



**LINUX
PLUMBERS
CONFERENCE**

August 24-28, 2020



State of Android on Mainline Kernels

Satya Tangirala <satyat@google.com>

Sumit Semwal <sumit.semwal@linaro.org>

Boot Mainline to UI on AOSP/Master

- For devices fully supported upstream
 - 1 patch: anonymous vma naming
 - Has been around for a while; only since last year or so, is required for AOSP to boot.
 - Inline crypto patches were needed previously; landed in v5.9
- Additional for snapdragon 845 based devices
 - DB845c
 - lomu-smmu patchset, under discussion
 - Lt9611 hdmi bridge driver, already queued for v5.10
 - Pixel3, Poco F1
 - lomu-smmu patchset
 - Board config / dts
 - Panel drivers
 - Amit has a video of Poco F1 running v5.9-rc1 with AOSP/Master [here](#)
 - Few additional patches for touch, Wifi, audio etc

Android Kernel Patches: drill-down

- Based on [android-mainline](#) (on top of v5.9-rc1), as of Aug 17th, 2020
 - Total outstanding: **485** patches
 - Fromlist: **30**; Reverts: **5**
- **ANDROID: 450**
 - Currently active for upstreaming by Android team: **78**
 - IncrementalFs, inline encryption, fscrypt, scsi-ufs, dm-bow, clk-sync-state, serdev
 - Currently active for upstreaming at Linaro: **25**
 - vma naming, dma-buf, wakeup reason, iommu-smmu, sdm845, virtio, v4l2
 - GKI related patches to discuss for upstream: **12**
 - Alternatives being worked upon: **54**
 - usb gadget configs, uid stats, cpufreq-times, ION
 - **Not** on upstream path right now: **260**
 - gki build and config, build, other Android-specific changes
 - Need users upstream: **10** - Drm
 - Misc: arm_pm_restart: **5**, unsure: **6**

Current Status

- Looking at upstreaming / open discussions:
 - Inline Encryption, Incremental FS: Android team is already actively upstreaming.
 - GKI enablement patches: (discussed in the GKI Debt session)
 - Anonymous vma naming:
 - was sent out in 2013 by Colin, but not merged. Sent v5 [here](#)
 - Dma-buf discussions:
 - partial cache update, secure flag
 - Dma-buf heaps as ION replacement
 - lommu-smmu, sdm845
- Slow due to missing In-kernel users
 - Drm patches: eg drm-notifier
 - New dma-buf heaps, and framework updates
 - need more companies upstreaming their downstream heaps
- Need to start on
 - Wakeup_reason (refreshed patches in AOSP)
 - Virtio, v4l2

State of inline encryption patches

- The basic inline encryption patches went upstream in v5.8 and 5.9:
 - Includes block layer patches in v5.8 and UFS, fscrypt, f2fs, ext4 patches in v5.9
- Android-mainline and android12-5.4 are up to date with what's upstream
- Android[11-5.4, -4.19, -4.14] have older implementation of patch series
- Still a number of out of tree features in the android kernels
 - dm-default-key for metadata encryption
 - Working on a metadata encryption solution for upstream now.
 - Device mapper support
 - Working on this now. Hopefully sent out by presentation time :)
 - Direct I/O support
 - Proposed upstream for 5.9 - objected to because it adds an alignment restriction.
 - Awaiting input from vendors regarding alignment requirements for hardware.
 - Hardware wrapped keys
 - UFS crypto variant ops (except in android-mainline)
 - eMMC support (except in android-mainline)
 - Ideally introduced upstream along with users of the code by vendors

Discussion

- Anonymous vma naming
 - Last version v4 was posted by Colin Cross in 2013; it wasn't merged, and then fell off the radar.
 - V5 posted [here](#) by Sumit; discussions ongoing on the MLs.
- More details on IncrementalFS, dm-user in the following sessions.