Technical Debt in Android Kernels

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One definition of technical debt

"Every patch on top of mainline Linux *required* for Android that is in conflict with the *upstream-first policy* is technical debt."

Tracking out-of-tree patches

- Idea at LPC 2019: maintain patch series

- [kernel/common-patches](#) in AOSP (quilt format)

- reproduces android-mainline when applied to mainline

- creates [android-mainline-tracking](#) branch in AOSP

Tracking out-of-tree patches

- Continuous tracking of android-mainline
  - series rebase on new merges
  - ingestion of new patches (fold if possible)
  - clean removal of obsolete patches
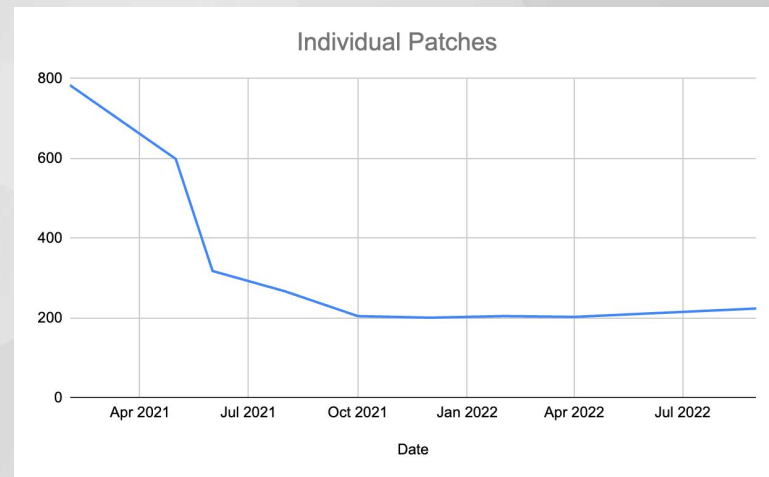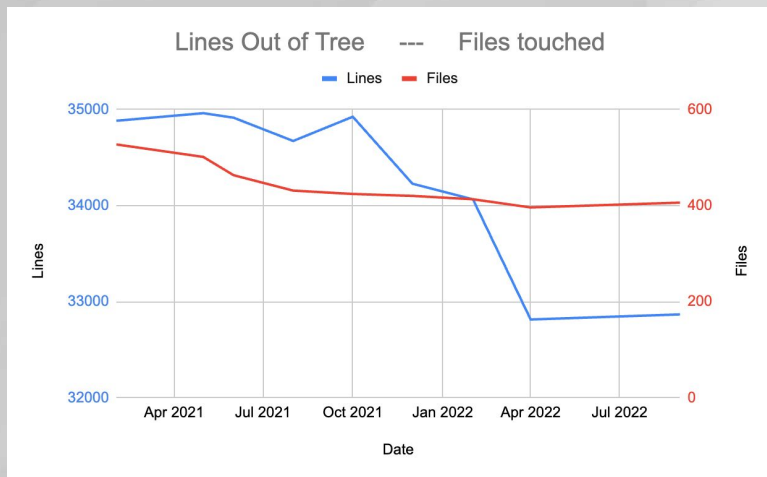 - sorting / classifying / metadata updates

- Total: **224** patches

- 9 Upstream reverts

- 27 Meta (__ANNOTATION) commits

- 42 Pending upstream patches

  - 14 FROMLIST

  - 26 UPSTREAM

  - 2 converted from ANDROID patches

- 149 ANDROID patches   (table →)

Area		# upstream relevant
Configuration, build scripts, docs	21	12
Vendor Hooks	18	1
Symbol exports	13	0
Networking	12	10
Scheduler	10	3
Drivers (incl. FW)	10	8
Kbuild	9	4
DMA	8	8
File system	6	4
Misc	42	33

https://android.googlesource.com/kernel/common-patches/+/refs/heads/master/android-mainline/series

Patches over time

Lines Out of Tree   ---   Files touched

Individual Patches

| IncrementalFS: | 15k lines | GKI defconfig: | 1k lines | ashmem: | 1k lines |
| USB: | 3k lines | dm-user: | 1k lines | | |

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Maintainer Tooling

- Bunch of sophisticated shell scripts

- Automation of rebases, amends, resolutions, quilt series refreshes, etc.

- Public at:
  https://android.googlesource.com/kernel/common-patches/+/refs/heads/master/scripts/

What now ?!?

- Effective "upstreaming worklist"

- Cross check upstream merges from mainline

- Clean patch reverts without leftovers

Questions?