



Towards a bright (mobile) future with Mobian?

Arnaud Ferraris

arnaud.ferraris@collabora.com

FOSDEM^{'24}

COLLABORA

Who am I?

- Senior Software Engineer @ Collabora
 - Mostly building and maintaining custom Linux distributions for embedded systems
- Long-time FLOSS enthusiast
- Debian Developer
- Mobian founder and lead developer

What is Mobian?

- A Debian derivative (or “Blend”) targeting mobile devices such as smartphones and tablets
 - Separate package repository and ready-to-use disk images for several devices
 - Very small overlay on top of Debian:
 - 25 source packages in **main** (35,000+ in Debian)
 - 13 packages (incl. 7 kernel packages) carrying non-upstreamable patches
 - 2 “workaround” packages awaiting a better upstream solution
 - 6 packages to be reworked for upload to Debian
- Can we go below 10 packages by next year?

Mobian “stable”, at last!

Mobian Bookworm in a nutshell

- Released on June 2023, alongside Debian Bookworm
- Supported devices
 - Linux-first: PinePhone (Pro), Librem 5
 - Android-based: OnePlus 6/6T, Pocophone F1
 - x86: desktop PCs, Microsoft Surface Pro/Go
- “Desktop” environments
 - Phosh
- Up-to-date 6.1 kernel
 - Automatic rebases on latest point release in CI (available into [bookworm-updates](#))

Things that didn't make it to Bookworm

- Universal images
 - Implemented and working well for SDM845-based devices (OnePlus 6, POCO F1...)
 - Unifying the kernel for PINE64 devices (A64 + RK3399) proved to be trickier than expected
- Improve hardware support upstream
 - Tow-Boot still doesn't support the Librem 5 nor the PineTab
 - Very few kernel patches upstreamed
- Switch to latest LTS kernel
 - Stuck on 6.1 forever (which actually means "2 years")

Recent developments

Unifying images, slowly

- Mobian images are 99% identical for devices sharing the same CPU architecture
 - Different kernels depending on the device SoC
 - Some devices require device-specific tweaks (PinePhone/PineTab & Librem 5)
- Several devices share a single kernel in Mobian
 - PinePhone & PineTab, PinePhone Pro & PineTab 2...
- Now building one image per kernel
 - **sunxi64** (Allwinner A64) → PinePhone & PineTab
 - **rockchip** (RK3399 & RK3566) → PinePhone Pro & PineTab 2
 - Already the case for **sdm845** & **sm7225**, but...

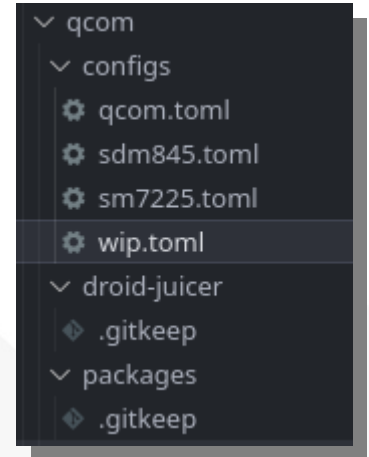
Unified images for Qualcomm-based devices

- 2 kernels until now:
 - SDM845
 - SM7225 (Fairphone 4)
- All patches imported into a single **qcom** kernel
 - Adding Fairphone 5 support in the process!
- Single image for all Qualcomm-based devices
 - Per-device configuration for generating boot images
 - Everything else handled at run-time through **droid-juicer** & **qcom-phone-utils**

```
[[device]]  
vendor = "fairphone"  
model = "fp4"  
chipset = "sm7225"  
append = "sdhci.debug_quirks=0x40"
```

Simpler new (Qualcomm-based) device support

- New **qcom-wip** device type in **mobian-recipes**
- Easy process for building images with packages not in Mobian/Debian
 - 1 Build downstream kernel using **make bindeb-pkg**
 - 2 Drop resulting **.deb** (and possibly others packages) into **packages/**
 - 3 *Optional: create **droid-juicer** config and copy to corresponding folder*
 - 4 Edit **wip.toml** with details of your device (chipset, vendor, model...)
 - 5 Build image using the provided build script:
./build.sh -t qcom-wip -i
 - 6 Flash using **fastboot**
 - 7 Celebrate?



Our FOSDEM present: Plasma Mobile images

- Effort started in 2022 Q4
- All required packages now in Debian
 - **plasma-mobile**
 - Main applications (phone, contacts & calendar, clock, calculator...)
 - **meta-plasma-mobile** metapackages similar to **meta-phosh**
- **meta-mobian** now includes metapackages for Plasma Mobile
- Plasma Mobile images available since January 28th
 - Built for all supported devices

What's next?

Rebooting per-device tweaks management

- Several devices need very specific “tweaks” (configuration, **udev** rules, scripts...)
- So far each device had its **<device>-tweaks** package
 - One new package for each new device we want to support
 - This doesn’t scale!
- Why not manage those at run-time?
 - Identify device we’re running on (e.g. using the device-tree **compatible** property)
 - Select and/or generate needed files for this device
 - Pack those into a Debian package and install
 - Trigger package re-creation on significant upgrades

Getting closer to “Pure Blend”

- Get all remaining Mobian-specific packages into Debian
 - Generic metapackages
 - Device support metapackages & per-device tweaks
- Next step once we have a solid run-time tweaks management
- Allows “pure” Debian on supported devices (and those Debian supports but not Mobian)
 - Not all hardware features will work
- Mobian (as a downstream project) will likely stay relevant for some time
 - Maintain patched kernel packages
 - Generate ready-to-use images for supported devices

Improving call audio management

- This actually got worse over the past year or so
- Consequence of the transition to PipeWire
 - **callaudioid** initially created in a PulseAudio world
 - No session manager for media devices/streams back then
 - PipeWire paired with WirePlumber as its default session manager
 - Handles profile switching & audio routing
 - **callaudioid** competes (and often loses) with WirePlumber
- Need to replace **callaudioid** with WirePlumber configurations & scripts
 - Requires modem-awareness in PipeWire and call status tracking
 - Hope to submit an initial implementation by the end of 2024

Misc improvements

- Better development & infrastructure documentation
 - Scarce and mostly high-level or user-centric
 - Lots of cryptic knowledge and special incantations needed
 - Very small bus factor (1 for some aspects of the project)
- Upstream device support
 - PinePhone Pro: several low-hanging fruits (audio, modem, notification LED...)
 - PineTab 2: currently being merged upstream
 - WiFi driver now working, maybe upstreamable?
 - PineTab V as our first supported RISC-V device?
 - Whichever device you can/wish to port to Mobian ;)

Links

- Website: <https://mobian.org>
- Downloads: <https://images.mobian.org>
- Community wiki: <https://wiki.debian.org/Mobian>
- Developers' wiki: <https://wiki.debian.org/Teams/Mobian>
- Matrix (bridged to IRC on OFTC)
 - General: [#mobian:matrix.org](https://matrix.org/#mobian:matrix.org)
 - Development: [#mobian-dev:matrix.org](https://matrix.org/#mobian-dev:matrix.org)
 - Porting: [#mobian-ports:matrix.org](https://matrix.org/#mobian-ports:matrix.org)

Q&A

Thank you!