

Android Device Longevity

Android Kernel Support for Longer Device Lifetimes

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Android Common Kernel (ACK) History 2016 - 2023

2016 and earlier: ACK is a patch repository for features and security patches

- Android Security Bulletin (ASB) cites CVEs and provides pointers to fixes in ACK

2017: GregKH announces 6-year LTS lifetime beginning with 4.4

2018 (Android 9): Pixel begins regular LTS updates

- In 2019, 92% of ASB-cited security exploits already fixed for Pixel via LTS

2020 (Android 11): Mandated LTS updates for ecosystem (beginning with 5.4)

- Devices shipping with Linux 5.4+ are required to perform LTS updates twice a year to meet Android Security Patch Level (SPL) requirements

2021 (Android 12): GKI w/5.10+ kernels

- Google does LTS merge for core kernel on behalf of ecosystem
- Out-of-tree patches must, of course, still be handled by vendors/OEMs



ACK Lifecycle 2017-2023

Device lifecycle fits into kernel lifecycle

Event	Relative Date	Example
Upstream LTS kernel created	End of Q4Y0	4.14: 11/2017
Android Platform Release Initial device launches	Q3Y1	Android 9 (Nougat): 8/2018
Android Platform Release Device launches allowed	Q3Y2	Android 10: 9/2019
Android Platform Release Device launches allowed	Q3Y3	Android 11: 9/2020
EOL	Q1Y7 (last launch release + ~3.5y)	4.14 EOL: 1/2024

All of this relies on 6y of support for LTS kernels



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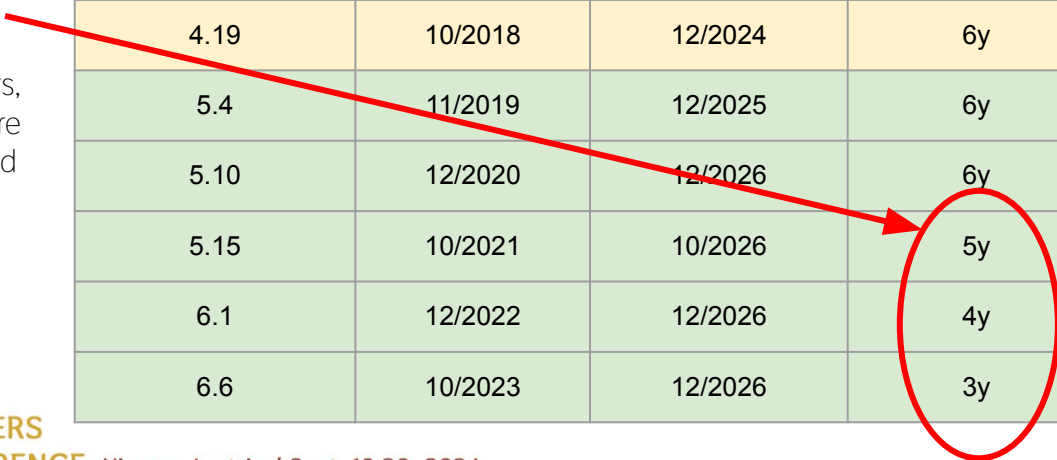
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LTS kernel lifetimes

see <https://source.android.com/docs/core/architecture/kernel/android-common#support-lifetimes>

Long-Term Supported	Launch	Upstream EOL	Upstream Support Life	Android Extension
3.18	12/2014	5/2019	4.5y	to 6y
4.4	1/2016	2/2022	6y	none
4.9	12/2016	1/2023	6y	none
4.14	11/2017	1/2024	6y	none
4.19	10/2018	12/2024	6y	none
5.4	11/2019	12/2025	6y	none
5.10	12/2020	12/2026	6y	none
5.15	10/2021	10/2026	5y	to 6y
6.1	12/2022	12/2026	4y	to 6y
6.6	10/2023	12/2026	3y	to 4y

Oh oh:
6-year lifetimes didn't work due to lack of engagement after 3-4 years, so lifetimes are being reduced



ACK Lifecycle Now

Device lifecycle *does not* fit into kernel lifecycle

Event	Relative Date	Example
Upstream LTS kernel created	End of Q4Y0	6.12: Q4 2024
Device Launch	Q3Y1	Android 16: 8/2025
Device Upgrade	Q3Y2	Android 17: 8/2026
Device Upgrade	Q3Y3	Android 18: 8/2027
Device Upgrade + Kernel Uprev	Q2Y4	Android 19 + 6.x: 2028
Kernel EOL	Q2Y5	6.12 EOL: 7/2028

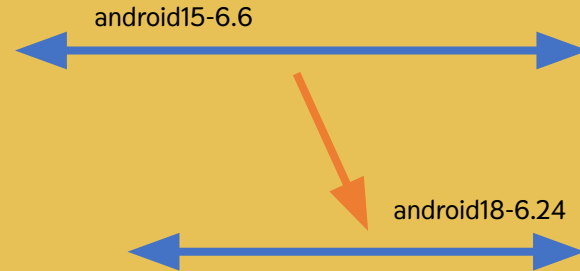


GKI Kernel Uprevs

- Many 2024+ devices will have support lifetimes of 7+ years
- The android15-6.6 kernel will EOL in July 2028 - less than 4 years after the 2024 devices launch
- These devices must Uprev to a later kernel version prior to EOL
- Uprevs will normally be done at the same time as the device upgrades to a new Android platform release
- Provides incentive for SoC vendors and OEMs to upstream drivers
- Most of the work on drivers that implement SoC and Board functionality will already have been completed as part of development of 2027 products by SoC vendors and OEMs

Major Version Uprev from 6.6.A to 6.24.B:

- Replace **android15-6.6** (2023 LTS) kernel with **android18-6.24** (2026 LTS) kernel
- Refactor out-of-tree drivers on new base
- Perf/Power Tuning



What we are doing to help with kernel uprevs

Performance Regression Monitoring on android-mainline

GKI DDK v2 to manage out-of-tree drivers

- Features
 - Build against local sources
 - Build against prebuilts
 - Build against a remote build
- Easy Setup
 - Declare Dependencies
 - Build
- Easier kernel uprev
 - Modify Dependencies
 - Fix Build/Fix Issues



Discussion

What are you most nervous about regarding upgrading your kernel version on devices in the field?

What tools are we lacking that would help you?

What metrics should we be watching to lower the risk of performance regressions on uprev?

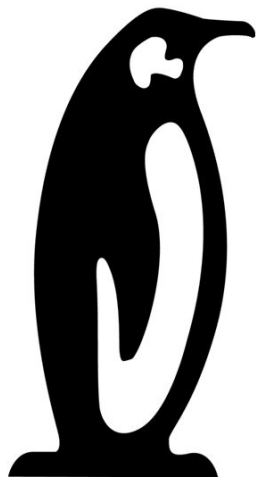


Thank you!

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