

Linux Kernel Development

Greg Kroah-Hartman
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github.com/gregkh/kernel-development

62,800 files
25,560,000 lines

4,466 developers
≈530 companies

Kernel releases 4.11.0 – 4.16.0
April 2016 – April 2017

9,500 lines added
2,700 lines removed
2,000 lines modified

9,500 lines added

2,700 lines removed

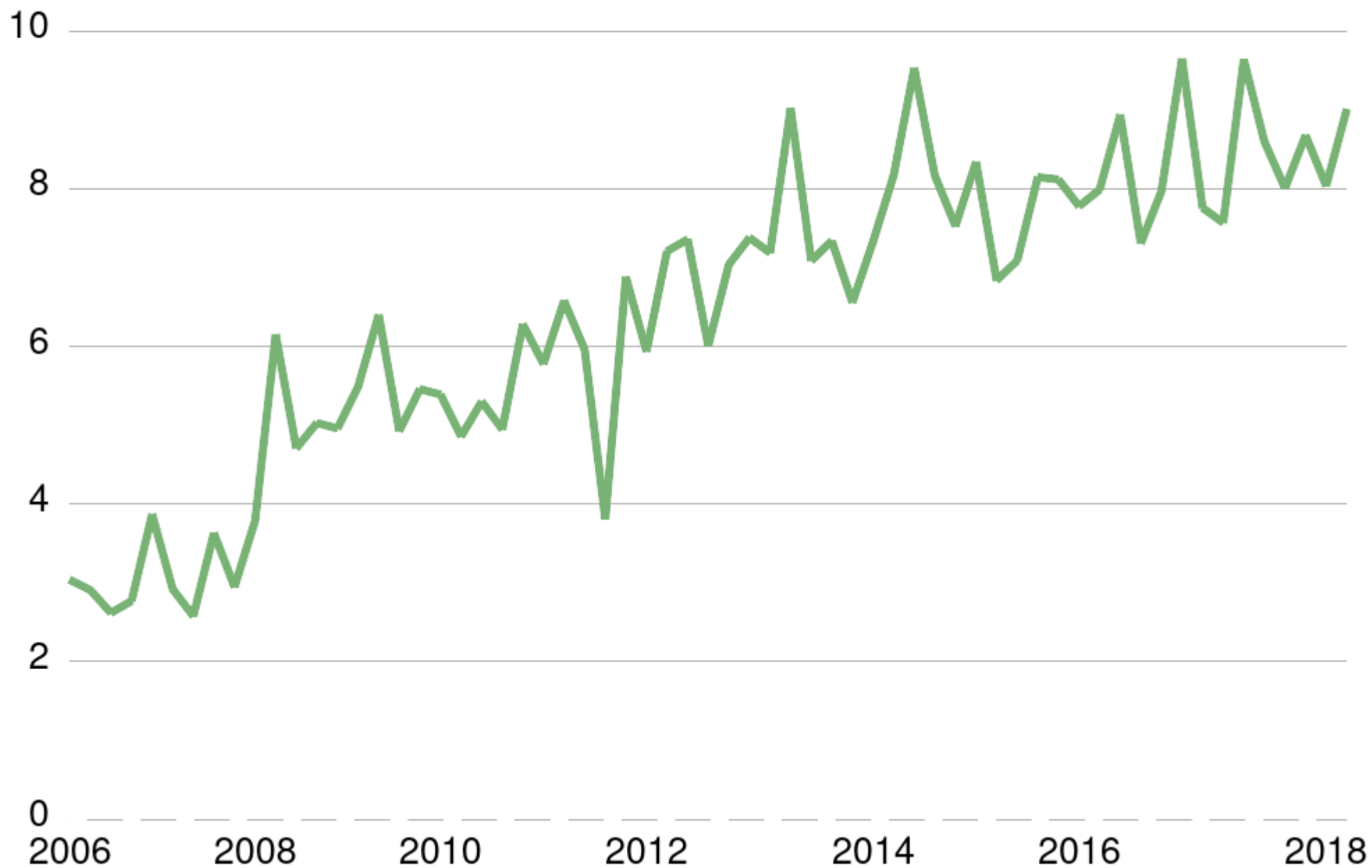
2,000 lines modified

Every day

8.5 changes per hour

Kernel releases 4.11.0 – 4.16.0
April 2016 – April 2017

Patches merged per hour



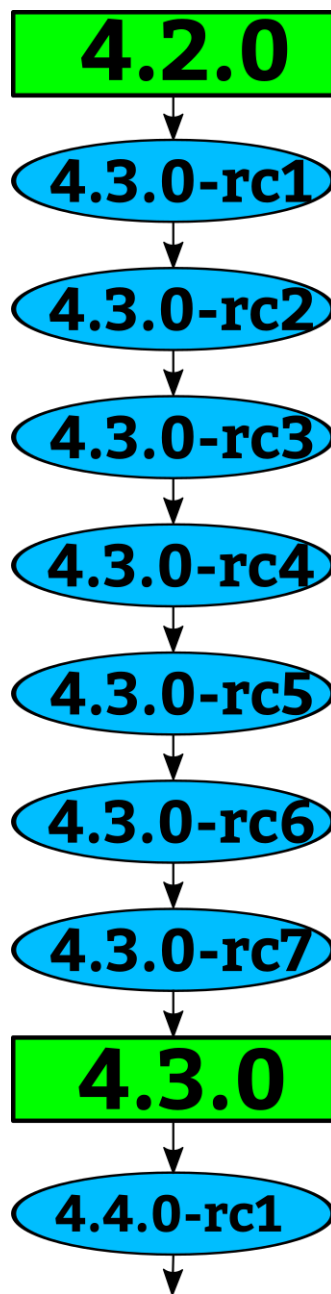
How we stay sane

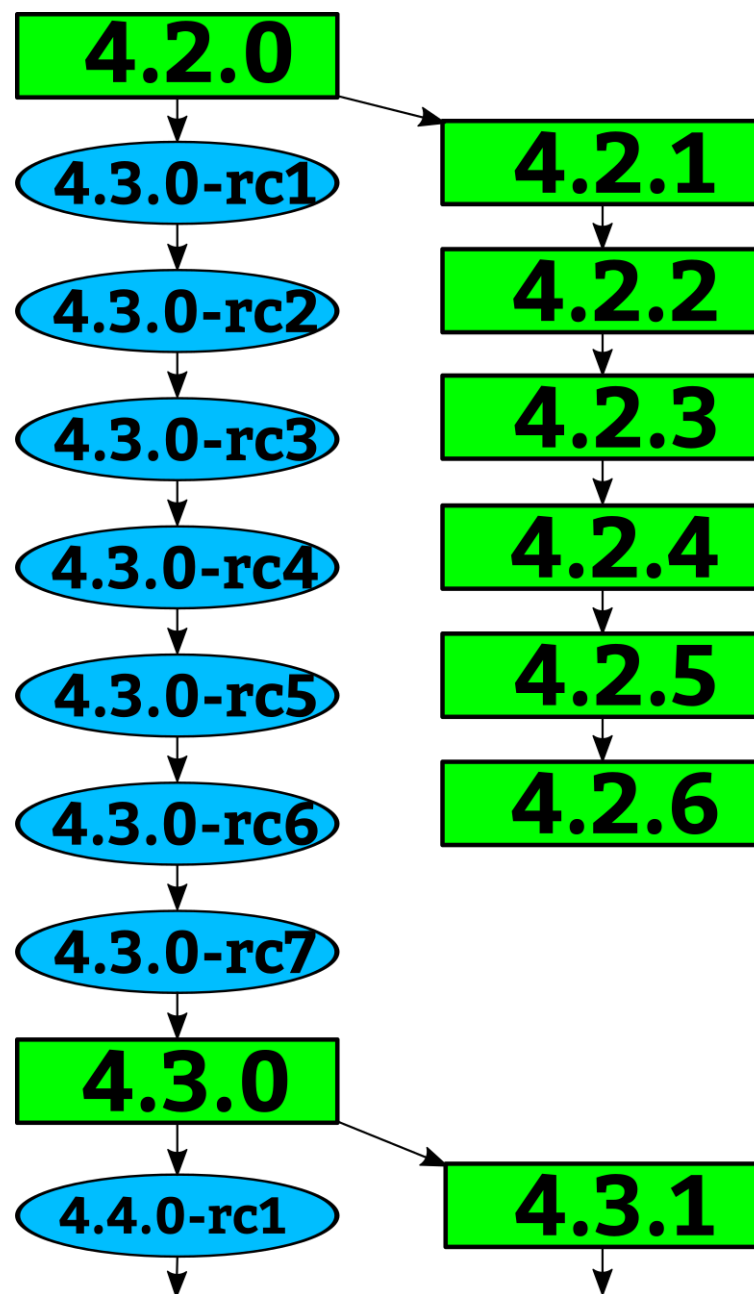
Time based releases

Incremental changes



**New release every
2½ months**





“Longterm kernels”

One picked per year

Maintained for two years

4.4

4.9

4.14

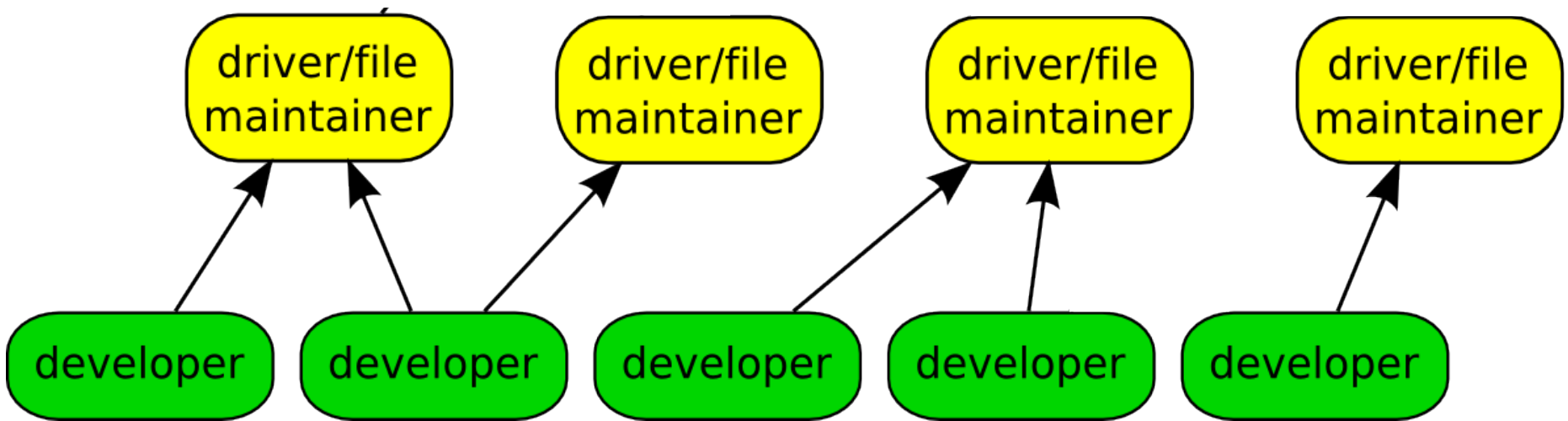
developer

developer

developer

developer

developer



commit ecf85e481a716cfe07406439fdc7ba9526bbfaeb
Author: Robert Jarzmik <robert.jarzmik@free.fr>
AuthorDate: Tue Apr 21 20:33:10 2009 -0700
Commit: Greg Kroah-Hartman <gregkh@suse.de>
CommitDate: Thu Apr 23 14:15:31 2009 -0700

USB: otg: Fix bug on remove path without transceiver

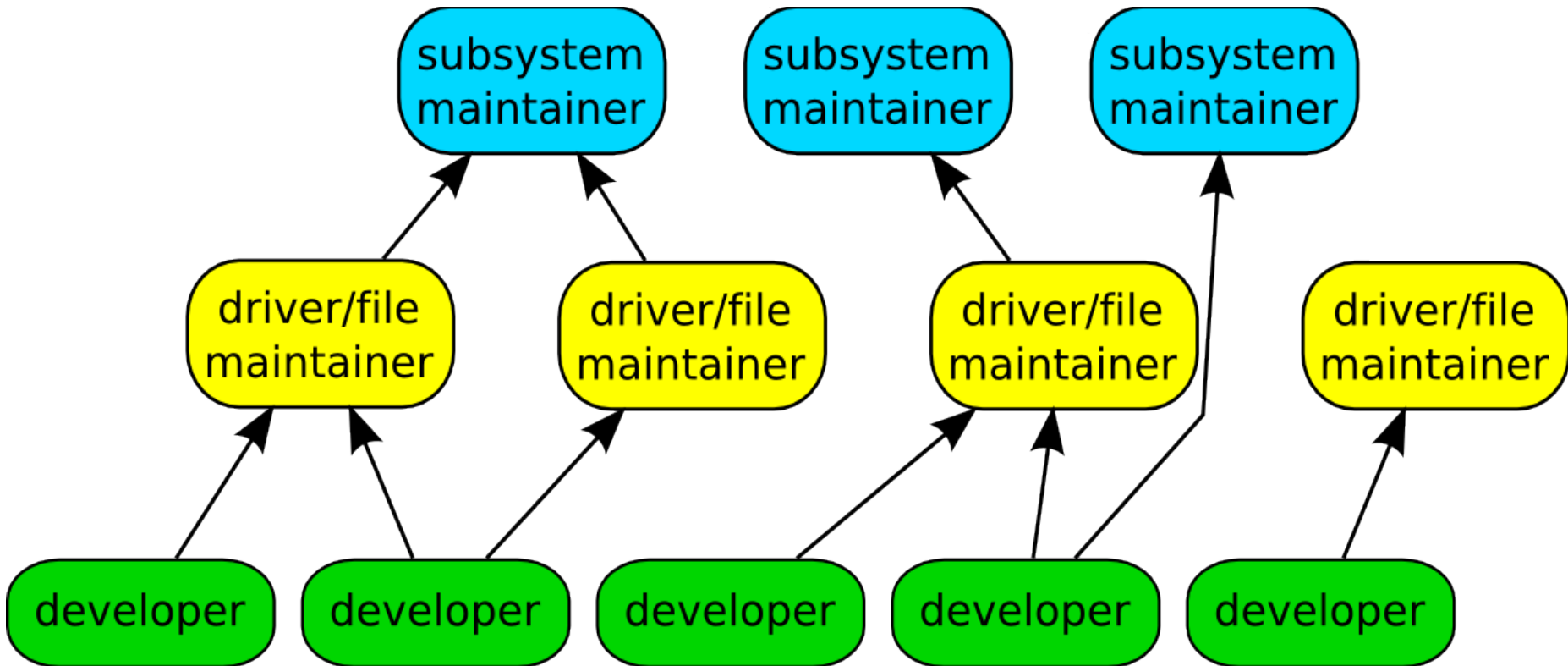
In the case where a gadget driver is removed while no transceiver was found at probe time, a bug in otg_put_transceiver() will trigger.

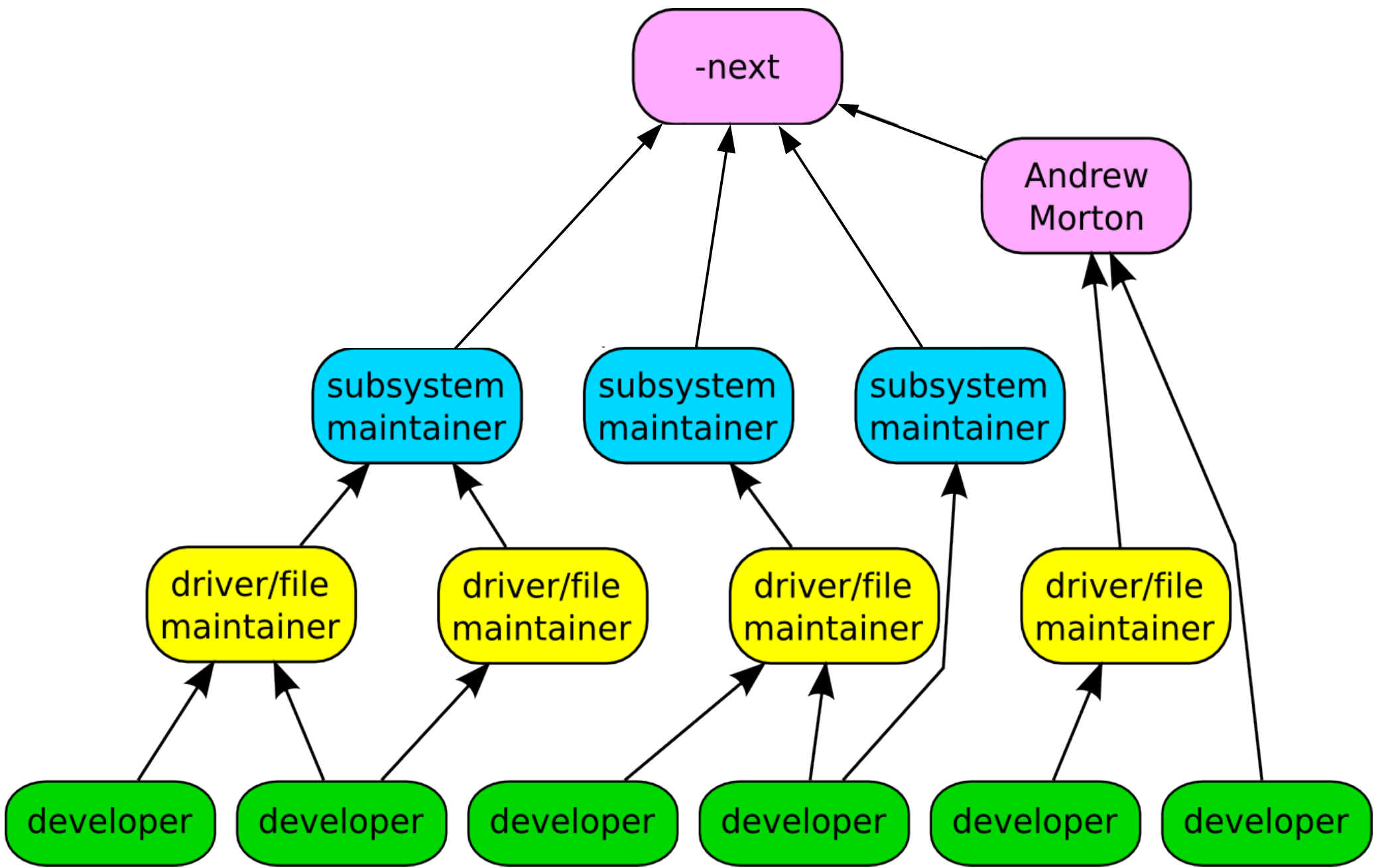
Signed-off-by: Robert Jarzmik <robert.jarzmik@free.fr>
Acked-by: David Brownell <dbrownell@users.sourceforge.net>
Signed-off-by: Greg Kroah-Hartman <gregkh@suse.de>

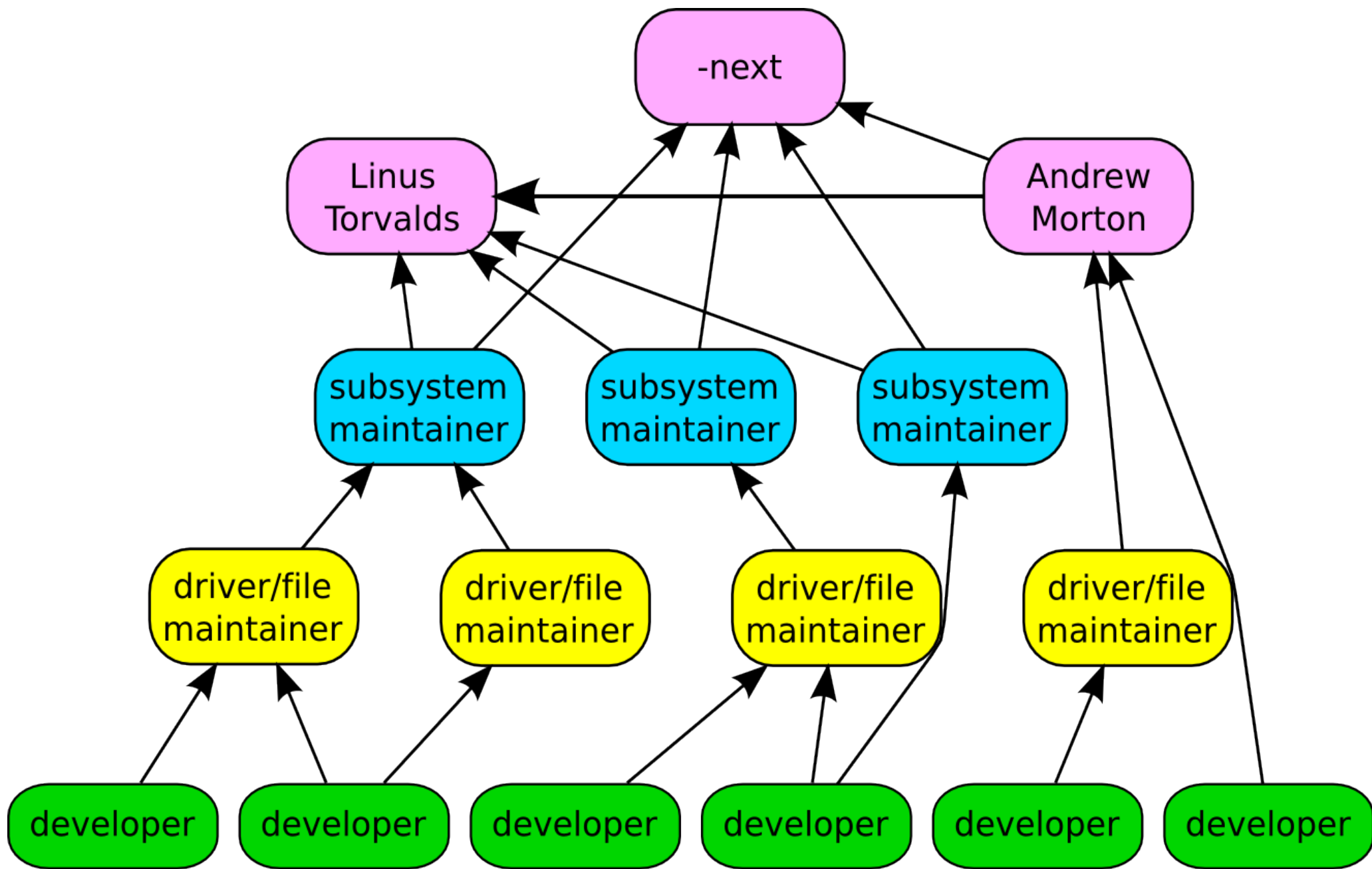
```
--- a/drivers/usb/otg/otg.c
+++ b/drivers/usb/otg/otg.c
@@ -43,7 +43,8 @@ EXPORT_SYMBOL(otg_get_transceiver);
 void otg_put_transceiver(struct otg_transceiver *x)
 {
-    put_device(x->dev);
+    if (x)
+        put_device(x->dev);
 }
```

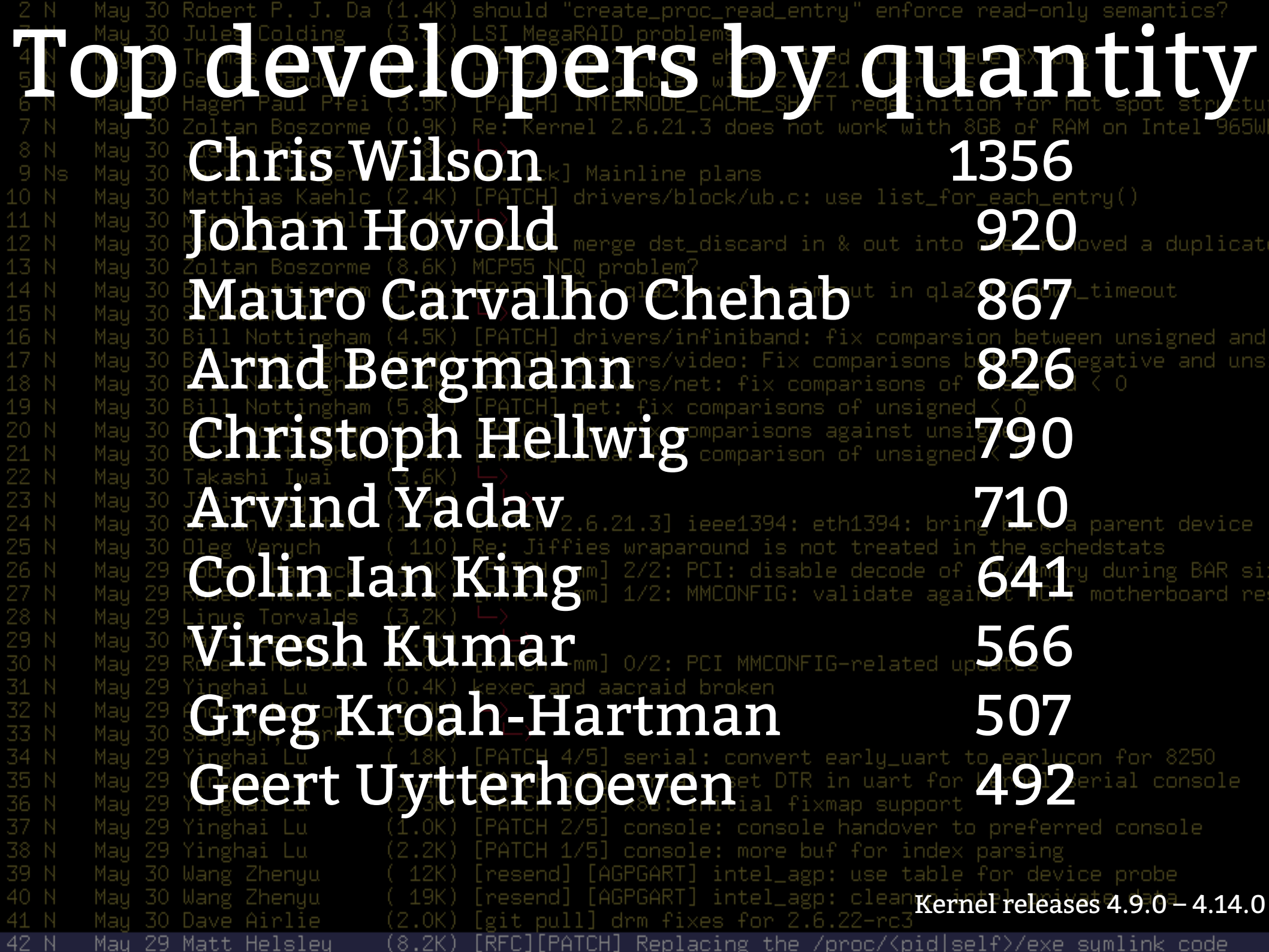
Developer's Certificate of Origin

- (a) I created this change; or
- (b) Based this on a previous work with a compatible license; or
- (c) Provided to me by (a), (b), or (c) and not modified
- (d) This contribution is public.









Top developers by quantity

Chris Wilson	1356
Johan Hovold	920
Mauro Carvalho Chehab	867
Arnd Bergmann	826
Christoph Hellwig	790
Arvind Yadav	710
Colin Ian King	641
Viresh Kumar	566
Greg Kroah-Hartman	507
Geert Uytterhoeven	492

Top Signed-off-by:

David S. Miller 9430

Greg Kroah-Hartman 9342

Mauro Carvalho Chehab 3039

Mark Brown 2385

Linus Torvalds 2261

Alex Deucher 2095

Andrew Morton 2013

Ingo Molnar 1989

Martin Petersen 1681

Chris Wilson 1520

Kernel releases 4.9.0 – 4.14.0

Who is funding this work?

1. Intel	12.4%
2. “Amateurs”	8.5%
3. Red Hat	6.8%
4. Linaro	5.4%
5. IBM	3.9%
6. Google	3.4%
7. Consultants	3.3%
8. SUSE	3.1%
9. AMD	2.8%
10. Samsung	2.7%

Who is funding this work?

11. Mellanox	2.2%
12. Renesas Electronics	2.1%
13. Oracle	1.7%
14. Broadcom	1.5%
15. ARM	1.5%
16. Huawei Technologies	1.5%
17. Texas Instruments	1.2%
18. Linux Foundation	1.1%
19. Free Electrons	1.1%
20. Canonical	1.1%

“Working upstream saves time and money”

Dan Frye – VP Open Systems, IBM

Dirk Hohndel – Chief Technologist, Intel

How to change

How to change

Submit code early and often

How to change

Send small pieces

How to change

Ask community for feedback

How to change

Act on it

How to change

Remove legal hurdles

How to change

Force them to work in public

How to change

Allow them to be the community

Kernel Security

Kernel Security

Almost all bugs can be a “security” issue.

Kernel Security

Almost all bugs can be a “security” issue.

Fix them as soon as possible.

Kernel Security

Averaging 21 fixes per day

“If you are not using a stable /
longterm kernel, your machine
is insecure”

– me

“The kernel needs airbags” – Konstantin Ryabitsev

[`slides.com/mricon/giant-bags-of-mostly-water#`](https://slides.com/mricon/giant-bags-of-mostly-water#/)

**“We will always have bugs,
we must stop their exploitation”
– Kees Cook**

outflux.net/slides/2015/ks/security.pdf

Kernel Hardening

kernsec.org/wiki/index.php/Kernel_Self_Protection_Project

Core Infrastructure Initiative

**“Ceaseless change is the only
constant thing in Nature.”**

– John Candee Dean



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