

The Changing State of Openness in Android

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Hello,

I'm Stefan Lengfeld

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- Linux Kernel
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Check out the bouncy castles!

[inovex](#) is a partner ([1](#), [2](#)) of FrOSCon this year and sponsoring the bouncy castles.

My kids already enjoyed it last year!



Main takeaway from this talk:

You should get a good overview
of what is going on
(in the last year)!

Agenda for this talk

See links in the slides.

Table of contents for this talk:

- Background
- Changes to AOSP
- Changes to Android
- Community reactions and changes

QR Code to slides:



<https://stefan.lengfeld.xyz/slides.pdf>

Where is my information from?

Working on Android/AOSP based projects:

- Since 2018 (Android 8.0)
- Development devices:
Pixel 2, hikey, VIM3, custom HW
- ~2-person to multiple teams

Doing a newsletter for aosp-devs:

- Since January 2025
- appears monthly

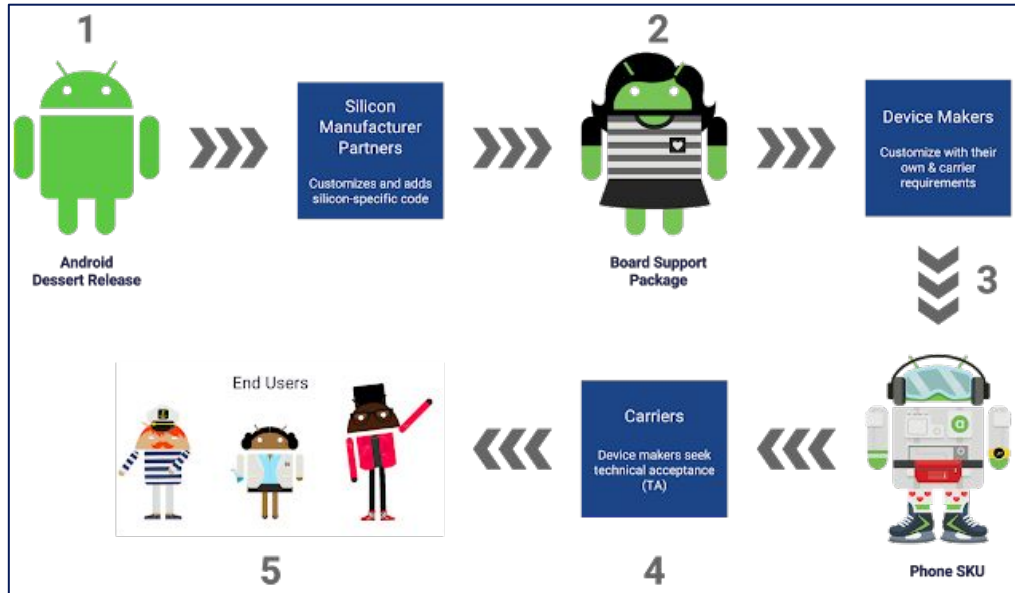
aosp-devs.org:

“Creating a community for AOSP developers”



Background

Players in the Android ecosystem



Players in the Android ecosystem

- Google: The Android Team
- SoC Vendors: Qualcomm, Intel, Samsung, MediaTek, RockChip, ...
- Device Manufacturers
 - Phones: Samsung, Motorola, Google, Xiaomi, Fairphone
 - Cars with [Android Automotive](#)
 - Other devices: TVs, Smartwatches ([Wear OS](#))
- App Developers
- End Users of Android certified devices

Non-certified Android devices and players:

- Custom ROMs/phones: [LineageOS](#), [e/OS](#), [CalyxOS](#), [GrapheneOS](#), ...
- Other devices: Tablets ([Amazon Fire OS](#)), Cars, Point of Sale Terminals, ...
- End users of “Degoogle” Android phones, non-certified devices

Android certified devices

Device manufacturers must

- fulfill the [Android Compatibility Definition Document](#) (CDD),
- run device test suites ([CTS](#), [VTS](#)),
- apply for [Android partnership](#)

Then the device manufacturer gets the [Google Mobile Services](#) (Play Store, Gmail, YouTube, ...)

so the devices support

- [Push notifications](#) (required by a lot of apps),
- [Play Integrity](#) (required by e.g. some banking/wallet apps),
- and have the Google Apps

for end users.

Otherwise, you cannot call the device “(certified) Android”.

Android != Android Open Source Project (AOSP)

For Android, “open source” is literal:

- You have access to the source code (AOSP), but Google steers development and decisions internally. Code is dropped only a few times a year.
- Code contributions are possible, but limited in practice.

Some parts are released as open source:

- Android Platform as AOSP
- Jetpack Libraries/AndroidX and Examples for App developers
- Android Studio (plugins)
- Linux Kernel as Android Common Kernel (ACK)

Some parts were never released as open source:

- Android Things (IoT OS)
- Android Wear OS
- Google Mobile Services (GMS) and Apps

History 2011:

One Android major release was not published to AOSP

Quote from [appleinsider.com - Google closes Android 3.0 Honeycomb source to prevent use on smartphones | AppleInsider](#):

“Google has closed availability of the source code to Android 3.0 Honeycomb, explaining that the tablet-oriented software was not ready for use on smartphones and that the company didn't want outside developers or enthusiasts experimenting with it in unauthorized ways.”

Honeycomb GPL modules

For Honeycomb, the entire platform source code isn't available. However, the parts of Honeycomb licensed under the GPL and LGPL are available under the following tags.

Changes to AOSP (in the last year)

Changes to AOSP in 2025 and 2026

2025

- March: No more aosp-main, no AOSP-first projects anymore ([source](#))
- March/April: No more APEX (Mainline modules) source code releases to AOSP ([source](#))
- June: Android 16 arrives without Pixel support, not a reference device anymore ([source](#))
- August/September: Quarterly instead of monthly security releases to AOSP ([source](#))
 - Only high risk issues per month for device manufacturers to patch
 - Less work for SoC Vendors and Device Manufacturers
- Feature degradation for Android code search (cs.android.com) (source [1](#), [2](#))

2026:

- January: Only two instead of 4 Major Android releases per Year ([source](#))

Security fixes are shared with partners before being released to AOSP

Google Partners can see internal development branches, e.g. security patches before they are released to AOSP:

“We have early access to Android Security Bulletin patches and will be able to set up a workflow where we can have releases already built and tested prior to the embargo ending. For now, we've still been doing the builds after the embargo ends. It will mainly help when they screw up pushing to AOSP.”

Criticism: Time window for exploitation increases!

Why does GrapheneOS see them?

Maybe because [Motorola announces a partnership with GrapheneOS Foundation, marking a new chapter in smartphone security and expanding its enterprise portfolio](#)

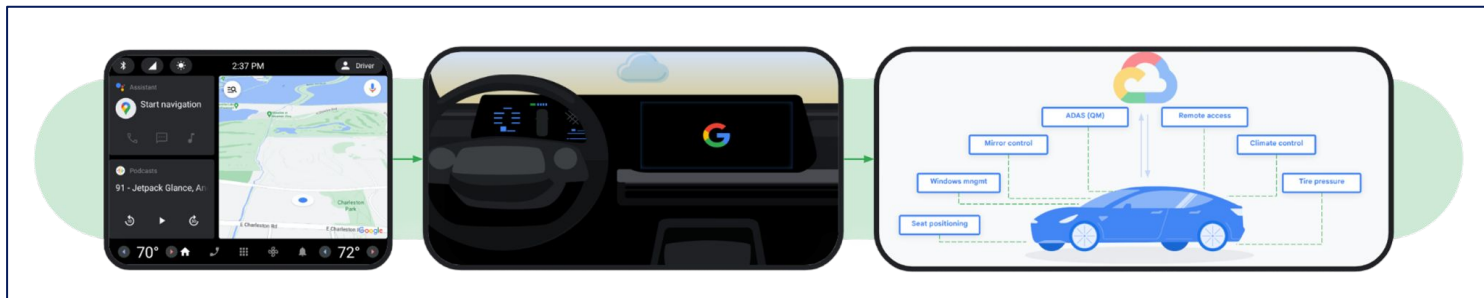
New code in AOSP

“Building an Open AAOS Ecosystem”

Announced in March 2026

[android-developers.googleblog.com - Beyond Infotainment: Extending Android Automotive OS for Software-defined Vehicles](https://android-developers.googleblog.com/2026/03/beyond-infotainment-extending-android-automotive-os-for-software-defined-vehicles.html)

Google released [Software defined vehicle \(SDV\)](#) in June 2026 with Android 17 to AOSP as open source.



Summary for AOSP changes

- My take: Google has cut costs on maintaining AOSP in 2025. In 2025 it was not clear whether Google was keeping up with the AI boom.
- It's bad for non-certified Android device builders and users, e.g. Custom ROMs (e.g. supporting Pixel devices requires more effort now).
- It does not affect Android partners or Android certified devices.
- AOSP is not the product in the first place. Android is!

See [opersys - Reading the tea leaves -- What could the future hold for the AOSP? \(2025-10-01\)](#)

Changes to Android Android Developer Verification

Android Developer Verification - 2025 Links

2025-08-25:

- [android-developers.googleblog.com - A new layer of security for certified Android devices](https://android-developers.googleblog.com/2025/08/a-new-layer-of-security-for-certified-android-devices.html)

2025-09-29:

- [f-droid.org - F-Droid and Google's Developer Registration Decree | F-Droid - Free and Open Source Android App Repository](https://f-droid.org/en/news/2025-09-29-f-droid-and-google-developer-registration-decree/)

2025-09-30:

- [android developers backstage podcast - Android developer verification](https://android-developers.googleblog.com/2025/09/android-developers-backstage-podcast-android-developer-verification.html)
- [android-developers.googleblog.com - Let's talk security: Answering your top questions about Android developer verification](https://android-developers.googleblog.com/2025/09/let-s-talk-security-answering-your-top-questions-about-android-developer-verification.html)

2025-10-28:

- [f-droid.org - What We Talk About When We Talk About Sideload-into | F-Droid - Free and Open Source Android App Repository](https://f-droid.org/en/news/2025-10-28-what-we-talk-about-when-we-talk-about-sideload-into-f-droid/)
- [Keep Android Open](https://keepandroidopen.com/) (since October 2025)

2025-11-12:

- [Android developer verification: Early access starts now as we continue to build with your feedback](https://android-developers.googleblog.com/2025/11/android-developer-verification-early-access-starts-now-as-we-continue-to-build-with-your-feedback.html)
- [android developers youtube - Android developer verification walkthrough](https://www.youtube.com/watch?v=...)

Android Developer Verification - 2026 Links

2026-02-24:

- [f-droid.org - An Open Letter Opposing Android Developer Verification | F-Droid - Free and Open Source Android App Repository](https://f-droid.org/en/about/letter-opposing-android-verification)

2026-03-19:

- [android-developers.googleblog.com - Android developer verification: Balancing openness and choice with safety](https://android-developers.googleblog.com/2026/03/android-developer-verification-balancing-openness-and-choice-with-safety.html)

2026-07-01:

- [f-droid.org - What We Talk About When We Talk About Malware | F-Droid - Free and Open Source Android App Repository](https://f-droid.org/en/about/letter-opposing-android-verification)

2026-07-04:

- [lineageos.org - Developer Verification](https://lineageos.org/developer-verification)

Main Entry point for App developers: [developer.android.com - Android developer verification](https://developer.android.com/develop/testing/verify)

What will change for certified Android devices?

- All apps are checked at installation time. Including apps from third-party app stores.
- ADB installs are not blocked.
- App developers (not already on Google Play) must register on [Android Developer Console](#) and accept the Terms Of Service.
- App developers must claim their package name (Conflicts are resolved)
- Two types of distributions:
 - Limited distribution (no fee, no ID, up to 20 installs)
 - Full distribution (ID, D-U-N-S number, 25\$ fee)
- Advanced flow: There is a process to sideload again. Various checks and 24-hour waiting time on your device.

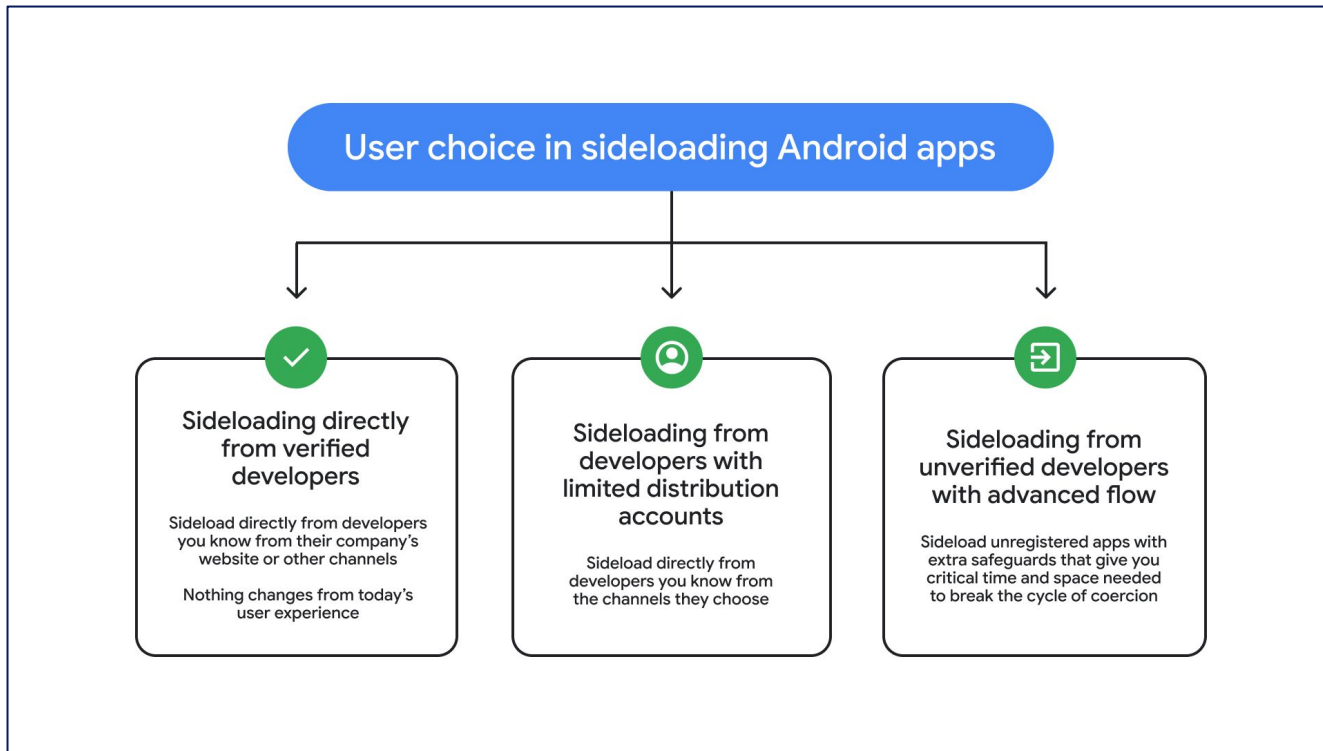
Rollout is in stages, based on region/country

Timeline

We're announcing these changes early and incorporating developer feedback to help keep the Android ecosystem safe and sustainable.

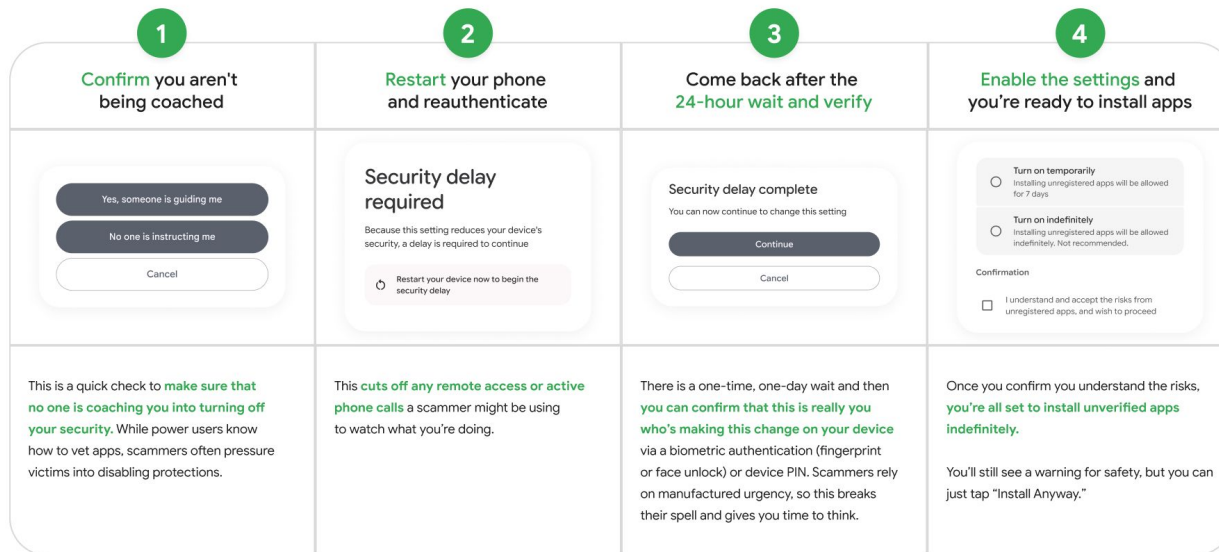
Milestone	Details
August 2026	Developer APIs, limited distribution accounts, and power user advanced flow launch.
September 30, 2026	Regional deadline in Brazil, Indonesia, Singapore, and Thailand for participating app stores.
2027 and beyond	Global rollout for all certified Android devices.

User choice in sideloading Android Apps



Advanced flow for power users

Advanced flow for power users to **sideload apps from unverified developers**



LineageOS Statements

“How does this affect LineageOS and its users?

TL;DR: This will not affect LineageOS directly. But it *may* affect users running the stock ROM on their device.”

“Why is Google doing this?

[...]

Google’s public justification is fraud and malware prevention: they claim **over 50x more malware** comes from sideloaded/internet sources than from the Play Store, and that anonymous, disposable developer identities let bad actors get caught, rebrand, and redistribute the same malware in hours. They’ve also pointed to regulatory pressure (the EU’s DSA, India’s IT Rules, etc.) pushing platforms toward developer traceability generally and framed the rollout order (fraud-heavy markets first: Brazil, Indonesia, Singapore, Thailand) as evidence the fraud rationale is the actual driver rather than a pretext.”

Keep Android Open

“Starting in 2027*, a silent update, nonconsensually pushed by Google, will block every Android app whose developer hasn't registered with Google, signed their contract, paid up, and handed over government ID.

Every app and every device, worldwide, with no opt-out.”

“If Google can retroactively lock down billions of devices that were sold as open platforms, every hardware manufacturer on the planet is watching.”

Summary: Android Developer Verification will come

- Currently, there does not seem to be enough pushback against ADV.
- Advanced Flow for power users exists.
- There are still a lot of unknowns how it will affect the F-Droid Store ([source](#)) and apps installed by it.
- The Android ecosystem is moving more towards the Apple iOS (“walled garden”) ecosystem. There, all app developers must also register with Apple.

Changes for Android App Stores & Android Assistant APIs

Google vs Epic Games - Timeline

[...]

2024-10-07:

- [blog.google - Why Google is appealing the U.S. Epic Games verdict](#)
“even though, unlike iOS, Android is an open platform that has always allowed for choice and flexibility like multiple app stores and sideloading.”

2026-03-04:

- [android-developers.googleblog.com - Android Developers Blog: A new era for choice and openness](#)
- [epicgames - Google's Changes Will Open Android Devices to Competition - Epic Games](#)

2026-08-10:

- [gizmodo - Google Finally Adds a Competing App Store to Google Play After Years-Long Battle With Epic](#)
(The app store is [Aptoide Games](#))

See timeline in [support.google.com - An update regarding Google Play's policies for developers serving users in the US](#)

Google vs Epic Games - Changes

- Other App Stores are installable with the Google Play Store officially
- Google reduces Google Play Store service fees
- Google cannot prohibit/forbid third-party app developers to promote other install methods and paying processes. Nevertheless there is a service fee per transaction.
- Only for the US market

EU DMA Action: Google needs to open up APIs for third-party App Developers

Digital Markets Act (DMA)

“On July 16, 2026, the European Commission adopted a decision under the DMA that requires Alphabet (Google’s parent company) to open up eleven Android features, including always-on wake word detection, ambient sensor access, and screen automation – to all assistants, on equal terms.”

Target goals Android 18 (2027) and Android 19 (2028).

Source: www.openhomefoundation.org - [A big win for Android interoperability](#) (2026-07-31)

Community reactions and changes (non-certified Android devices and ecosystem)

UnifiedPush: the old kid in town

Replacement for Push Notifications provided by Google Mobile Services (GMS) for non-Android certified devices (or for more privacy) has seen increased interest.

See talks:

- [Push-Benachrichtigungen. Dezentral und OpenSource](#) (2026-08-15)
- [UnifiedPush - Push notifications. Decentralized and Open Source](#) (January 2026)

UnifiedAttestation: the new kid in town

Replacement for Google's Play Integrity. Needed by some banking/wallet apps.

- Proposed by [Volla Systeme](#) with others in March 2026
- See
 - [Unified Attestation homepage](#)
 - [VCD26-UnifiedAttestation.pdf](#) (2026-02-09)
- There is a dispute with GrapheneOS developers about the architecture (source [1](#), [2](#)). They prefer a concept called [Hardware attestation](#).
- Not much activity in the source code repos since launch.

Main takeaway from this talk:

Hopefully, you got a good overview of what is going on.

(Quite a lot is based on legal actions from other companies or states.)

Nearly the end of the talk

Time for

- questions,
- answers and
- discussions.

Now or later in the hallway (I have cookies :-)!)

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LLMs used for grammar and spell checking.

Thank you!



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Abstract:

The Changing State of Openness in Android

Date&Time: 16.08.2026 16:15–17:15

Room: HS 8

Schedule: [link to schedule](#)

Subtitle: What has happened? Where is it heading to? And how does the community adapt?

In this talk, I want to give an overview of the changes that Google has introduced in the past twelve months in the Android ecosystem and how they are affecting Android users, device manufacturers, custom ROM maintainers and the open-source community in general. Furthermore, I want to explore the possibilities of how the community can and is already adapting to the changing landscape.

Last year, Google announced the introduction of Android Developer Verification and upcoming restrictions for Android Application sideloading on Android-certified devices. This caused a wave of opposition in the open-source community and led to the creation of the "Keep Android Open" initiative. Projects like UnifiedPush, have seen an increased interest and ideas for a Unified Attestation framework are emerging. Apart from that, there are further changes that Google has made to the development process of the AOSP that affect AOSP developers and custom ROM maintainers, like LineageOS or GrapheneOS. For example, the Pixel phone was dropped as a reference device from the AOSP tree and the count of security patch releases was reduced. In this talk, I want to discuss these examples, along with other developments that have occurred over the last twelve months.