Regaining control of your smartphone with postmarketOS and Maemo Leste

Merlijn Wajer, Bart Ribbers

February 2, 2020
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
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

... 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

[Link to PinePhone website](https://www.pine64.org/pinephone/)
February 2, 2020
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

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

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

https://mobile.nixos.org
postmarketOS

- Announced on 26th of May
- Started by Oliver Smith
- At the time, 2 devices supported
postmarketOS

- 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"
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"
► ... 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?
Maemo Leste: Now?

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
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

Questions?