

oFono

Open-source telephony

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Outline

- 1 A brief history of Linux telephony
- 2 Nokia N900
- 3 oFono

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What's (cellular) telephony?

- network status
- network selection
- SIM security (PIN, PUK. . .)
- SIM phone book

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- network status
- network selection
- SIM security (PIN, PUK. . .)
- SIM phone book
- voice calls
- Short Message Service (SMS)
- location
- supplementary services
- General packet radio service (GPRS)
- . . .

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- ITU V.250
- 3GPP 27.007
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- Hayes commands set
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- designed in the seventies...
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- ASCII
- awkward multiplexing
- PPP (binary) for backward-compatibility

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 - vendor-specific commands
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- AT commands extensions:
 - vendor-specific commands
 - many implementations not fully adherent
- Full replacement for AT commands, e.g.:
 - Nokia: Phonet / ISI
 - ST-Ericsson: CAIF
- PPP can be replaced too:
 - proprietary framing
 - Ethernet emulation

Existing solutions

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- NetworkManager: laptop-centric, AT-specific, IP-centric
- N900 CSD: Nokia modem-specific, closed

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N900 telephony architecture

| | | | |
|------------------------|-----|----------------|---------------|
| Telepathy Ring | ICd | Applications | |
| D-Bus | | IP stack | PulseAudio |
| CSD | | GPRS interface | |
| Phonet stack | | Phonet pipe | Character dev |
| McSAAB (Phonet device) | | | CMT speech |
| OMAP SSI driver | | | |
| SSI bus | | | |
| Cellular modem | | | |

Phonet

- simple datagram-based binary protocol
- multiplexing out of the box
- asynchronous notifications
- abstraction layer for modem interconnect
- one IP packet = one Phonet datagram

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- simple datagram-based binary protocol
- multiplexing out of the box
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- abstraction layer for modem interconnect
- one IP packet = one Phonet datagram
- 2.6.28: Phonet stack, GPRS, USB gadget
- 2.6.31: USB host driver
- same stack on N900 and PC!

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oFono architecture

| | | | |
|-------------------|----------------|--------------|------------|
| D-Bus | | | |
| oFono core stack | | | |
| Modem driver API | | | Plugin API |
| Generic AT driver | Calypso driver | ISI driver | |
| TTY | | Phonet stack | |

oFono core stack

Core:

- D-Bus (de)serialization
- network registration logic
- call handling logic
- SMS retransmit, format and parsing
- SIM phonebook to vCard conversion
- data caching
- ...

Plugins:

- call history
- SMS storage

oFono drivers

- hardware auto-detection
- modem message formatting/parsing
- plugin sub-layer for AT modem variants
- hardware-specific extra functions

oFono vs CSD comparison

| | |
|----------------|------------------|
| D-Bus | |
| CSD plugins | oFono core |
| CSD | oFono ISI driver |
| Phonet stack | |
| OMAP SSI | USB CDC-Phonet |
| Cellular modem | Nokia device |

References

- oFono project
<http://www.ofono.org/>
- Linux kernel
<http://www.kernel.org/>

Any questions?