Regaining control of your smartphone with postmarketOS and Maemo Leste

Merlijn Wajer, Bart Ribbers

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Status of GNU/Linux on the smartphone

- Brief introduction
- Why GNU/Linux on the smartphone?
- Hard(ware) problems, potential solutions
- Overview of various efforts
- postmarketOS
- Maemo Leste

Introduction

Merlijn Wajer

- ▶ Graduated at University of Amsterdam
- ▶ Does work for Internet Archive (archive.org)
- ▶ Spare time spent on Maemo Leste, Amsterdam hackerspace, Tor and other FOSS projects

Bart Ribbers

- ▶ postmarketOS/Alpine Linux developer
- ▶ FOSS and Linux geek
- ▶ Lives in the Netherlands

Why GNU/Linux on your smartphone?

Really shouldn't warrant justification, but here goes:

- ▶ No essential freedom(s) - why can't we have the same freedom that we enjoy on our laptops, desktop and servers?
- ▶ Dependent on manufacturer, no (longtime) support, planned obsolescence
- ▶ Too much spyware, bloatware and lock in
- ▶ Closed development
- ▶ Trust, Control and Choice

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… What does this mean, practically speaking?

Why GNU/Linux on your smartphone? II

Essential pieces of a GNU/Linux smartphone:

- ▶ Mainline Linux hardware support
- ▶ Little to no non-free drivers/firmware
- ▶ Bootloaders without restrictions
- ▶ **Usable** FOSS userspace (hopefully multiple variants)

Hard(ware) problems

Historically, support for mobile (ARM) devices has been poor:

- ▶ Vendor-only kernels, not much of it made it back to Linux
- ▶ u-boot bootloader often per device, separate targets
- ▶ Linux needs to know what drivers to load (and what device-tree to use), not like Intel/AMD where GRUB just loads standard kernel
- ▶ There are so many devices!
- ▶ Power management

Has gotten a little better with 64 bit ARM, but many problems remain.

Hard(ware) problems, potential solutions

Alleviate some of the pains by:

- ▶ Focussing only on a few devices
- ▶ When manufacturing new devices, pick a SoC (System on Chip) that is already well supported.

Not by:

- ▶ Building abstraction layers around Android and Android drivers (has its uses, though)

Two companies are working on new devices right now....

Upcoming hardware: PinePhone and PineTab

- ▶ Allwinner A64 SoC (System on Chip), mainline support
- ▶ 2GB RAM, eMMC, Quad core CPU
- ▶ Mali400 GPU, open source 'lima' driver works!
- ▶ Kill switches for microphone, modem, wifi, camera, etc...
- ▶ Worldwide 4G/LTE modem
- ▶ Will probably ship with choice for various distributions

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150 EUR approximately. Braveheart edition has shipped.

`https://www.pine64.org/pinephone/`

Upcoming hardware: Librem 5

- ▶ i.MX 8M SoC (System on Chip), mainline support
- ▶ 3GB RAM, eMMC, Quad core CPU
- ▶ Vivante GC7000Lite
- ▶ Kill switches for WiFi, Cellular, Microphone/Cameras (all 3 will turn off GPS)
- ▶ Baseband differs depending on the region
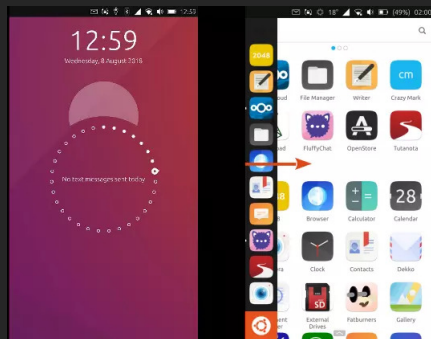- ▶ Will ship with PureOS

Chestnut edition has shipped.

`https://www.puri.sm/products/librem-5/`

Overview of various efforts: KDE Neon
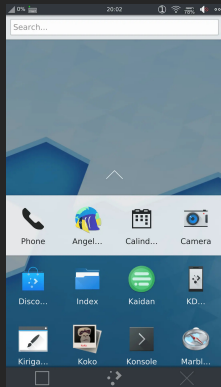
- ▶ Plasma Mobile
- ▶ Based on Ubuntu
- ▶ Uses libhybris

`https://neon.kde.org`

Overview of various efforts: Ubuntu Touch

- Unity 8
- Uses libhybris

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https://ubuntu-touch.io
```
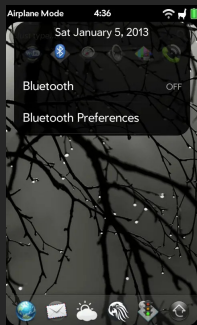
Overview of various efforts: Nemo Mobile
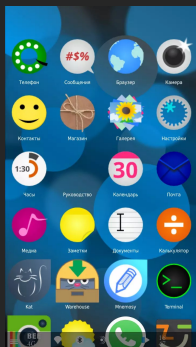
- ▶ Glacier UI
- ▶ Originally based on Mer, now on SailfishOS
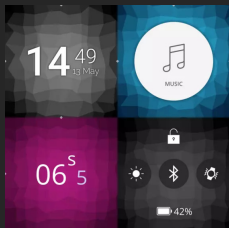- ▶ Uses libhybris if ran on a SFOS device

```
https://wiki.merproject.org/wiki/Nemo
```

Overview of various efforts: Lune OS

▶ Luna Next
▶ Continuation of original webOS
▶ Uses libhybris

`https://webos-ports.org/wiki/Main_Page`

Overview of various efforts: AsteroidOS

- ▶ AsteroidUI
- ▶ Smartwatches only
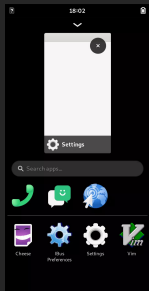- ▶ Based on Mer
- ▶ Uses libhybris

`https://asteroidos.org/`

Overview of various efforts: AOSC
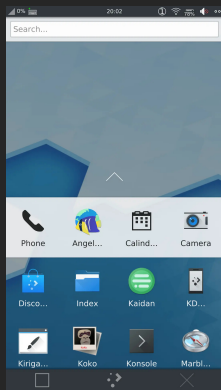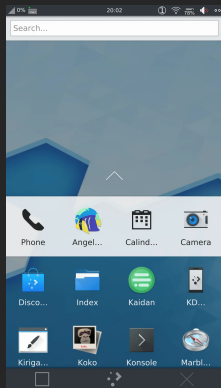

- ▶ Plasma Mobile
- ▶ Mainline only

`https://aosc.io`

Overview of various efforts: PureOS

- ▶ Main focus on Phosh, but also ship Plasma Mobile
- ▶ Based on Debian
- ▶ Runs on mainline kernels only

`https://www.pureos.net`

Overview of various efforts: Manjaro

- ▶ Plasma Mobile
- ▶ Based on Arch
- ▶ Runs on mainline kernels only

`https://manjaro.org`

Overview of various efforts: Nix OS

- ▶ DE agnostic
- ▶ Runs on both mainline and libhybris images

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https://mobile.nixos.org
```

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- ▶ Announced on 26th of May
- ▶ Started by Oliver Smith
- ▶ At the time, 2 devices supported
- ▶ Now, 173 devices supported (in various degrees)

postmarketOS

- Based on Alpine linux
  - Base installation: only 6MB!
- Development based around chroots
  - Using our own tool "pmbootstrap"
- Upstreaming to Alpine as much as possible

postmarketOS

- ▶ DE agnostic
- ▶ Current efforts focussed on PinePhone and Plasma Mobile
  - ▶ More interfaces are available though!
- ▶ Alpha state now, but aiming to be usable as daily driver around PinePhone launch

`https://postmarketos.org`

On Matrix: #main:postmarketos.org

On IRC: Freenode, #postmarketos

Maemo Leste: Introduction

History:

- Developed by Nokia
- Maemo 5 (for Nokia N900) used in production since 2009, based on Debian
- Community maintained after Nokia abandoned it
- Lots of maemo community-maintained packages available in "application manager"

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- Lots of maemo community-maintained packages available in "application manager"
- … not everything in Maemo 5 is open source

I (Merlijn) have been using it as a phone ever since.

Maemo Leste: Why?

- Has been used by "ordinary users"
- Community developed - no corporate backing, no special interests
- Compatible with existing software (X11, gtk, Qt) - 'stuff just runs'
- Big chunks of the code are open source and/or GPL
- APIs are developed with mobile and power management in mind (act on proximity sensor, ambient light, compass, vibrator)
- Fast, low resource usage (150MB of RAM is plenty for the core system)
- Lots of existing applications, porting is usually trivial.

Trying to be(come) feature compatible allows us to keep focus on what matters.

Maemo Leste: How?

- ▶ Port code to updated APIs and frameworks
- ▶ Reimplement frameworks and UIs that are closed source
- ▶ Uses dpkg and apt, build packages in Jenkins
- ▶ Simple repository on top of Devuan and Debian contains all packages
- ▶ Focus on core features of a mobile phone
- ▶ Aim for FOSS enthusiasts and hackers

Received funding from NLNet just a few months ago

Maemo Leste: Now?

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Alpha quality, at best.

- ▶ Runs now on Nokia N900, Motorola Droid 4, PinePhone
- ▶ Virtual machines work great for development
- ▶ Get all core components in place, then port extra applications
- ▶ Live demos/devices at the Pine64 stand in FOSDEM AW building
- ▶ No UI for calling - yet

Maemo Leste: Devices

https://leste.maemo.org/Category:Device

- ▶ Nokia N900
- ▶ Motorola Droid 4
- ▶ PinePhone, PineTab
- ▶ QEMU/Virtualbox/VMWare

Some have great potential battery life.

PowerVR support (not open) has improved significantly, see
https://github.com/openpvrsgx-devgroup

Concluding

Things are starting to look brighter, **but we can use YOUR help!**

▶ Various UIs and distributions available
▶ All of them need work in some way (some are further along)
▶ Expect phones/hardware to show up this year
▶ Don't be afraid to show up and ask questions (both end users and developers)

Resources

- IRC: irc.freenode.net #maemo-leste and #postmarketos
- `https://postmarketos.org`
  `https://gitlab.com/postmarketos`
- `https://leste.maemo.org`
  `https://maemo-leste.github.io`
  `https://github.com/maemo-leste`
- `https://pine64.org`
- Detailed OpenFest 2019 talk:
  `https://www.youtube.com/watch?v=heQmjP5tQn0`

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Questions?