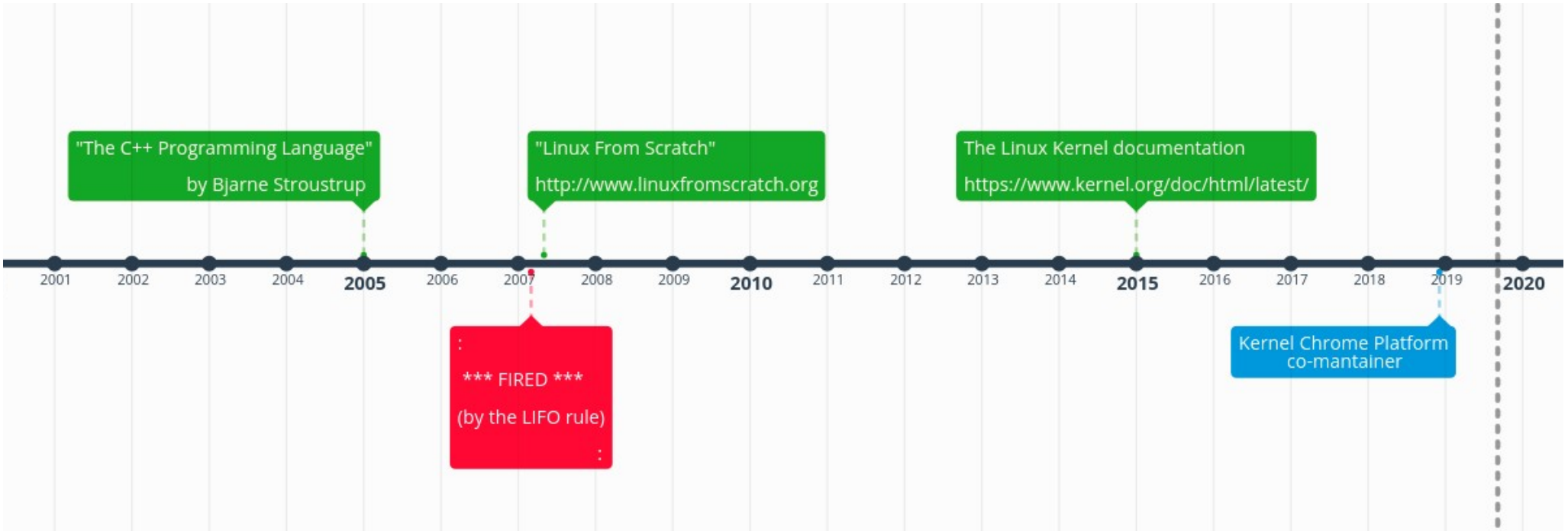
Driving the industry *toward upstream first*

Enric Balletbo i Serra, Collabora Ltd.

About me


"The C++ Programming Language"
by Bjarne Stroustrup
"Linux From Scratch"
http://www.linuxfromscratch.org
The Linux Kernel documentation
https://www.kernel.org/doc/html/latest/
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(by the LIFO rule)
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Kernel Chrome Platform
co-mantainer

Photo by Artem Beliaikin from Pexels

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Agenda

Upstream is challenging

Chrome OS

Mainline on Chromebooks

Working upstream is challenging . . .

- Time and commitment
- Many stakeholders
- Discussions

. . . but has multiple benefits

- Quality impact
- Less maintenance
- Less regressions

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Agenda

Upstream is challenging

Chrome OS

Mainline on Chromebooks

Chrome OS

- Security is important
- Chrome OS devices auto-update every ~6 weeks
- Devices are supported for ~6 years
- Lots of different devices in the field

Impossible to maintain a kernel for every device

Chrome OS kernel

- Pick LTS kernel every year
  - All devices that year use that kernel
  - 6–7 branches but not 50
- Switch to a newer kernel version at least once during device lifetime

Doug Anderson, Chrome OS developer at ELC NA 2019

”~10 years ago there was much angst about Android doing all private development”

”**Chrome OS** tries to **not** replicate that”

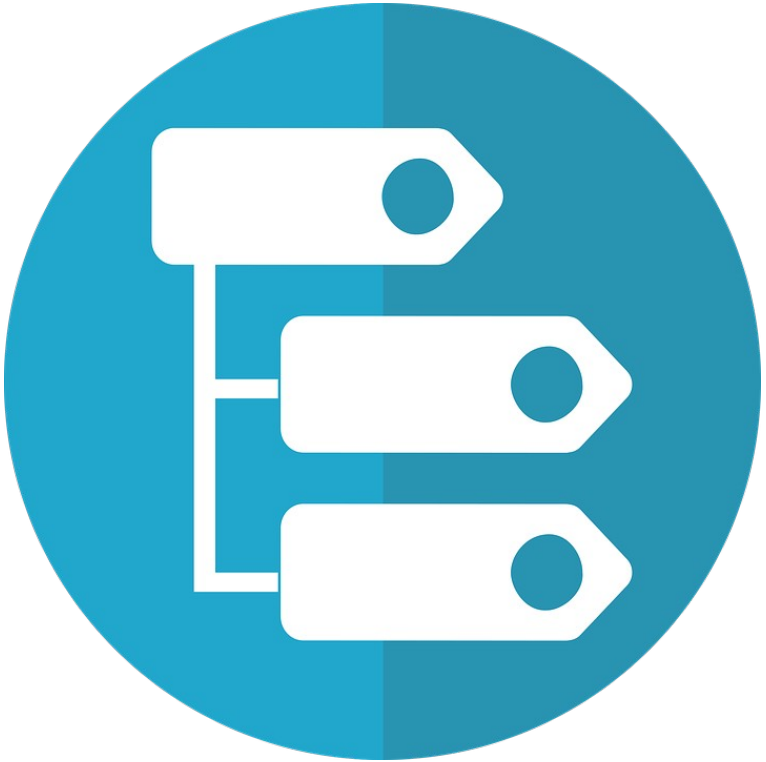
Upstream First

Chrome OS kernel tags

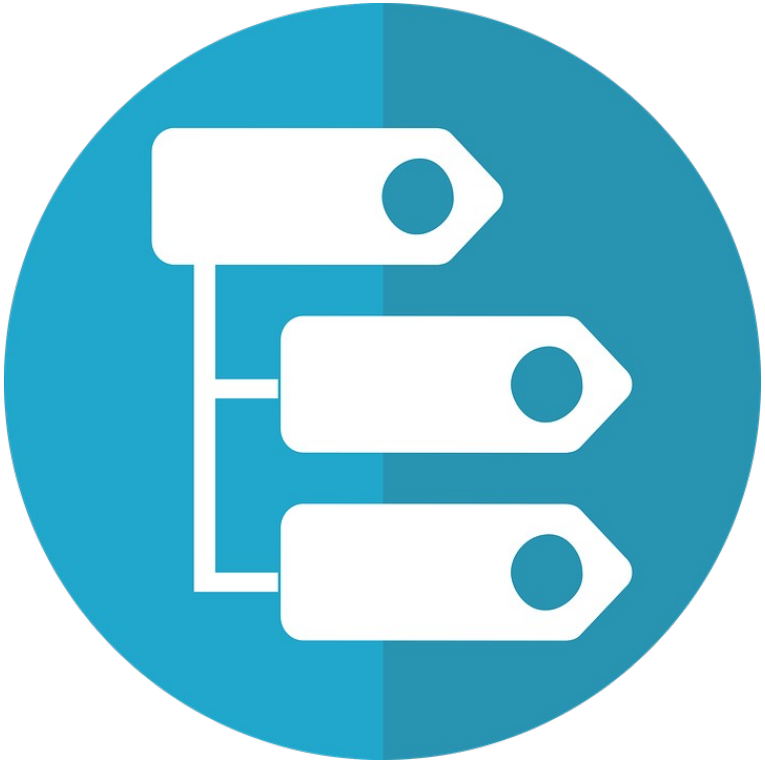
[UPSTREAM]

[FROMGIT]

[FROMLIST]



Chrome OS kernel tags



[BACKPORT]

[FIXUP]

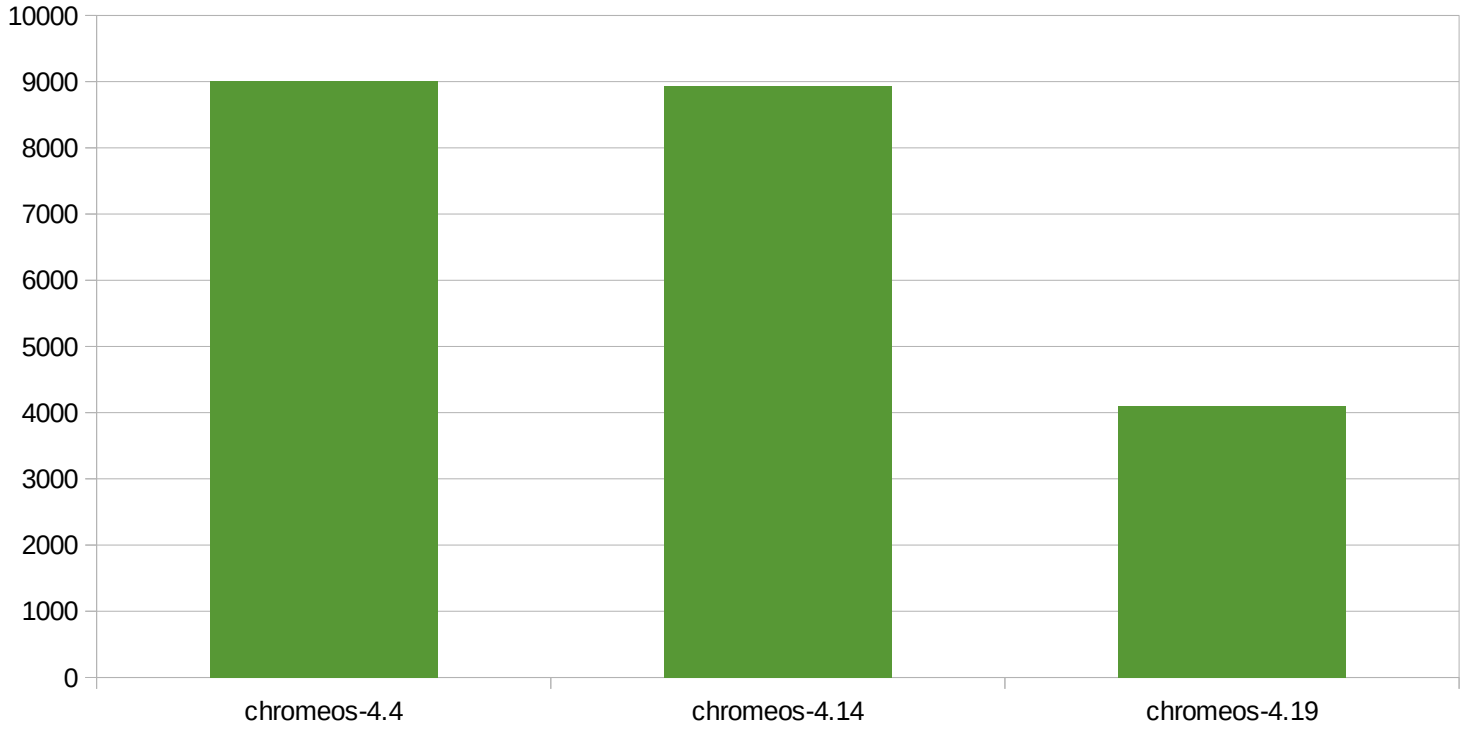
[CHROMIUM]

Why upstream is good for Chrome OS

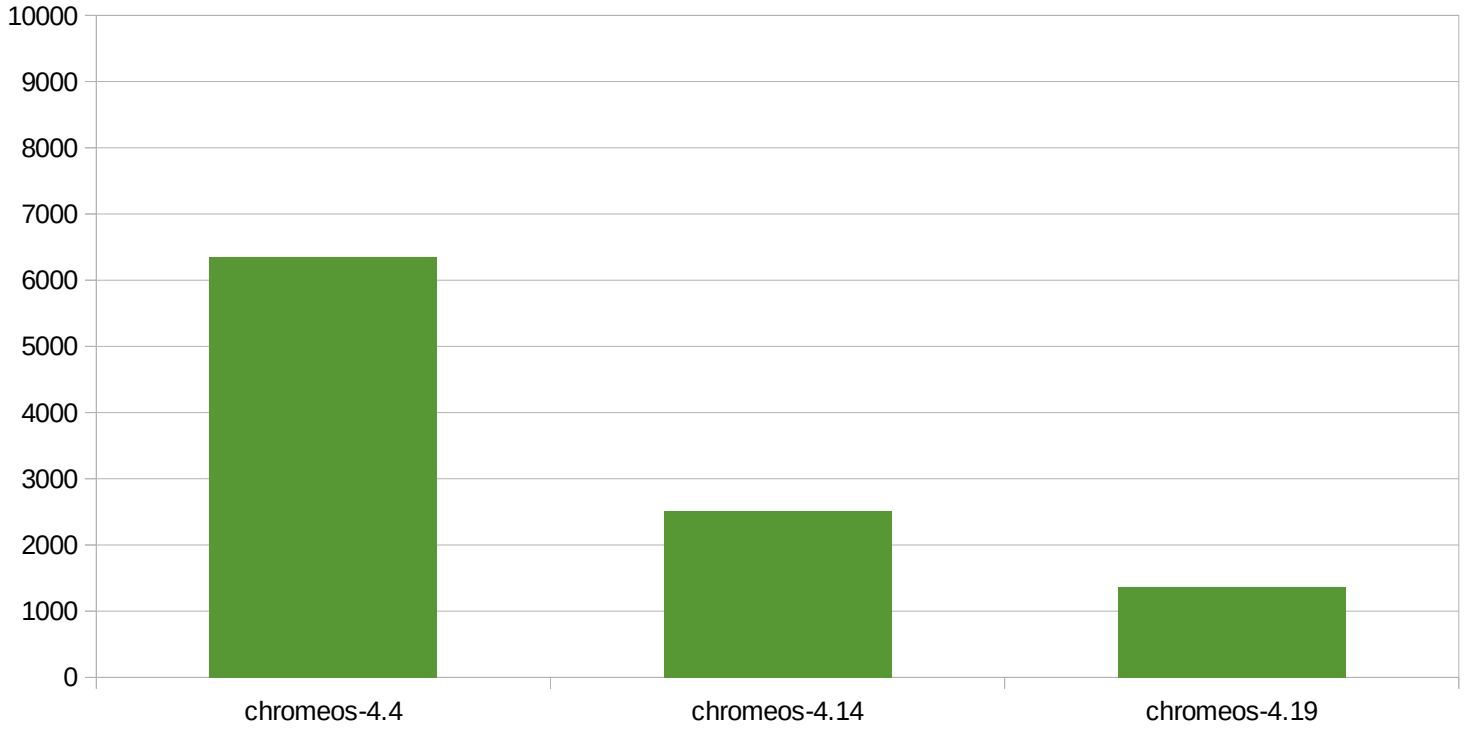
- “Free” code reviews
- “Free” bugfixes

- Makes “uprevs” possible
- Makes the system more solid
- Starting the next project is easier

Chrome OS - UPSTREAM commits



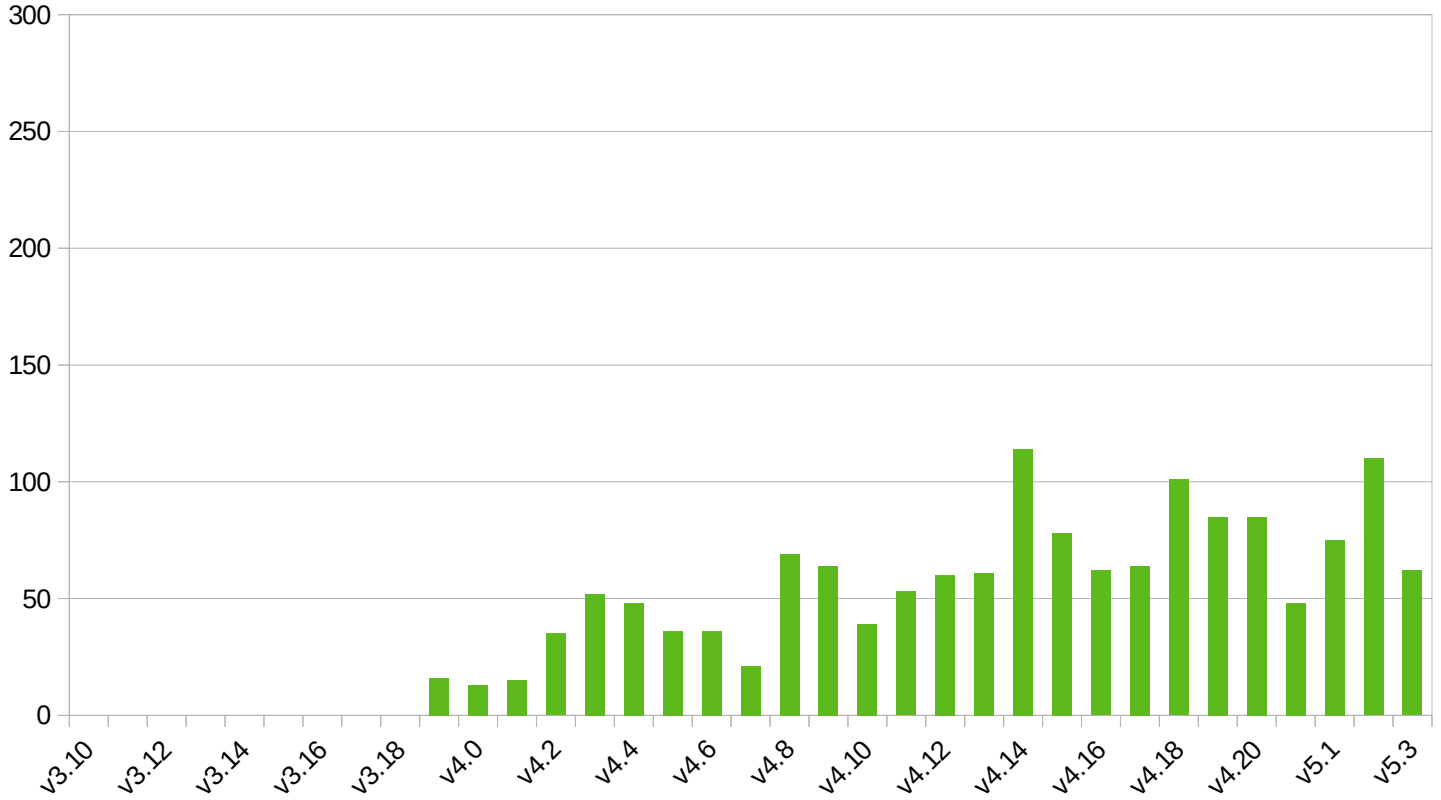
Chrome OS – CHROMIUM commits



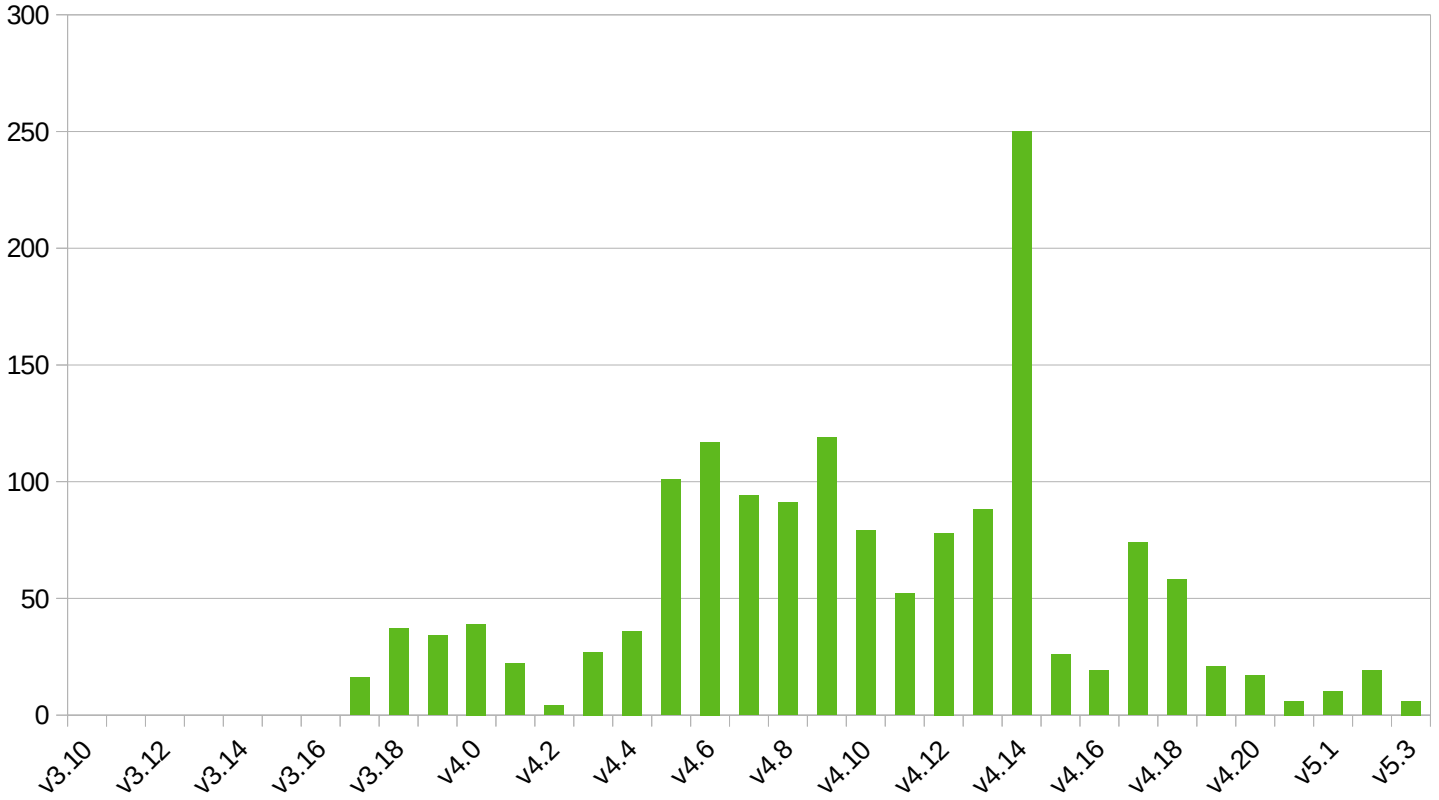
Why Chrome OS is good for upstream

- Provides review bandwidth upstream
- Merges upstream patches and thus provides extra testing
- Requires HW vendors to work with upstream

Contributions by vendor: Mediatek



Contributions by vendor: Rockchip



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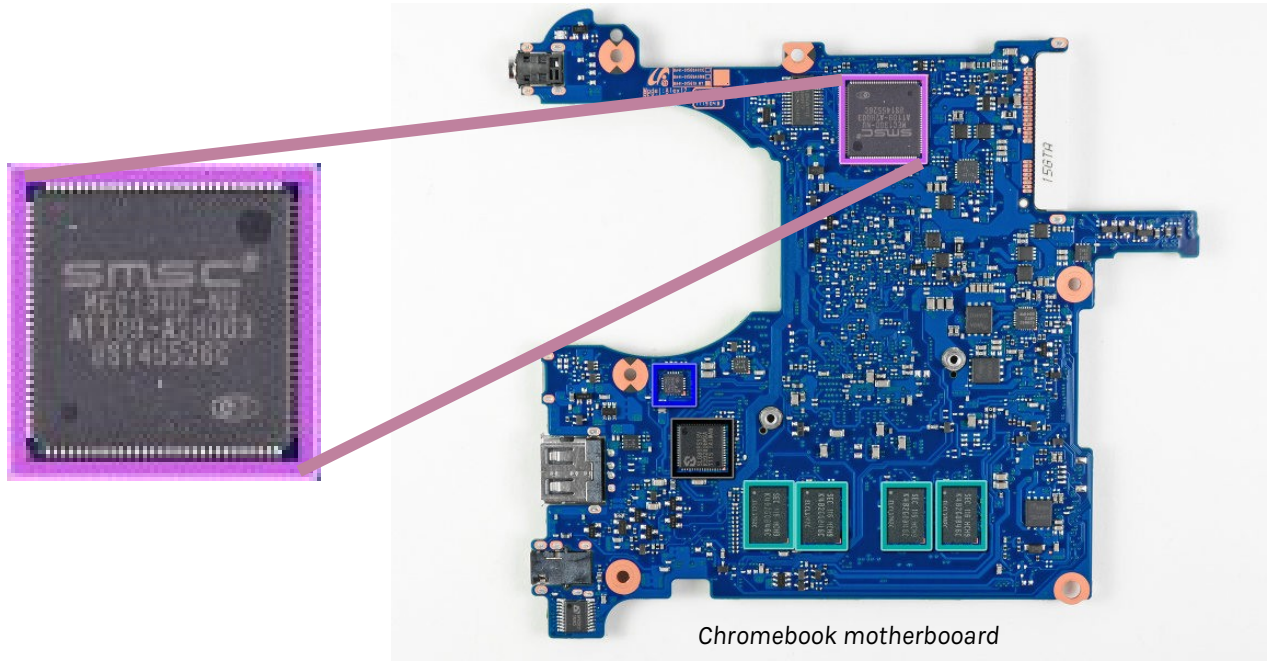
Upstream is challenging

Chrome OS

Mainline on Chromebooks

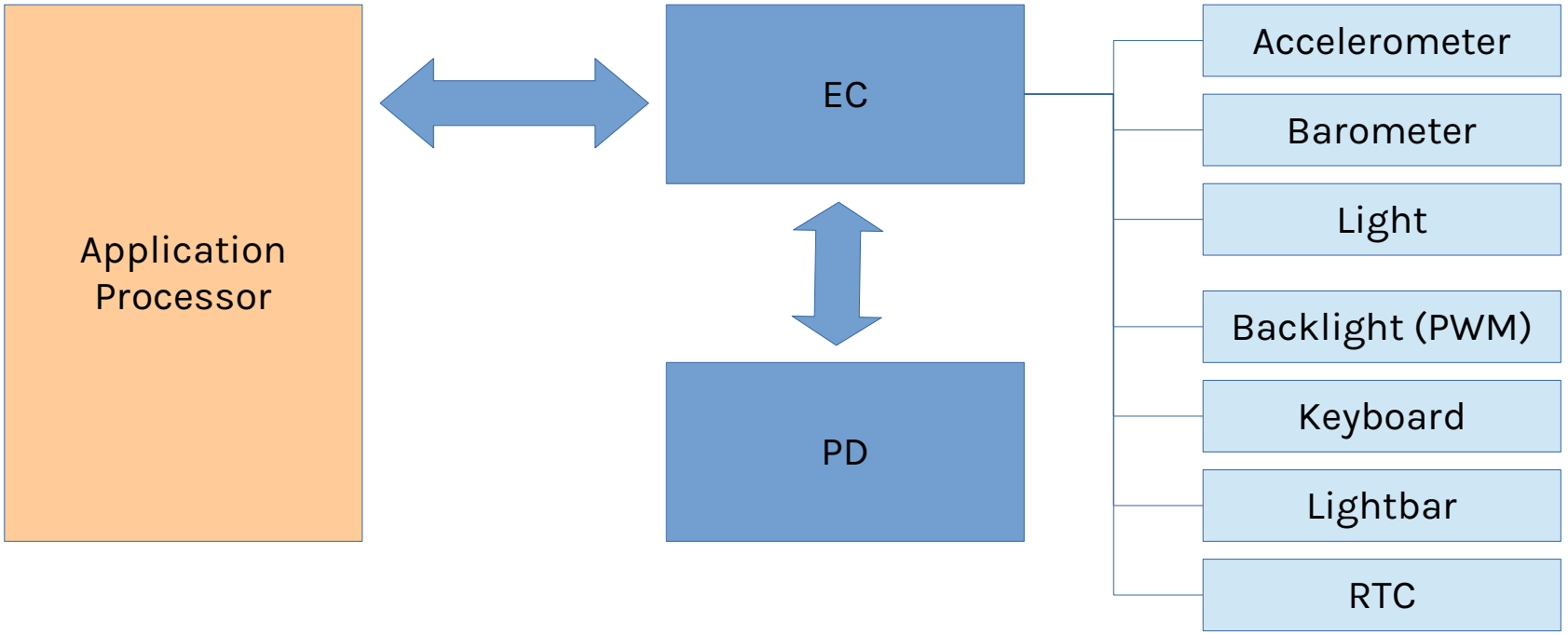
Chrome OS Embedded Controller

What's the CrOS EC?



Chromebook motherbooard

Chrome OS Embedded Controller



The CrOS EC upstream effort

- **The upstream process consisted on:**
  - Squash downstream patches
  - Split properly between subsystems
  - Test the patches with a specific device
  - Submit the patch to the subsystem ML

The CrOS EC upstream effort

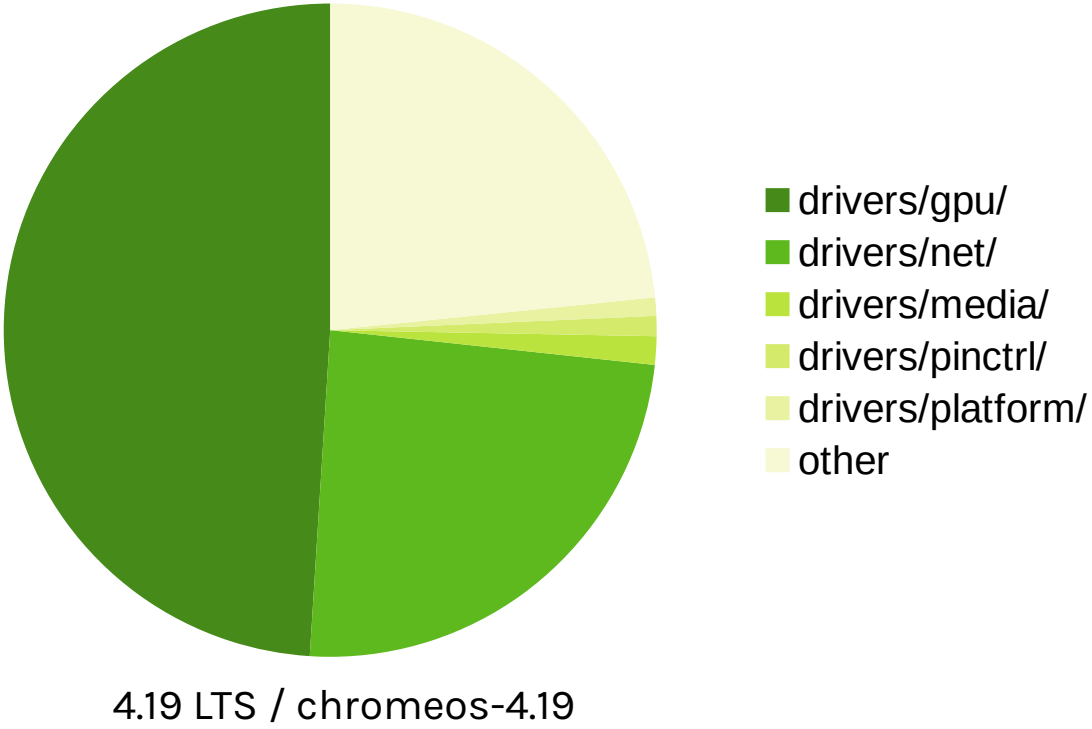
- **The problems:**
  - Driver rework
  - The abuse of the MFD API subsystem
  - Test on a specific device

The CrOS EC upstream effort

- Most CrOS EC drivers are now upstream
- New related drivers will go through the upstream first path
- Some patches needs some rework

What's still missing in mainline?

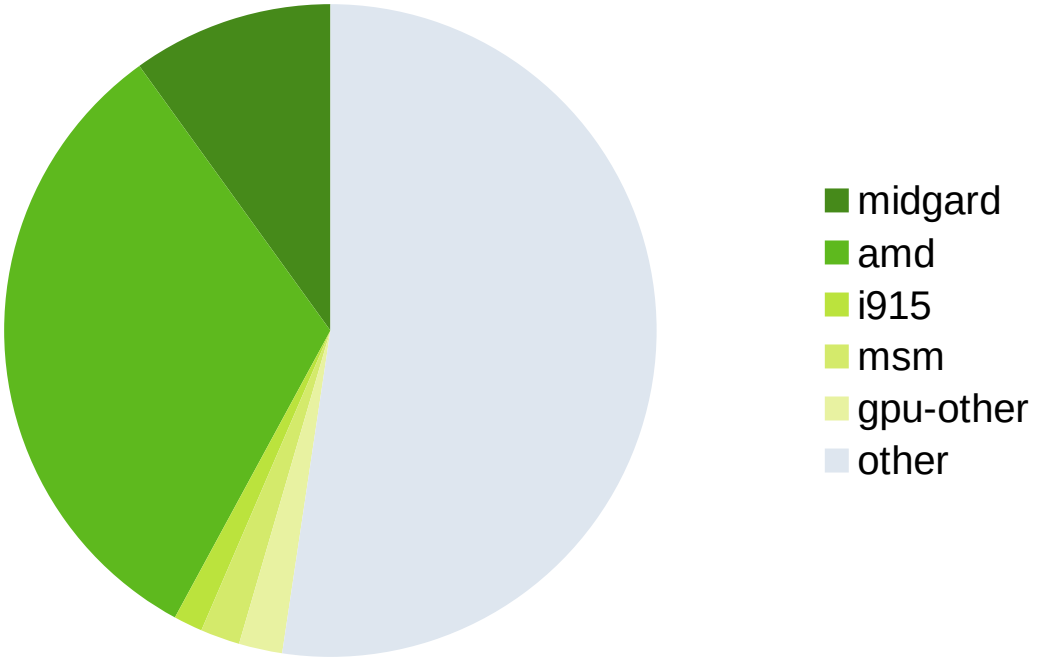
drivers/	
gpu	49.00 %
net	24.30 %
media	1.40 %
pinctrl	1.00 %
platform	0.90 %
other	23.40 %



4.19 LTS / chromeos-4.19

What’s missing in drivers/gpu?

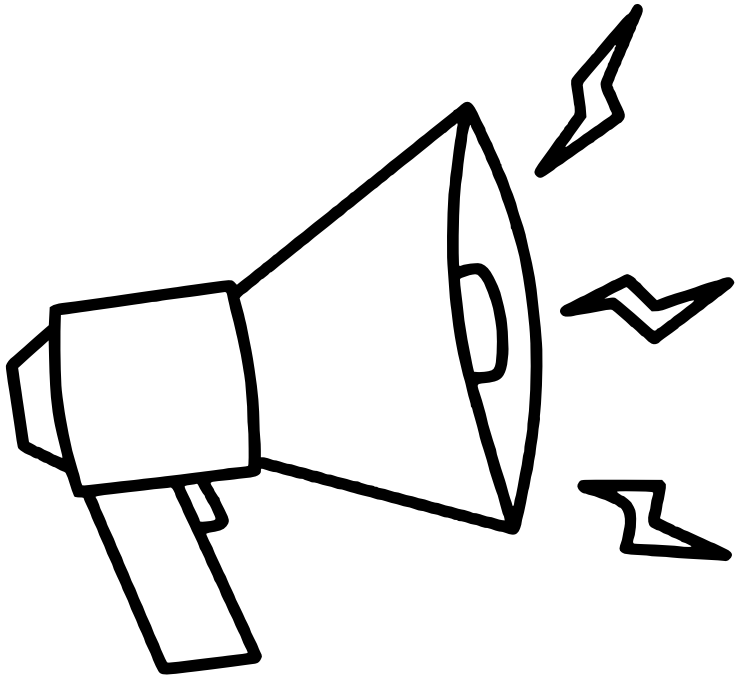
drivers/gpu	
midgard	9.70 %
amd	31.30 %
i915	1.40 %
msm	1.90 %
gpu-other	2.10 %



The Open-source GPU drivers effort

- ~10% of the differences are unlikely to be upstreamed
- There were no good open-source alternative

The Open-source GPU drivers effort



- We have now Panfrost
- Can Chromebooks use Panfrost?

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Demo

Samsung Chromebook Plus

Samsung Chromebook Plus

Component		Status	Kernel version
CPU	ARMv8 Cortex-A72	Works	5.3
GPU	Mali-T860MP4	Works	5.3
Display	11.6" @ 1366x768	Works	5.3
WiFi	Broadcom	Works	5.3
Bluetooth		Works	5.3
Touchpad	Elan I2C	Works	5.3
Touscreen		Works	5.3
Camera	HD UVC WebCam	Works	5.3
Type-C	USB 3.0	Works	5.3
	USB 2.0	Works	5.3
BUTTONS	POWER	Works	5.3
	VOLUME	Works	5.3
Embedded Controller	Google CrOS EC	Works	5.3
Audio	Speaker	Works	5.3
	Headphone	FAIL	5.3
	Internal MIC	FAIL	5.3
	Headset MIC	FAIL	5.3
	Headset BTN_0	Works	5.3
	Headset VOLUME	Works	5.3
Suspend / Resume		Works	5.3

Thank you!

We're hiring!

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