

# 2 Years of Mobian

## Birth and Growth of a Mobile Linux Distribution

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# Agenda

- A Brief History of Linux on Mobile
  - The rise of Linux-first phones
- Running Debian on the PinePhone
  - Can you hear me?
  - Achieving decent battery life
- Mobian development and maintenance
- Our plans for the future

# A Word About Myself

- Embedded Software Engineer @ Collabora
  - Create and maintain Debian-based distros for embedded devices (Apertis)
- Long-time FLOSS enthusiast and Debian user
- Created Mobian 2 years ago and eventually became a Debian Maintainer



## Mobile OS Market

- Effectively an iOS/Android duopoly
- Very few alternate choices, especially FLOSS alternatives
- Concerns about privacy and long-term support

# Previous attempts at Linux phones

- Palm Pre: WebOS
- Nokia N900: Maemo (Debian-based)
- Jolla Phone: SailfishOS
- Ubuntu Touch: eventually gave up
- Tizen: quickly abandoned on phones

# Something happened...



# Something happened...

- 2017: Purism announces the Librem 5
  - Linux-first device
  - General-purpose SoC (NXP i.MX series)
    - WIP but decent mainline kernel support
- Community-friendly development

# Something else happened...





# Something else happened...

- 2019: PINE64 announces the PinePhone
  - Linux-first device
  - General-purpose SoC (Allwinner A64)
    - Good mainline kernel support
- Community-driven development

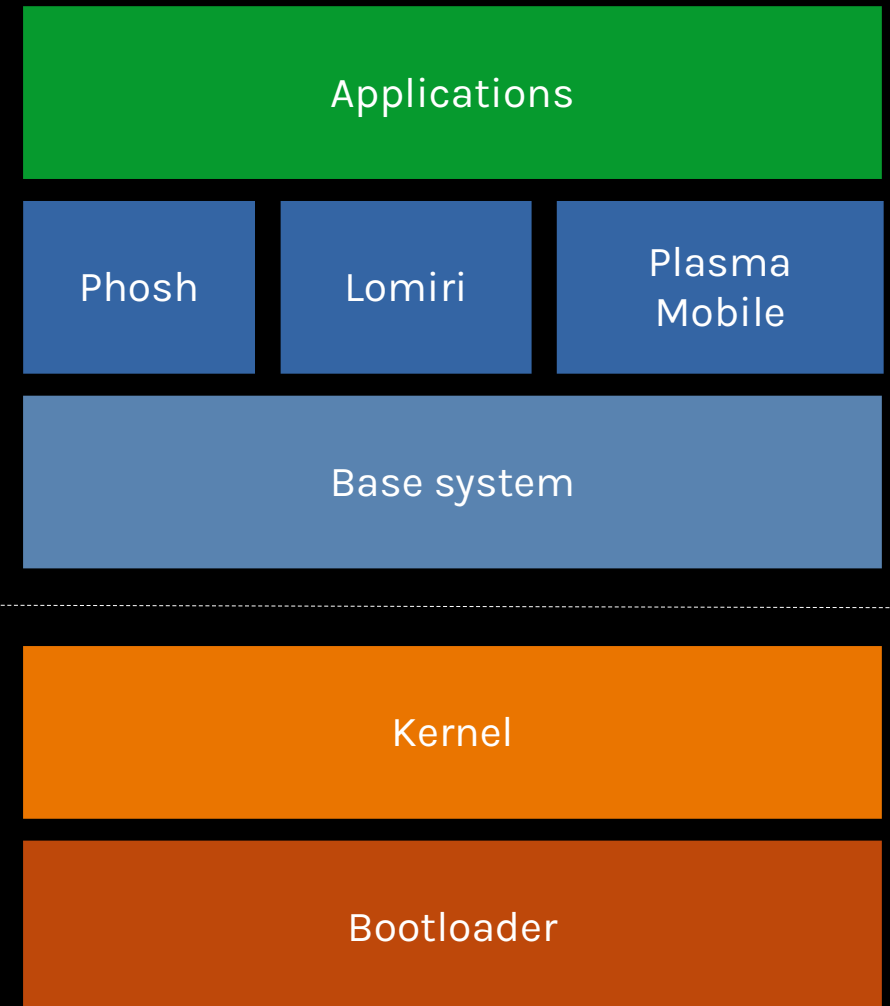


## Debian on a phone?

- PinePhone arrived a few days before FOSDEM'20
- Several distros available, but no “real” Debian
- Librem 5 runs PureOS, a Debian derivative
- How hard can it be?

# First steps

- Bootloader (`u-boot`) and kernel by the PINE64 community
- Basic Debian userspace (“rootfs”)
  - Generated using `debos`
- Booting was “easy”



# Running Phosh on Debian

- PureOS is Debian-based, let's use their packages!
  - Based on *buster*: major dependency issues
- Cross-compile everything for *bullseye*
- Manual process, long and tedious
  - It *did* work!

# Distributing the images

- Setup a repository on personal web server
- Built images locally then uploaded manually
- Awesome reception from the community
- Let's keep working on this :)



- Audio routing for calls
- Improve the battery life
- Package mobile-friendly applications

# Can You Hear Me?

- 2 use cases (profiles) for audio routing
  - “Normal” use: speaker, system audio
  - Phone calls: earpiece, modem audio
- Automate switching between use cases
- Headset/headphones detection

# `ugly_hacks (self);`

- No way to route calls using only existing PulseAudio modules
- Purism had `wys` for the Librem 5: we tore it apart and adapted it to our needs
- “Calls” app hardcoded `system()` calls to PulseAudio CLI tools
- A better solution was needed!



# callaudiod

- Handles all audio routing changes:
  - Automatic headset detection and switching
  - Selection of profile and/or appropriate output port
- Simple D-Bus interface
  - Use case selection
  - Speaker activation
  - Microphone muting
- Default for the Phosh ecosystem

# Battery life improvements

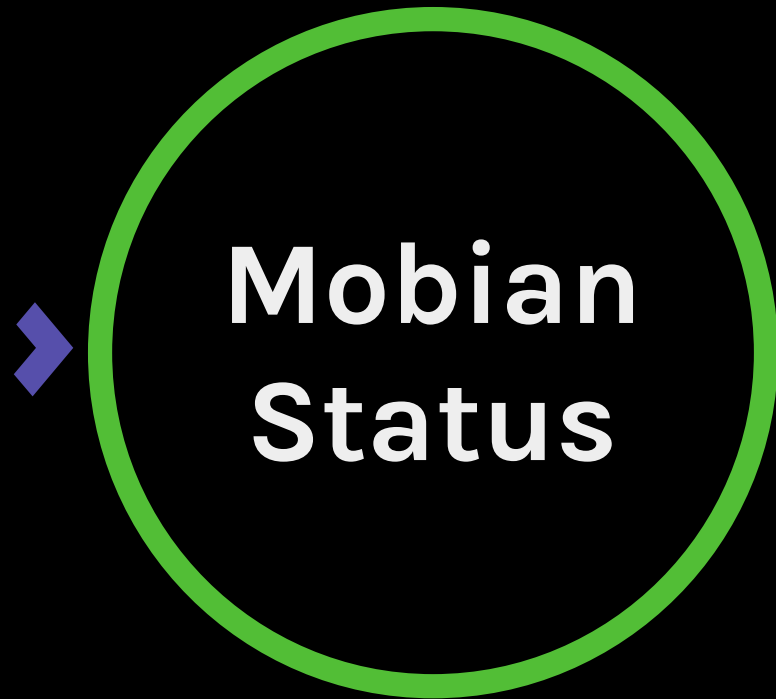
- A64 not really power-efficient
- Modem includes its own SoC running a full Linux system
- Need to suspend the system as frequently as possible to save battery
- `crust` allows low energy consumption in suspend mode while still processing interrupts

# Suspend issues on the PinePhone

- Modem not always recognized when resuming from suspend
- Would need to reset the USB link
- `eg25-manager` mitigates those issues + modem power-on and configuration
- Widely adopted on the PinePhone (Pro)

# Packaging mobile-friendly software

- DebianOnMobile team
  - Phosh packages, ModemManager, callaudiod, osk-sdl...
- Packages go directly into Debian whenever possible
- Mobian only holds specific packages (~60)
  - Non-upstreamable patches
  - Packages not accepted in Debian (testing) yet
  - Mobian-specific hacks or hardware-specific patches



- Infrastructure
- Supported devices

# Infrastructure

- Originally quick'n'dirty repo on personal server
- Started with shell scripts/hacks + cron jobs
- Mobian Community Edition PinePhone
  - Allowed to grow as a community
  - Substantial donation from PINE64
- ARM64 build server (SolidRun HoneyComb LX2K)

# Having Fun With CI

- Distribute builds
  - x86-64 main server (repo, web, build amd64 packages)
  - ARM64 build server for arm\* architectures
  - Use Gitlab CI and configure servers as runners
- Automatic publishing on tags
- Generate docker images for development/CI use
- Image build process also moved to Gitlab CI

# Supported devices

- Current Linux-first phones are well supported
- x86 PCs and tablets (such as Surface Pro/Go) should work mostly seamlessly
- Some Android devices work as well (SDM845)
  - OnePlus 6/6T
  - Pocophone F1





## What's Next?

- Make Debian Great for Mobile devices!
- Support more devices
- How to help?

# Improve Debian for mobile devices

- Import packages into Debian + contribute to existing ones
- Rework Mobian tweaks for Debian acceptability
- Bookworm freeze in 1 year
  - Need to reduce the Mobian vs. Debian delta
  - 1<sup>st</sup> fully mobile-compatible Debian release?

# Supporting more devices

- Improvements to build system will make it easier to port to more devices
- “Core” Mobian team priorities:
  - Mainline-based only (no vendor kernel)
  - Linux-first devices
  - Vendors with shared ethics (Fairphone, SHIFT...)
- Contributions welcome for supporting any device!

# Contributing to Mobian

- Device support maintenance
  - Kernel/bootloader monitoring and update
- Baseline maintenance
  - Package new software
  - Update packages already in the Mobian archive
- QA/testing: weekly images builds, but no regression testing due to lack of manpower

# Communication channels

- Chat:
  - #mobian:matrix.org
  - #mobian on OFTC (bridged to Matrix channel)
- Social media:
  - @MobianLinux on Twitter
  - @mobian@fosstodon.org on Mastodon
- Development:
  - <https://gitlab.com/mobian1>
  - <https://salsa.debian.org/DebianOnMobile-team>
- Website: <https://www.mobian-project.org>

# Thank you

```
Message {
  config {
    priority: "high"
    body: "Collabora is hiring" // Many open positions
    recipient: "you" // Please join us
    calltoaction: "http://col.la/join"
  }
}
```