

Bluetooth mit Linux

Ein Erfahrungsbericht

von und mit

Ralf Fischer

Agenda

- Was ist Bluetooth eigentlich?
- Kernelmodule
- Systemdienste
- Userland-Tools
 - Dateien übertragen
 - Datenbackup
- Ausblick

Was ist Bluetooth eigentlich? 1/2

- 1994 von Ericsson und Nokia entwickelt
 - Ersatz für Kabel zw. Handys und Zusatzgeräten
 - günstiger robuster Transceiver
 - auf einem Chip
- 1998 Gründung einer Special Interest Group
 - mittlerweile >1000 Mitglieder
 - Standardisiert BT-Kurzstreckenfunk
- Warum „*Bluetooth*“
 - Harald Blåtand (dänischer König, vereinte Skandinavien)

Was ist Bluetooth eigentlich? 2/2

- 2400-MHz ISM-Band
 - 2,402 GHz und 2,480 GHz
- wird auch verwendet von (z.B.):
 - WLAN
 - Drahtlose Videoübertragung
 - Mikrowelle ?!?
- Frequency-Hopping bei Störungen
 - 79 Stufen, 1-MHz Abstand

Kernelmodule

USB entsprechend der Hardware (UHCI/OHCI/EHCI)

```
CONFIG_BT=y # Bluetooth support
CONFIG_BT_L2CAP=m # Logical Link Control/Adaption
CONFIG_BT_SCO=m # Audio Links
CONFIG_BT_RFCOMM=m # RF-Kommunikation
CONFIG_BT_RFCOMM_TTY=y #
CONFIG_BT_BNEP=m # Network encapsulation
CONFIG_BT_HIDP=m # Human Interfaces Devices Protocol
CONFIG_BT_HCIUSB=m # Bluetooth über USB
CONFIG_BT_HCIUSB_SCO=y # Voice über Bluetooth
CONFIG_BT_HCIBCM203X=m # Treiber Broadcom Chipsatz Dongle
CONFIG_BT_HCIBFUSB=m # Treiber für AVM BlueFritz Dongle
```

Userland (1/12): Pakete

- net-wireless/bluez-libs Bibliotheken
- net-wireless/bluez-utils Tools, u.a.:
 - hciconfig vgl. ifconfig
 - hcitool „scanner“
 - l2ping vgl. ping
 - rfcomm konfiguriert rf-devs
 - /etc/init.d/bluetooth
- app-mobilephone/obexftp
 - Open OBject EXchane FTP client.

Userland (2/12): /etc/bluetooth/hcid.conf

```
options {
    autoinit yes;
    security auto;
    pairing multi;
    pin_helper /etc/bluetooth/pin-helper;
}
device {
    name "Ralfs %h (%d)";
    class 0x3e0100;
    iscan enable; pscan enable;
    lm accept, master;
    lp rswitch, hold, sniff, park;
}
```

Userland (3/12): Dongle gefunden?

```
#-> hciconfig -a
```

```
hci0:    Type: USB  
        BD Address: 00:00:00:00:00:00 ACL MTU: 0:0 SCO MTU: 0:0  
        DOWN  
        RX bytes:0 acl:0 sco:0 events:0 errors:0  
        TX bytes:0 acl:0 sco:0 commands:0 errors:0
```

Soweit, Sogut:

```
#-> /etc/init.d/bluetooth start
```

```
* Starting Bluetooth ...  
*   Starting hcid ...           [ ok ]  
*   Starting sdpd ...           [ ok ]  
*   Starting hidd ...           [ ok ]  
*   Starting rfcomm ...         [ ok ]
```

```
#->
```

Userland (4/12): Dongle gefunden? (2)

```
#-> hciconfig -a
```

```
hci0:    Type: USB  
BD Address: XX:XX:XX:XX:XX:XX ACL MTU: 192:8 SCO MTU: 64:8  
UP RUNNING PSCAN ISCAN  
RX bytes:117 acl:0 sco:0 events:15 errors:0  
TX bytes:310 acl:0 sco:0 commands:14 errors:0  
Features: 0xff 0xff 0x0f 0x00 0x00 0x00 0x00 0x00  
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3  
Link policy: RSWITCH HOLD SNIFF PARK  
Link mode: ACCEPT MASTER  
Name: 'Ralfs lexx (0)'  
Class: 0x3e0100  
Service Classes: Networking, Rendering, Capturing  
Device Class: Computer, Uncategorized  
HCI Ver: 1.1 (0x1) HCI Rev: 0x175 LMP Ver: 1.1 (0x1) LMP Subver: 0x175  
Manufacturer: Cambridge Silicon Radio (10)
```

```
#->
```

Userland (5/12): Handy finden

```
#-> hcitool inq
```

```
Inquiring ...
```

```
YY:YY:YY:YY:YY:YY
```

```
clock offset: 0x2cbc
```

```
class: 0x520204
```

```
#-> hcitool scan
```

```
Scanning ...
```

```
YY:YY:YY:YY:YY:YY
```

```
Rfi
```

Nun sollte man versuchen ob das Handy den Dongle am Rechner findet und es im Handy als Gerät hinzuzufügen.

Je nach verwendetem Pin Helper wird ein GTK-Dialog nach einer Pin fragen oder die in `/etc/bluetooth/pin` hinterlegte verwendet.

Userland (6/12): Dateien übertragen (1)

```
#-> obexftp --bluetooth YY:YY:YY:YY:YY:YY --list
Browsing YY:YY:YY:YY:YY:YY ...
Channel: 7
Connecting...done
Receiving "(null)"... <?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE folder-listing SYSTEM "obex-folder-listing.dtd">
<!--
Generated by XML Coder.
.\cxc125821_EU_1_C\IAR-ARM7\src\xml_coder.c (May 29 2004 00:04:41)
(C) 2001 Sony Ericsson Mobile Communications AB, Lund, Sweden
-->
<folder-listing version="1.0"><folder name="Bilder"/>
<folder name="Töne"/>
<folder name="Displayprofile"/>
<folder name="Videos"/>
<folder name="Andere"/>
</folder-listing>
done
Disconnecting...done
```

Userland (7/12): Dateien übertragen (2)

```
#-> obexftp -b YY:YY:YY:YY:YY:YY -c Bilder -l
Browsing YY:YY:YY:YY:YY:YY ...
Channel: 7
Connecting...done
Sending "Bilder"... done
Receiving "(null)"... \<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE folder-listing SYSTEM "obex-folder-listing.dtd">
<!--
Generated by XML Coder.
.\cxc125821_EU_1_C\IAR-ARM7\src\xml_coder.c (May 29 2004 00:04:41)
(C) 2001 Sony Ericsson Mobile Communications AB, Lund, Sweden
-->
<folder-listing version="1.0"><parent-folder/>
<file name="Shutdown-Show.gif" size="18960"/>
[SCHAAANIP ... /]
<file name="bild(8).jpg" size="6759"/>
<folder name="camera_semc"/>
</folder-listing>
done
Disconnecting...done
```

Userland (8/12): Dateien übertragen (3)

```
#-> obexftp -b YY:YY:YY:YY:YY:YY \  
      -c Bilder -g "bild(8).jpg"
```

```
Browsing YY:YY:YY:YY:YY:YY ...  
Channel: 7  
Connecting...done  
Sending "Bilder"... done  
Receiving "bild(8).jpg"... \done  
Disconnecting...done
```

```
#-> obexftp -b YY:YY:YY:YY:YY:YY \  
      -c Displayprofile -p "linuxblind08.thm"
```

```
Browsing YY:YY:YY:YY:YY:YY ...  
Channel: 7  
Connecting...done  
Sending "Displayprofile"... done  
Sending "linuxblind08.thm"... |done  
Disconnecting...done
```

Userland (9/12): Backup Kontaktdaten (1)

```
USE="irmc [evo]" emerge multisync
```

The screenshot shows the Multisync application window. At the top is a menu bar with 'File', 'Edit', 'Options', and 'Help'. Below the menu bar is a toolbar with icons for 'New...', 'Edit...', 'Delete...', 'Log...', and 'Sync'. The main area contains a table with the following structure:


Auto	Synchronization pair	Status
<input type="checkbox"/>	handy	Editing options...

At the bottom of the window, a status bar displays the text 'Multisync running.'


Userland (10/12): Backup Kontaktdaten (2)

Plugins | Synchronize options | Filters | Sounds

Synchronization plugins:

First plugin: IrMC Mobile Device  Options...

Connects to IrMC compliant mobile devices, such as the SonyEricsson T39/T68/T610 or Siemens S55.

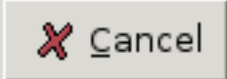
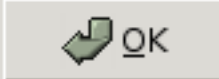
Second plugin: Backup  Options...

This plugin keeps a backup of your data. You can manage the stored entries in the plugin options (above).

Display Name: handy

Data types to synchronize:

- Calendar (Events)
- Addressbook (Contacts)
- Tasks (ToDo)


 

Userland (11/12): Backup Kontaktdaten (2)

Connection | **Options**

Connection type:
Bluetooth

Options:
Bluetooth address: 00:0F:DE:17:03:44
Channel: 8

 Search for units...

Test connection...

Found units





Rfi (00:0F:DE:17:03:44, channel 8)

Search done. 1 units found.



Userland (12/12): Backup Kontaktdaten (3)

Files Options

Status	Type	Summary	ID
	Contact	[REDACTED]	multisync1143905500-51
	Contact	[REDACTED]	multisync1143905500-52
	Contact	[REDACTED]	multisync1143905500-53
	Contact	[REDACTED]	multisync1143905500-54
	Contact	[REDACTED]	multisync1143905500-55
	Contact	[REDACTED]	multisync1143905500-56
	Contact	[REDACTED]	multisync1143905500-57
	Contact	[REDACTED]	multisync1143905500-58
	Contact	[REDACTED]	multisync1143905500-59

 Restore selected  Restore all  Delete from backup  Rebackup all

All actions will be performed on next synchronization.

 Cancel  OK

Ausblick

- Ultra-Wideband Funktechnik
 - WiMedia-Vorschlag
 - <http://www.wimedia.org>
- Übertragungsraten um 100MBit/s
- später bis zu 500MBit/s
 - USB2.0/Firewire-Ersatz?

Vielen Dank!

- Folien demnächst verfügbar auf
 - <http://makii.de/>
- Weiterführende Fragen:
 - makii@jabber.ccc.de
 - ralf.fischer@makii.de (0xFC5D51EAA)
 - [#lusc.de](irc://irc.lusc.de)