Towards a bright (mobile) future with Mobian?

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FOSDEM'24
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`

```plaintext
[[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
  - `callaudiod` 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
    - `callaudiod` competes (and often loses) with WirePlumber
- Need to replace `callaudiod` 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
  - Development: #mobian-dev:matrix.org
  - Porting: #mobian-ports:matrix.org
Q&A
Thank you!