XR Software

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Role of software

- Obvious answer - to drive hardware!
- Not so obvious answer – drive hardware to generate XR experience utilizing our senses

Software in XR

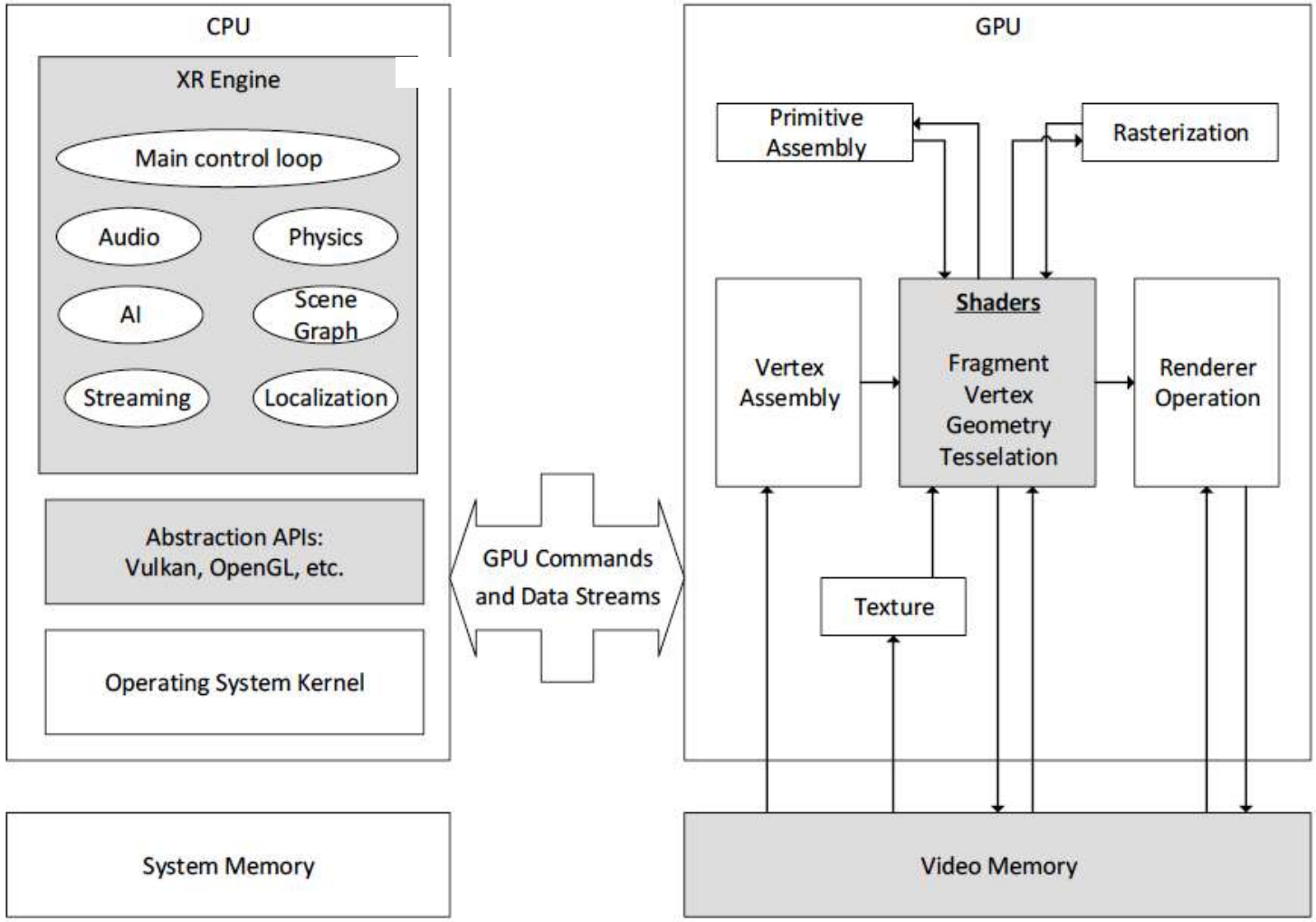
- Creating XR experience mainly involves
  - Creating virtual environment – modeling
  - Rendering (audio, video, touch, …)
  - Incorporating interaction – interaction (involves tracking)

Software in XR

- Software assists a developer to create an XR application – assists in all the 3 activities listed

XR Engine

- A middleware - abstracts hardware and software functionalities for developers of XR applications
    - A software-development environment to build XR experiences



Source - http://nrexplained.com/tr/26928/xreng

XR engine – core functionalities

- Rendering engine ("renderer") for 2D or 3D graphics
- Physics engine/collision detection (and collision response) [for animation]
- Audio support
- Scene graph/video support
- scripting
- AI
- Networking including streaming services
- Memory management - threading, localization support
- …

XR engine

- There are many
  - Unity3D
  - Unreal Engine 4
  - CryEngine
  - Godot
  - Lumberyard
  - Amazon Sumerian
  - …

Popular Engines

- Unity3D
- Unreal Engine 4

XR Deployment

- Native application (SDKs)
  - Windows/Mac app
  - Android/iOS app
- Web application

Sdk - Software development kit

- Collection of software development tools in one installable package
- Specific to a hardware and operating system combination

Sdks for XR

- Provide fundamental tools to design, build, and test VR experiences
  - Offer tools to perform functions such as adding, cloning, and moving 3D objects
- Building blocks to create XR experiences such as mobile apps, marketing experiences, training simulations, and more

Xr sdk categorization

- Broadly two ways to categorize
  - **Type**: VR vs AR vs MR
  - **Availability:** Proprietary vs open source

sdks for popular vr hmds

- HTC Vive
  - OpenVR SDK by Valve
  - SteamVR SDK
  - VRTK
- Oculus Rift
  - Oculus SDK

sdks for popular vr hmds

- Samsung Gear VR
  - Oculus Mobile SDK
- Sony PlayStation
  - PSVR SDK
- Google DayDream View/Google Cardboard
  - Google VR SDK (open source)

Popular sdks for ar

- Vuforia – most versatile SDK
- Wikitude
  - Supports development for Android, iOS and smart glass devices

Popular sdks for ar

- ARKit
  - By Apple, only supports iOS
- ARCore (Google, Android)
  - By Google, only supports Android
- ARToolKit
  - Open source, supports Android, iOS, Windows, Linux, OS X

How to work with sdks

- Let’s try to understand how SDKs work for native applications

- We will use Vuforia SDK for AR for this

Basic steps

- Choose and install a game engine
- Import SDK package
- Use functions in your code
- Compile and build your app
- Deploy