



TIZEN™ DEVELOPER CONFERENCE MAY 7-9, 2012

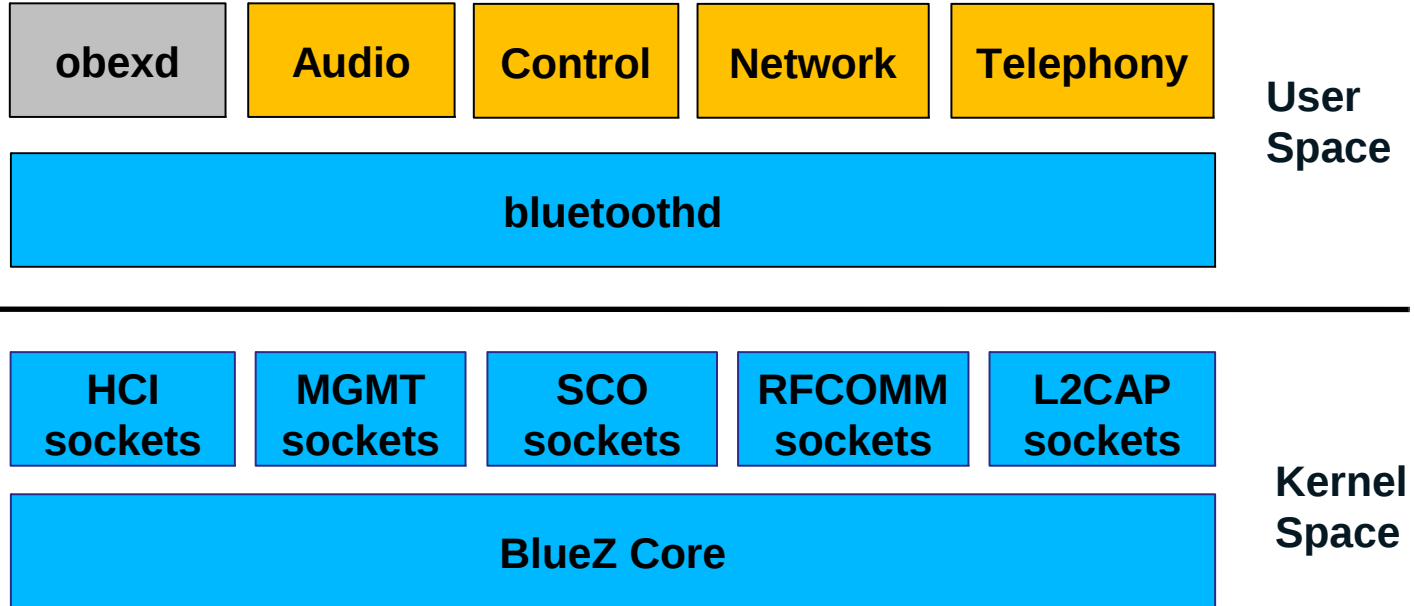
BlueZ - Plugging the Unpluggable

Luiz Von Dentz

Agenda

- **BlueZ High-level Architecture**
- **Audio Architecture**
 - **With PulseAudio reference design**
- **Control Architecture**
- **Telephony Architecture**
 - **With oFono reference design**
- **Network Architecture**
 - **With ConnMann reference design**

BlueZ High-level Architecture

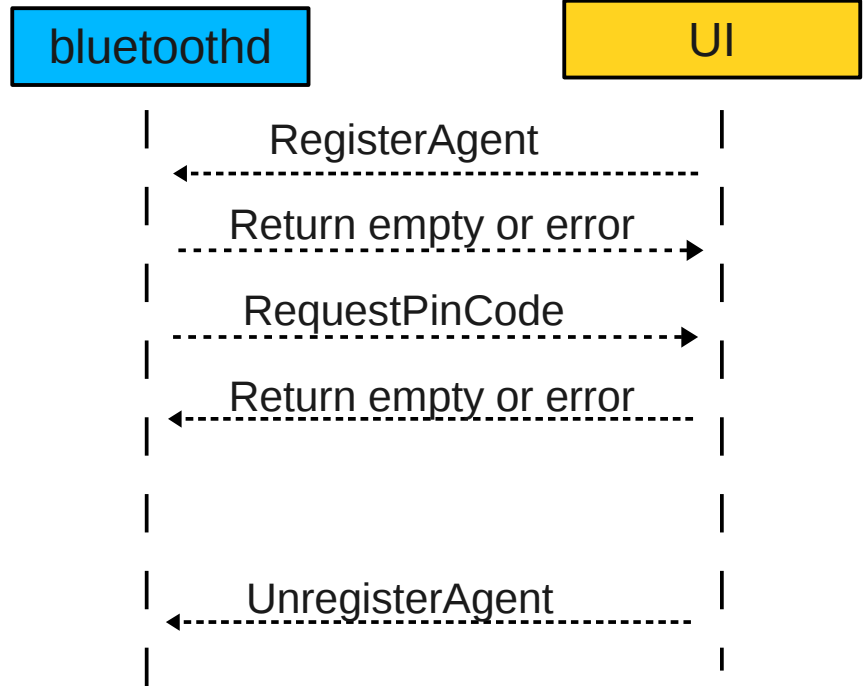


BlueZ Interfaces

- **Application interfaces are D-Bus based**
- **Use cases based high-level interfaces**
- **Limited exposure to Bluetooth technical low-level details**
- **Agent based interfaces**

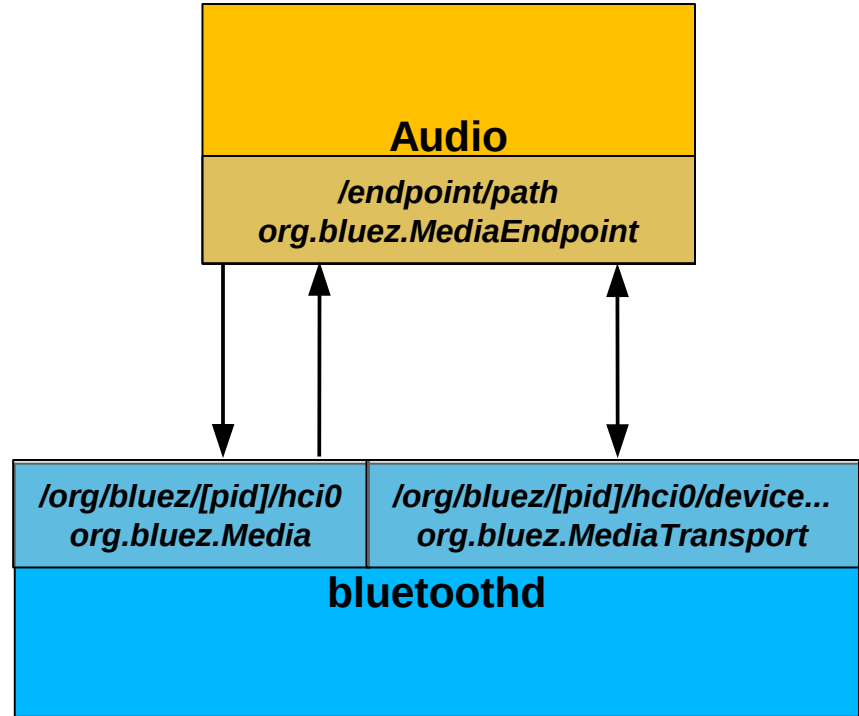
D-Bus agents and BlueZ

- **User interface creates unique D-Bus object and registers it**
- **If required daemon will call into that D-Bus object for extra information**
- **Agent can reply with information or detailed error codes**

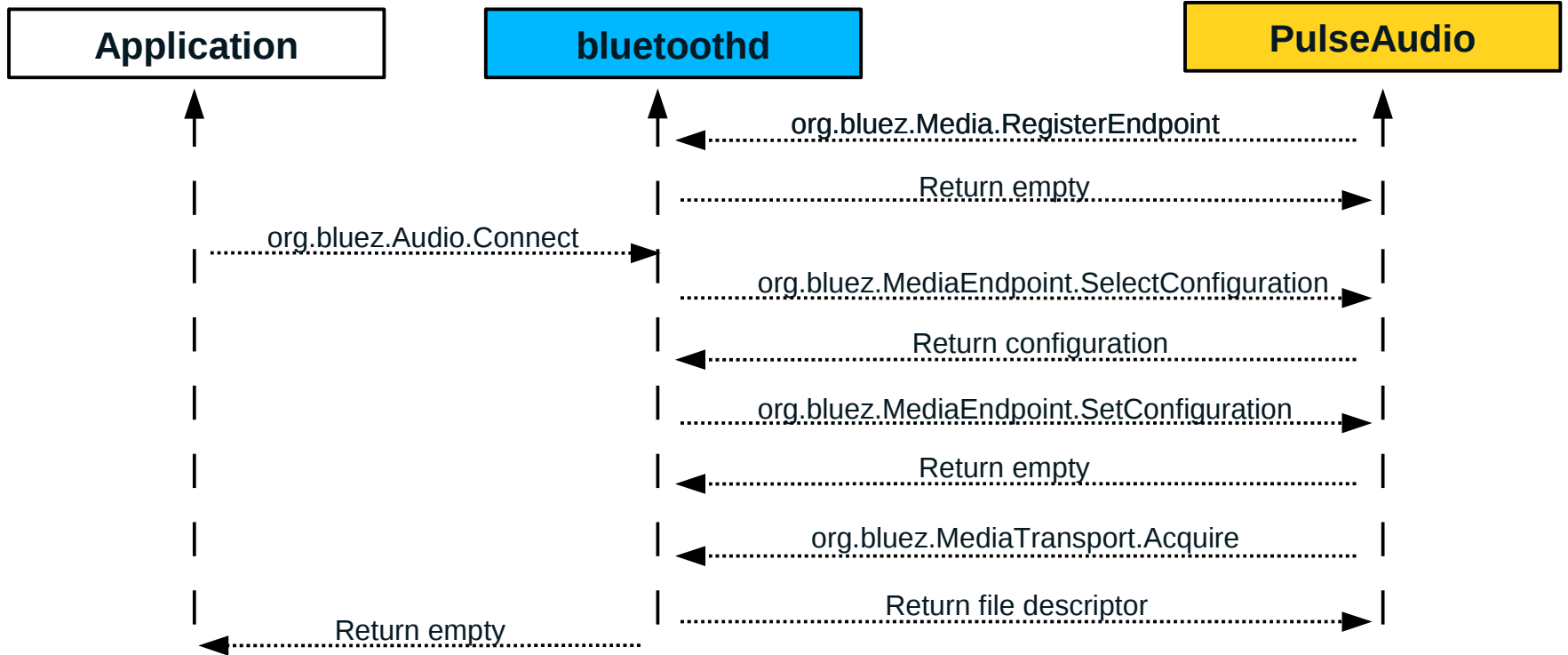


Audio Architecture

- **Hands-free Profile (HFP)**
 - Mono voice quality at 8khz
 - Voice commands, navigation and calls
 - Low Latency
 - Bluetooth audio link (SCO)
- **Advanced Audio Distribution Profile (A2DP)**
 - Sink or source role
 - Stereo
 - Medium/High Latency
 - Bluetooth data link (ACL)

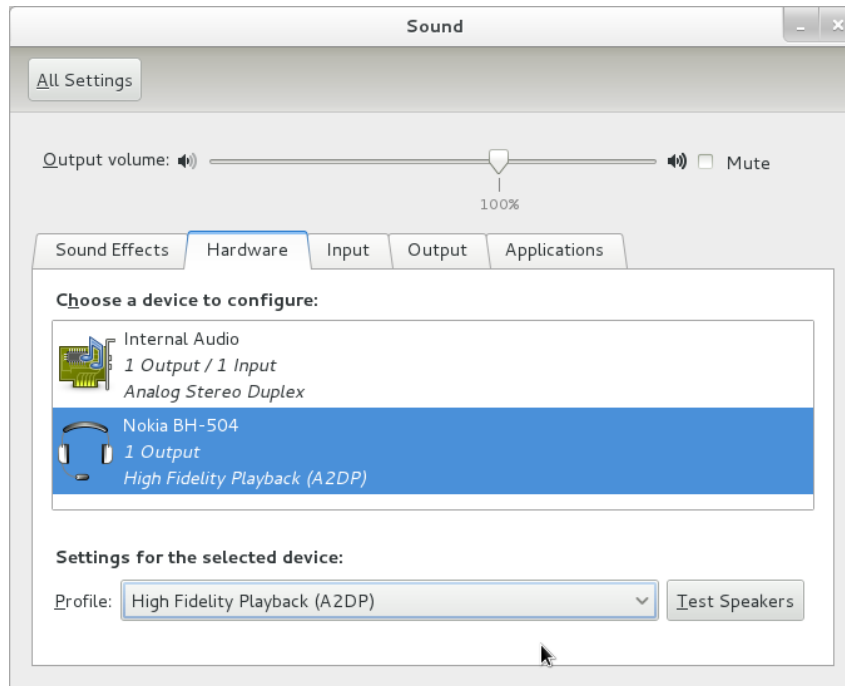


Audio Interaction



PulseAudio Integration

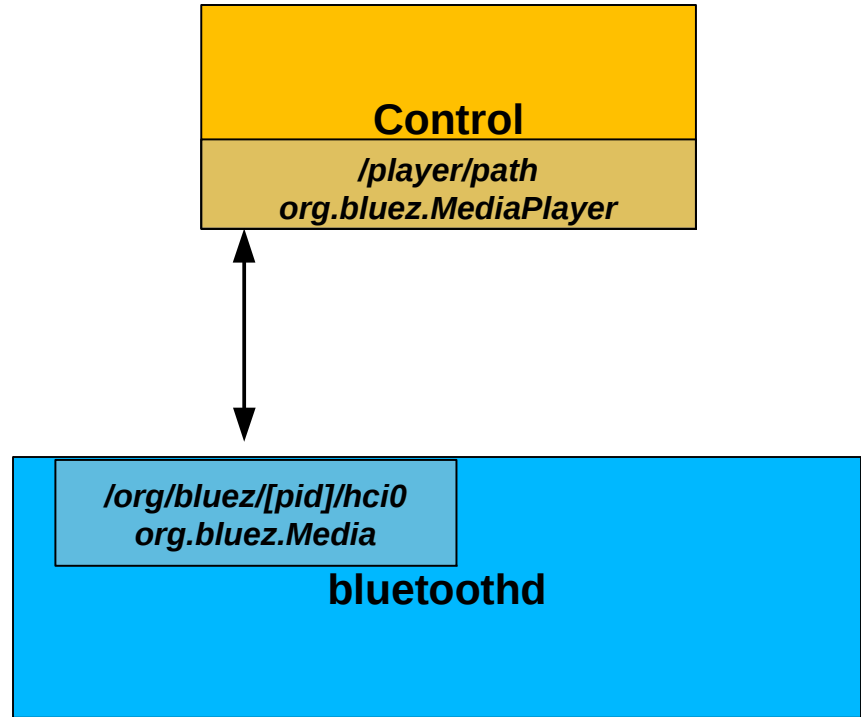
- **module-bluetooth-discover**
 - Detects and loads device modules
- **module-bluetooth-device**
 - Card creation and profile detection
 - Telephony Duplex (HFP)
 - Phone, PC and IVI roles
 - PCM and HCI routing
 - High Fidelity Playback (A2DP)
 - Phone, PC and IVI roles
 - SBC codec



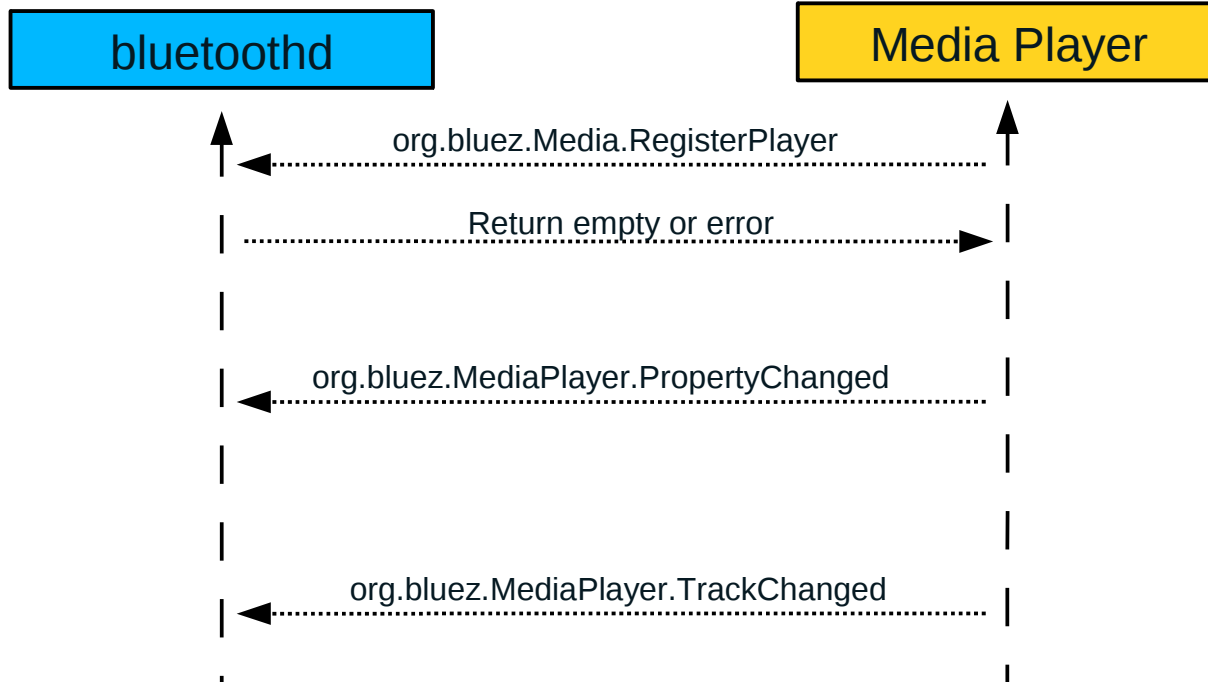
Control Architecture

- **Audio and Video Remote Control Profile (AVRCP)**

- Key input
- Player settings
- Track metadata
- Volume control
- Media Browsing

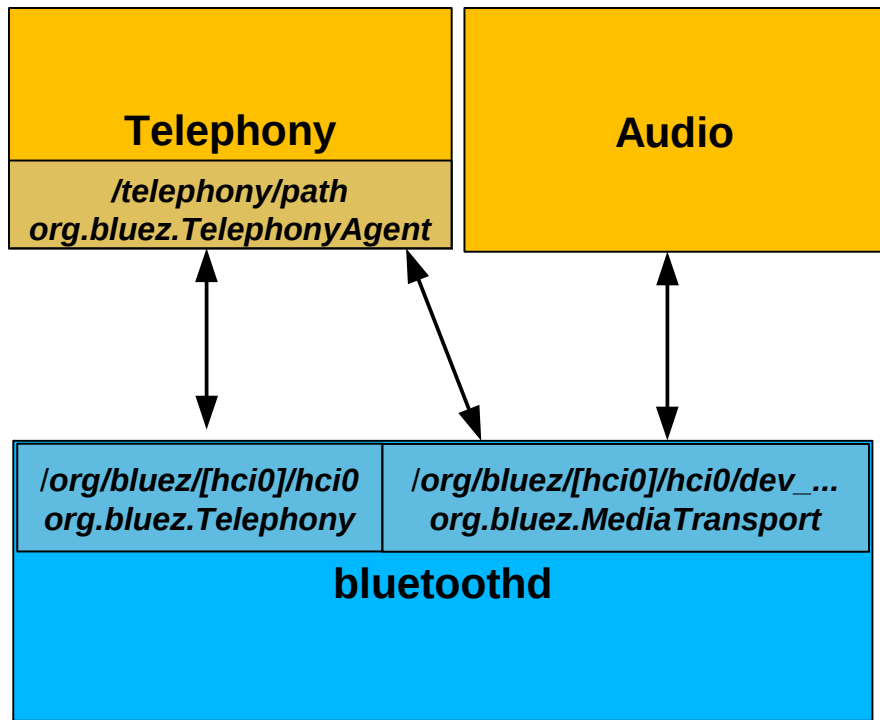


Control Interaction

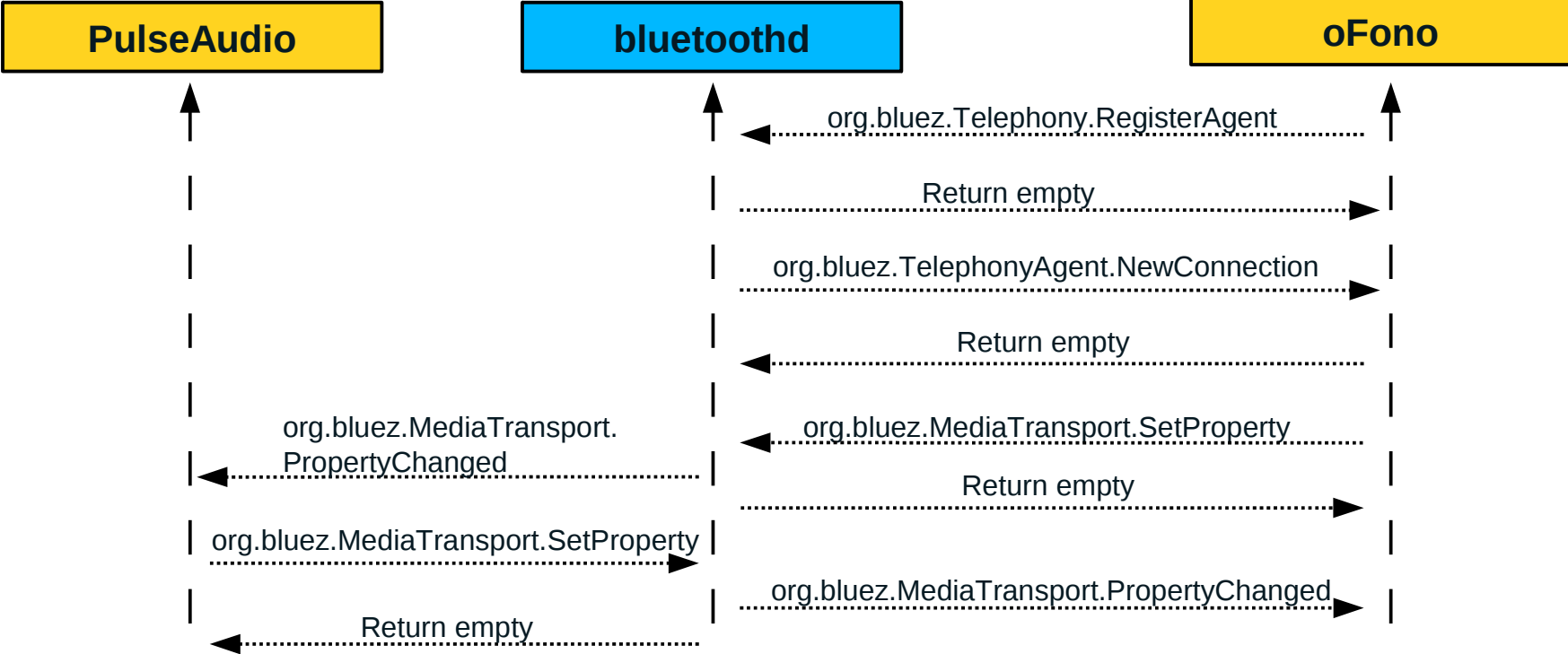


Telephony Architecture

- **Hands-free Profile**
 - GSM based call states
 - AT commands
 - Volume control
 - Speech control
 - Echo Cancellation and Noise Reduction
- **Dial-up Network Profile (DUN)**
- **Sim Access Profile (SAP)**

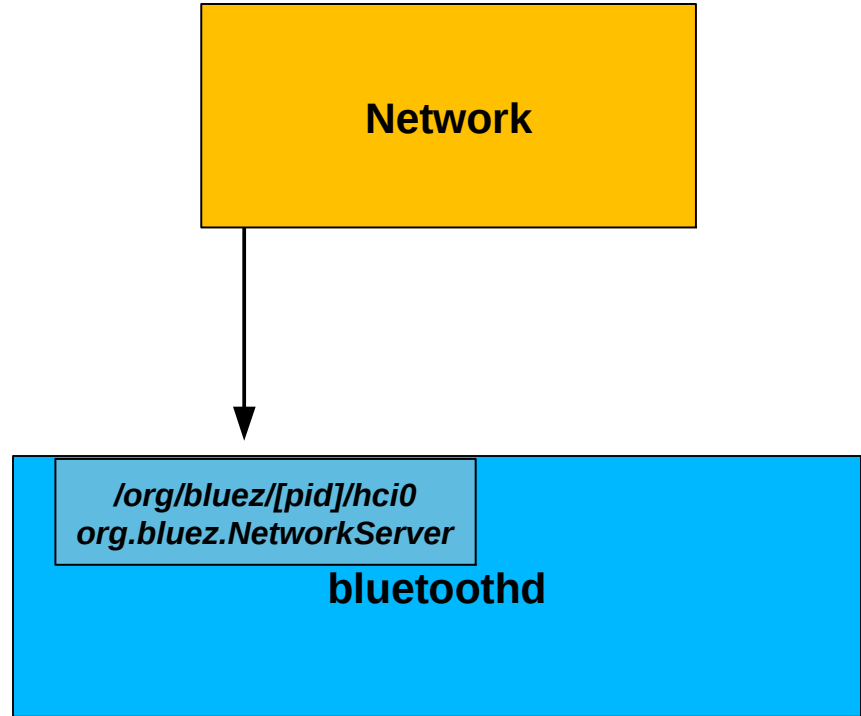


Telephony Interaction

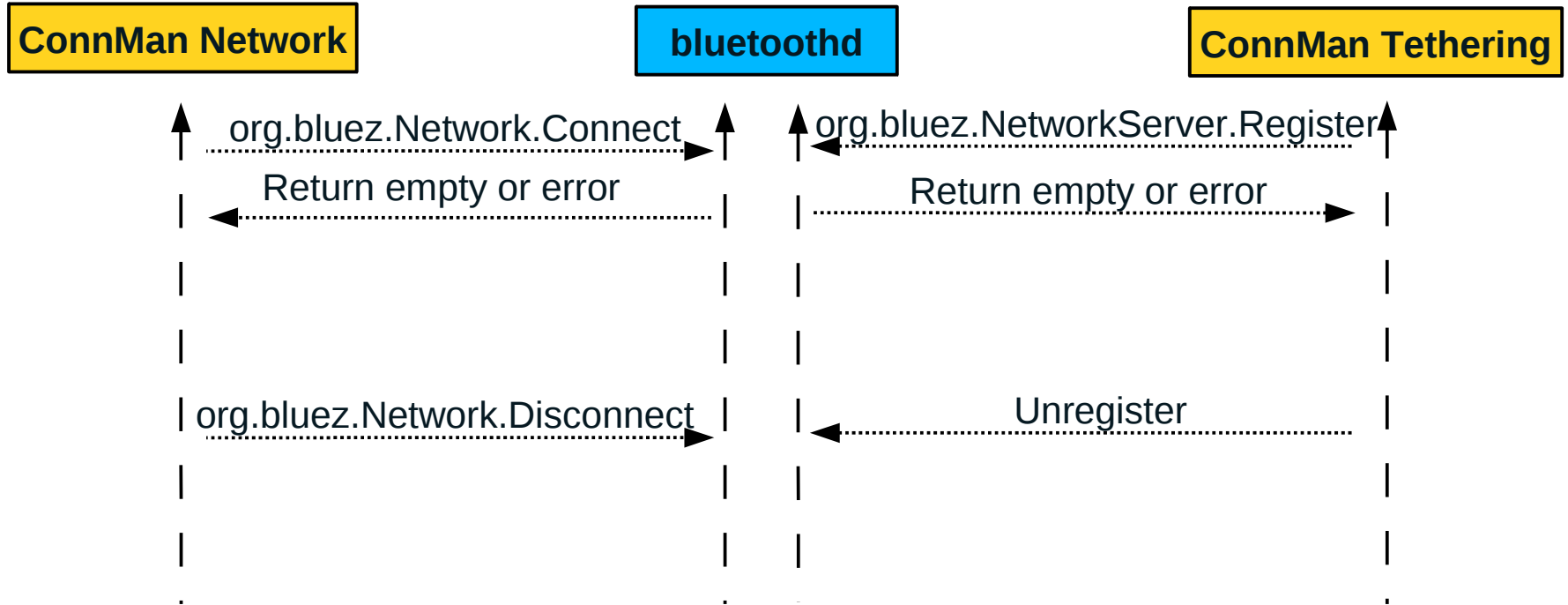


Network Architecture

- **Personal Area Network Profile (PAN)**
 - Bluetooth Network Encapsulation Protocol (BNEP)
 - Network Access Point (NAP)
 - Group Ad-hoc Network (GN)
 - PAN user (PANU)



Network Interaction



Future development

- **Management interface**
 - Kernel based handling of Bluetooth controllers
 - Power efficient with limited wake-ups of user space
 - BlueZ 5.x
- **High-Speed support**
 - Alternate MAC/PHY support
 - Work in progress
- **Low-Energy support**
 - Work in progress

Questions?

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