

ParaView and VR on Linux

Tyson Whitehead

2023-04-17

Oculus SDK

- ▶ proprietary SDK decedent from original Oculus VR
- ▶ taken over by Facebook (now Meta) in 2014
- ▶ Linux support discontinued with final development hardware (DK2)
- ▶ moved to cordless after Oculus Rift S

OpenVR

- ▶ proprietary API and runtime by Valve to abstract VR hardware
- ▶ API and headers made public in 2015
- ▶ Linux Valve hardware implementation part of Valve Steam
- ▶ no public/open source implementations
- ▶ GitHub repo provides headers and binary loader blobs (don't build)

OpenXR

- ▶ royalty free open standard for AR (augmented reality) and VR
- ▶ developed by Khronos Group consortium (like OpenGL, OpenCL, etc.)
- ▶ Linux Valve hardware implementation part of Valve Steam
- ▶ Monado is a very new (still rough) open source implementation (like Mesa)

Wine (and Proton)

- ▶ Windows subsystem implemented on Linux
- ▶ can run Windows programs to varying degrees of success
- ▶ Valve Proton variant for gaming has OpenXR and OpenVR support
- ▶ Wine OpenXR Proton code available but won't build with upstream Wine
- ▶ shim between Windows and Unix variants (same as OpenGL, Vulkan, etc.)

Revive

- ▶ open source Windows shim layer between Oculus SDK and OpenVR/OpenXR
- ▶ injects dll that hooks Oculus SDK and translates to OpenVR or OpenXR
- ▶ doesn't work under wine due to issue with dll signature verification
- ▶ fixed this in Wine but will be awhile before it makes it to Proton

VTK

- ▶ added a `vtkVRRender` super class to `vtkViewport` hierarchy
- ▶ both `vtkOpenVRRenderer` and `vtkOpenXRRenderer` subclasses
- ▶ OpenVR enabled by CMake switch
`VTK_MODULE_ENABLE_VTK_RenderingOpenXR`
- ▶ OpenXR enabled by CMake switch
`VTK_MODULE_ENABLE_VTK_RenderingOpenXR`
- ▶ can be set to YES, WANT, DONT_WANT, or NO
- ▶ can also set `VTK_ENABLE_VR_COLLABORATION` for remote VR sharing

ParaView

- ▶ added support in 2018 for VR
- ▶ set CMake switch `PARAVIEW_PLUGIN_ENABLE_XRInterface` to ON
- ▶ set above VTK CMake switches as well
- ▶ OpenVR non-optional (required by `Plugins/XRInterface/Plugin/paraview.plugin`)
- ▶ removing from `REQUIRED_MODULES` results in an include failure
- ▶ OpenVR git repo checked out and path set with CMake `OpenVR_ROOT`