Keeping up with android-mainline-tracking kernel

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What this won’t cover

● Android out of tree legacy patchset
  ○ Already covered in details few times in the past
  ○ Most recently at ELC NA 2018
    Android Common Kernel and Out of Tree Patchset

● Android common kernel
  ○ Explained with details at architecture/kernel/android-common

● Android EAS dev
  ○ EAS is developed upstream and its progress can be tracked at
    kernel/common/experimental/eas-dev
  ○ YVR18-406:‘EAS for Android’ & mainlining update
android-mainline-tracking kernel
What is android-mainline-tracking?

- **android-mainline-tracking** kernel is android-$(latest-LTS) common kernel patchset rebased to mainline Linux kernel.
  
  ○ For example, as of today
  
  `android-mainline-tracking` == android-4.14 patchset rebased to v4.19-rc2
  
  ■ LTS versions get tagged as android-$(latest-LTS)
  
  ■ Non-LTS release versions are smoke tested on db410c and tagged.
  
  e.g: **experimental-android-4.18**
Why?

- Find/Report/Fix Android regressions or ABI breakages in upstream kernel.
- Testbed for WIP patches which are yet to be submitted upstream for RFC.
- Reference or experimental preview tree for member partners for their upcoming SoCs.
git diff v4.19-rc2..android-mainline-tracking

- 277 files changed, 24129 insertions(+), 701 deletions(-)
  - 20.1% fs/sdcardfs/
  - 19.5% net/netfilter/ (qtaguid, quota2)
  - 10.2% drivers/usb/gadget/ (f_accessory, f_audio_source)
  - 07.7% arch/ (ranchu, cuttlefish defconfigs)
  - 07.2% drivers/input/ (input_gpio, keyreset, keycombo)
  - 06.2% drivers/md/ (dm-android-verity)
  - 04.6% kernel/ (wakeup_reason, cpu_freq_times, CFI)
  - 04.4% drivers/misc/ (uid_sys_stats, memory_state_time)
Keeping up with android-mainline-tracking
PPP: PPTP/L2TP replacing oPNS/oLAC

- Upstream PPTP and L2TP PPP driver support added
  - Android' inhouse oPNS and oLAC drivers are deprecated.
  - Relevant patches across AOSP (mtpd, pppd, kernel/configs) are merged to make AOSP run with upstream drivers.
  - HowTo: Make Android use upstream PPP VPN code
    - YVR18-501: Using VPN implementation from upstream kernel in Android
Clang Control Flow Integrity

● Clang CFI support added
  ○ It enforces/restricts the control-flow of an application to valid execution traces, by monitoring the application at runtime and comparing its state to a set of known valid states.
  ○ AOSP Gerrit topic:"android-4.14-cfi"
Socket Accounting: eBPF replacing qtaguid

- Android’ Qtaguid netfilter module is used for network monitoring and per application (uid) data usage accounting.

- Obsolete. To be replaced by eBPF in android-4.19
  - LPC 2017: eBPF cgroup filters for data usage accounting on Android
Dropped patchset

- **FIQ debugger driver**
  - Deprecated. No longer used by vendors

- **Goldfish hacks and hooks**
  - To be maintained upstream

- **Keychord input driver**
  - Obsolete. Replaced by userspace /dev/input/ interface

- **Trace events**
  - Mostly upstreamed.
  - No users for leftover deprecated trace events.
Dropped patchset (contd.)

- **MMC hacks and hooks**
  - No users for mmc sdio device and deprecated mmc retries and re-detection hacks.

- **USB otg-wakelock and dual role sysfs interface**
  - Superseded by upstream implementations

- **Legacy hacks and workarounds**
  - Clang/gcc build hacks
  - Device specific workarounds
  - Obsolete debug hooks
Renewed upstreaming effort

- Android kernel team is taking more upstream friendly approach in android-common kernel development
  - New feature goes thru respective mailing-list review first
  - Upstream fixes go thru stable kernels

- Legacy android-patchset seem to be going thru cleanup
  - Patches are being reworked and submitted upstream
  - Device specific hacks and hooks are being dropped from common kernel
  - Non-upstreamable features are being worked upon to move to userspace instead
Q&A