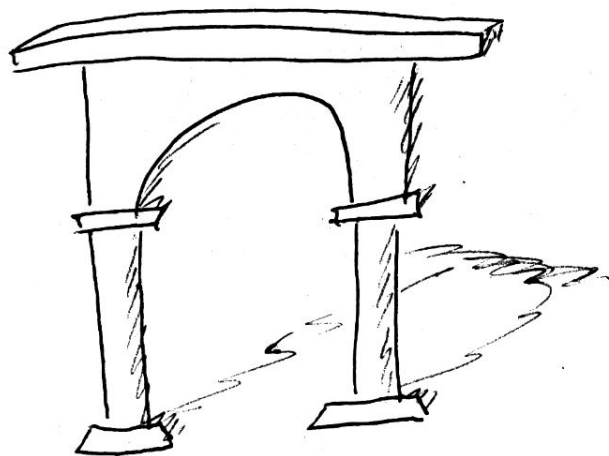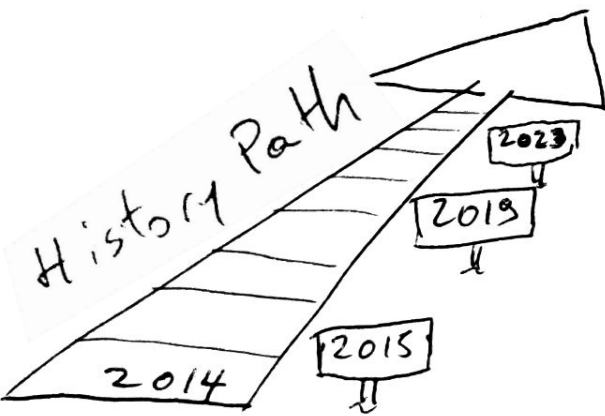# Travel Guide 2024

Guillaume Tucker

gtucker@gtucker.io - 21st March 2024
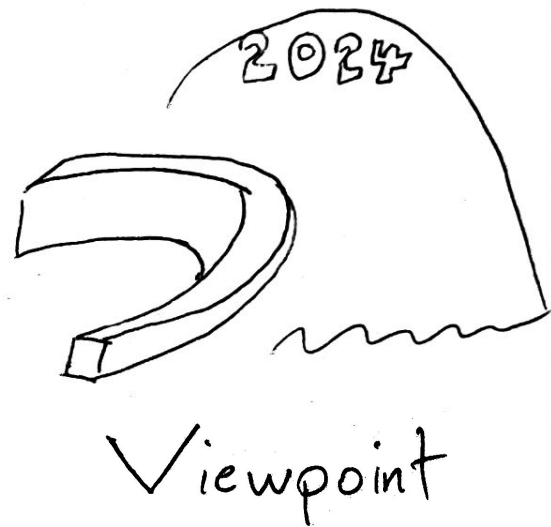
My KernelCI Journey

- 2017 Automated bisection
- 2018 Functional testing
- 2019 TSC Chair
- 2020 Board Chair
- 2021 New API concept
- 2022 ChromeOS support
- 2023 Bootstrap & Roadmap
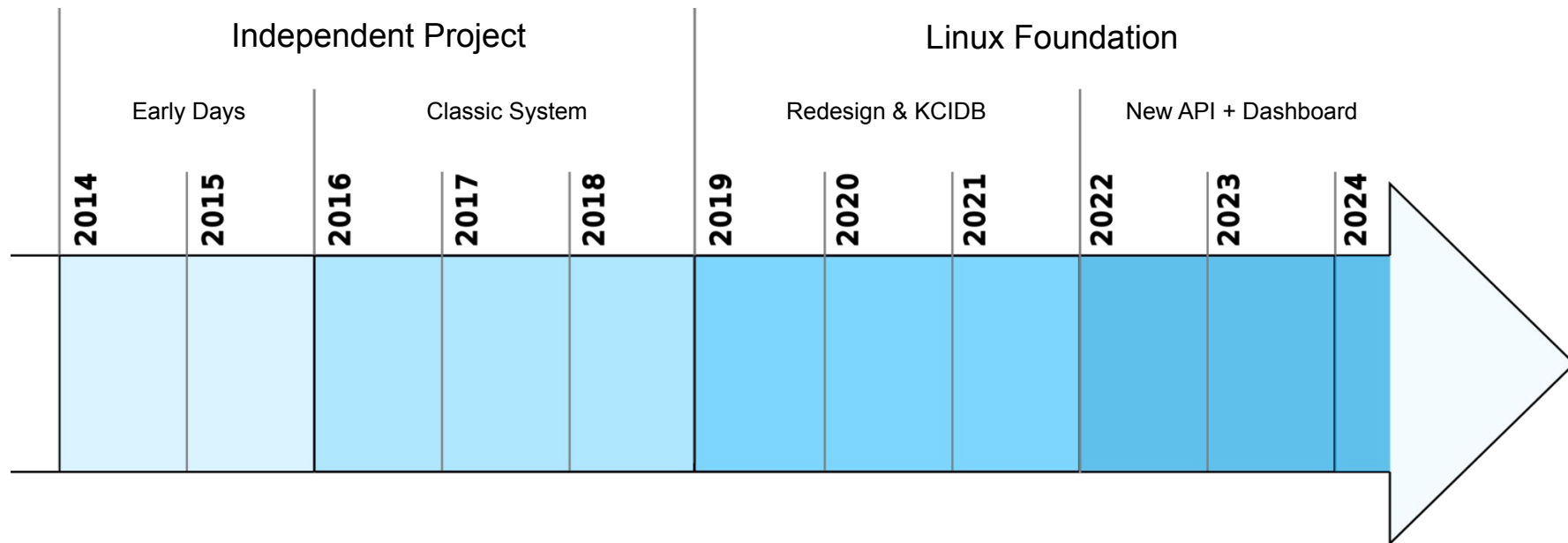- 2024 Succession

LF *live* MENTORSHIP SERIES

1. **KernelCI History**
   10 years in 10 minutes

2. **Guided Tour**
   Places of interest

3. **Horizon 2024**
   Discussion

KernelCI History

Independent Project | Linux Foundation

Early Days | Classic System | Redesign & KCIDB | New API + Dashboard

2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024

2014-2015: Early Days

Independent initiative by arm-soc maintainers

Kevin Hilman, Olof Johansson

Collaboration with Linaro developers

Tyler Baker, Milo Casagrande

Kernel builds and boot testing on embedded ARM platforms

2016-2018: Classic System

More VM builders

Move LAVA labs

Extensive boot testing

Automated bisections

2019: Linux Foundation

OSS 2019

Launch

Greg KH and Kevin Hilman

Scope extended

Whole upstream kernel

One CI to "rule them all"

2019: Founding members

Essentially same set of members today

Actively looking for new members now

Members provide infrastructure and people

MS Azure, Google Cloud, Hetzner VMs etc.

Maintainers, Chair and other project roles

Members

The success of the KernelCI project will be driven by contributions from our developer community and organizations joining as members.

Learn how your organization can contribute to the project now.

Organizations interested in joining KernelCI, can send us an email.

EMAIL US ABOUT JOINING THE PROJECT

2020-2021: Back to the drawing board

Test Suites kselftest, IGT, LTP, "baseline" checks…

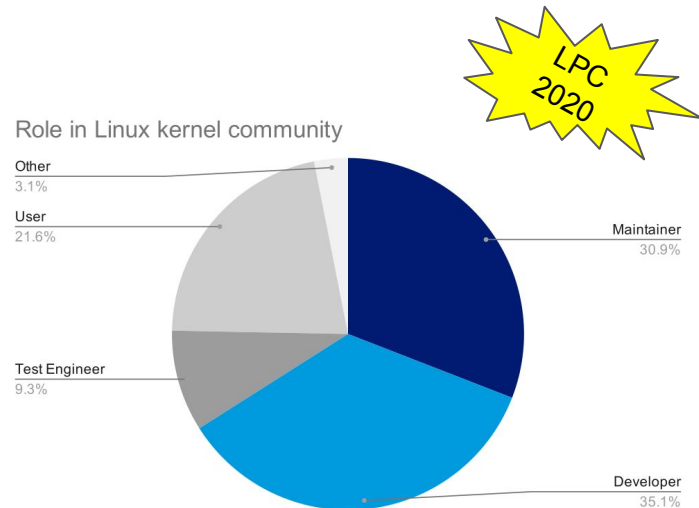**ChromeOS** hardware and user-space coverage in LAVA

KCIDB launch as pure centralised database
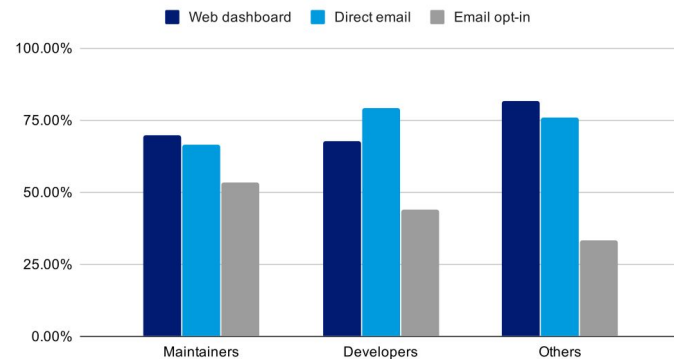
New API concept based on community input

Community Survey Report[1]

- ## Need to test patches
  - Reports sent to authors
  - Early results in the loop
- ## Extend long-running coverage
  - Integration branches
  - Deeper, more thorough testing
- ## Improve web dashboard
  - User-defined queries
  - Further fine-tuning

[1] https://foundation.kernelci.org/blog/2020/07/09/kernelci-community-survey-report/

LPC 2020

Role in Linux kernel community

Other 3.1%
User 21.6%
Test Engineer 9.3%
Maintainer 30.9%
Developer 35.1%

Reporting preferences

■ Web dashboard ■ Direct email ■ Email opt-in

100.00%

75.00%

50.00%

25.00%

0.00%

Maintainers   Developers   Others

First year at the Linux Foundation

LF Project Launch ELC-E 2019

Mission Statement[1]

KCIDB Dashboard

MS Azure Servers

Community Survey

Google syzbot

FOSDEM 2021

Linux Plumbers 2020

Setting things up

FOSDEM 2020

kernelci.org Functional Testing

Kubernetes

Oct	Nov	Dec	2020	Feb	March	April	May	June	July	Aug	Sept

[1] https://foundation.kernelci.org/mission-objectives/

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2022-2023: New API & Pipeline Concepts

Reworking the overall design to better serve the community

Unifying KernelCI with a single tool set for kernel developers

Modular API Proof-of-concept

With Jeny as Outreachy intern, now co-maintainer

Preparation for new web dashboard

2024: Coming soon…

TSC and Board changes

Roadmap adjustments

UX Analysis

2. Guided Tour
Places of interest

Current overview

Growing community

Empowering users

Legacy system

Builds

```
GCC, Clang, Rust
arm, arm64, x86, riscv, mips, sparc
```

Tests

```
Kselftest, LTP, IGT etc.
ChromeOS Tast
```

Regressions

```
Tracking, bisection
```


Test Results: «next-20240320» (next / master)

Tree   next — 🏢
Git branch master — 🏢
Git describe next-20240320 — 📦
Git URL   https://git.kernel.org/pub/scm/linux/kernel/git/next/linux-next.git
Git commit 72fb52fb0ac44b6a1edd9bc390e44bce3acccd26
Date   2024-03-20

34678
test results

Available Test Plans

Test Plan	Test Results			Status
baseline	5246	297	37	⚠
baseline-nfs	2945	139	18	⚠
baseline_fvp	18	0	0	✅
cros-ec	58	0	1	⚠
igt-gpu-etnaviv	32	3	1	⚠
igt-gpu-i915	32	0	0	✅
igt-gpu-lima	48	0	0	✅
igt-gpu-msm	1	8	0	❌
igt-gpu-panfrost	74	11	0	❌
igt-gpu-v3d	292	0	0	✅
igt-kms-mediatek	152	0	1	⚠
igt-kms-msm	63	16	0	❌
igt-kms-rockchip	75	1	0	❌
igt-kms-vc4	232	80	0	❌
kselftest-alsa	5688	314	4	⚠
kselftest-arm64	2252	0	3	⚠
kselftest-arm64_fvp	1963	0	0	

One Linux kernel - One KernelCI

Not focused on any products

Open Testing Philosophy

Shared hardware

Grouped results

Community driven

KCIDB

Contributors

CKI, KernelCI, Syzbot, TuxSuite

Dashboard currently private

A fix is being worked on

Kernel issue tracking WIP

See also https://github.com/orgs/kernelci/projects/16/views/1
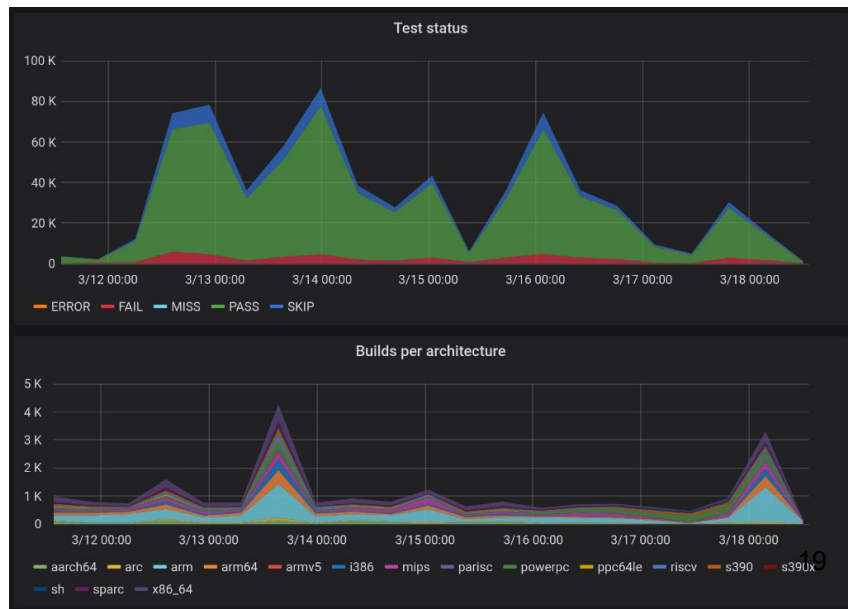
New API

Early Access dataset

x86 builds, boot, KUnit

Not in production yet

Roadmap put on hold

Dashboard being designed

UX Analysis
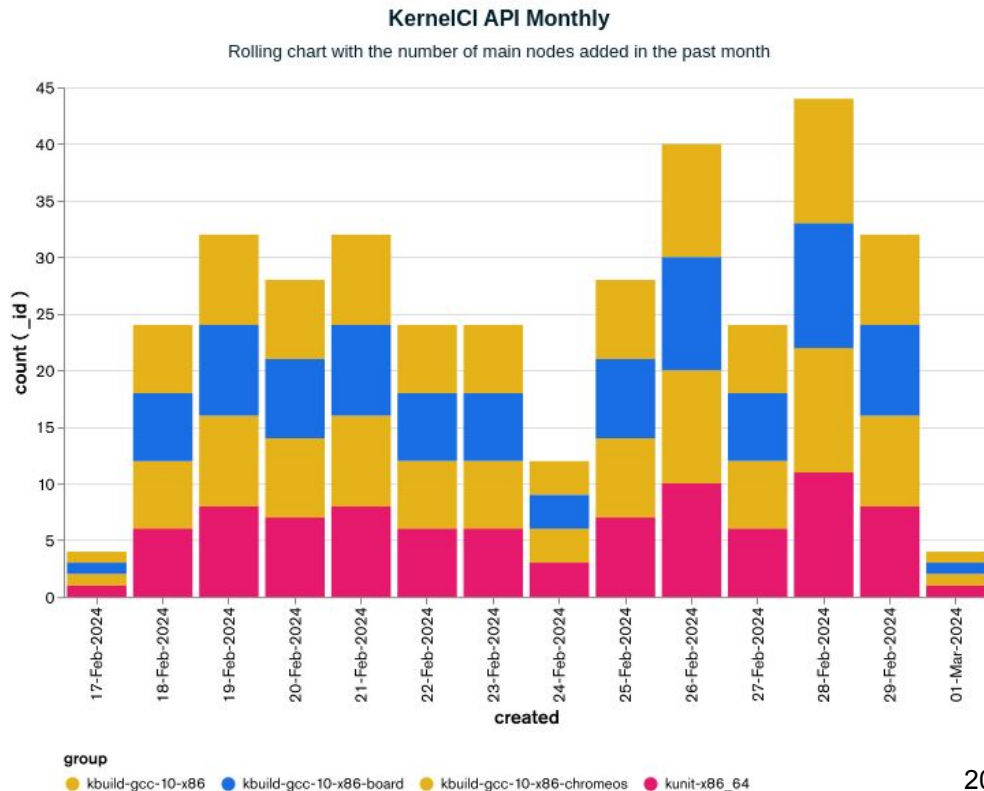
A Growing Ecosystem

" It's a social project. "

- Linus Torvalds (2017)

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contributors

kernel tree

LTP

kselftest

KUnit

build

test

infrastructure

web, email

22
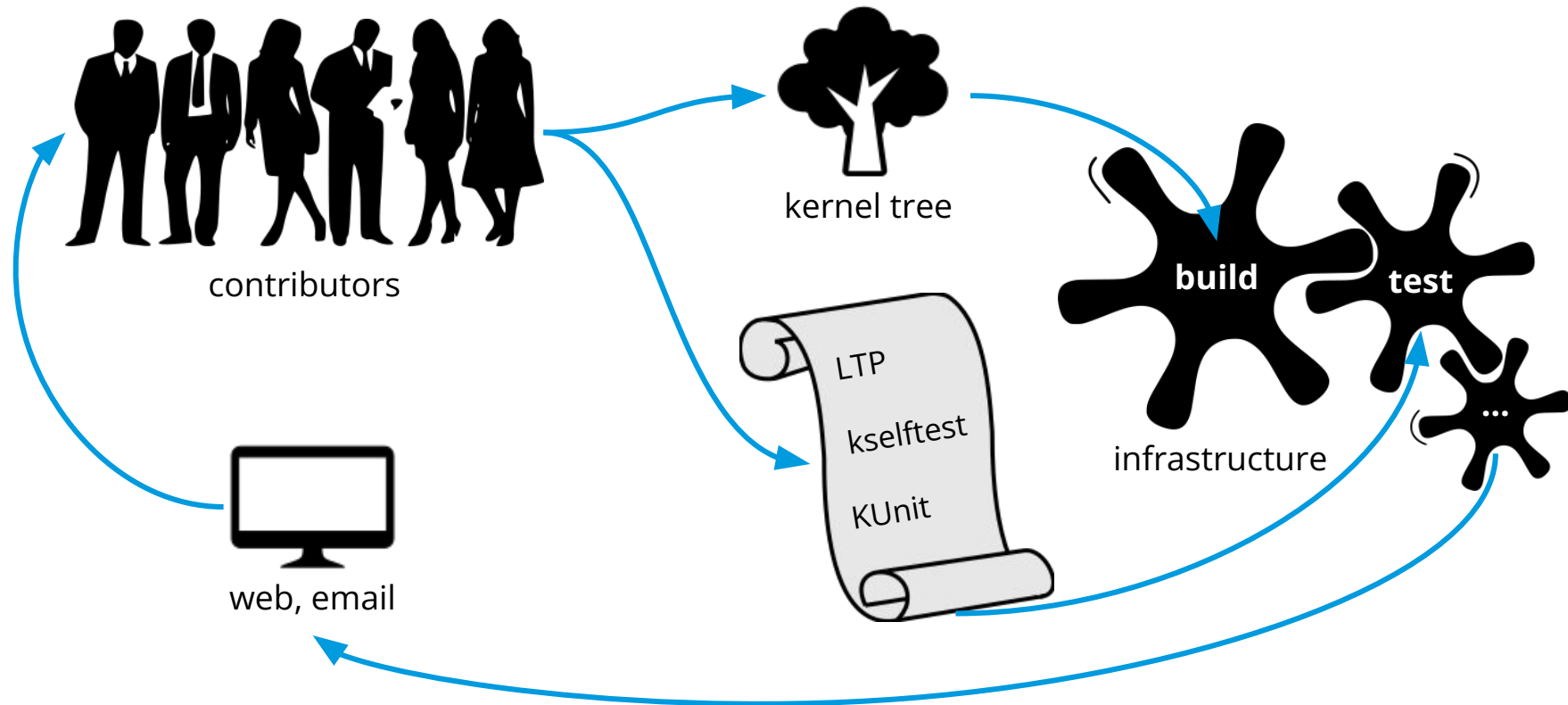
regzbot

Some KernelCI regressions are sent to regzbot

```
[ *NEW* ] net: bgmac: bootrr.deferred-probe-empty test fails in KernelCi on sun8i-h3-libretech-all-h3-cc
-------------------------------------------------------------------------------------------------------
https://linux-regtracking.leemhuis.info/regzbot/regression/20230404134613.wtikjp6v63isofoc@rcn-XPS-13-9305/
https://lore.kernel.org/netdev/20230404134613.wtikjp6v63isofoc@rcn-XPS-13-9305/

By Ricardo Cañuelo; 5 days ago; 3 activities, latest 4 days ago.
Introduced in f99e6d7c4ed3 (v6.3-rc2)
```

GitLab CI

Demo video

Email thread

Not KernelCI

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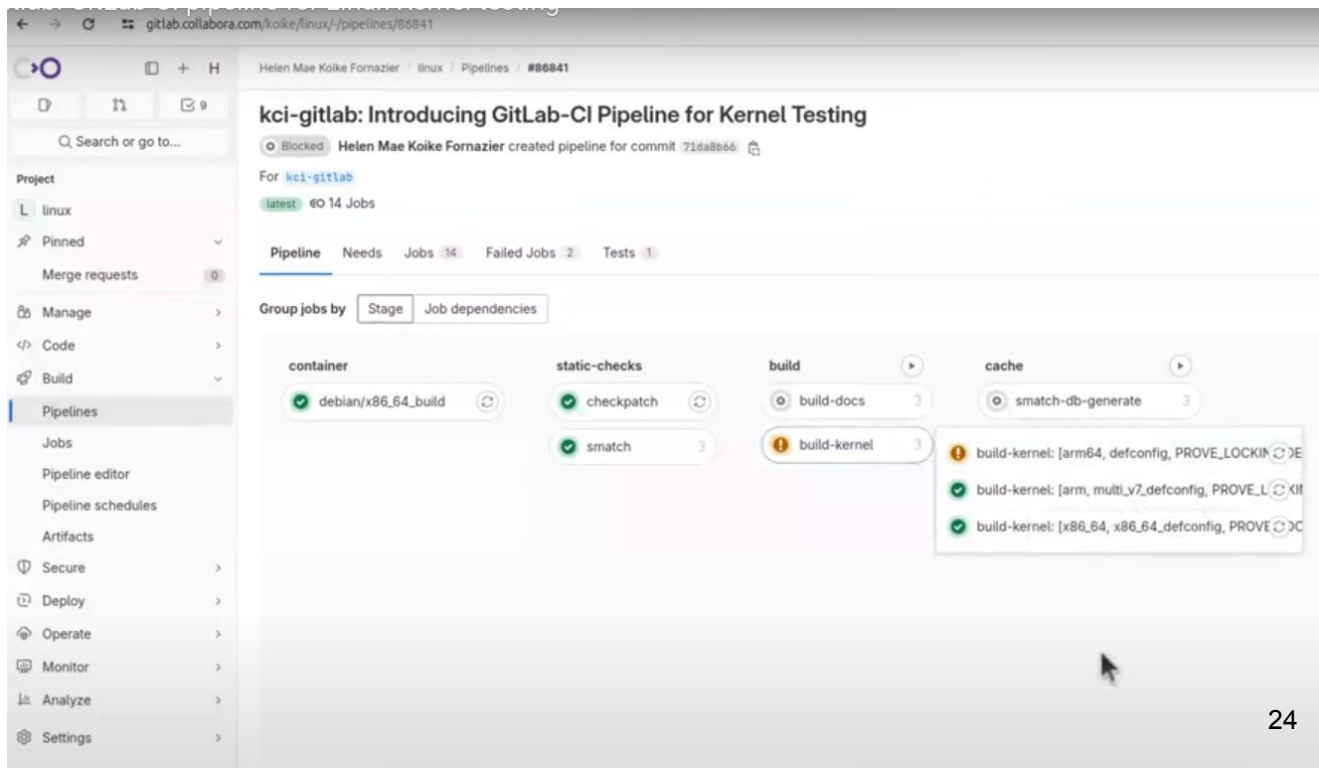
Organisations

Collaboration with Meta

BPF-CI, pre-merge testing

Pengutronix, TI, ARM, Linaro

Currently also on hold as dependent on new API

Kernel domains and subsystems

LLVM / ClangBuiltLinux

```
On 02/08/2023 7:06 pm, Nick Desaulniers wrote:

> Hi KernelCI team.  Thanks for these reports, as always, they are my

> "morning paper."

https://lore.kernel.org/all/CAKwvOdmuXnChEiZ-VOPbhYd_VzqjCJ0+Jc_38hwWMCDDDNM3uA@mail.gmail.com/
```

Rust, v4l2, drm, BPF, various individual maintainers

Stable reviews

Manual email reports

Sent to the stable-rc reviews

Plans:

Adding functional testing

Automating

	A	B	C	D	E
1	**Stable-rc kernel**	**version**	**date**	**build**	**boot**
12	stable/LTS 6.1.71	6.1	2024-01-03	0	0
13	stable/LTS 5.4.266	5.4	2024-01-05	1	0
14	stable/LTS 6.1.72	6.1	2024-01-10	0	0
15	stable/LTS 6.6.11	6.6	2024-01-10	0	0
16	stable/LTS 5.10.208	5.10	2024-01-15	0	0
17	stable/LTS 5.15.147	5.15	2024-01-15	0	0
18	stable/LTS 6.1.73	6.1	2024-01-15	0	0
19	stable/LTS 6.6.12	6.6	2024-01-15	0	0
20	stable/LTS 5.4.268	5.4	2024-01-24	0	0
21	stable/LTS 5.15.148	5.15	2024-01-24	0	0
22	stable/LTS 6.1.75	6.1	2024-01-24	0	0
23	stable/LTS 6.6.14	6.6	2024-01-24	0	0
24	stable/LTS 6.1.76	6.1	2024-01-30	1	0
25	stable/LTS 6.6.15	6.6	2024-01-30	0	0
26	stable/LTS 6.1.77	6.1	2024-02-05	0	1
27	stable/LTS 6.6.16	6.6	2024-02-05	0	0
28	stable/LTS 6.1.78	6.1	2024-02-15	0	0
29	stable/LTS 6.6.17	6.6	2024-02-15	0	0
30	stable/LTS 5.4.269	5.4	2024-02-22	0	0
31	stable/LTS 5.10.210	5.10	2024-02-22	0	0
32	stable/LTS 5.15.149	5.15	2024-02-22	0	0
33	stable/LTS 6.1.79	6.1	2024-02-22	0	0
34	stable/LTS 6.6.18	6.6	2024-02-22	0	0
35	stable/LTS 6.7.6	6.7	2024-02-22	0	0
36	stable/LTS 5.4.270	5.4	2024-02-29	0	0
37	stable/LTS 5.10.211	5.10	2024-02-29	0	0
38	stable/LTS 5.15.150	5.15	2024-02-29	1	0
39	stable/LTS 6.1.80	6.1	2024-02-29	0	0
40	stable/LTS 6.6.18	6.6	2024-02-29	0	0
41	stable/LTS 6.7.7	6.7	2024-02-29	0	0

Stable reviews

```
On 08/12/2023 16:58, Greg KH wrote:
> Looks great!
>
> A few notes, it can be a bit more verbose if you want🙂
>
> One email per -rc release (i.e. one per branch) is fine, and that way if
> you add a:
>     Tested-by: kernelci-bot <email goes here>
> or something like that, to the email, my systems will pick it up and it
> will get added to the final commit message.
```

See also: https://lore.kernel.org/stable/?q=%22tested-by+kernelci%22

Empowering users

How to engage with KernelCI

Email: kernelci@lists.linux.dev

Meetings: https://kernelci.org/docs/org/#meetings

IRC: #kernelci on libera.chat

Tooling: kci command line, web dashboard

Developers: from manual tests to full automation
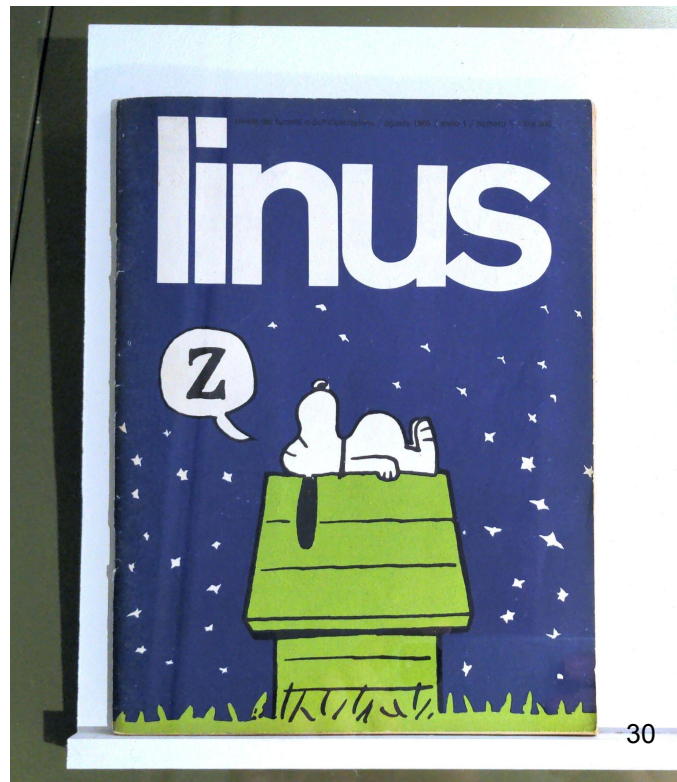
A Maintainer's Dream

Continuous improvement

Tools developed for the community

Gradual automation

Aiming for synchronous CI loop

Relieving maintainers' burden

3. **Horizon 2024**
   Discussion

   Challenges

   Advanced features

   The bigger picture

Team updates

Don Zickus as new Board Chair since January 2024

Nikolai Kondrashov as new TSC Chair in April 2024

Shuah Khan as new TSC member in March 2024

→ *Partly a new beginning, good for the project overall*

→ *Transition, adjustments and handover can take a long time*

Word of the Board Chair

For 2024, KernelCI will continue to grow a community of collaboration around automated CI testing of the linux kernel while focusing on easing the burden of kernel maintainers.

- Don Zickus

Word of the TSC Chair

" *Our priorities: improve reliability of legacy KernelCI, make the new KernelCI API useful ASAP, and engage and onboard the community with fixes and new features.* "
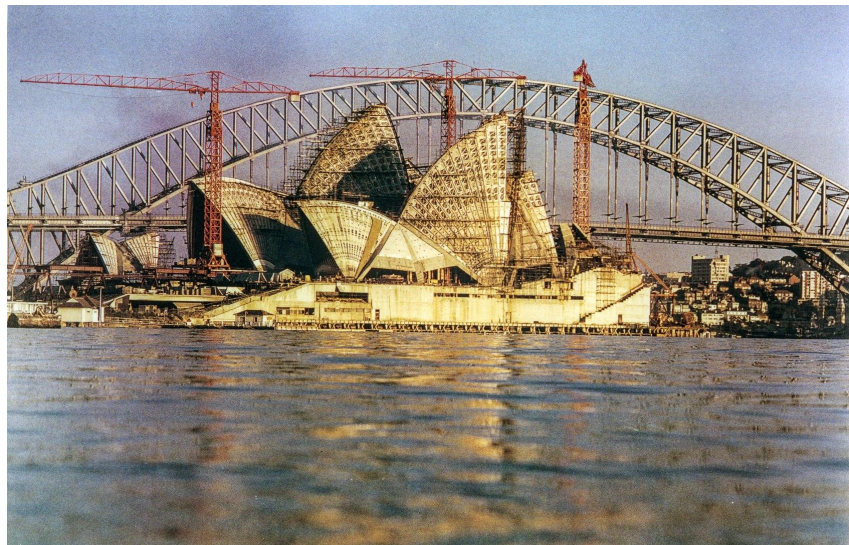
- Nikolai Kondrashov

Technical slowdown

New API roadmap delayed

Legacy system overloaded

Dashboard progress impacted

Advanced features

Post-regression checks

Dynamic scheduling

Stats-based bisection

Performance testing

The bigger picture

Engaging more with the kernel community again

Progress often gated by infrastructure progress

CI / CD has come a long way with open source projects

Wishlist?

Brainstorming…

OEM product testing, extending to full OS images?

EU directives for 2025

*from the date of end of placement on the market to **at least 5 years after that date**, [vendors shall] make such updates available at no cost for all units of a product model with the **same operating system**;*
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AJOL_2023_214_R_0003

Field kernel uprev

Not currently on Android phones → Apple model

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Thank you for joining us today!

We hope it will be helpful in your journey to learning more about effective and productive participation in open source projects. We will leave you with a few additional resources for your continued learning:

- The LF Mentoring Program is designed to help new developers with necessary skills and resources to experiment, learn and contribute effectively to open source communities.
- Outreachy remote internships program supports diversity in open source and free software
- Linux Foundation Training offers a wide range of free courses, webinars, tutorials and publications to help you explore the open source technology landscape.
- Linux Foundation Events also provide educational content across a range of skill levels and topics, as well as the chance to meet others in the community, to collaborate, exchange ideas, expand job opportunities and more. You can find all events at events.linuxfoundation.org.

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