

Insights and statistics about the Android Open Source Project

Deep dive AOSP

Stefan Lengfeld

About me: Stefan Lengfeld

Website and contacts:

stefan.lengfeld.xyz

“I like to collect and order things!”

Example: Collecting tarballs of live555

<https://lengfeld.github.io/live555-unofficial-archive/>

live555 unofficial archive and mirror

[How to use the archive?](#)

[How to use the git repository?](#)

Using a git tag with the -tree suffix

Using the git commit history and tags without the -tree suffix

[Frequently Ask Questions](#)

Why was this project created?

Are the tarballs authentic?

Is it legal to redistribute the archives?

What is the expected audience of the mirror?

Can I use this site as a tarball mirror?

[Contributions and Questions](#)

Prior Art

Imprint

This project is an unofficial archive and mirror of the source code of the [LIVE555 Streaming Media libraries](#). It collects the source tarballs released on the server live555.com/liveMedia/public/.

What was my goal?

Watch and inspect all repos on <https://android.googlesource.com/>

The screenshot shows a web-based Git interface with a light gray header bar. On the left is the "Google Git" logo, and on the right are links for "Code Review", "Generate Password", "Revoke Passwords", and "Sign in". Below the header, the title "Git repositories on android" is centered. A table lists ten repositories, each with a link to its details:

Name	Description
accessories/manifest	
assets/android-studio-ux-assets	Bug: 32992167
brillo/manifest	
cts_drno_filter	Parent project for CTS projects that requires Dr.No +2's.
device/aaeon/upboard	
device/amlogic/yukawa	Bug: 122486287
device/amlogic/yukawa-kernel	Bug: 122486287
device/asus/deb	
device/asus/flo	
device/asus/flo-kernel	

What do you need?

Requirements:

- Good downstream bandwidth
- Enough storage
- Some compute power
- Basic Linux distro for scripting and tools

Solution: Shopping on the [Hetzner Serverbörse](#)

- 62GB RAM
- 2x 7.3 TB disk (used with mirror raid)
- 12 Core 3.x Ghz Intel something
- Debian 13
- Using btrfs for repository clone (features: checksums and mirroring)
- Tooling: Make, python, ninja, shell, gnuplot
- Cost: 44€/month

How to get the source code in the first place?

You normally execute a command like

```
$ repo init --partial-clone \
-u https://android.googlesource.com/platform/manifest \
-b android-16.0.0_r4

$ repo sync -c -j8
```

The different parts

- Base URL: <https://android.googlesource.com/>
- Manifest repository: platform/manifest
- group of releases: android
- version of release: 16.0.0_r4

(A bit of)

Caution!

I tried to be accurate with the graphs, but ...

What do you find
in 3040 git repositories
and 1.7 TB of data*
?

* without refs refs/cache-automerge/* refs/changes/* refs/notes/* refs/users/*

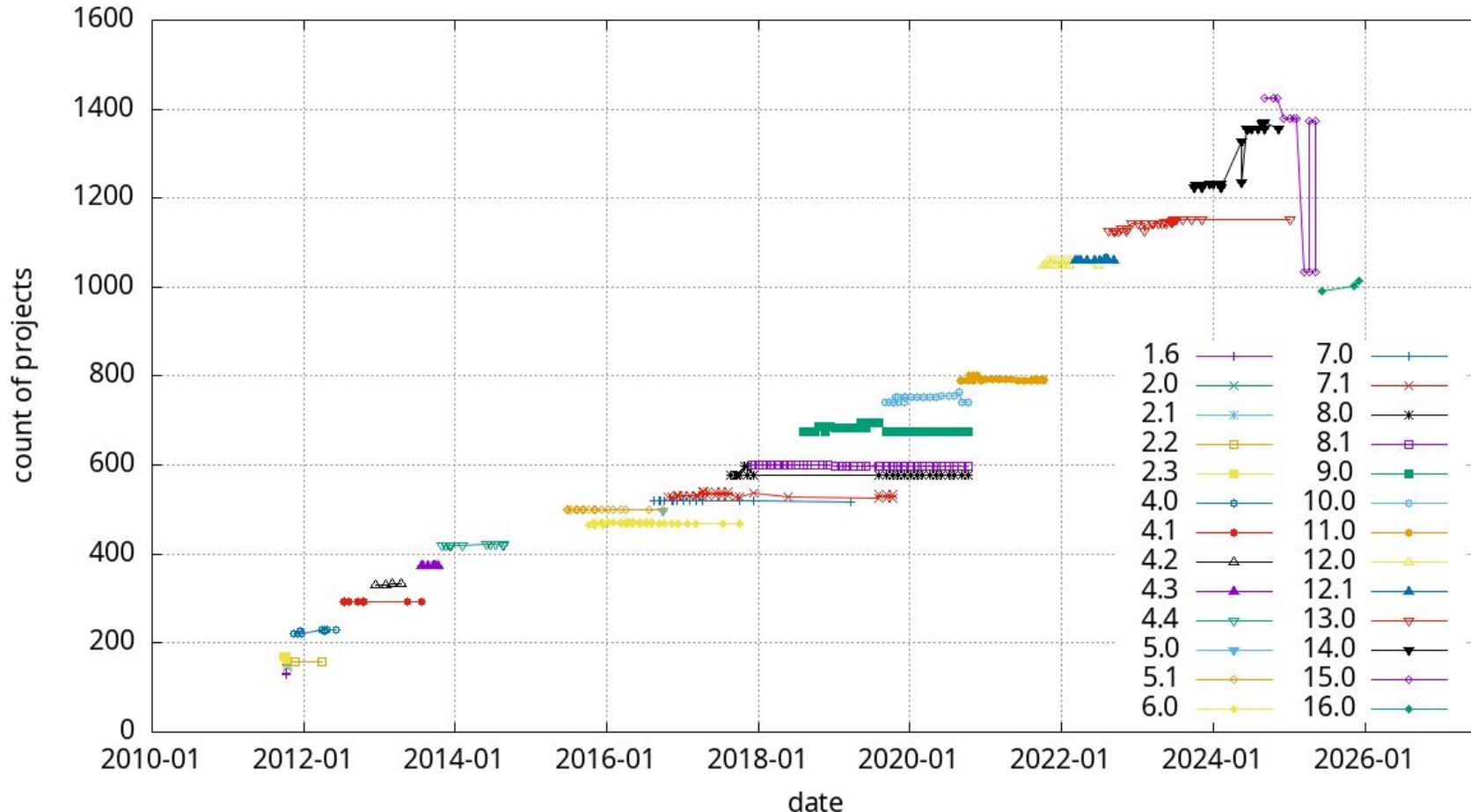
Multiple manifest repositories for the repo tool

repo_name	count_tags	count_branches	latest_update
<u>accessories/manifest</u>	0	2	2012-06-28 20:22:38 UTC
<u>brillo/manifest</u>	0	11	2016-09-16 19:05:25 UTC
<u>kernel/manifest</u>	6	492	2026-01-07 10:39:44 UTC
<u>mirror/manifest</u>	0	2	2026-01-23 19:03:53 UTC
<u>platform/manifest</u>	2975	3483	2026-01-24 00:30:09 UTC
<u>toolchain/manifest</u>	0	5	2015-07-16 22:44:02 UTC
<u>tools/manifest</u>	0	3	2024-11-20 20:10:03 UTC
<u>trusty/manifest</u>	0	2	2025-03-14 01:27:46 UTC

Manifest repo: platform/manifest (only tags, no branches!)

main_group	count	first manifest date	last manifest date
android	911	2011-09-29	2025-12-02
android-mainline	764	2019-09-04	2025-03-18
android-cts	299	2011-12-22	2025-11-04
android-security	202	2020-10-07	2025-12-01
android-platform	191	2020-10-06	2025-12-02
android-vts	134	2017-10-05	2025-11-05
studio	131	2014-08-12	2026-01-15
ndk	87	2016-03-14	2025-10-06
android-wear	64	2015-05-28	2025-04-09
iot	37	2017-02-28	2022-01-10
platform-tools	29	2019-07-15	2024-08-05
ub-automotive-master	20	2023-03-06	2025-11-19
android-automotiveos	10	2024-07-29	2025-11-25
[...]			

AOSP android_X_rY releases and project count in the XML manifest



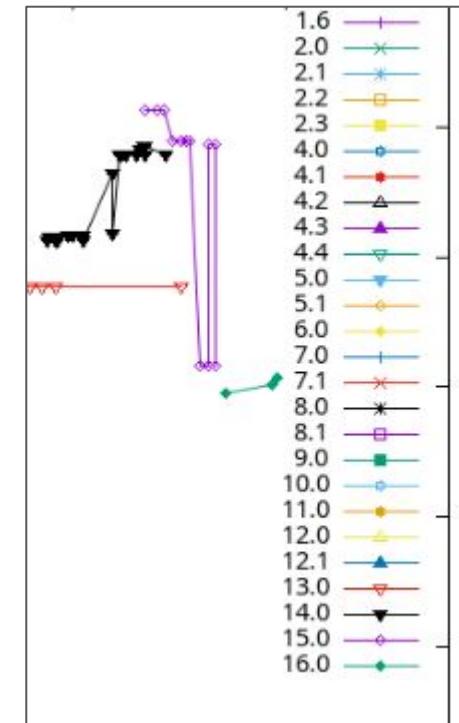
Why does Android 16 has less projects?

First answer: rust

- The (super) repo [external/rust/android-crates-io/](#) was added: “This repository contains Rust crates imported from crates.io for use by the Android platform.”
- See [commit](#) (2025-05-04) that removes the individual rust dependency repos

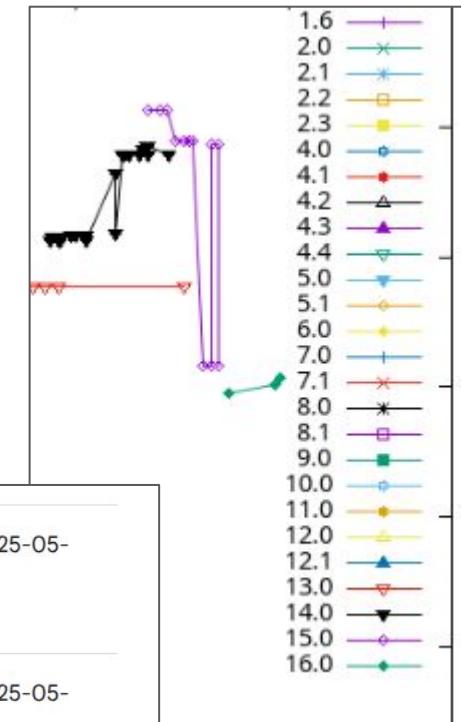
Also a lot of google devices were removed:

- See [commit](#) (2025-06-09)



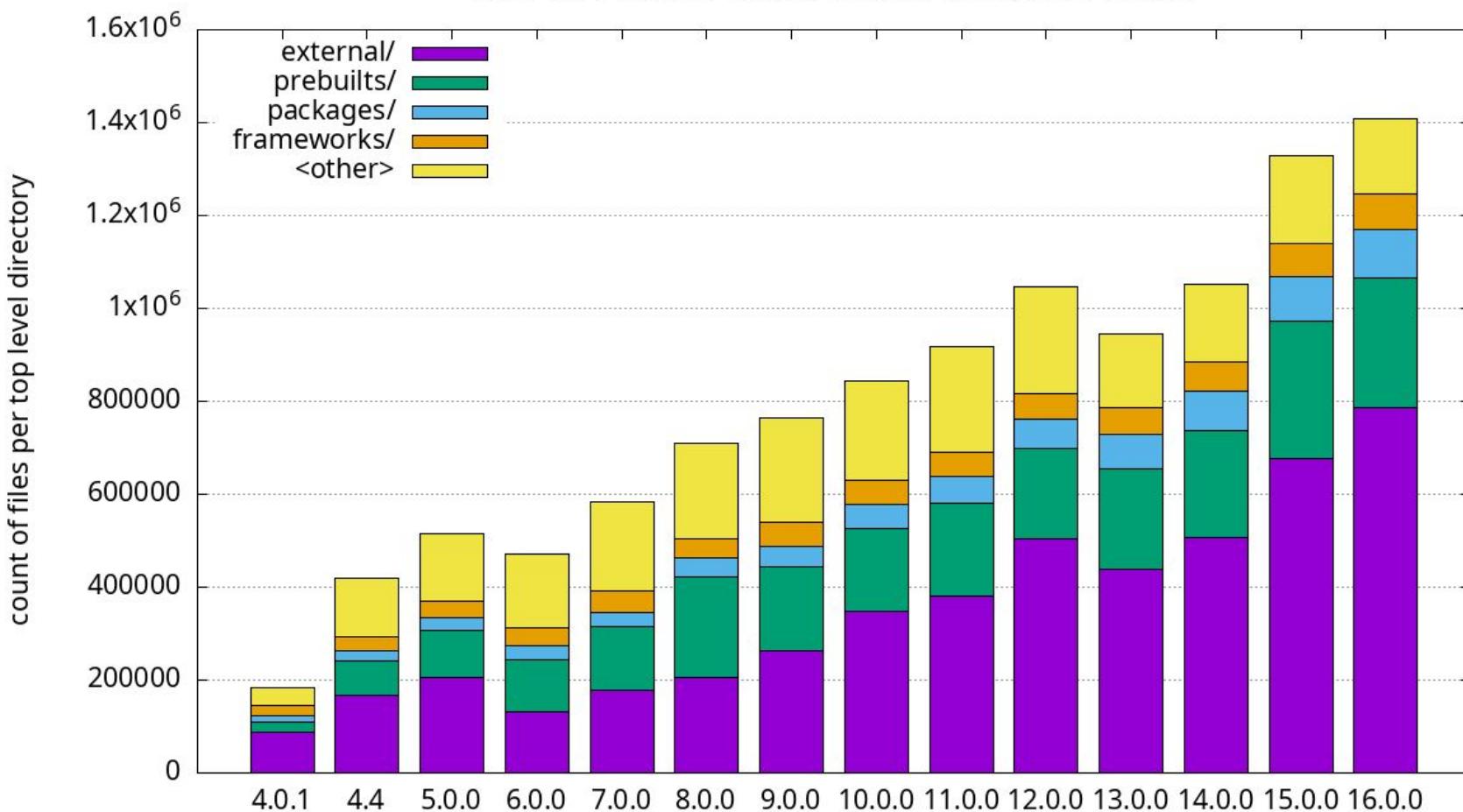
Why are sometimes the commits going backward?

- The android_X_rY releases are **not linear** in Y.
- There are different “families” of Y releases,
 - Releases of different phones models
 - Then android-security-X_rY releases were android-X_rY previously
- See [Codenames, tags, and build numbers](#)

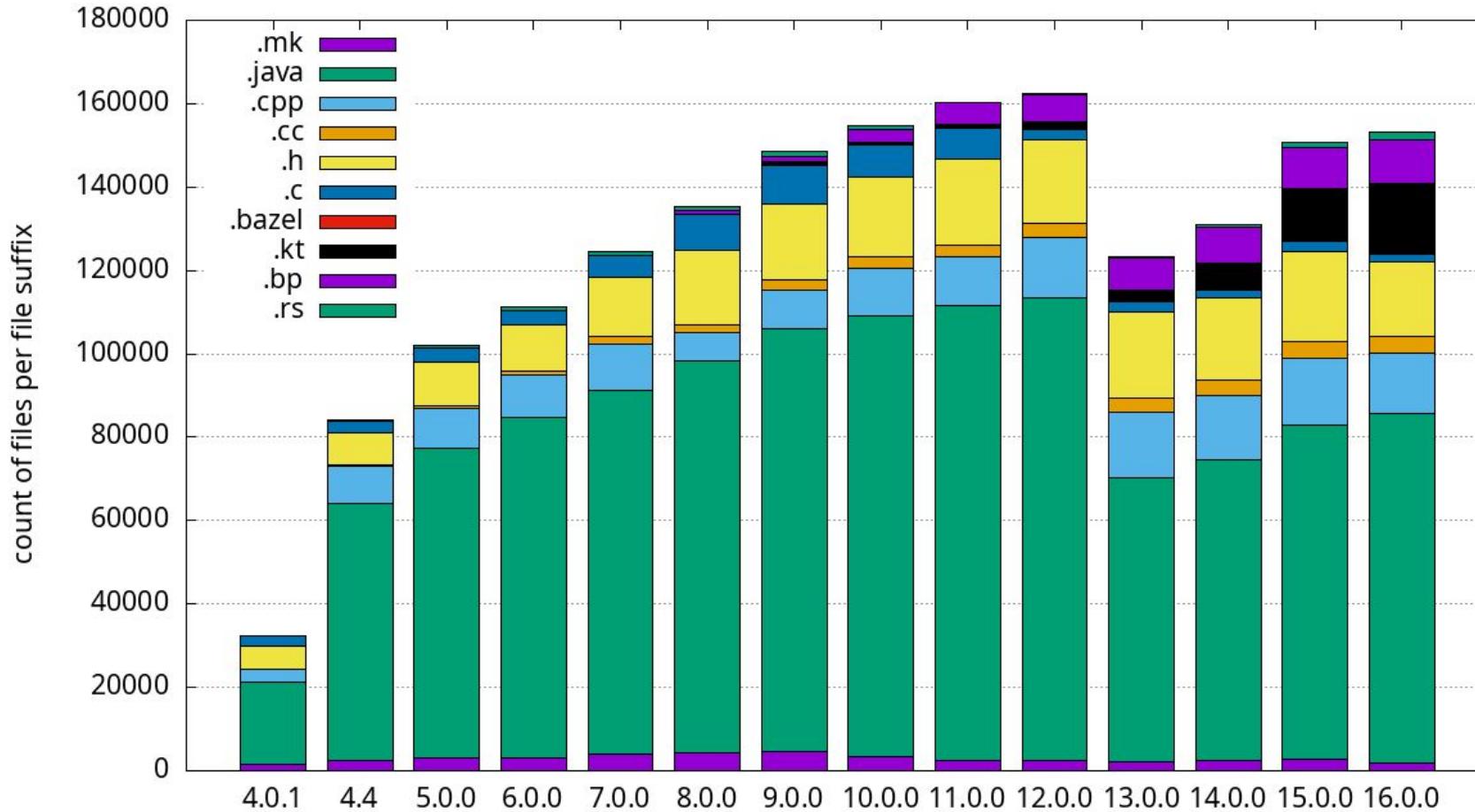


BP1A.250505.005	android-15.0.0_r32	Android15	Pixel 6, Pixel 6 Pro, Pixel 6a, Pixel 9, Pixel 9 Pro, Pixel 9 Pro Fold, Pixel 9 Pro XL, Pixel Tablet	2025-05-05
BD4A.250505.003	android-15.0.0_r31	Android15	Pixel 9a	2025-05-05
BP1A.250405.007.D1	android-15.0.0_r30	Android15	Pixel 9, Pixel 9 Pro, Pixel 9 Pro Fold, Pixel 9 Pro XL	2025-04-05

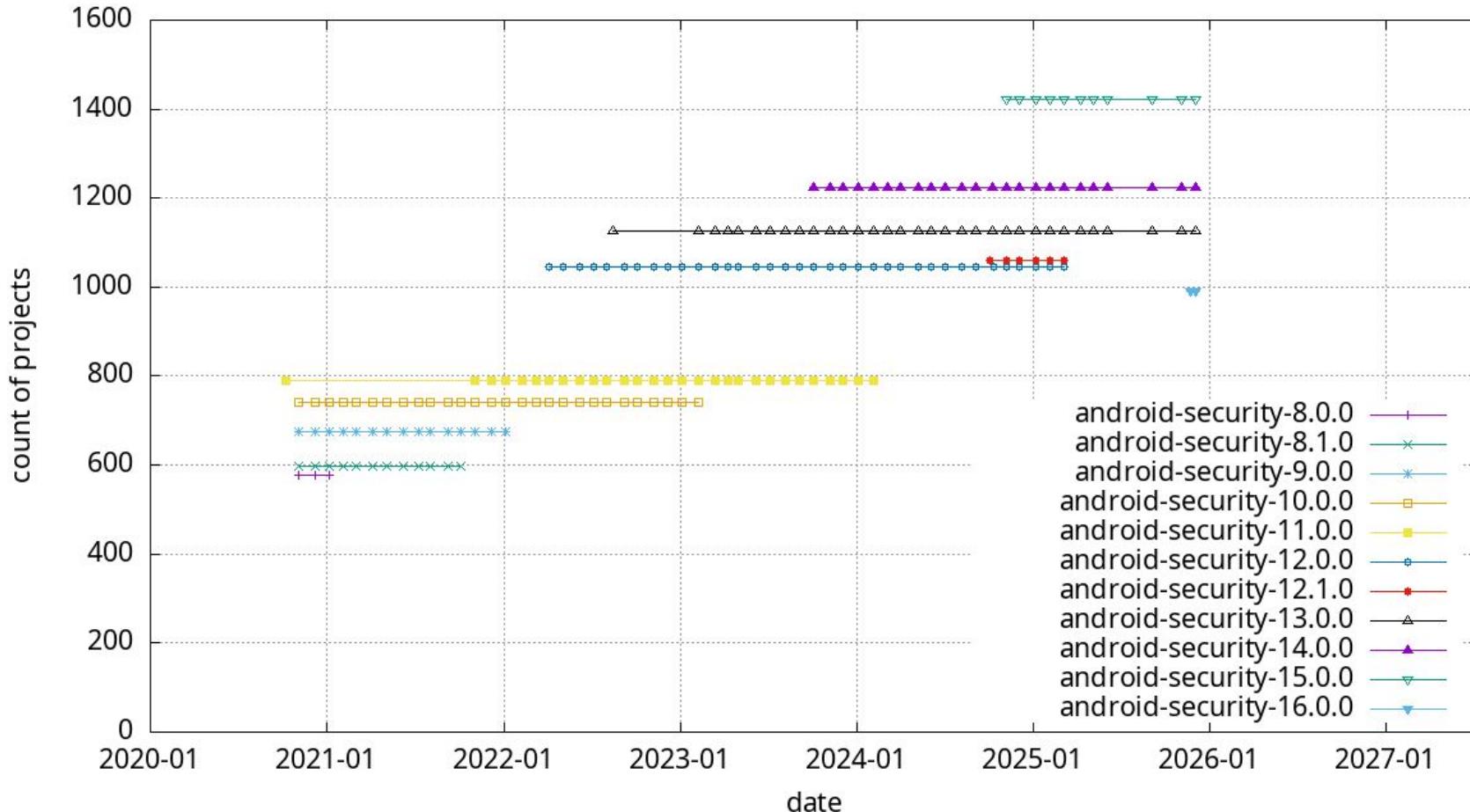
AOSP X_r1 releases and file count in the top level folders



AOSP X_r1 releases and selected file types without 'external/' , 'prebuilt/'



AOSP android-security_X_rY releases and project count in the XML manifest



Brillo and Android Things

Brillo:

- announced in 2015
- Android-based IoT OS for resource constrained devices (32MB)
“Android without the Java-parts”
- [Building Brillo: first impressions | 2net.co.uk](#) (Chris Simmonds)
- Source code in [manifest/brillo](#) manifest repository. Just 10 branches!
- Last update there in Sep. 2016 and official discontinued in Dec 2016
- Replaced by Android Things

Android Things

Android “with Java” for (bigger) IoT devices, e.g. Smart Speakers:

- Source code in the [platform/manifest](#) manifest repository on tags/branches with “iot” in the name!
- First source code release on Feb. 2017 and last source code release on Jan. 2022.
- 1.0 release in 2018
- Shutdown announcement in 2020
- Final shutdown in January 2022

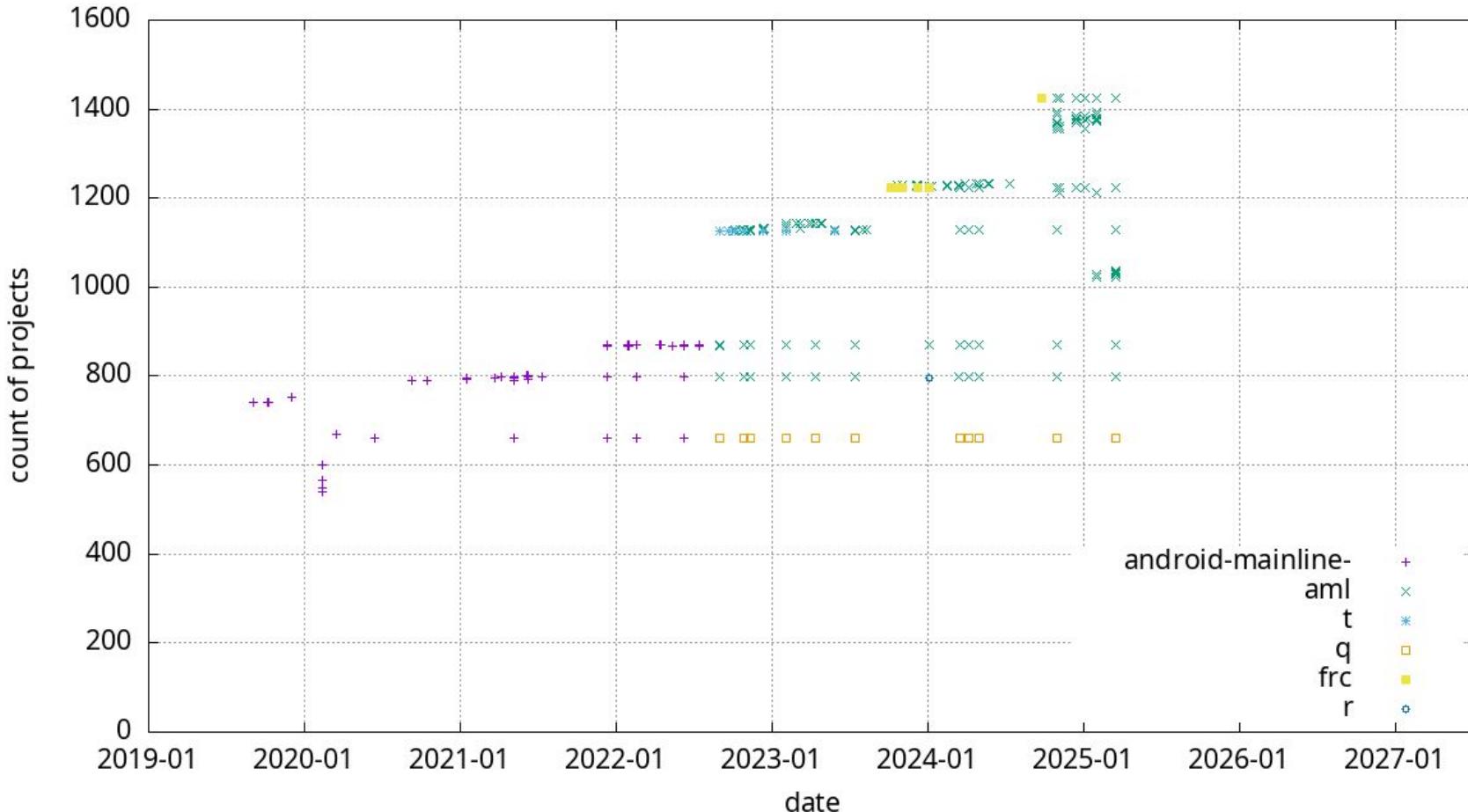
Tag examples:

- | | |
|--------------------------------------|-------------------------------------|
| ● android-n-iot-release-lg-thinq-wk7 | Nougat IOT Release (ThinQ Speaker) |
| ● android-o-mr1-iot-release-1.0.0 | Android Things LTS v1.0.0 (4760714) |
| ● android-o-mr1-iot-release-1.0.1 | Android Things LTS v1.0.1 (4795405) |

Android Mainline

- Android Mainline (Modules)
- Also called “Google Play System Updates”
- Started around Android 10
- Uses the APEX (Android Phoney EXpress) container format
- There are ~30 different modules, e.g. tzdata, media, wifi, statsd, ...
- Released as different types of manifests (tag names):
 - ~183x e.g. android-mainline-12.0.0_r116
 - ~529x e.g. aml_tz2_306503000, aml_wif_341610000, aml_med_341513600
 - ~60x other tags, e.g. t_frc_med_330443030, q_tzdata_am_294400310

AOSP android-mainline-, aml,... releases and project count in the XML manifest



Android Automotive: AAOS

[Android Automotive OS releases](#)

Started at 2024-07-29

“14.0.0_lts1” is missing!

[Unbundled apps release notes](#)

Started at 2023-03-06

And released two previous versions: 2022-11-02, 2022-12-15

[android-automotiveos-14.0.0_lts2](#)

[android-automotiveos-14.0.0_lts3](#)

[android-automotiveos-14.0.0_lts4](#)

[android-automotiveos-14.0.0_lts5](#)

[android-automotiveos-14.0.0_lts6](#)

[android-automotiveos-14.0.0_lts7](#)

[android-automotiveos-15.0.0_lts1](#)

[android-automotiveos-15.0.0_lts2](#)

[android-automotiveos-15.0.0_lts3](#)

[android-automotiveos-15.0.0_lts4](#)

[ub-automotive-master](#)

[ub-automotive-master-20221102](#)

[ub-automotive-master-20221215](#)

[ub-automotive-master-20230303](#)

[ub-automotive-master-20230427](#)

[ub-automotive-master-20230622](#)

[ub-automotive-master-20231011](#)

[ub-automotive-master-20231102](#)

[ub-automotive-master-20240125](#)

[ub-automotive-master-20240314](#)

[ub-automotive-master-20240521](#)

[ub-automotive-master-20240731](#)

[ub-automotive-master-20240924](#)

[ub-automotive-master-20241205](#)

[ub-automotive-master-20250219](#)

[ub-automotive-master-20250402](#)

[ub-automotive-master-20250418](#)

[ub-automotive-master-20250609](#)

[ub-automotive-master-20250722](#)

[ub-automotive-master-20250910](#)

[ub-automotive-master-20251118](#)

Lighting talk at 14:25 in the this devroom

Stay tuned for a talk by Chris Simmonds:

A quick look at Android release names,
tags and build numbers

links: [Schedule slides](#)

Thank you!
Questions?
Comments!
Ideas?



<https://aosp-devs.org>

Data and graphs on
<https://codeberg.org/lengfeld/talk-aosp-stats>

Abstract: Deep dive AOSP: Insights and statistics about the Android Open Source Project

The Android Open Source Project (AOSP) is more than just the yearly and now half-yearly releases of the Android platform source code. It consists of 3000+ git repositories, 1500+ repo XML manifests, and 1.8+TB of (compressed) source code data.

In this talk I want to give a detailed tour of the AOSP releases, the code, and everything that can be found in the AOSP repositories: How are the _rXXX releases assembled? And why do the git tags sometimes go backward? Where do I find the source code for my Pixel devices (until 2025)? What are the Build IDs? What are Brillo manifests, and why are they also in the AOSP? How are security patches released? Why is the number of git repos increasing with every release? And why is it decreasing with Android 16? How did the amount of rust and other code evolve over time? What is Project mainline and apex's? And where do I find the source code for these "Google Play system updates"? Where do I find the AAOS (Android Automotive Operating System) code and its releases?

These and other questions I want to answer in my talk.

<https://fosdem.org/2026/schedule/event/9DRDS7-deep-dive-aosp/>