State of Android on Mainline Kernels

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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
    ■ Iommu-smmu patchset, under discussion
    ■ Lt9611 hdmi bridge driver, already queued for v5.10
  ○ Pixel3, Poco F1
    ■ Iommu-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](https://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, fsencrypt, 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 configfs, 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
  ○ Iommu-smu, 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.