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Running Android on the Mainline Graphics Stack

Robert Foss

Software Engineer

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Open First

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Agenda

- Android Graphics Stack
- Open Source Graphics Stack
- Current Status
- Why does this matter?

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Android Graphics Stack

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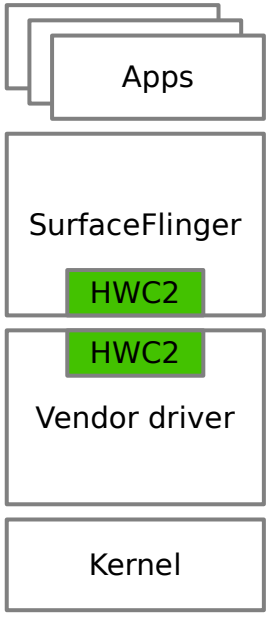
Android Graphics Stack



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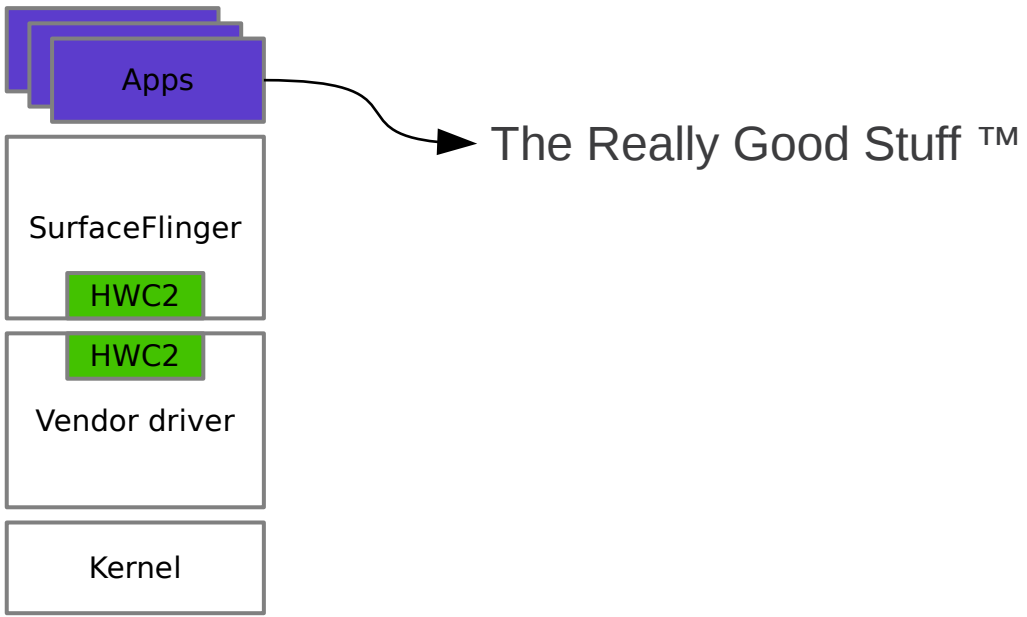
Android Graphics Stack



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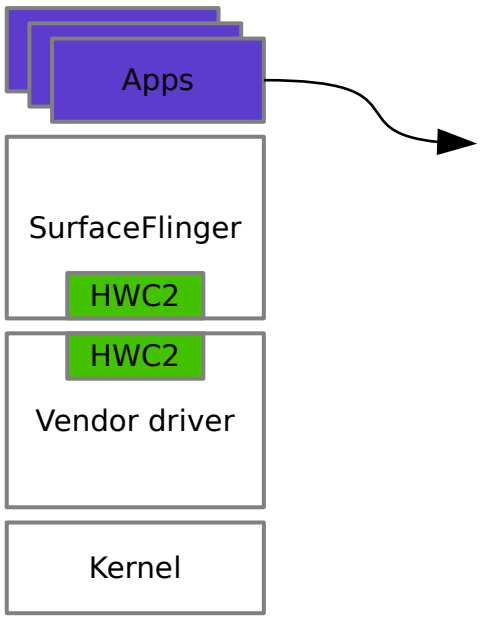
Android Graphics Stack



The Really Good Stuff ™
- No really, this is the whole point!

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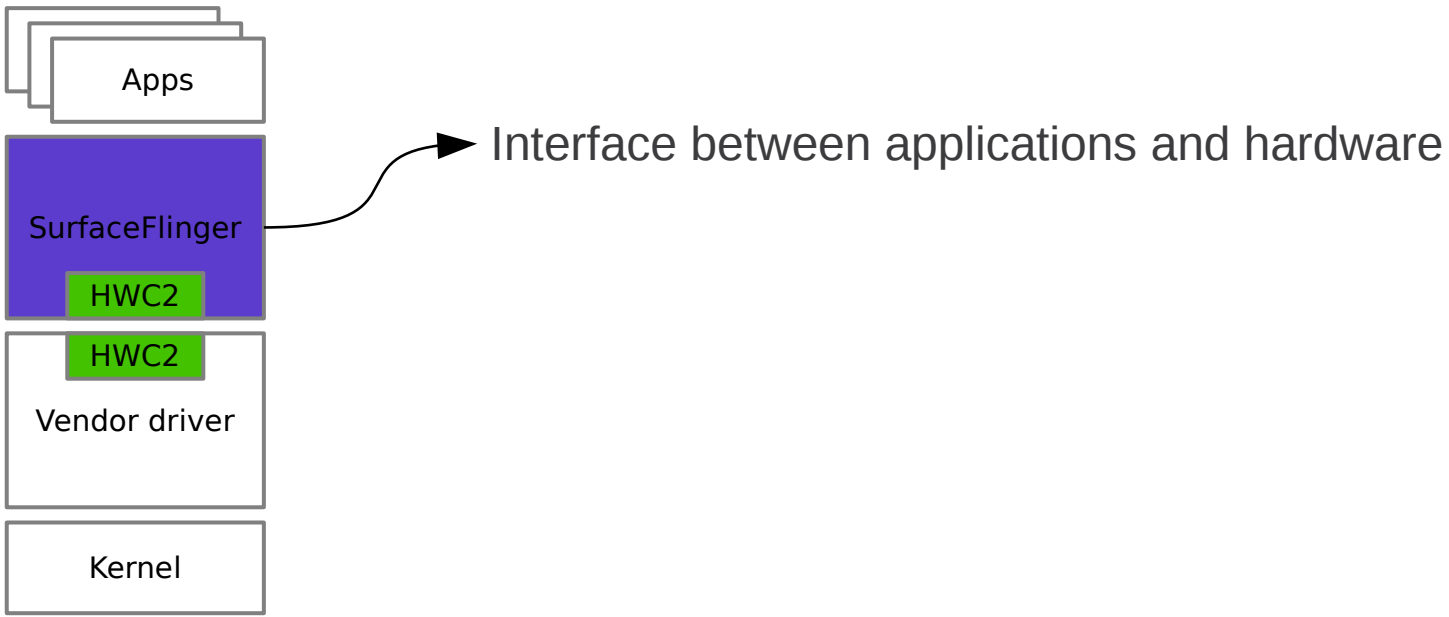
Android Graphics Stack



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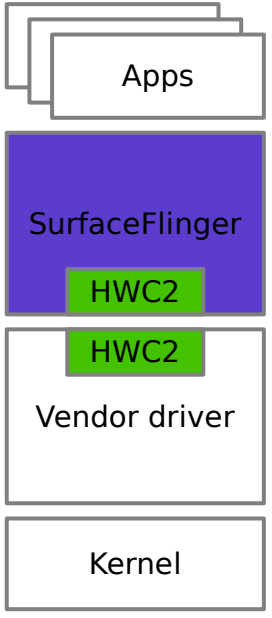
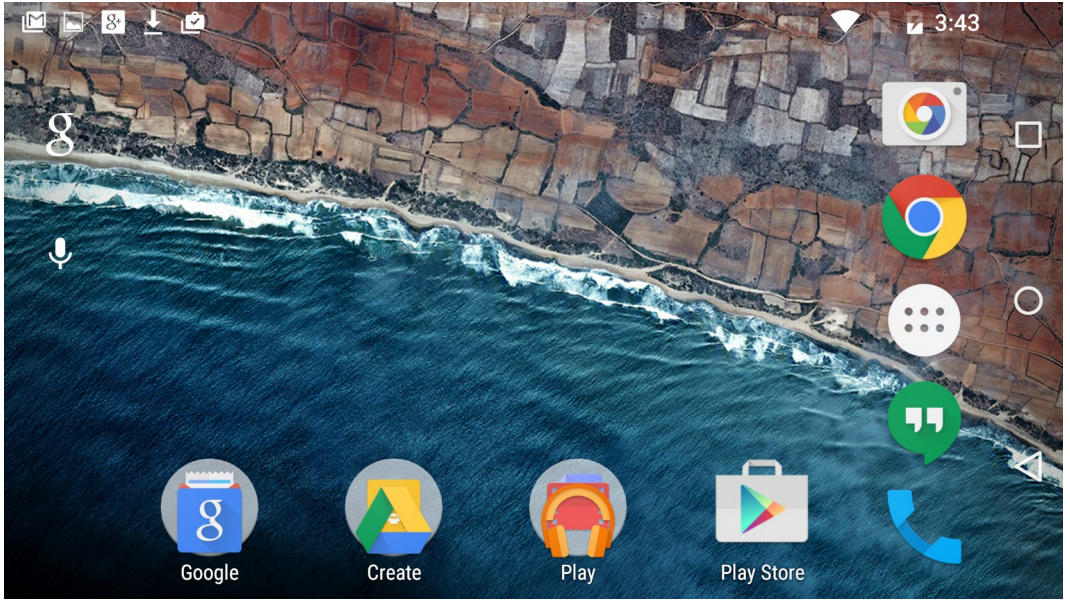
Android Graphics Stack





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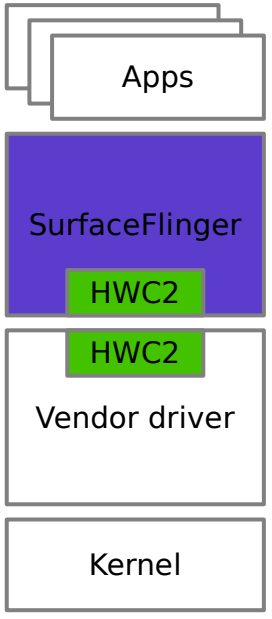
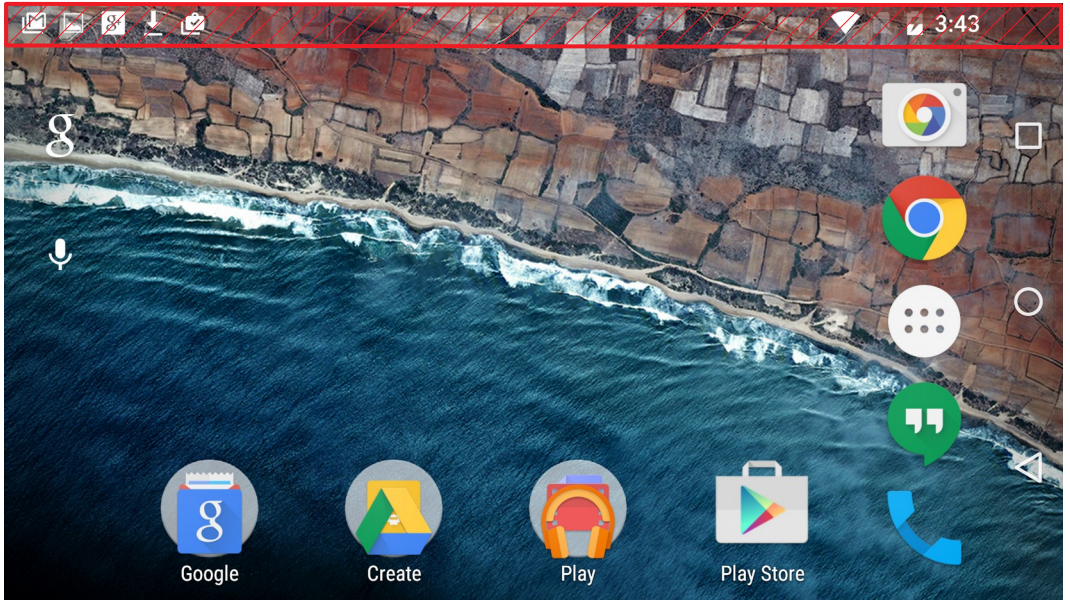


Status Bar



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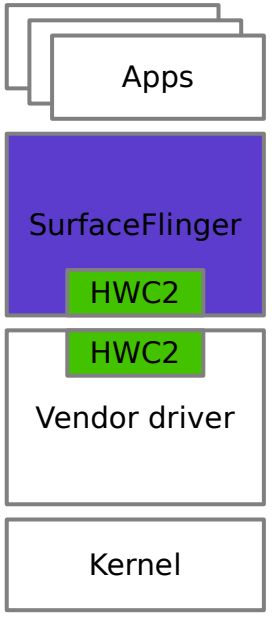

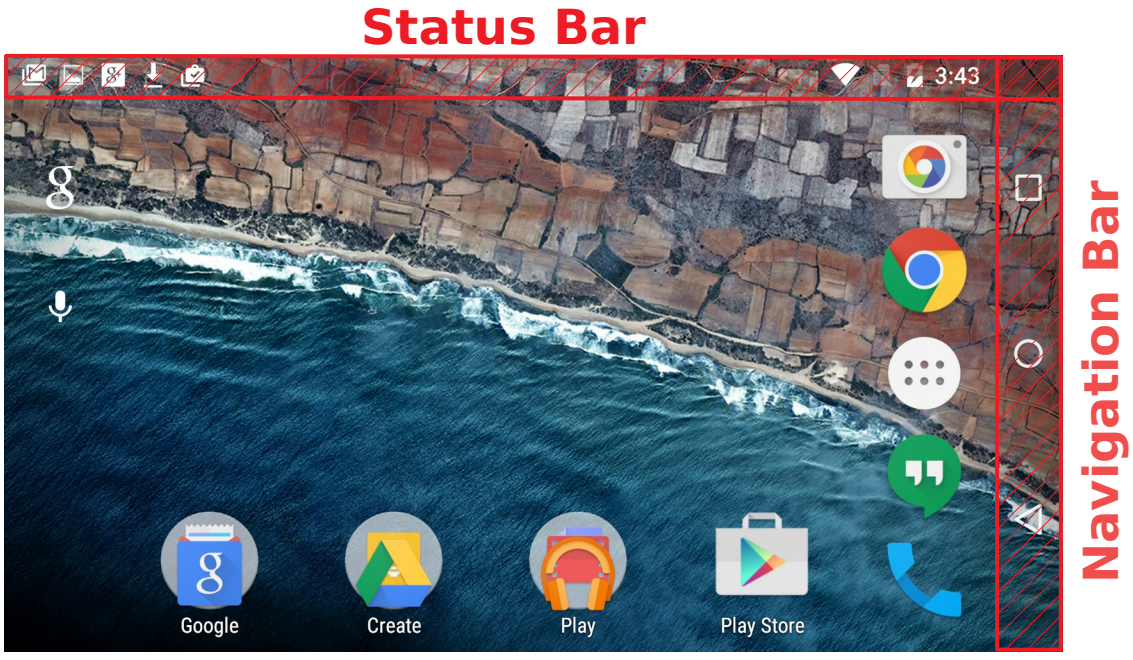

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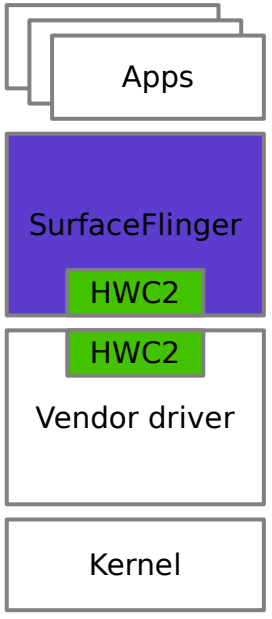

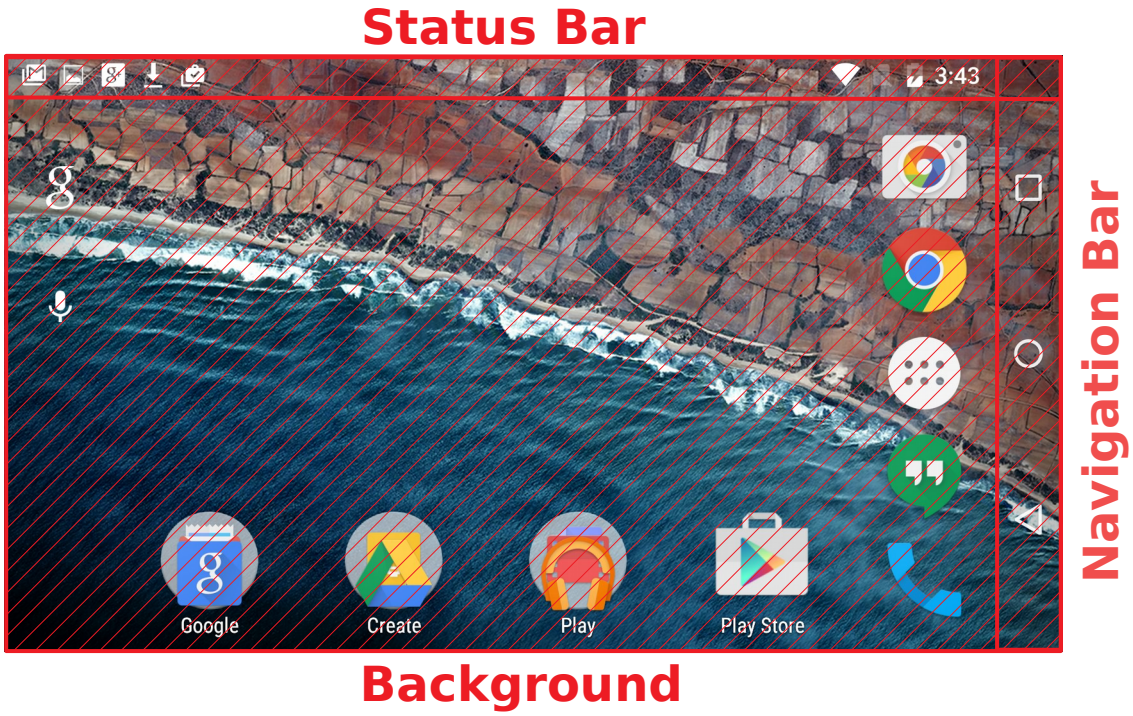

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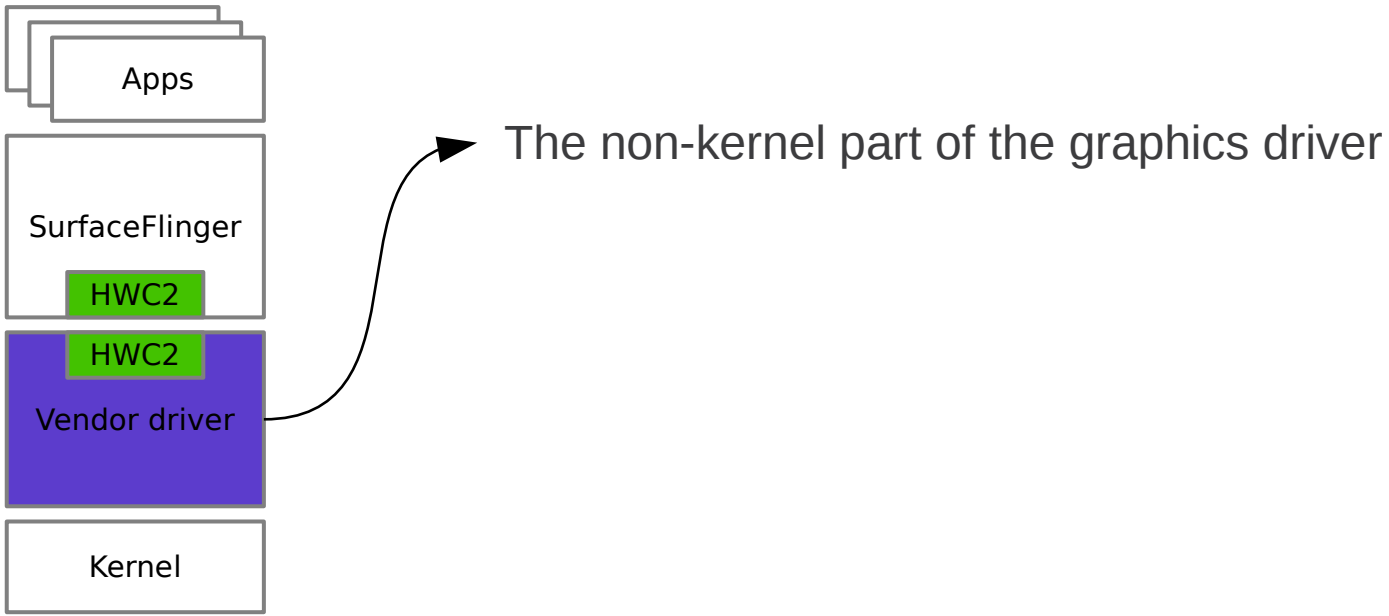

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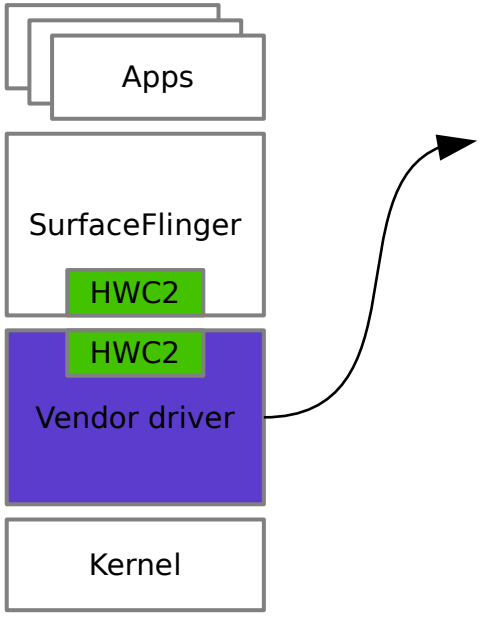

The non-kernel part of the graphics driver
- OpenGL, Vulkan, memory allocator, etc.

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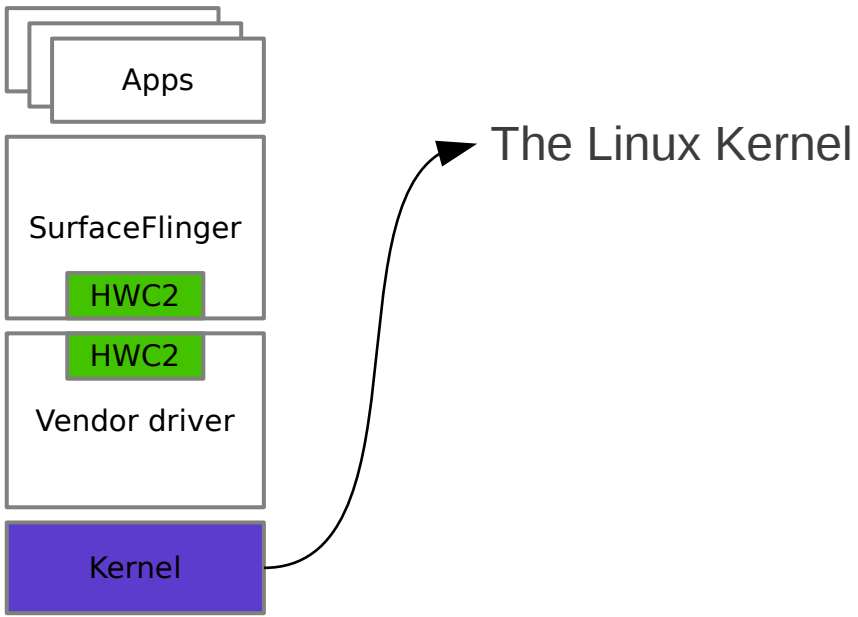
Android Graphics Stack



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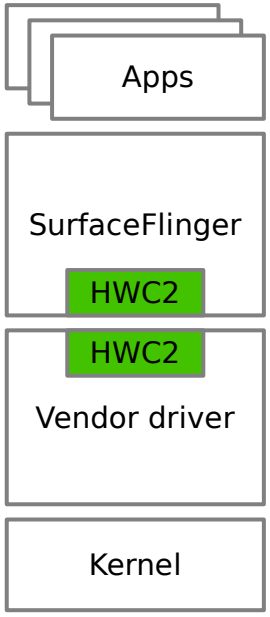
Android Graphics Stack

What does the HWC2 API do?



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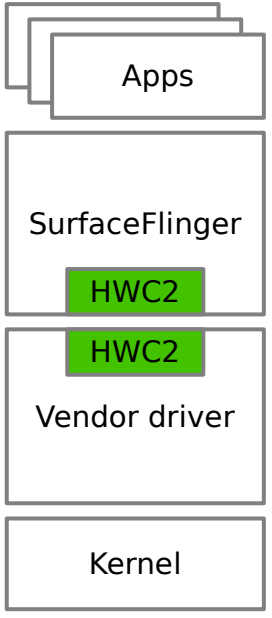

- API used between SurfaceFlinger and hardware

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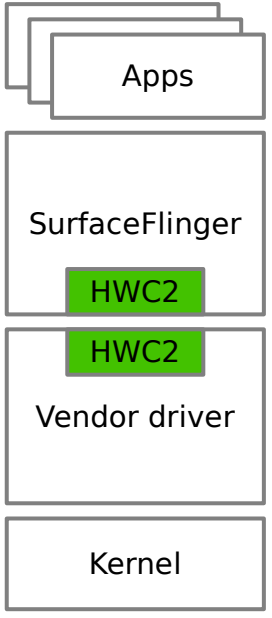

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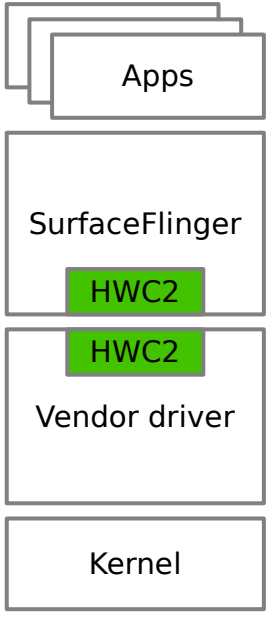

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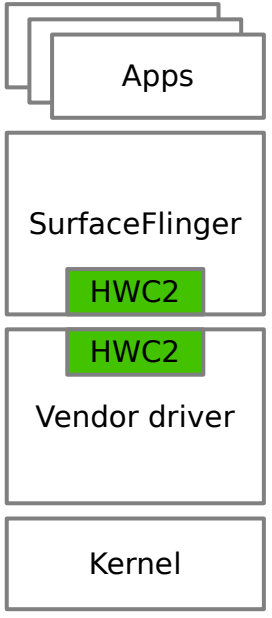

- API used between SurfaceFlinger and hardware
- Compose layers to the screen
- Abstract graphical objects
- Offload work from GPU to compositor hardware

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Mainline Grahpics Stack

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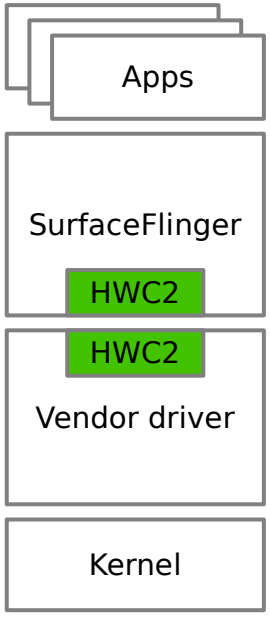
Mainline Graphics Stack

Where does the OSS stack fit in?



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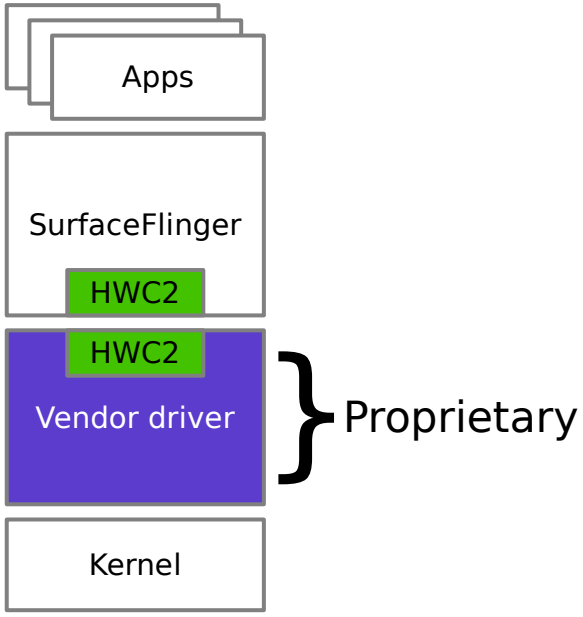

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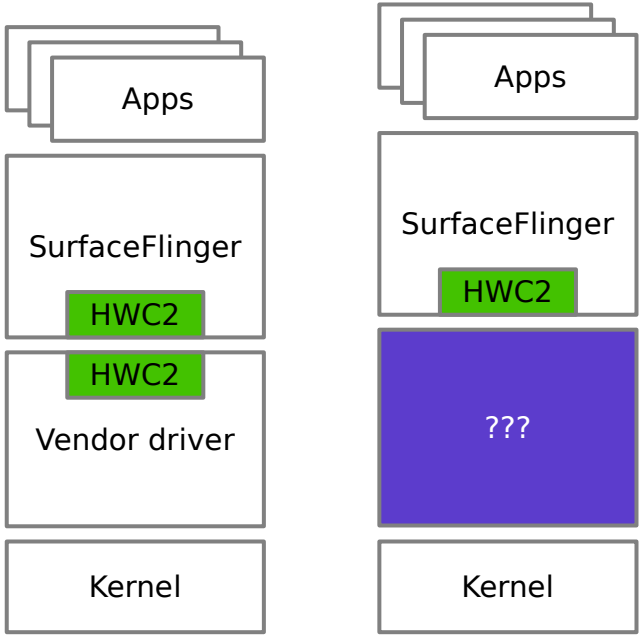

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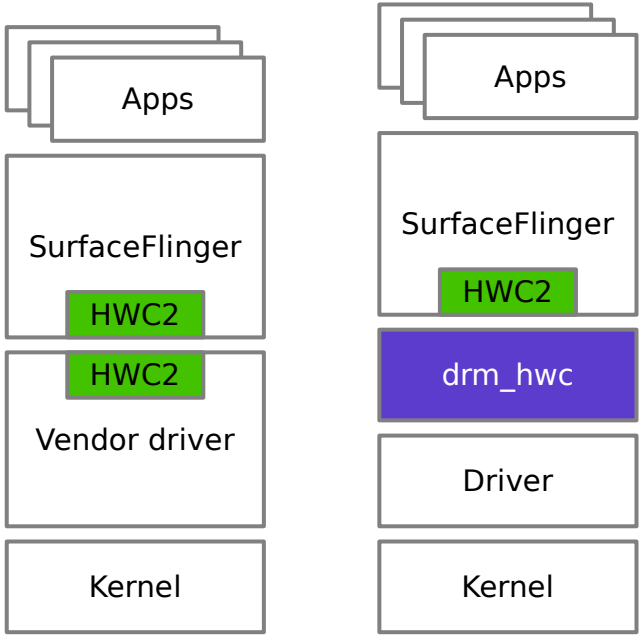

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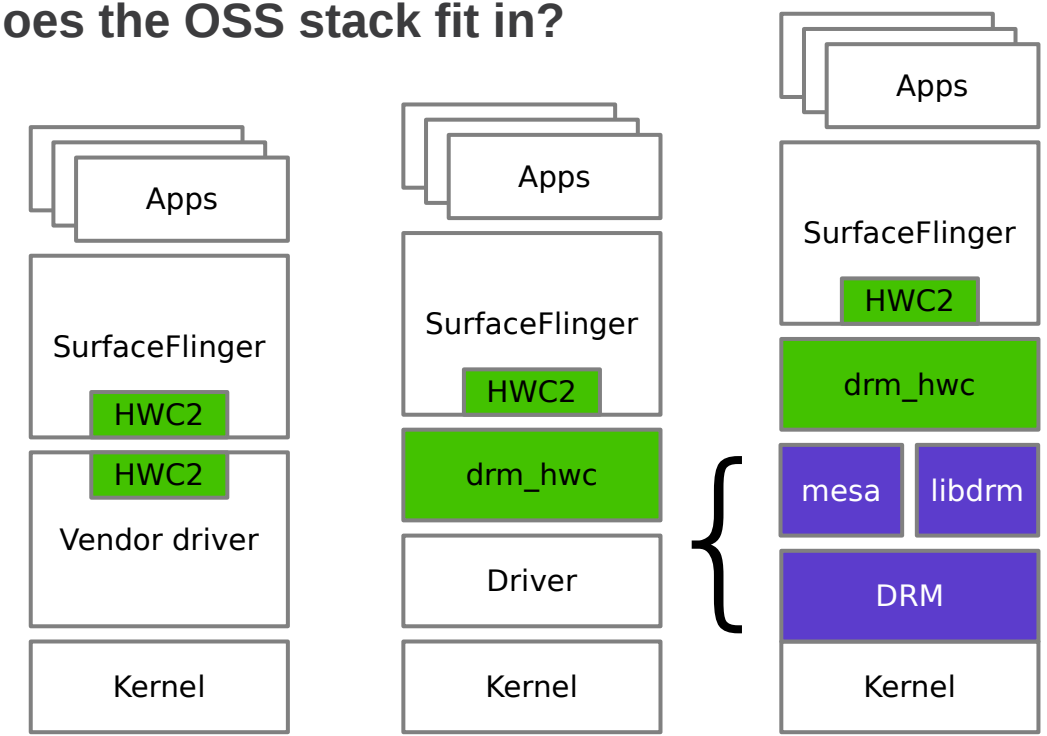

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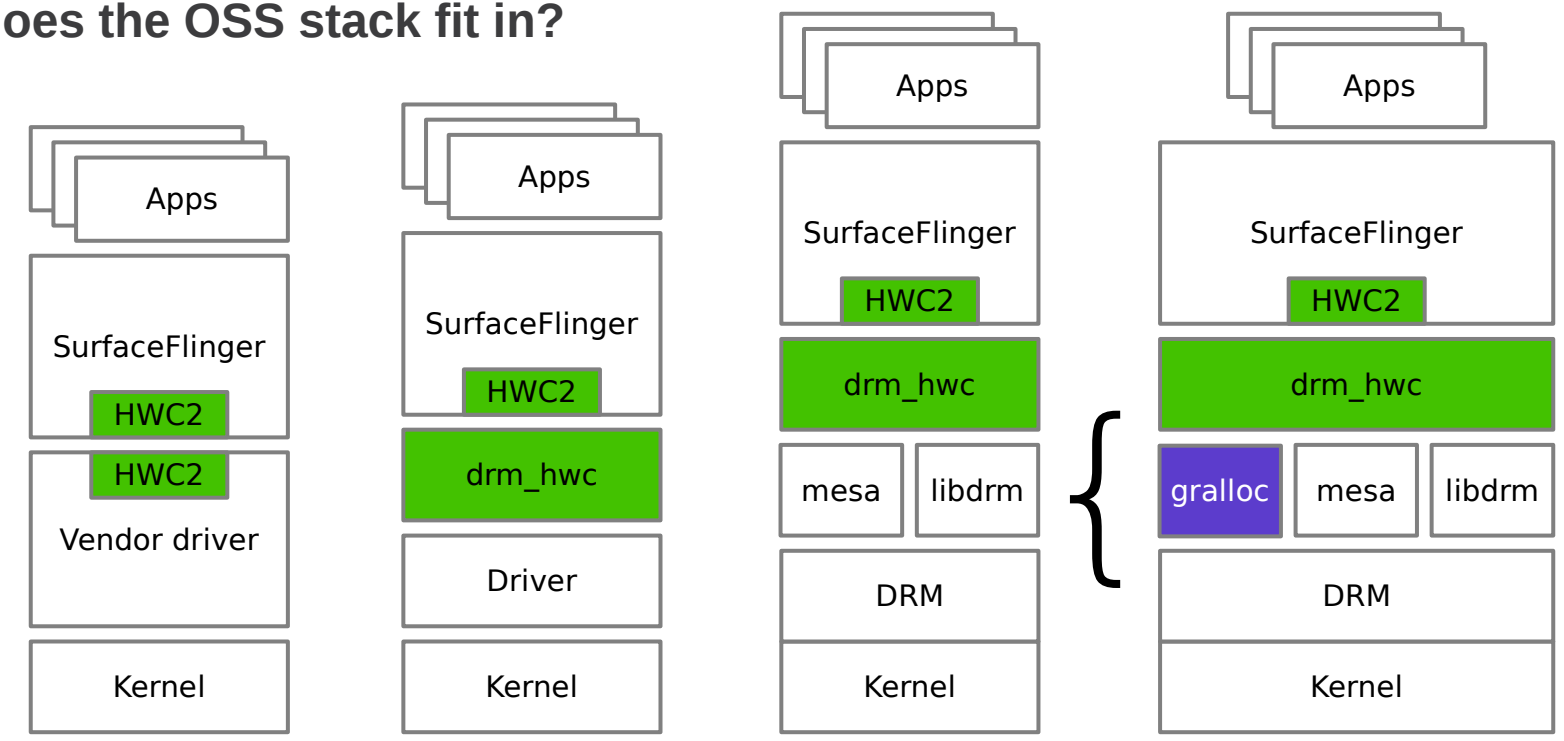

Mainline Graphics Stack

What does drm_hwcomposer do?

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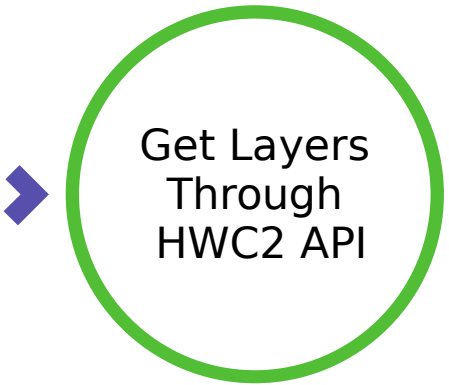

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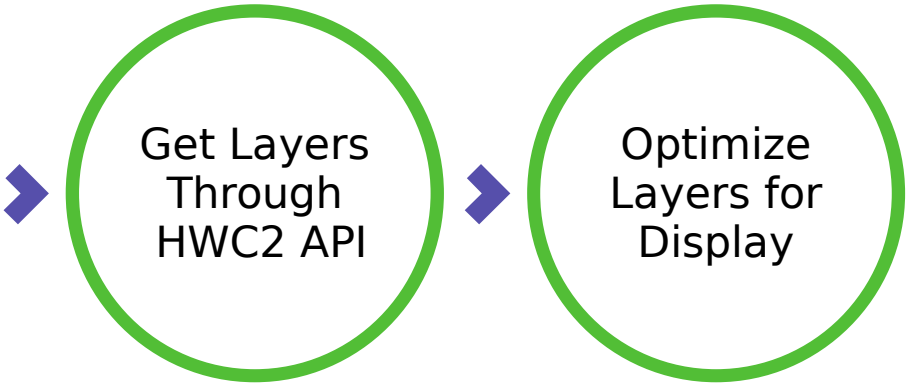

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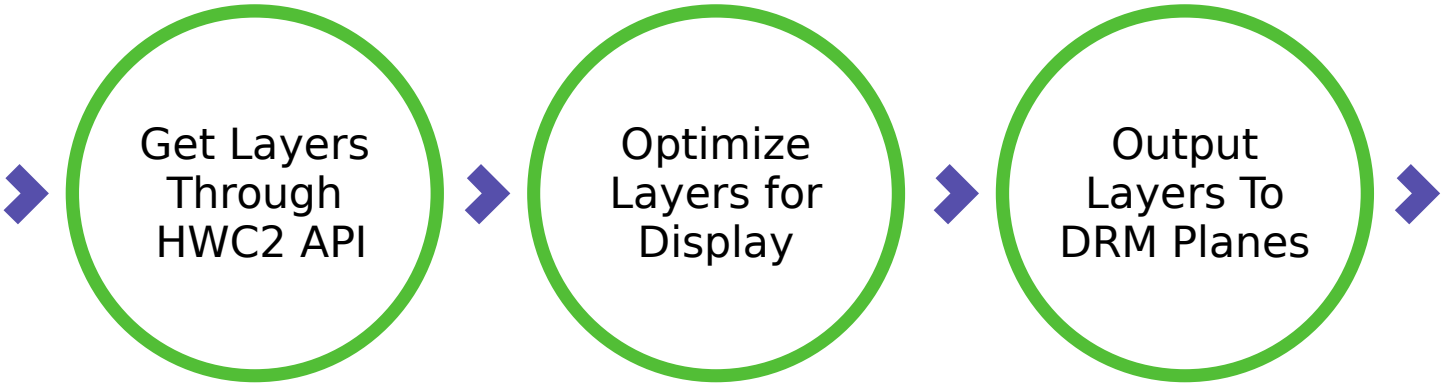

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Current Status

Current status

Why now?

Current status

Why now?

- Kernel Buffer Synchronization support
  - Inspired by Android kernels, now in mainline
  - Some GPU drivers now support this

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Why now?

- Kernel Buffer Synchronization support
  - Inspired by Android kernels, now in mainline
  - Some GPU drivers now support this

- Atomic Display Framework API
  - Most drivers implement this

Current status

Tested platforms

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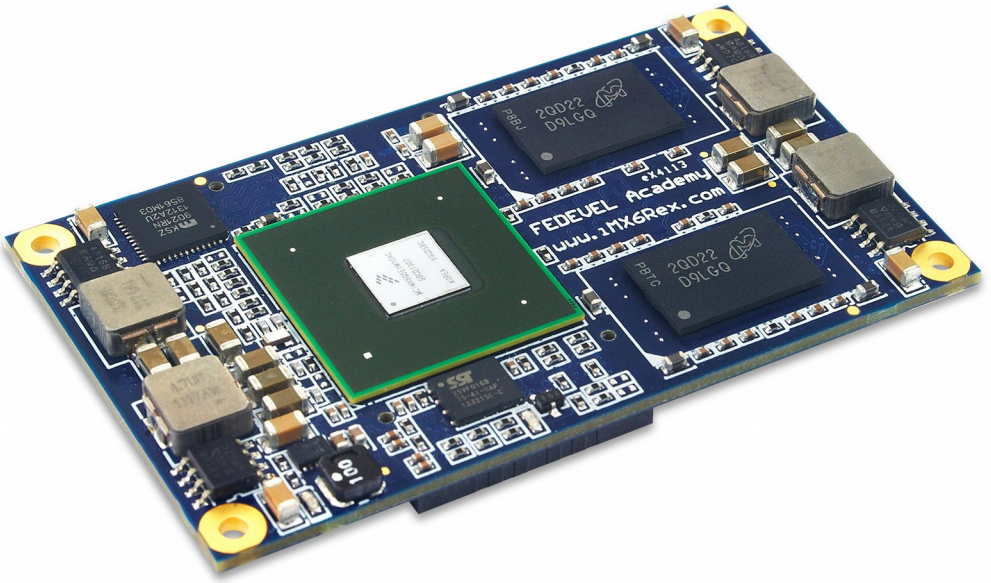
Current status

Tested platforms

- iMX6
  - GPU: Vivante GC3000



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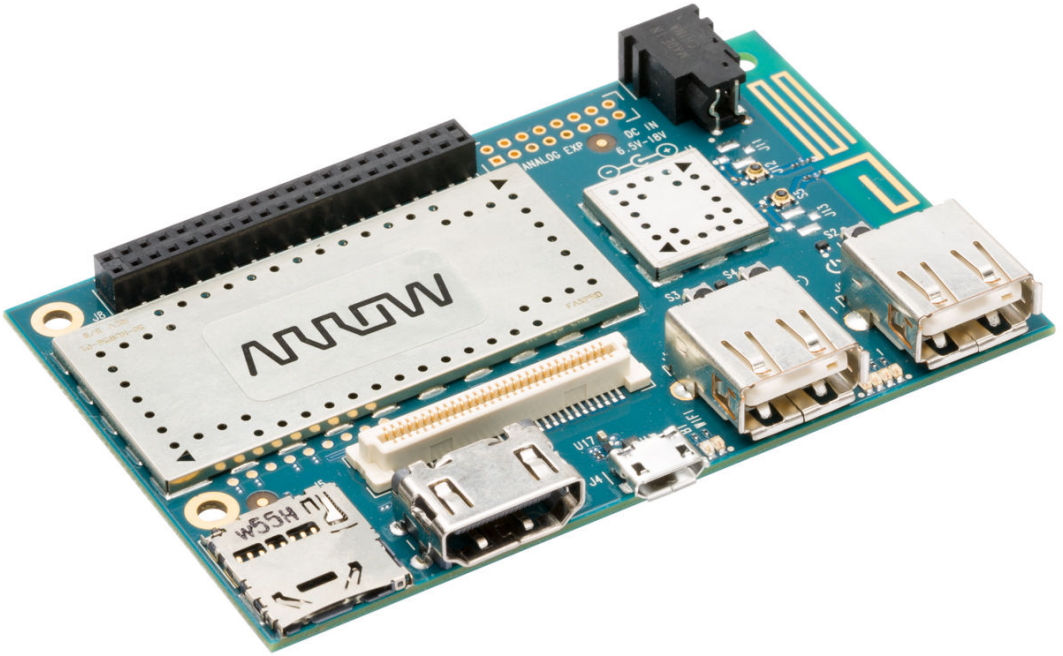
Current status

Tested platforms

- Dragonboard 410c
  - GPU: Adreno 306



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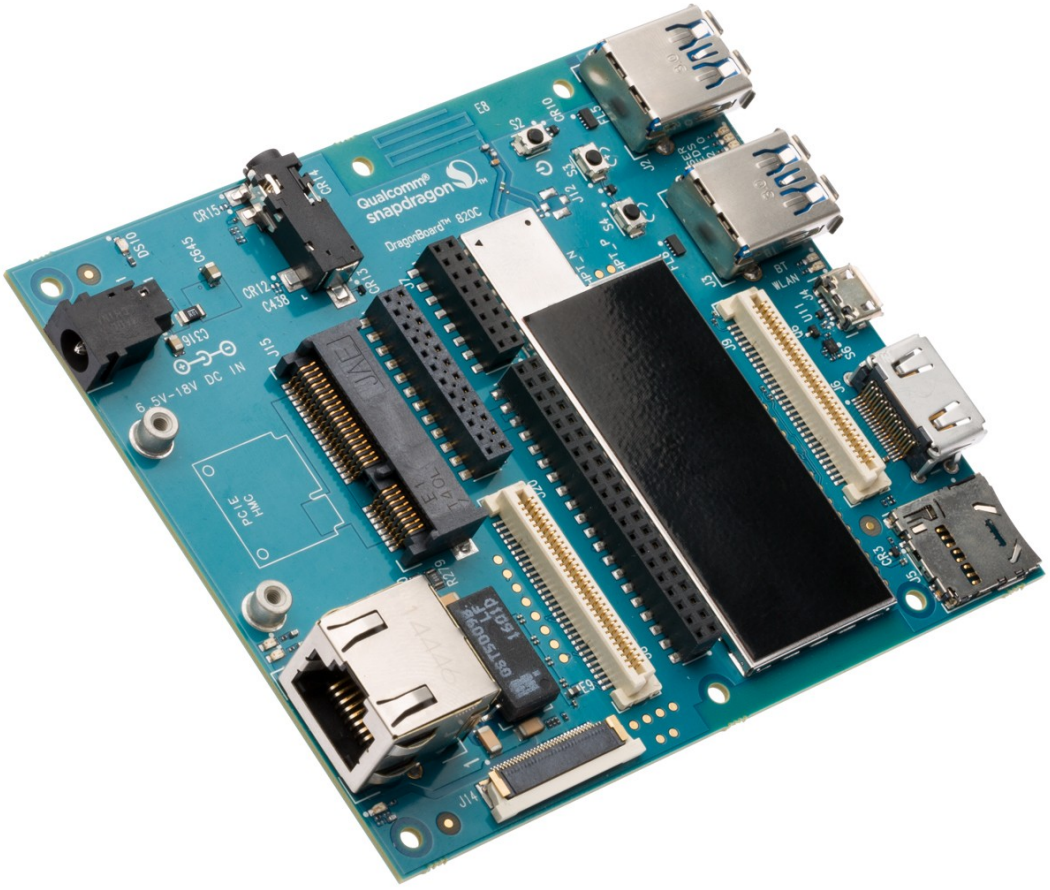
Current status

Under Development

- Dragonboard 820c
  - GPU: Adreno 560



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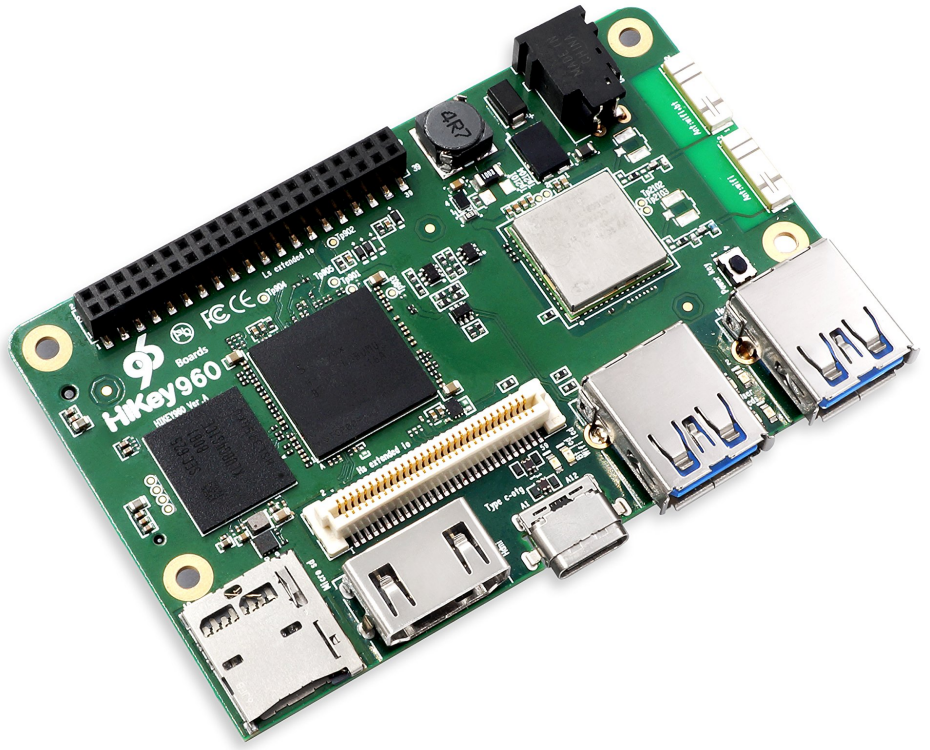
Current status

Under Development

- HiKey 960
  - GPU: Mali G71



Current status

Project Hosting

Current status

Project Hosting

- Previously hosted within ChromiumOS

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Current status

Project Hosting

- Previously hosted within ChromiumOS
- Now hosted on Freedesktop.org

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Why?

Why?

Long term support

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Why?

Long term support

- Deliver products with >10 year lifespan

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Why?

Long term support

- Deliver products with >10 year lifespan
- Support can be provided by anyone

Why?

Long term support

- Deliver products with >10 year lifespan
- Support can be provided by anyone
- Hardware support even if the vendor disappears

Why?

Push industry towards Open Source

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- Lower driver development costs

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- Increase driver quality

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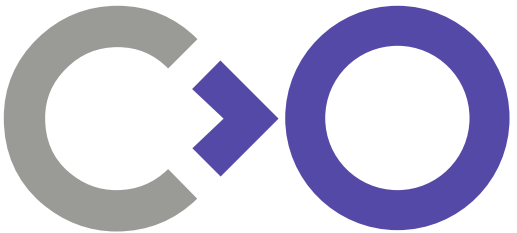
Push industry towards Open Source

- Lower driver development costs
- Increase driver quality
- Lower cost for device manufacturers



Thank you!