



**AMD LINUX<sup>®</sup> DRIVER STACK** ▲

SEPTEMBER 2015

- ▲ The amdgpu project will unify AMD's Linux® driver offerings
- ▲ A key component is the new open source Base Graphics Driver<sup>1</sup> 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

- ▲ 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

## All Open

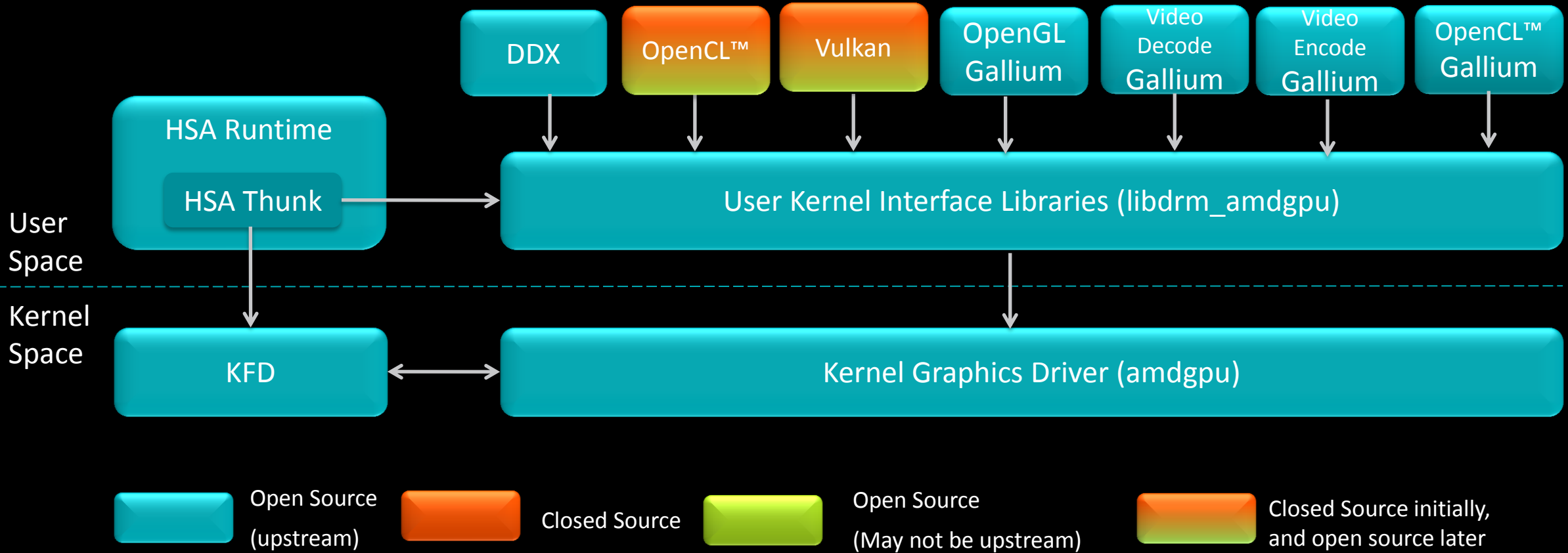
- ▲ Open source Base Graphics<sup>1</sup>
- ▲ KFD and HSA runtime
- ▲ Open source UMDs
  - OpenGL
  - Multimedia
  - OpenCL™
- ▲ Closed source initially and open source later
  - OpenCL™
  - Vulkan

## Pro

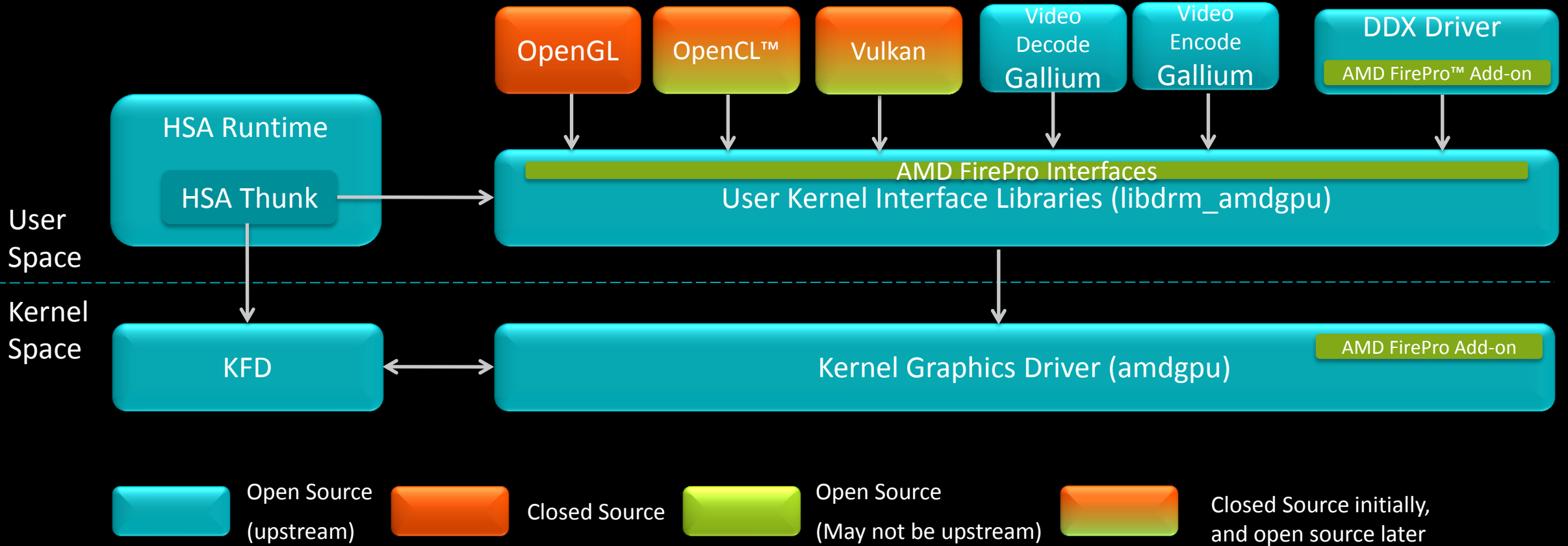
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- ▲ AMD FirePro add-ons

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# Stack Diagram: All Open



# Stack Diagram: Pro



# What does it look like?

## ▲ 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, AMD UMDs for open source
- AMD Catalyst™ UMDs for closed source

# Why are there still closed source components?

- ▲ Certain customers need certain key features today
  - Workstation features
  - OpenGL 4.5
  - OpenCL™
- ▲ Future
  - More focus on open source



# Where are we now?

## ▲ Kernel driver

- Initial amdgpu driver merged into kernel 4.2
  - Volcanic Islands (codenamed “Carrizo”/”Tonga”/”Iceland”)
  - Sea Islands (experimental)
- Additional support merged into kernel 4.3
  - “Fiji” support
  - CGS API support (internal cross component APIs)
  - Initial SW GPU scheduler (disabled by default)
  - KFD support for VI APUs (codenamed “Carrizo”)

## ▲ Libdrm\_amdgpu

- Initial support merged into libdrm 2.4.63

## ▲ Mesa

- Initial VI support merged into mesa 11.0

## ▲ Closed source OpenGL and OpenCL™

- Basic support is complete

## ▲ Vulkan

- Basic support is complete based on DRI3

# Where are we going?

## ▲ Kernel driver

- SW GPU scheduler optimization
  - To be enabled by default soon
  - GPU reset support
- New display component (DAL)
- New power component (Powerplay)
- New ASIC support

## ▲ Libdrm\_amdgpu

- Add new interfaces for some advanced features

## ▲ Open Source OpenCL™

## ▲ Open Source Vulkan

## ▲ UMD interops

## ▲ Transitional Period

- Initial support using existing closed source OpenCL driver
- Transition to open source

## ▲ New AMD maintained project

- Will be open source
- Leveraging existing internal code base

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## ▲ DAL

- AMD display team contributing directly to amdgpu
- More features than current code
- Initial support for DCE11

## ▲ Powerplay

- New component ported from Catalyst
- More features than current code
- Initial support for Volcanic Islands

# Community Feedback



- ▲ 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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