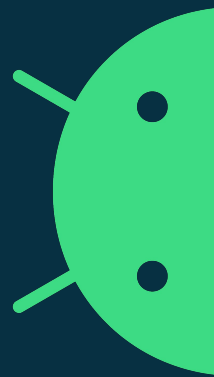# DRM/KMS for Android

Adoption, upstreaming, testing update

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DRM/KMS Devices in AOSP

- Pixel 3a / 3a XL
  - Same driver as Pixel 3

- DragonBoard 845c (under review)
  - Same SoC as Pixel 3, but not the same driver
  - Proves Android can run on upstream driver

- Cuttlefish
  - Uses `virtio_gpu`
  - Backported `virtio_gpu` from upstream (~5.3-rc4) to 4.14 for features
    - in/out fence support
    - EDID support
    - Still issues with default FB format

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AOSP Status

○ **Pixel 3 / 3 XL / 3a / 3a XL**
Large driver, very different to upstream

```
$ git diff --shortstat v4.9.165..android-msm-bonito-4.9-android10 drivers/gpu/drm/drm_*.{c,h}
       13 files changed, 1004 insertions(+), 70 deletions(-)
$ git diff --shortstat v4.9.165..android-msm-bonito-4.9-android10 drivers/gpu/drm/{msm,bridge}
       197 files changed, 127835 insertions(+), 424 deletions(-)
```

○ **Hikey / Hikey 960**
Small delta with upstream

```
$ git diff --shortstat v4.14.140..android-hikey-linaro-4.14 drivers/gpu/drm/drm_*
       5 files changed, 115 insertions(+), 4 deletions(-)
$ git diff --shortstat v4.14.140..android-hikey-linaro-4.14 drivers/gpu/drm/hisilicon
       16 files changed, 8737 insertions(+), 2 deletions(-)

$ git diff --shortstat v4.19.68..android-hikey-linaro-4.19 drivers/gpu/drm/drm_*
        (no changes)
$ git diff --shortstat v4.19.68..android-hikey-linaro-4.19 drivers/gpu/drm/hisilicon
       20 files changed, 11423 insertions(+), 2 deletions(-)
```

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AOSP Status

- **BeagleBoard X15**

  Small delta with upstream

  ```
  $ git diff --shortstat v4.14.119..android-beagle-x15-4.14 drivers/gpu/drm/drm_*
        6 files changed, 192 insertions(+), 18 deletions(-)
  $ git diff --shortstat v4.14.119..android-beagle-x15-4.14 drivers/gpu/drm/{omapdrm,panel,tidss,tilcdc}
        116 files changed, 17998 insertions(+), 1007 deletions(-)

  $ git diff --shortstat v4.19.50..android-beagle-x15-4.19 drivers/gpu/drm/drm_*
        6 files changed, 49 insertions(+), 13 deletions(-)
  $ git diff --shortstat v4.19.50..android-beagle-x15-4.19 drivers/gpu/drm/{omapdrm,panel,tidss,tilcdc}
        95 files changed, 14181 insertions(+), 5669 deletions(-)
  ```

- **DragonBoard 845c (under review)**

  Basically upstream

  ```
  $ git diff --shortstat v5.2..dragonboard-android-mainline-tracking drivers/gpu/drm/drm_*
        (no changes)
  $ git diff --shortstat v5.2..dragonboard-android-mainline-tracking drivers/gpu/drm/{bridge,msm}
        7 files changed, 1277 insertions(+), 2 deletions(-)
  ```

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~~Kernel~~ DRM Hacking with Cuttlefish

- Display stack has been switched to DRM/KMS

  ```
  $ launch_cvd -gpu_mode=drm_virgl
  ```

- Works with `crosvm` on Chrome OS and Linux

- Adding QEMU support back soon

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Android Common Kernel

- Partners merge from ACK tree
  - Need to be careful with DRM core changes

- Generic Kernel Image (GKI) will come from this tree
  - Ecosystem shows us most DRM/KMS drivers depend on core backports..
  - ..but we haven't had much feedback on what to backport yet

- Cuttlefish is the only 'reference' currently
  - Backported e.g. `virtio_gpu` without making core changes

- Greater alignment of Android kernels is critical
  - This should be good for upstream, too

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Testing Update

- DRM hwcomposer used on AOSP dev boards
  - hikey, hikey960, cuttlefish, db845c, beagle_x15 (wip)

- `igt-gpu-tools` has been added to AOSP
  - Android build system / porting changes
  - Looking at tests we can enable as a baseline soon

- Detection of DRM display driver will be added to Android VTS
  - Detection will trigger `igt-gpu-tools` on those display drivers

- Incrementally increasing test cases / coverage

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Questions ?

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