The Penguin with the *BlueZ*

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BlueZ Project

Agenda

- Bluetooth technology overview
- History of Bluetooth and Linux
- Architecture of BlueZ
- Current application
- Look into the future

What is Bluetooth

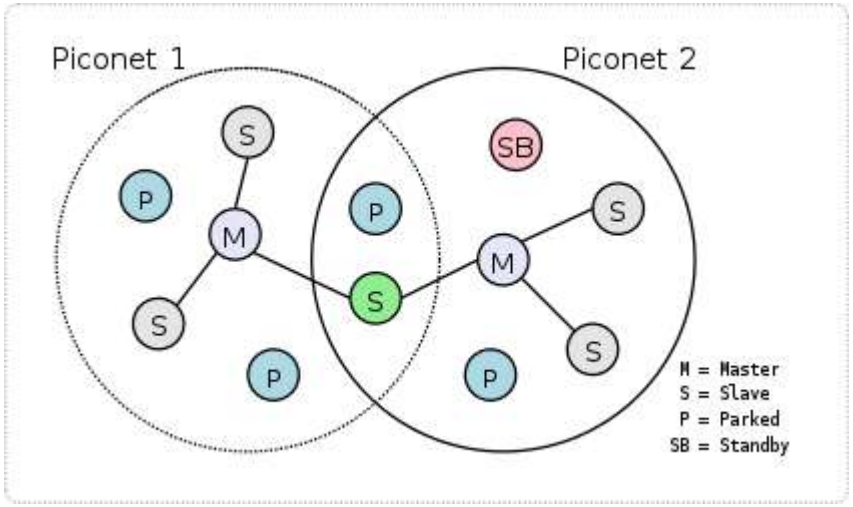
- Bluetooth SIG
  - Trade association
  - Founded 1998
  - Owns and licenses IP
- Bluetooth technology
  - A general cable replacement
  - Using the ISM band at 2.4 GHz
  - Protocol stack and application profiles

How it works

- Data and voice transmission
  - ACL data connections
  - SCO and eSCO voice channels
- Piconet and scatternet topology
- Frequency hopping
  - 79 channels
  - 1600 hops per second

Creating the topology

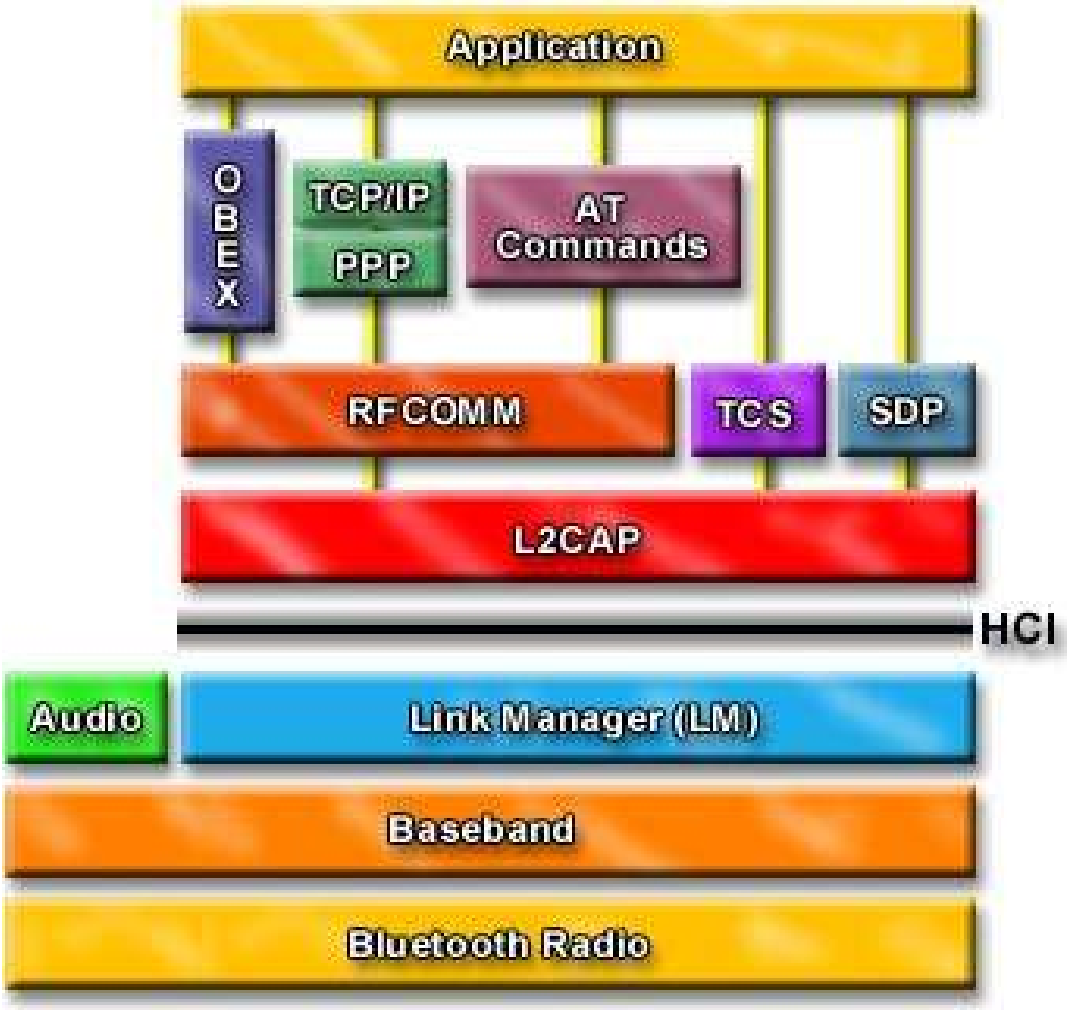
- Hopping sequence defines the piconet
  - Master defines the hopping sequence
  - Up to seven active slaves
  - Scatternet creation



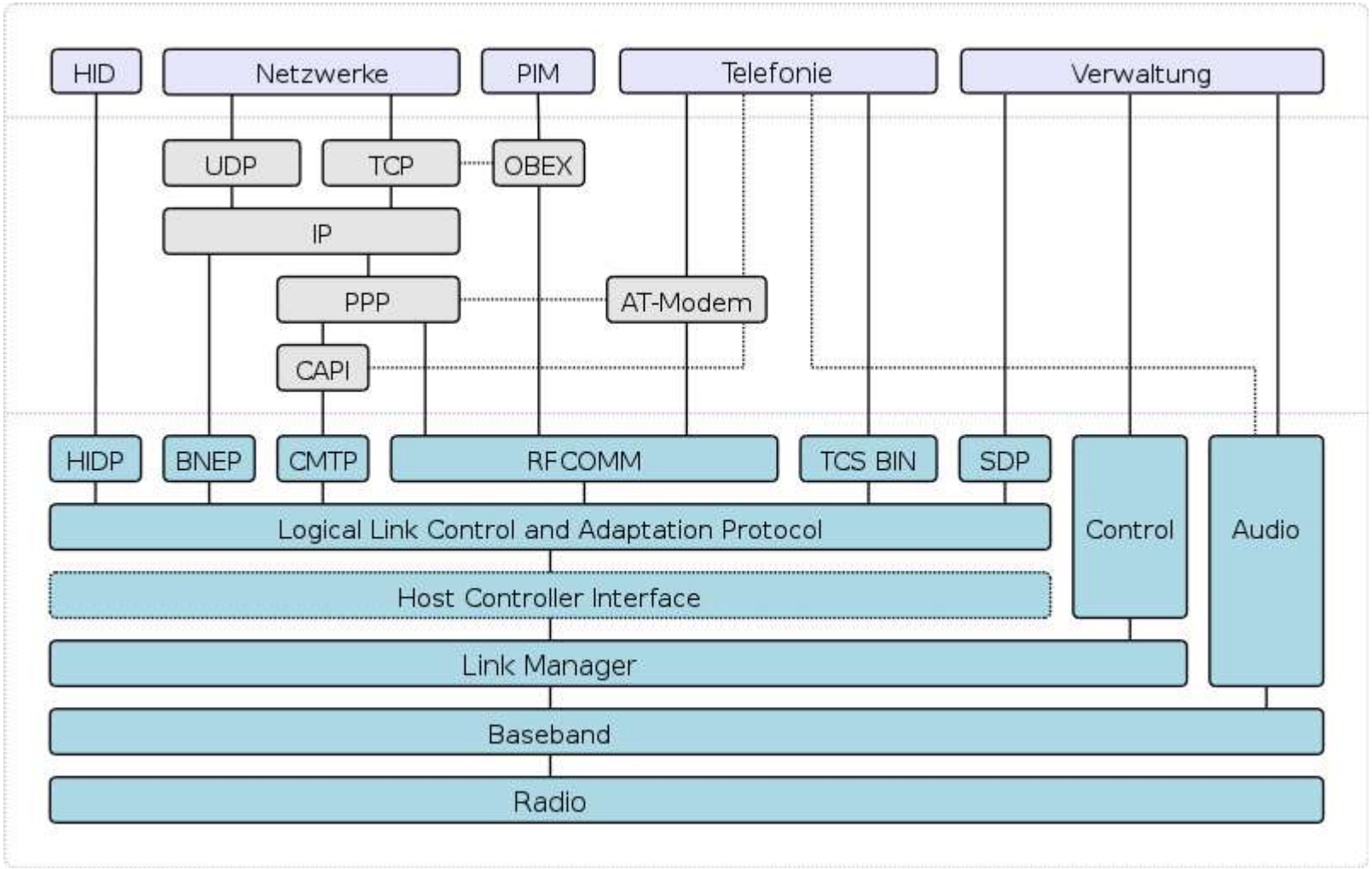
Bluetooth architecture

- Hardware layer
  - Radio, Baseband and Link Manager
  - Access through the Host Controller Interface
    - Standards for USB and UART
- Host protocols
  - L2CAP, RFCOMM, BNEP, AVDTP etc.
- Application profiles
  - Serial Port Profile, Dialup, PAN, A2DP, HID etc.

Bluetooth stack



More complex view

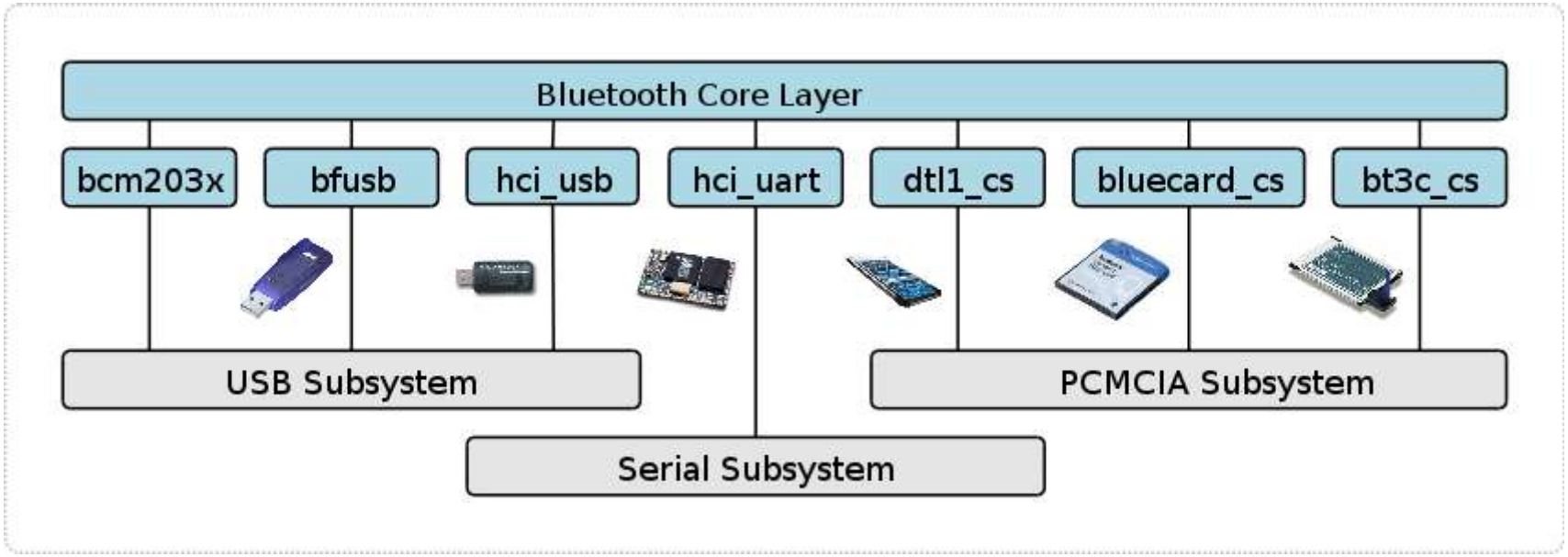


Bluetooth and Linux

- Many implementations
  - Embedded and non-free protocol stack
  - Four major known Bluetooth stacks
  - OpenBT, BlueDrekar, BlueZ and Affix
- Official protocol stack is BlueZ
  - Released May, 3th 2001
  - Integrated into Linux kernel 2.4.6 (June 2001)
  - Enhanced many times

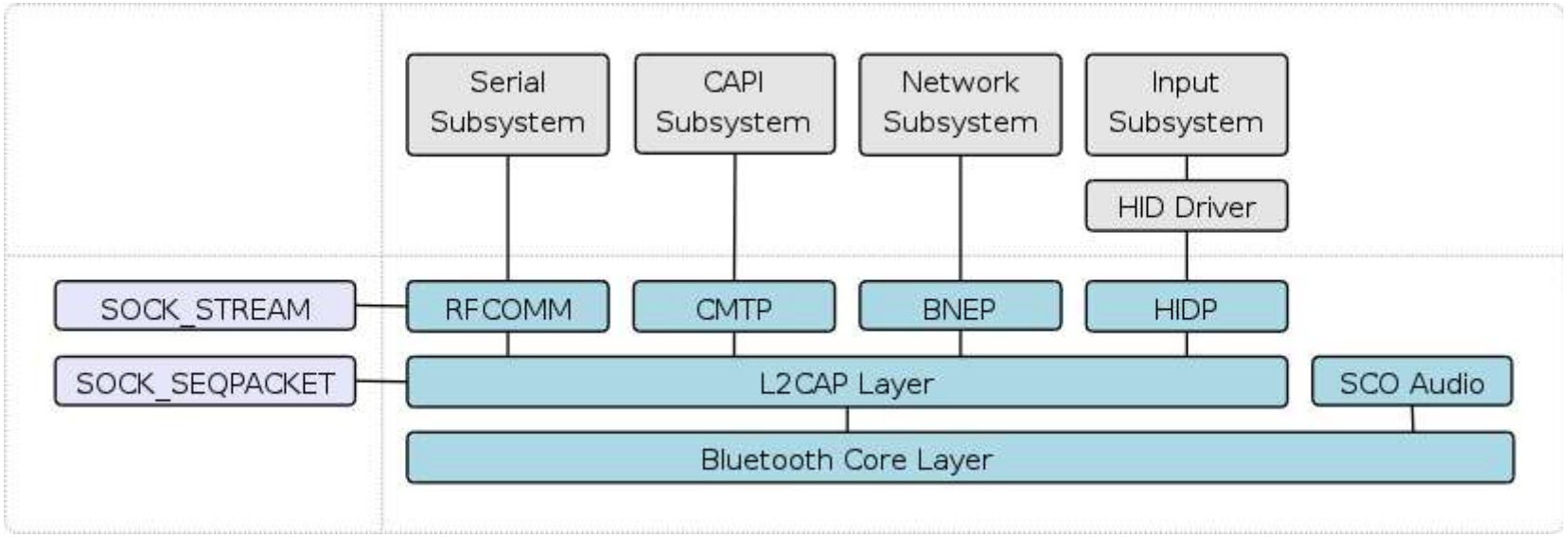
BlueZ core layer

- Real hardware abstraction over HCI
- Generic interface for drivers
- Support of multiple devices

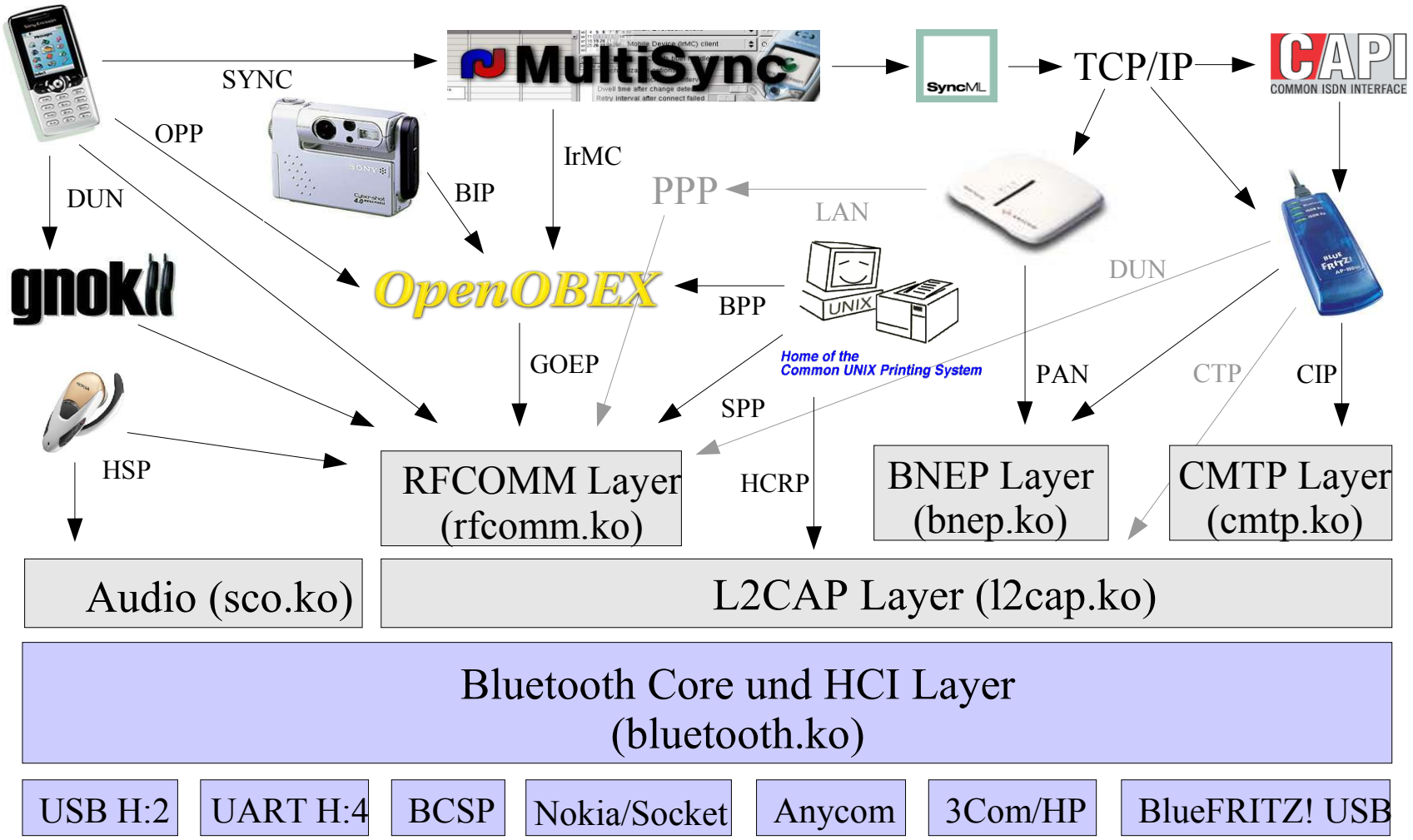


BlueZ protocols

- Kernel modules for core protocols
- Use of the BSD socket interface
  - Management sockets
  - Stream or sequential packet sockets



Integration of BlueZ



Bluetooth networks

- Dialup and LAN access
  - RFCOMM terminal emulation (rfcomm tool)
  - Using of PPP and AT commands (pppd + chat)
  - LAN access using PPP (dund program)
- Personal Area Networks (PAN)
  - Linux TCP/IP with BNEP (pand program)
  - Use bridging, netfilter, NAT etc.
- Access to ISDN
  - CAPI integration with CMTP (ciptool + CAPI library)

Contacts and calendar

- Using Object Exchange (OpenOBEX)
  - Business cards, images, text etc.
  - FTP like file sharing
- Synchronization
  - ETSI TS 07.07 AT commands (GSM library)
  - OBEX based with IrMC (MultiSync)
  - SyncML over TCP/IP or OBEX
  - Nokia specific (Gnokii or Gammu)
  - Siemens specific (ObexFTP with flex support)

Wireless printing

- CUPS integration
  - Printing over serial port emulation
  - HCRP support
- Invisible for the end user
  - Printing from every application
  - Setup is required only once
- Identification with URI
  - bluetooth://00047663724D/

Mouse and keyboard

- Reusing of the USB HID concept
  - Boot protocol support in Linux kernel 2.6.8
  - Full HID support will follow
  - Works with the Input subsystem
  - All Bluetooth HID are supported
  - Setup only required once

- HID Proxy support for BIOS stage
  - Bluetooth dongle emulates USB HID
  - Switching via software (hid2hci)

Audio without cables

- Headsets for voice transmission
  - Supporting the Headset/Handsfree profiles
  - Plugin for the ALSA library
- Headphones for high quality audio
  - Using the Advanced Audio profile
  - Support of the Subband Codec (SBC)
  - Plugin for the ALSA library

Summary

- The source code is under GPL
- BlueZ is qualified by the Bluetooth SIG
- Full access to all Bluetooth host layers
- Native integration into many projects
- Active development
- Very good interoperability with Bluetooth 1.0b, 1.1, 1.2 and 2.0 devices

Questions or feedback

www.bluez.org