

# BlueZ

The Bluetooth Stack of your CarKit

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embedded systems

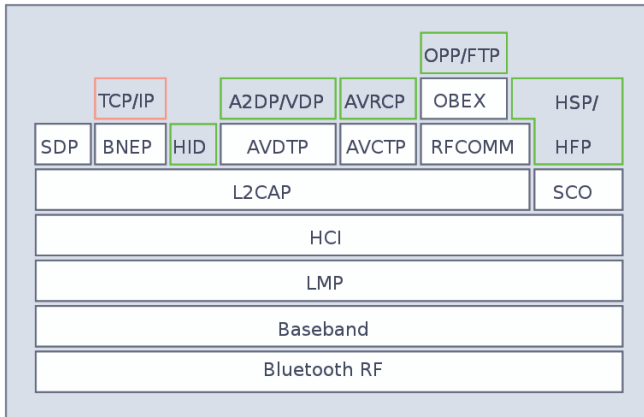
# agenda

- What is Bluetooth?
- What is BlueZ?
- BlueZ features
- oFono and ConnMan
- Profiles
- Bluetooth High Speed
- Conclusion

# What is Bluetooth?

- Use the unlicensed 2.4GHz ISM band
- Designed for short-distance data exchange
- Designed as a cable replacement
- Many use cases (profiles)
- Specified by the Bluetooth SIG
- Low Power, Low Cost

# The Bluetooth Stack



# What is BlueZ?

- Official Linux Bluetooth Protocol Stack
- Project started in 2001 by Qualcomm
- Not planned for the final user
- DBus API
- Used by Linux Desktops, Android, MeeGo, TomTom, etc.

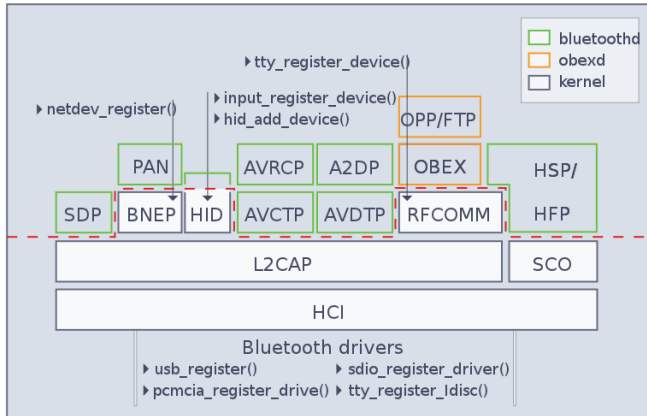
## BlueZ features

- Complete modular implementation
- Real hardware abstraction
- Support for multiple Bluetooth devices
- Device and service level security support
- Standard socket interface to all layers

## Obexd

- Part of the BlueZ project
- Implement profiles that run over the Object Exchange Protocol(OBEX)
- Run in user session for security reasons

# Linux and the Bluetooth Stack



- Telephony stack for 2G/3G devices
- Full feature set for voice calls, SMS and cell broadcast
- Multiple Modem support
- Internal AT Chat library

# ConnMan

- Connection Manager for Linux Systems
- Ethernet, Wifi, Bluetooth and 3G
- DHCP, automatic and static configuration
- Automatic and manual proxy setup
- Wireless and Bluetooth Tethering

## Profiles for your Car

- A2DP - Advanced Audio Distribution Profile
- VDP - Video Distribution Profile
- AVRCP - Audio/Video Remote Control Profile
- HFP - HandsFree Profile
- HSP - Headset Profile
- SPP - Serial Port Profile
- SAP - SIM Access Profile
- PAN - Personal Area Network Profile
- DUN - Dial-up Network Profile
- PBAP - Phone Book Access Profile
- MAP - Message Access Profile
- OPP - Object Push Profile

# A2DP - Advanced Audio Distribution Profile

- High Quality Audio
- Sink role
- Latest spec version: 1.2
- BlueZ version: 1.2
- Pulseaudio for audio handling

# VDP - Video Distribution Profile

- Implement Video Streaming
- Need A2DP for Audio streaming
- Sink role
- Latest spec version: 1.0
- BlueZ version: none

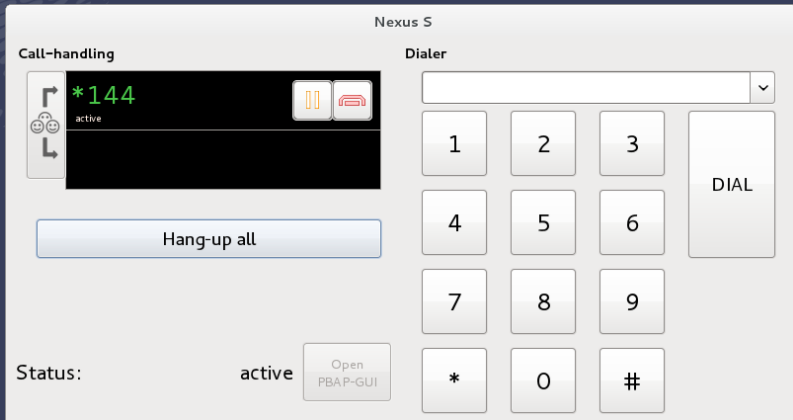
# AVRCP - Audio/Video Remote Control Profile

- Handles commands like 'play', 'pause', 'forward', etc
- Controller role
- Version 1.3 adds metadata information (title, artist, album, etc)
- Version 1.4 adds file browsing
- BlueZ version: part of 1.0

## HFP - HandsFree Profile

- One of the most important profiles
- Phone calls via Bluetooth
- HandsFree role
- Use of oFono for call control
- Use Pulseaudio for audio handling
- Latest spec version: 1.6
- BlueZ version: 1.5
- opendialer concept by BMW Car IT

# HFP - HandsFree Profile - Opendialer



## HSP - HeadSet Profile

- Can also be used for phone calls
- Few control commands
- HFP is much better
- Some old phone only supports HSP
- Latest spec version: 1.2
- BlueZ version: none

# SPP - Serial Port Profile

- General purpose profile
- Useful for Proprietary Application
- Both roles
- Latest spec version: 1.1
- BlueZ version: 1.1

# SAP - SIM Access Profile

- Remote access to your's phone SIM Card
- Client role
- Uses oFono for SIM handling
- Latest spec version 1.1
- BlueZ version: 1.1
- BlueZ and oFono only supports modems with SAP built-in.

# PAN - Personal Area Network Profile

- Share Internet connection
- PANU role
- Use ConnMan for network handling
- Latest spec version: 1.1
- BlueZ version: 1.1

## DUN - Dial-up Network Profile

- Mimic a Dial-up modem over Bluetooth
- Client Role
- PAN is much better than DUN
- Should be deprecated in the future
- Many phones still implement it.
- Need oFono and ConnMan
- Latest spec version: 1.1
- BlueZ version: 1.1 is under development by BMW Car IT

# PBAP - Phone Book Access Profile

- Access Phone Book contacts via Bluetooth
- PCE role
- Latest spec version: 1.1
- BlueZ version: 1.0
- upgrade to version 1.1 is simple

# MAP - Message Access Profile

- Access Email and SMS over Bluetooth
- MCE role
- Latest spec version: 1.0
- BlueZ version: none

## OPP - Object Push Profile

- Transfer vCard and vCalendar objects
- Both roles
- Latest spec version: 1.2
- BlueZ version: 1.1
- Upgrade to version 1.2 is simple

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# Bluetooth High Speed

- Add support to use the 802.11 radio
- Increase the transfer bandwidth
- Complete abstraction for the user
- Still under development

## Conclusion

- It's open source
- Some parts are ready to use
- Once it's done, it's done for everyone
- Choose from who to get support from
- It's cheaper
- Shareable maintenance costs

# thanks!

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