Logical Devices

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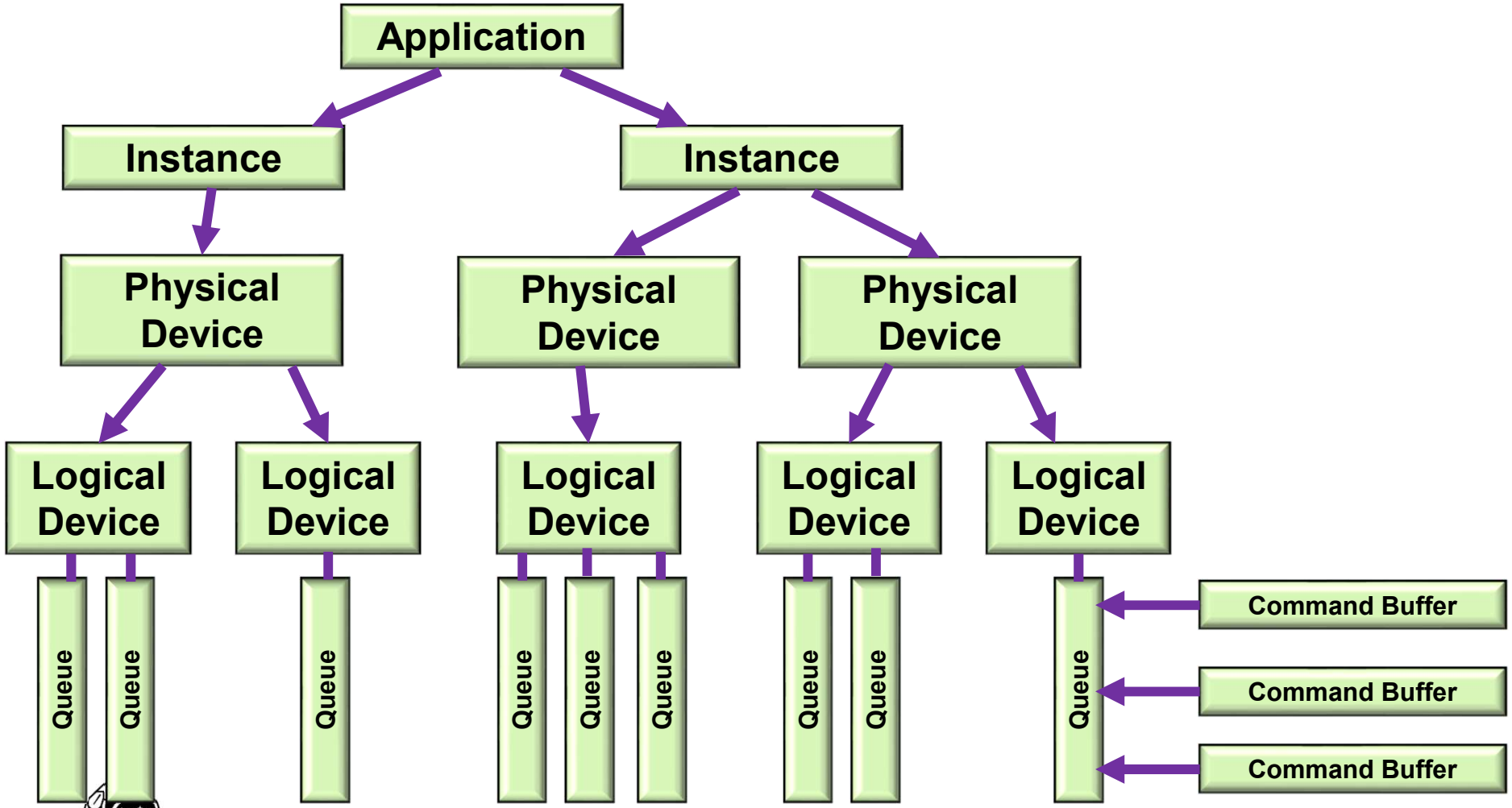
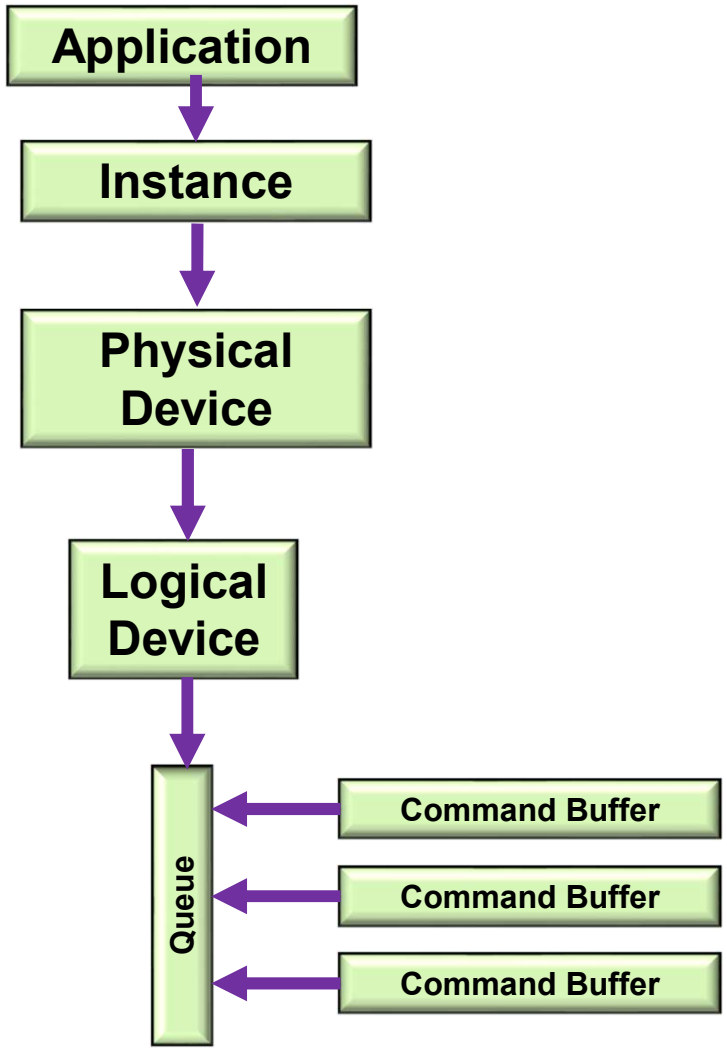
Oregon State University
Computer Graphics

Vulkan: Overall Block Diagram



Vulkan: a More Typical (and Simplified) Block Diagram



Looking to See What Device Layers are Available


```
const char * myDeviceLayers[ ] =
{
		// "VK_LAYER_LUNARG_api_dump",
		// "VK_LAYER_LUNARG_core_validation",
		// "VK_LAYER_LUNARG_image",
		"VK_LAYER_LUNARG_object_tracker",
		"VK_LAYER_LUNARG_parameter_validation",
		// "VK_LAYER_NV_optimus"
};

const char * myDeviceExtensions[ ] =
{
		"VK_KHR_surface",
		"VK_KHR_win32_surface",
		"VK_EXT_debug_report"
		// "VK_KHR_swapchains"
};

// see what device layers are available:

uint32_t  layerCount;
vkEnumerateDeviceLayerProperties(PhysicalDevice, &layerCount, (VkLayerProperties *)nullptr);

VkLayerProperties * deviceLayers = new VkLayerProperties[layerCount];

result = vkEnumerateDeviceLayerProperties( PhysicalDevice, &layerCount, deviceLayers);
```

Looking to See What Device Extensions are Available

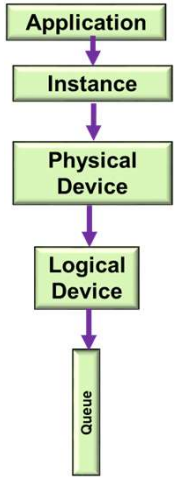

```
// see what device extensions are available:

uint32_t  extensionCount;
vkEnumerateDeviceExtensionProperties(PhysicalDevice, deviceLayers[i].layerName,
                                                    &extensionCount, (VkExtensionProperties *)nullptr);

VkExtensionProperties * deviceExtensions = new VkExtensionProperties[extensionCount];

result = vkEnumerateDeviceExtensionProperties(PhysicalDevice, deviceLayers[i].layerName,
                                                    &extensionCount, deviceExtensions);
```

What Device Layers and Extensions are Available


```
4 physical device layers enumerated:


0x004030cd   1  'VK_LAYER_NV_optimus'  'NVIDIA Optimus layer'
        160 device extensions enumerated for 'VK_LAYER_NV_optimus':

0x00400033   1  'VK_LAYER_LUNARG_core_validation'  'LunarG Validation Layer'
        0 device extensions enumerated for 'VK_LAYER_LUNARG_core_validation':

0x00400033   1  'VK_LAYER_LUNARG_object_tracker'  'LunarG Validation Layer'
        160 device extensions enumerated for 'VK_LAYER_LUNARG_object_tracker':

0x00400033   1  'VK_LAYER_LUNARG_parameter_validation'  'LunarG Validation Layer'
        160 device extensions enumerated for 'VK_LAYER_LUNARG_parameter_validation':
```

Vulkan: Creating a Logical Device


```
float   queuePriorities[1] =
{
        1.
};
VkDeviceQueueCreateInfo   vdqci;
        vdqci.sType = VK_STRUCTURE_TYPE_DEVICE_QUEUE_CREATE_INFO;
        vdqci.pNext = nullptr;
        vdqci.flags = 0;
        vdqci.queueFamiltyIndex = 0;
        vdqci.queueCount = 1;
        vdqci.pQueueProperties = queuePriorities;
```




```
VkDeviceCreateInfo   vdci;
        vdci.sType = VK_STRUCTURE_TYPE_DEVICE_CREATE_INFO;
        vdci.pNext = nullptr;
        vdci.flags = 0;
        vdci.queueCreateInfoCount = 1;              // # of device queues
        vdci.pQueueCreateInfos = IN vdqci;          // array of VkDeviceQueueCreateInfo's
        vdci.enabledLayerCount = sizeof(myDeviceLayers) / sizeof(char *);
        vdci.enabledLayerCount = 0;
        vdci.ppEnabledLayerNames = myDeviceLayers;
        vdci.enabledExtensionCount = sizeof(myDeviceExtensions) / sizeof(char *);
        vdci.ppEnabledExtensionNames = myDeviceExtensions;
        vdci.pEnabledFeatures = IN &PhysicalDeviceFeatures;

    result = vkCreateLogicalDevice( PhysicalDevice, IN &vdci, PALLOCATOR, OUT &LogicalDevice );
```

Vulkan: Creating the Logical Device's Queue


```
// get the queue for this logical device:

vkGetDeviceQueue( LogicalDevice, 0, 0,  OUT &Queue );          // 0, 0 = queueFamilyIndex, queueIndex
```