

# The year of Linux on Desktop^WMobile

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- goes by devrtz
- Daily driving "Linux first" phones since early 2020
- Debian Maintainer
- contributor to phosh / GNOME ecosystem
- Working with Purism on the Librem 5 phone

- Only free software
- Based on (close to) mainline Linux
- Reuse existing userspace components
- Run traditional distributions
- Upstream first mentality

## User control

- Software freedom
- Software (security) support
- Know where your data goes
- Smartphones **are** general purpose computers

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It's fun!



```
mobian@i5: ~  
> $ cowsay moin, moin Fr0SCon!  
  
< moin, moin Fr0SCon! >  
-----  
      \   ^__^  
       (oo)\_____  
        (____)\  )\/\  
             ||----w |  
             ||     ||  
  
mobian@i5 ~ [19:42:49]  
> $
```

# My phone runs arch btw



You could be this guy

# Good old days

N900



(C) 2010 Ianaré Sév CC-BY-SA 3.0

FreeRunner



(C) wiki something

# What kind of phones?

- Since 2019 we have Librem 5 and PinePhone





# What kind of phones?

- Since 2019 we have Librem 5 and PinePhone
- PinePhone Pro
- SDM845: OnePlus 6/6T, Pocophone F1, SHIFT 6mq...



# Phones, lots of phones



<https://postmarketos.org/blog/2023/06/07/v23.06-release/>

# Hardware support

Phones		Device	Codename	Architecture	USB Net	Flashing	Touch	Screen	WiFi	FDE	Battery	3D	IMU	Audio	Bluetooth	Camera	GPS	Mobile Data	SMS	Calls	USB-OTG	NFC	
	BQ Aquaris X5	bq-paella	aarch64	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	-
	Fairphone 4	fairphone-fp4	aarch64	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N
	Lenovo A6000	lenovo-a6000	aarch64	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y			-
	Lenovo A6010	lenovo-a6010	aarch64	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	Y			Y	Y	Y	Y	P	-
	Motorola Moto G4 Play	motorola-harpia	aarch64	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	P	
	Nokia N900	nokia-n900	armv7	Y	-	Y	Y	Y	Y	Y	Y	N	Y	Y	N	P	P	Y	Y	Y	P	-	-
	OnePlus 6	oneplus-enchiada	aarch64	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	P	Y	Y	Y	Y	P	N
	OnePlus 6T	oneplus-fajita	aarch64	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	P	Y	Y	Y	Y	P	N
	PINE64 PinePhone Pro	pine64-pinephonepro	aarch64	Y	-	Y	Y	Y	Y	P	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	-
	Samsung Galaxy A3 (2015)	samsung-a3	aarch64	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	P	Y
	Samsung Galaxy A5	samsung-a5	aarch64	Y	Y	Y	P	Y	Y	P	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	P	Y
	Samsung Galaxy E7	samsung-e7	armv7 / aarch64	Y	Y	Y	P	Y	Y	P	Y	P	Y	Y	Y	N		Y	Y	Y	Y	P	Y
	Samsung Galaxy Grand Max	samsung-grandmax	armv7 / aarch64	Y	Y	Y	Y	Y	Y	Y	P	Y	P	Y	Y	N		Y	Y	Y	Y	P	-
	Samsung Galaxy S III	samsung-m0	armv7	P	Y	Y	Y	Y	Y	Y	Y	N	P	P	P		N	N	N	N	N		
	Samsung Galaxy S4 Mini Value Edition	samsung-serranove	armv7	Y	Y	Y	P	Y	Y	Y	P	Y	Y	Y	Y		Y	Y	Y	Y	Y	P	Y
	SHIFT SHIF76mq	shift-axoloti	aarch64	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	N	N
	Wileyfox Swift	wileyfox-crackling	aarch64	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	P	-
	Xiaomi Mi Note 2	xiaomi-scorpia	aarch64	Y	Y	Y	Y	Y	P	P	Y	N	P	Y		P	N	Y	P	N	Y	Y	Y
	Xiaomi Pocophone F1 / POCO F1	xiaomi-beryllium	aarch64	Y	Y	Y	Y	Y	Y	P	Y	N	Y	Y	Y	N	P	Y	Y	Y	Y	N	-
	Xiaomi Redmi 2	xiaomi-wt88047	aarch64	Y	Y	Y	P	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	-

<https://wiki.postmarketos.org/wiki/Devices>

# How hard can it be?

Sounds simple? Heaps of work, e.g. to light up the screen:

- LCD panel driver
- Display controller, DSI bridge and PHY
- LCD (backlight) driver plus regulators
- GPU drivers and mesa support

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and all of these need power management

# Mainlining efforts

<https://source.puri.sm/Librem5/linux.git>

L5	Files changed	Insertions	Deletions
5.12.2	170	+48519	1339
5.16.7	148	+37030	1477
6.4.5	172	+41461	1691

<https://gitlab.com/sdm845-mainline/linux.git>

SDM845	Files changed	Insertions	Deletions
5.16.12	75	+18161	278
6.1.3	114	+50135	175
6.4.0	132	+50010	269





# Alternatives: Android

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- Pro: Broad device support

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- Con: Binary blobs (drivers, middleware) don't go away
- Con: Reliance on Google

<b>Kernel</b>	<a href="#">OnePlus 6 downstream</a>
<b>Branch/Tag</b>	lineage-18.1
<b>Branched from</b>	v4.9.227
<b>Total changes</b>	+5,655,241 -29,256

<https://mainline.space/> <https://not.mainline.space/>

# Alternatives: halium and libhybris

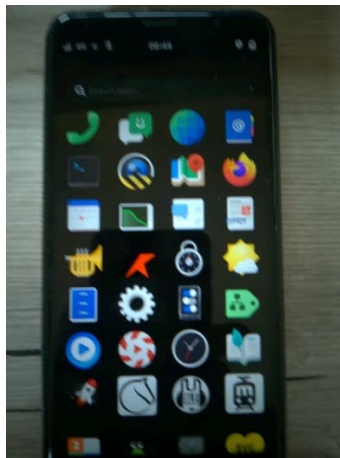
- Hardware abstraction layer
- Android Linux kernel
- Uses android services to talk to the hardware
- libhybris: bionic → glibc/musl compatability layer

# "Desktop" environments

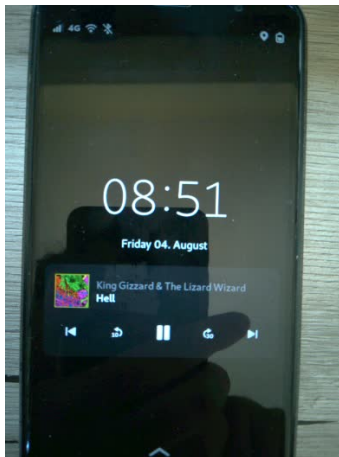
- Phosh
- GNOME (mobile) shell
- Plasma Mobile
- Lomiri
- Nemo
- Sxmo

# phosh (=PHone SHell)

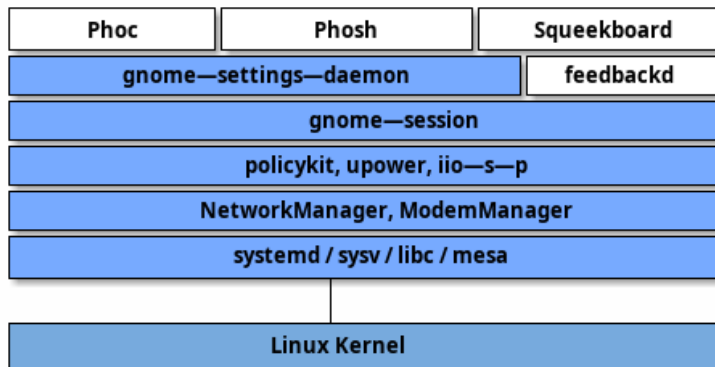
- mobile friendly graphical shell
- touch input
- wayland
- written with GTK
- heavily uses GNOME components



# Lockscreen

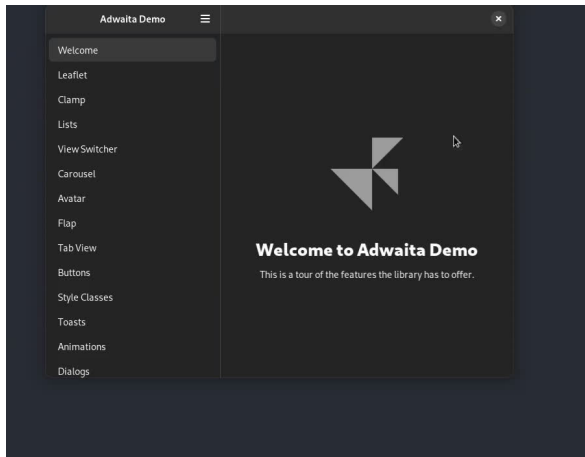


# Standing on the shoulders of a giant GNOME





# Adaptive application toolkit



# Daily driver?

- It depends. . .

# Essential: yes

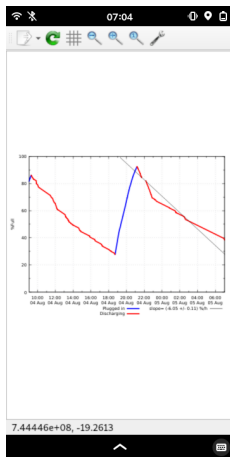
- Phone calls (VoLTE)
- SMS, MMS
- Internet browsing
- Email

# Instant messaging

- XMPP
- Matrix
- Signal
- Telegram
- Whatsapp ?!

# Battery life

- No suspend completely idle: ~10h
- With suspend completely idle: ~22h
- Real life usage example:
- Powerbank
- No runtime management



Yesterday's travels

- 12 MP rear camera, 8 MP front
- Focus, Exposure and white balance now automatic
- Video recording also possible
- EXIF metadata missing (GPS, rotation)
- libcamera + pipewire !
- #ShotOnLibrem5 #ShotOnPinePhone #ShotOnPinePhonePro

- GPS fix using AGPS swift ( $<1\text{min}$ )
- gnome-maps (currently) not so great for turn by turn
- PureMaps (Qt) works great
- OrganicMaps
- osmin



- Music players
- Video players
- Social media (Fediverse)
- View conference schedules
- 2FA
- Podcast
- RSS
- passes
- mumble
- SIP
- syncting

# Even more stuff

- Online banking ?
- waydroid ?
- sharing connections over USB

- attach a monitor and off you go
- give presentations

# Let me give you the tour

DEMO TIME

- Mobian, PureOS (Debian based)
- postmarketOS (alpine based)
- Fedora
- DanctNix, kupfer, Manjaro (Arch based)
- Nemo Mobile
- Ubuntu Touch
- NixOS
- Gentoo

- No need to download 10GB SDKs No developer accounts needed
- Use existing/familiar tools and frameworks (GTK, Qt)
- No hardware needed

# Running nested

`https://phosh.mobi/posts/phosh-dev-part-0/`

- runtime management background apps
- push notifications
- wake-up on IP connections
- more applications
- "share to" functionality
- monetization in app store



- Write applications which adapt to mobile form factors
- Package mobile friendly applications
- Help mainlining devices
- Buy linux first hardware

`#fossmo-wg:matrix.org`

Where do we go from here? - craftyguy

Thanks!



<https://richarddeescifi.co.uk/the-perfect-ending/fin/>

- Email: [devrtz@fortysixandtwo.eu](mailto:devrtz@fortysixandtwo.eu)
- Matrix: [@devrtz:fortysixandtwo.eu](matrix://devrtz:fortysixandtwo.eu)
- Fediverse: [@devrtz@fosstodon.org](mailto:@devrtz@fosstodon.org)
- Eventphone: 6273

- Free Software Policy with Semi-Firm Firmware
- Where do we go from here? - craftyguy
- Is there hope for Linux on smartphone
- Regaining control of your smartphone with postmarketOS and Maemo Leste
- The current state of Debian on a Smartphone

- <https://phosh.mobi>
- <https://linmob.net/>
- <https://linuxphoneapps.org/>

- <https://puri.sm>
- <https://pine64.com>

- <https://mobian.org>
- <https://postmarketos.org>
- <https://pureos.net>