AMD

AMD LINUX® DRIVER STACK

OCTOBER 2014

Project Summary

- The amdgpu project will unify AMD's Linux® driver offerings
- A key component is the new open source Base Graphics Driver[1] which will:
  - be upstreamed as much as possible
  - be unified to support both closed and open source user mode driver stacks to fit multiple use cases
  - consolidate advantages and features of current AMD Radeon ™ and AMD Catalyst™ graphics drivers
- Requires changes in both closed source and open source user mode drivers to work with this new open source Base Graphics Driver.

1. Base Graphics Driver includes kernel graphics driver, user/kernel interface libraries and DDX driver

Upstream

- The existing open source AMD Radeon driver and new amdgpu driver leverage upstream components
  - TTM – Open source graphics memory manager
  - DRM – Open source graphics modesetting and GPU infrastructure
  - GBM – Generic Buffer Manager for EGL
  - DRI – Protocol for sharing buffers between X and other UMDs
  - Glamor – X acceleration layer
- We are not open sourcing the existing AMD Catalyst code base
  - amdgpu is based on current upstream open source AMD Radeon kernel driver
  - Component expertise (display, power management, etc.) will be leveraged in new form

AMD Linux Stacks

AMD

All Open

- Open source Base Graphics[1]
- KFD and HSA runtime
- Open source UMDs
  - OpenGL
  - Multimedia
  - OpenCL™

Non-Pro

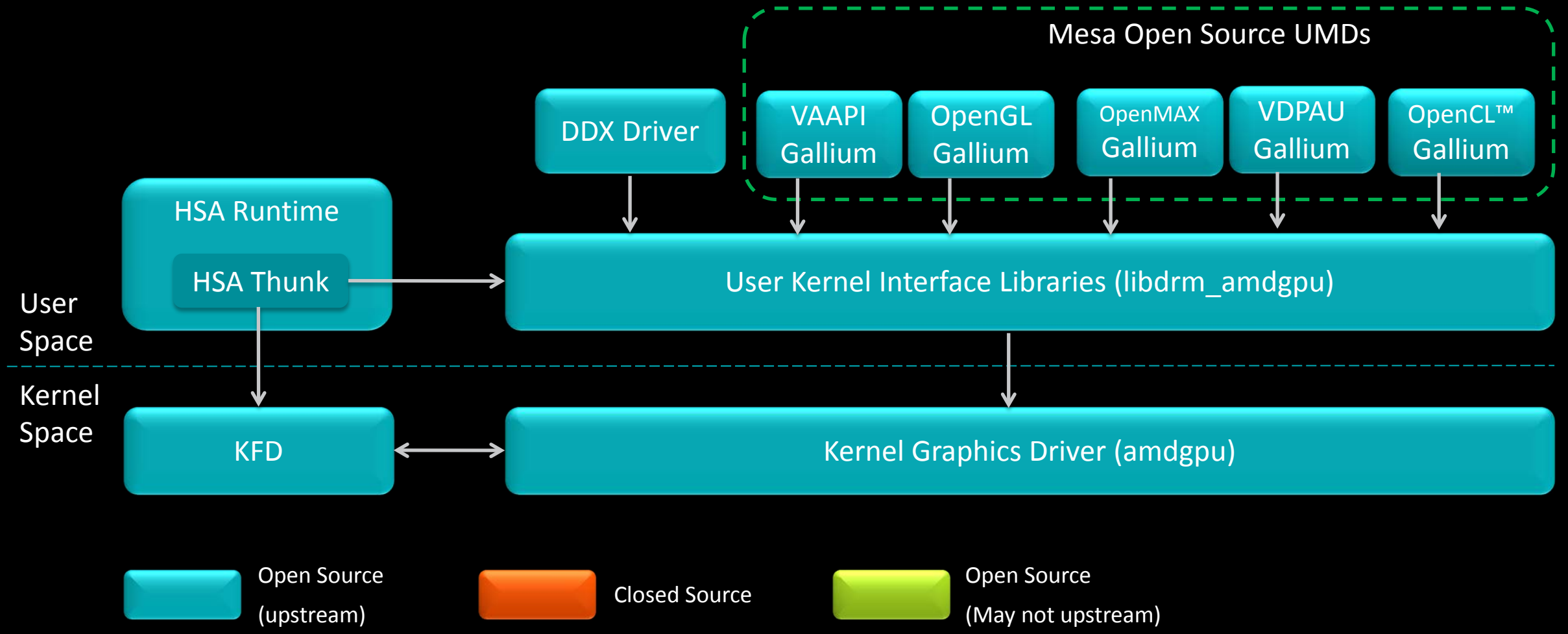
- Open source Base Graphics[1]
- KFD and HSA runtime
- Closed source UMDs
  - OpenGL
  - Multimedia
  - OpenCL

Pro

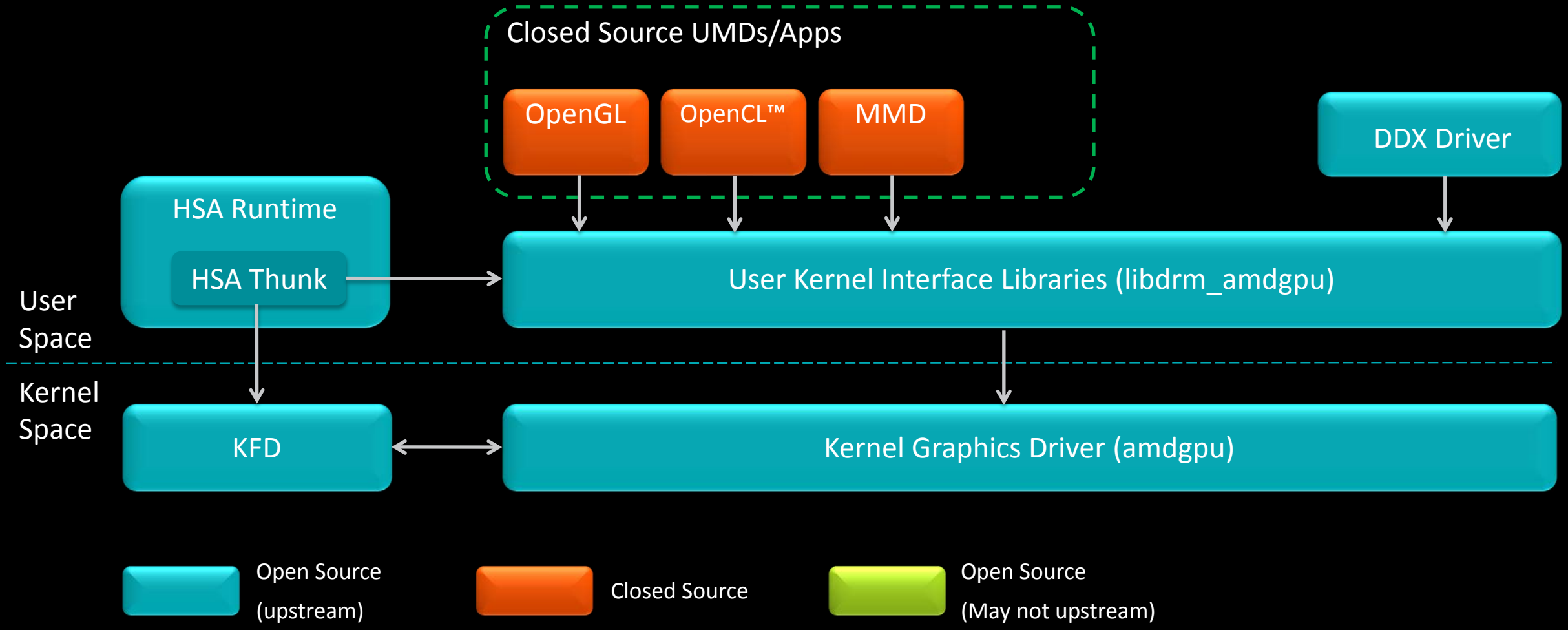
- Open source Base Graphics[1]
- KFD and HSA runtime
- Closed source UMDs
  - OpenGL
  - Multimedia
  - OpenCL
- FirePro add-ons

1. Base Graphics includes kernel graphics driver, user/kernel interface libraries and DDX driver

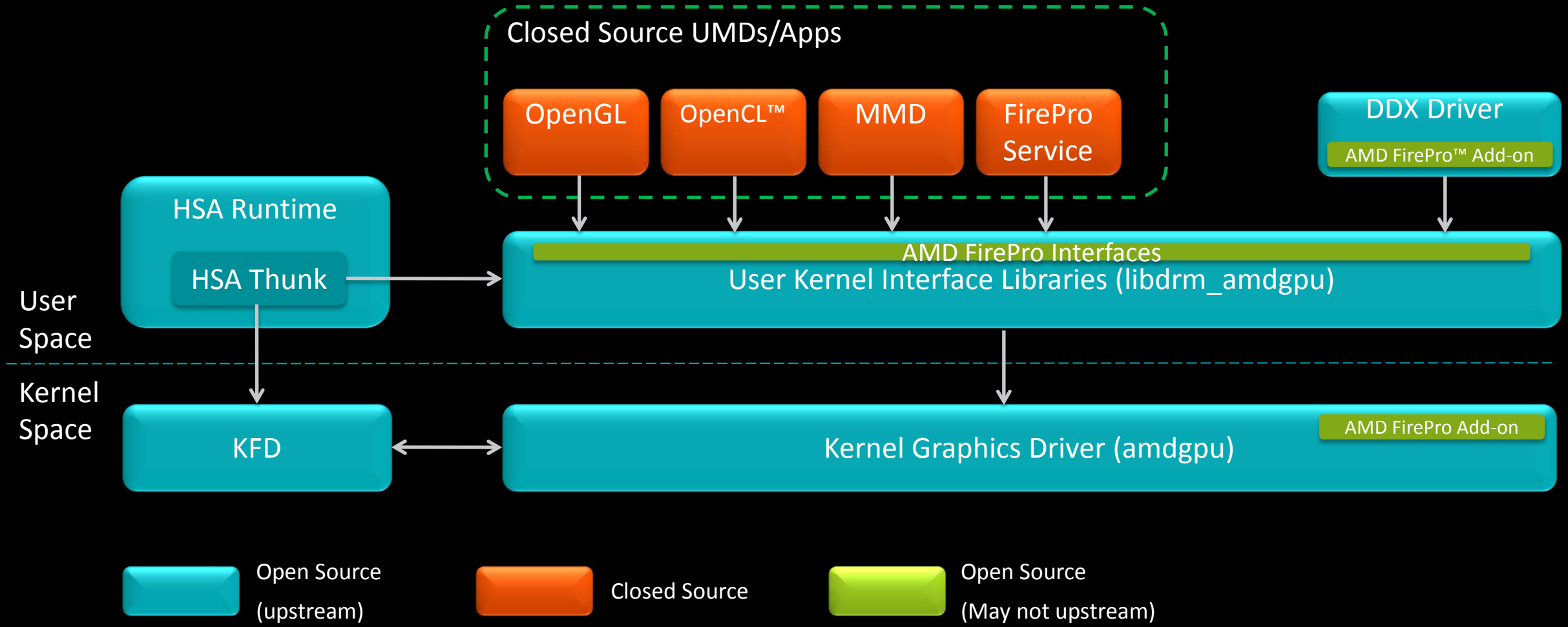
Stack Diagram: All Open



Stack Diagram: Non-Pro



Stack Diagram: Pro



What does it look like?

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- Kernel driver (amdgpu)
  - Command submission and memory management IOCTL interfaces based on open source AMD Radeon™
  - Uses common KMS modesetting IOCTL interface
- User/kernel interface lib (libdrm_amdgpu)
  - Common interface for command submission, memory management, buffer sharing, etc.
  - Supports both open and closed UMDs
- AMD FirePro™ add-on
  - Only if absolutely necessary
  - Will be open source
- Xorg ddx (xf86-video-amdgpu)
  - Uses glamor for 2D/Xv acceleration
- UMDs
  - Mesa UMDs for open source
  - AMD Catalyst™ UMDs for closed source

Challenges

- Lots of areas
  - HW IP (registers, packets, etc.)
  - Code
  - Documentation
- We are not open sourcing existing AMD Catalyst™ code base

Challenges - IP Review

- Current model
  - Review IP for open source release as needed
- New model
  - Readiness for open source happens at HW design time

Challenges - Code

- Developer ramp up
  - Internal developers need to gain experience working in public
  - What's safe and what's not safe to code and discuss
  - Ramp up period before interacting with the public repos directly
  - Guidance from established open source developers

Challenges - Documentation

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- What is there?
  - 3D register reference guides
  - 3D programming guides
  - Shader ISA reference guides
- What about the future?
  - Documentation that can be released publically progressively integrated into the hw design cycles

Why are there still closed source components?

- Certain customers need certain key features today
  - Workstation features
  - OpenGL 4.x
  - OpenCL™
- Future
  - More focus on open source

Where we are now / Future

- Where we are
  - Prototype support for Sea Islands
  - New asic support underway
- Future
  - Open source support for all new asics currently planned to be on amdgpu

Community Feedback

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- We look forward to community feedback
  - Features to support
  - Improvements to focus on
  - Testing
  - Better integration with upstream projects

Questions

- Questions?

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