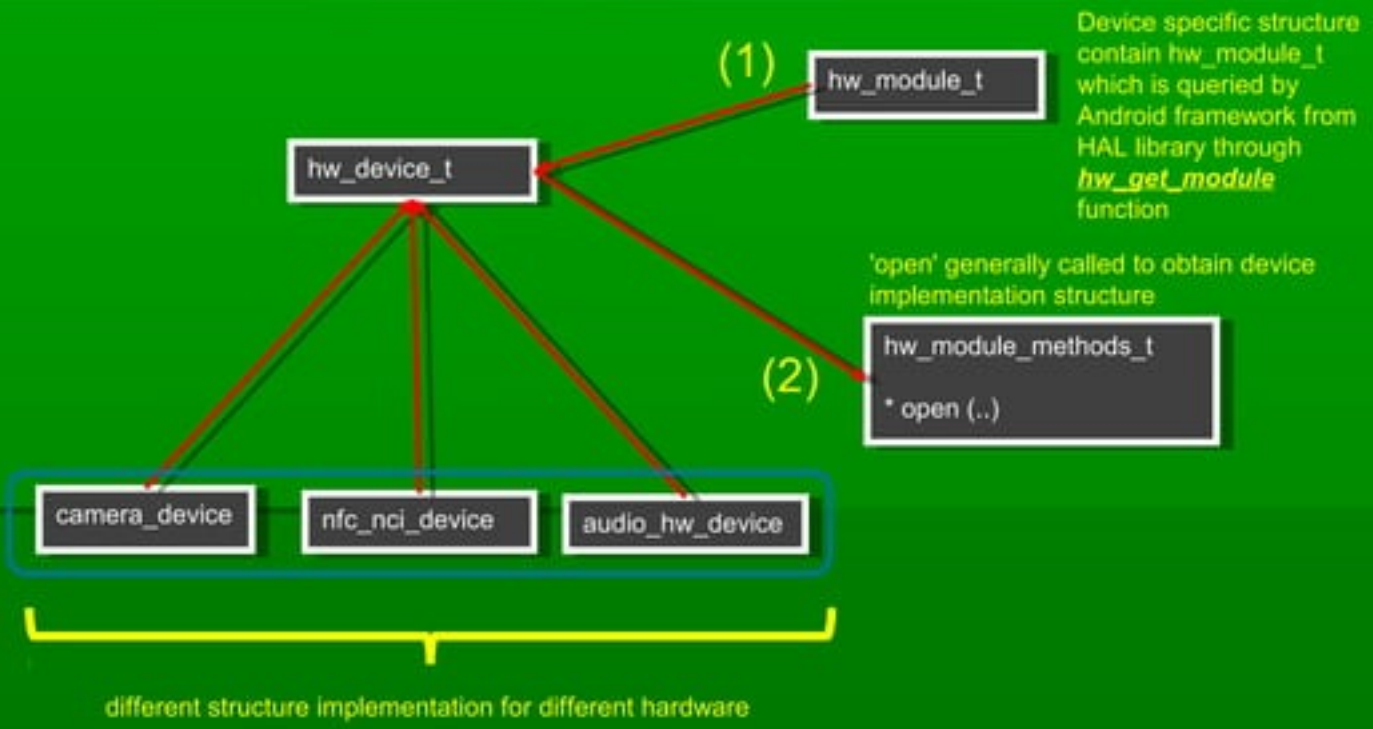
Example - Power HAL



Example – LCD Backlight



HAL Structure



Thank You