버택스를 재구성하는게 좋을까 아니면 텍스쳐를 재구성하는게 좋을까. 이럴거면 버텍스 버퍼를 새롭게 만드는게 좋지 않을까. 아니면 나나이트 써볼까? 컨트롤 포인트에서 해당 영역의 id 를 알아내서 해당부분만 custom cull 시키는거지. 이게 좋을까?

FRenderResource 랜더링 쓰레드에서 소유하는 자원들을 말한다.바뀐게 아니라면 일단 해당 클래스를 상속받은 것들은 모두 랜더쓰레드에서 사용한다라고 봐야한다. 관련된 기능들은 대부분 RHI 에 쓰인다.

메쉬를 랜더링 하는 것을 일반화 하면 이렇다.

Cpu || 메쉬 준비단계

버텍스 버퍼 클래스에 데이터를 입력해준다.

인덱스 버퍼 클래스에 데이터를 입력해준다.

Cpu to gpu || commandlist 작성단계

버텍스 버퍼 클래스에게 gpu 공간을 할당하라는 명령어를 내린다.

인덱스 버퍼 클래스에게 gpu 공간을 할당하라는 명령어를 내린다.

Render command || 랜더링 command 작성단계

FprimitiveSceneProxy 클래스에게 그릴 내용을 알려준다.

메쉬의 정점을 일반화 하면 이렇다.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | FRenderResource   |  |  | | --- | --- | |  | [FBufferWithRDG](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBufferWithRDG) : RDG 에서 쓰이는 버퍼같다. | |  | [FDuplicatedVerticesBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FDuplicatedVerticesBuffer) : 가보면 내부에 skeletal 메쉬와 관련된 내용들이 있다. | |  | [FEmptyVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FEmptyVertexDeclaration) : 빈 버텍스 버퍼 선언에 쓰이는 클래스같다. | |  | [FFilterVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FFilterVertexDeclaration) | |  | [FGeometryCacheTrackStreamableRenderResource](https://docs.unrealengine.com/5.3/en-US/API/Plugins/GeometryCache/FGeometryCacheTrackStreamableRen-) | |  | [FGlobalBoundShaderStateResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderStateResource) | |  | [FGlobalDynamicReadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicReadBuffer) | |  | [FHairCommonResource](https://docs.unrealengine.com/5.3/en-US/API/Plugins/HairStrandsCore/FHairCommonResource) | |  | [FIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIndexBuffer) : 내가 생각하는 인덱스 버퍼가 맞는거같은데, 이거 그대로 쓰지는 않고 특수화를 해서 쓴다.   |  |  | | --- | --- | |  | [FcubeIndexBuffer : 시발 왜 큐브가 따로있지?](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCubeIndexBuffer) | |  | [FDynamicMeshIndexBuffer16 : 16비트 그니깐 ushort 인거같은데 뭐 데이터를 아낄때쓸 듯.](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FDynamicMeshIndexBuffer16) | |  | 근데 보면 dynamicmesh 라고 되어 있는거 보면 이거 써야할듯. 근데 이거 보니깐 chaos 임. 흠…주된 용도가 파티클인가봄  [FDynamicMeshIndexBuffer32](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FDynamicMeshIndexBuffer32) | |  | [FGeomCacheIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/GeometryCache/FGeomCacheIndexBuffer) | |  | [FHairCardIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/HairStrandsCore/FHairCardIndexBuffer) | |  | [FParticleIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FParticleIndexBuffer) | |  | [FRawIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FRawIndexBuffer) | |  | [FRawIndexBuffer16or32](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FRawIndexBuffer16or32) | |  | [FRawStaticIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FRawStaticIndexBuffer) | |  | [FRawStaticIndexBuffer16or32Interface](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FRawStaticIndexBuffer16or32Inter-) | |  | [FScreenRectangleIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScreenRectangleIndexBuffer) | |  | [FSixTriangleParticleIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FSixTriangleParticleIndexBuffer) | |  | [FTwoTrianglesIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTwoTrianglesIndexBuffer) | |  | [FWaterMeshIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/Water/FWaterMeshIndexBuffer) | | |  | [FLandscapeTextureAtlas](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FLandscapeTextureAtlas) | |  | [FLightmapResourceCluster](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FLightmapResourceCluster) | |  | [FMaterialRenderProxy](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Materials/FMaterialRenderProxy) | |  | [FMediaVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMediaVertexDeclaration) | |  | [FMorphTargetVertexInfoBuffers](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FMorphTargetVertexInfoBuffers) | |  | [FNDIGeometryCollectionBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/ChaosNiagara/FNDIGeometryCollectionBuffer) | |  | [FNDIHairStrandsBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/HairStrandsCore/Niagara/FNDIHairStrandsBuffer) | |  | [FNDIPhysicsAssetBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/Niagara/FNDIPhysicsAssetBuffer) | |  | [FNDIRigidMeshCollisionBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/Niagara/FNDIRigidMeshCollisionBuffer) | |  | [FNDIVelocityGridBuffer](https://docs.unrealengine.com/5.3/en-US/API/Plugins/HairStrandsCore/Niagara/FNDIVelocityGridBuffer) | |  | [FParticleSortBuffers](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FParticleSortBuffers) | |  | [FPhysicsFieldResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/PhysicsField/FPhysicsFieldResource) | |  | [FPrecomputedVolumetricLightmapData](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FPrecomputedVolumetricLightmapDa-) | |  | [FRayTracingGeometry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRayTracingGeometry) | |  | [FRenderTargetPool](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTargetPool) | |  | [FSceneTextureExtracts](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Renderer/FSceneTextureExtracts) | |  | [FScreenVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FScreenVertexDeclaration) | |  | [FShaderMapResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapResource) | |  | [FSharedSamplerState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FSharedSamplerState) | |  | [FSimpleElementVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FSimpleElementVertexDeclaration) | |  | [FSinglePrimitiveStructured](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FSinglePrimitiveStructured) | |  | [FSkeletalMeshAttributeVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FSkeletalMeshAttributeVertexBuff-) | |  | [FSkeletalMeshGpuDynamicBufferProxy](https://docs.unrealengine.com/5.3/en-US/API/Plugins/Niagara/FSkeletalMeshGpuDynamicBufferPro-) | |  | [FSkeletalMeshGpuSpawnStaticBuffers](https://docs.unrealengine.com/5.3/en-US/API/Plugins/Niagara/FSkeletalMeshGpuSpawnStaticBuffe-) | |  | [FSlateRenderTargetRHI](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Slate/FSlateRenderTargetRHI) | |  | [FSlateTexture2DRHIRef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Slate/FSlateTexture2DRHIRef) | |  | [FStaticMeshInstanceBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Engine/FStaticMeshInstanceBuffer) | |  | [FStaticMeshSectionAreaWeightedTriangleSamplerBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FStaticMeshSectionAreaWeightedTr-_1) | |  | [FStaticMeshVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FStaticMeshVertexBuffer) | |  | [FStreamingManager](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FStreamingManager) | |  | [FSubsurfaceProfileTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Engine/FSubsurfaceProfileTexture) | |  | [FSystemTextures](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Renderer/FSystemTextures) | |  | [FTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTexture) | |  | [FTextureReference](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTextureReference) | |  | [FTextureRenderResources](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/SparseVolumeTexture/FTextureRenderResources) | |  | [FTileVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTileVertexDeclaration) | |  | [FVariableRateShadingImageManager](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Renderer/FVariableRateShadingImageManager) | |  | [FVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexBuffer) | |  | [FVertexFactory](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexFactory) | |  | [FVertexFactoryResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/Rendering/FVertexFactoryResource) | |  | [FViewport](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FViewport) | |  | [FVirtualTextureFeedbackBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Renderer/VT/FVirtualTextureFeedbackBuffer) | |  | [FVisualizeTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVisualizeTexture) | |  | [FVolumetricLightmapBrickAtlas](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FVolumetricLightmapBrickAtlas) | |  | [TBoundShaderStateHistory](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RHICore/TBoundShaderStateHistory) | |  | [TRenderResourcePool](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/TRenderResourcePool) | |  | [TStaticStateRHI::FStaticStateResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticStateRHI/FStaticStateResource) | |  | [TUniformBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/TUniformBuffer) | |

랜더 코어

랜더 코어는 말그대로 랜더링의 코어를 담당하는 부분이다. 랜더링과 관련된 모든것들을 포함하며 해당 부분만 파도 솔직히 언리얼 그래픽스는 전부 안다고 봐야한다. 이거 다 팔수있을까…

|  |  |  |
| --- | --- | --- |
| class | description | 한글주석 |
| [FACESTonemapParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FACESTonemapParams) |  |  |
| [FAdaptiveVTDescription](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FAdaptiveVTDescription) | Describes an adaptive virtual texture. |  |
| [FAllocatedVTDescription](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FAllocatedVTDescription) | [Parameters needed to create an IAllocatedVirtualTexture Describes both page table and physical texture size, format, and layout](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IAllocatedVirtualTexture) |  |
| [FARGB16BigConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FARGB16BigConvertPS) | Pixel shader to convert ARGB16, big endian to RGB |  |
| [FAYUVConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FAYUVConvertPS) | Pixel shader to convert an AYUV texture to RGBA. |  |
| [FBinkDrawICtCpPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBinkDrawICtCpPS) |  |  |
| [FBinkDrawVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBinkDrawVS) |  |  |
| [FBinkDrawYCbCrPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBinkDrawYCbCrPS) |  |  |
| [FBinkParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBinkParameters) |  |  |
| [FBMPConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBMPConvertPS) | Pixel shader to convert a Windows Bitmap texture. |  |
| [FBudget](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBudget) | Represent an independent budget to dynamically scale by its own. |  |
| [FBufferWithRDG](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBufferWithRDG) |  |  |
| [FCachedUniformBufferDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCachedUniformBufferDeclaration) |  |  |
| [FClearQuadCallbacks](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FClearQuadCallbacks) |  |  |
| [FClearVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FClearVertexBuffer) |  |  |
| [FCompactFullName](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCompactFullName) |  |  |
| [FCompareShaderPipelineNameTypes](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCompareShaderPipelineNameTypes) | Used to compare two shader pipeline types by name. |  |
| [FCompareShaderTypes](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCompareShaderTypes) | Used to compare two shader types by name. |  |
| [FCompareVertexFactoryTypes](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCompareVertexFactoryTypes) | Used to compare two Vertex Factory types by name. |  |
| [FCompressedTransform](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCompressedTransform) |  |  |
| [FCopyRectPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCopyRectPS) | Pixel shader to copy pixels from src to dst performing a format change that works on all platforms. |  |
| [FCopyTextureCS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCopyTextureCS) |  |  |
| [FCoreRenderDelegates](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCoreRenderDelegates) |  |  |
| [FCubeIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FCubeIndexBuffer) |  |  |
| [FDeferredCleanupInterface](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDeferredCleanupInterface) | The base class of objects that need to defer deletion until the render command queue has been flushed. |  |
| [FDeprecatedSerializedPackedNormal](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDeprecatedSerializedPackedNorma-) |  |  |
| [FDepthStencilBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDepthStencilBinding) | Render graph information about how to bind a depth-stencil render target. |  |
| [FDisplayInformation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDisplayInformation) |  |  |
| [FDummyResolveParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDummyResolveParameter) |  |  |
| [FDynamicAllocReadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FDynamicAllocReadBuffer) |  |  |
| [FEmptyShaderParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FEmptyShaderParameters) | An empty shader parameter structure ready to be used anywhere. |  |
| [FEmptyVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FEmptyVertexDeclaration) | The empty vertex declaration resource type. |  |
| [FExtraShaderCompilerSettings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FExtraShaderCompilerSettings) | [Additional compilation settings that can be configured by each FMaterial instance before compilation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Engine/FMaterial) |  |
| [FFillTextureCS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FFillTextureCS) | Compute shader for writing values |  |
| [FFilterVertex](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FFilterVertex) | The vertex data used to filter a texture. |  |
| [FFilterVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FFilterVertexDeclaration) | The filter vertex declaration resource type. |  |
| [FGBufferBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferBinding) |  |  |
| [FGBufferBindings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferBindings) | Describes the bindings of the GBuffer for a given layout. |  |
| [FGBufferCompressionInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferCompressionInfo) |  |  |
| [FGBufferInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferInfo) |  |  |
| [FGBufferItem](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferItem) | The texture positions in the GBuffer |  |
| [FGBufferPacking](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferPacking) |  |  |
| [FGBufferParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferParams) |  |  |
| [FGBufferTarget](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGBufferTarget) |  |  |
| [FGenerateMips](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGenerateMips) |  |  |
| [FGenerateMipsParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGenerateMipsParams) |  |  |
| [FGlobalBoundShaderState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderState) |  |  |
| [FGlobalBoundShaderStateArgs](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderStateArgs) |  |  |
| [FGlobalBoundShaderStateResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderStateResource) | [FGlobalBoundShaderState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderState) |  |
| [FGlobalBoundShaderStateWorkArea](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalBoundShaderStateWorkArea) |  |  |
| [FGlobalDynamicIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicIndexBuffer) | A system for dynamically allocating GPU memory for indices. |  |
| [FGlobalDynamicIndexBufferAllocation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicIndexBufferAllocat-) |  |  |
| [FGlobalDynamicIndexBufferAllocationEx](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicIndexBufferAllocat-_1) |  |  |
| [FGlobalDynamicReadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicReadBuffer) | A system for dynamically allocating GPU memory for rendering. |  |
| [FGlobalDynamicVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicVertexBuffer) | A system for dynamically allocating GPU memory for vertices. |  |
| [FGlobalDynamicVertexBufferAllocation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalDynamicVertexBufferAlloca-) |  |  |
| [FGlobalShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShader) | [FGlobalShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShader) |  |
| [FGlobalShaderBackupData](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderBackupData) | Container for Backup/RestoreGlobalShaderMap functions. |  |
| [FGlobalShaderMap](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderMap) |  |  |
| [FGlobalShaderMapContent](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderMapContent) |  |  |
| [FGlobalShaderMapId](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderMapId) | Class that encapsulates logic to create a DDC key for the global shader map. |  |
| [FGlobalShaderMapSection](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderMapSection) |  |  |
| [FGlobalShaderPermutationParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderPermutationParamete-) |  |  |
| [FGlobalShaderType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FGlobalShaderType) | A shader meta type for the simplest shaders; shaders which are not material or vertex factory linked. |  |
| [FHandler](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FHandler) | Base class persistent handler for receiving messages. |  |
| [FHeuristicSettings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FHeuristicSettings) | Represent an independent budget to dynamically scale by its own. |  |
| [FIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIndexBuffer) | An index buffer resource. |  |
| [FInitStaticResourceRenderThreadTask](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FInitStaticResourceRenderThreadT-) | Helper task to initialize a static resource on the render thread. |  |
| [FInputLatencyTimer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FInputLatencyTimer) | Encapsulates a latency timer that measures the time from when mouse input is read on the gamethread until that frame is fully displayed by the GPU. |  |
| [FInstancedScreenVertexShaderVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FInstancedScreenVertexShaderVS) | Vertex shader to draw an instanced quad covering all the viewports (SV\_ViewportArrayIndex is output for each SV\_InstanceID). |  |
| [FIoStoreShaderCodeArchive](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIoStoreShaderCodeArchive) |  |  |
| [FIoStoreShaderCodeArchiveHeader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIoStoreShaderCodeArchiveHeader) |  |  |
| [FIoStoreShaderCodeEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIoStoreShaderCodeEntry) | Descriptor of an individual shader. |  |
| [FIoStoreShaderGroupEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIoStoreShaderGroupEntry) | Descriptor of a group of shaders compressed together. |  |
| [FIoStoreShaderMapEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FIoStoreShaderMapEntry) | Descriptor of a shader map. |  |
| [FLongGPUTaskPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FLongGPUTaskPS) |  |  |
| [FMediaElementVertex](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMediaElementVertex) | Stores media drawing vertices. |  |
| [FMediaShadersVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMediaShadersVS) | Media vertex shader (shared by all media shaders). |  |
| [FMediaVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMediaVertexDeclaration) | The simple element vertex declaration resource type. |  |
| [FMemcpyResourceParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMemcpyResourceParams) |  |  |
| [FMemsetResourceParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMemsetResourceParams) | Can store arbitrary data so long as it follows alignment restrictions. |  |
| [FMipBiasFade](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMipBiasFade) | Functionality for fading in/out texture mip-levels. |  |
| [FMipFadeSettings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FMipFadeSettings) | Mip fade settings, selectable by chosing a different EMipFadeSettings. |  |
| [FModifyAlphaSwizzleRgbaPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FModifyAlphaSwizzleRgbaPS) | Pixel shader to swizzle R G B A components, set alpha to 1 or inverts alpha |  |
| [FNullColorVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNullColorVertexBuffer) | A vertex buffer with a single color component. |  |
| [FNULLPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNULLPS) | An internal dummy pixel shader to use when the user calls RHISetPixelShader(NULL). |  |
| [FNullVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNullVertexBuffer) | A vertex buffer with a single zero float3 component. |  |
| [FNV12ConvertAsBytesPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNV12ConvertAsBytesPS) | Pixel shader to convert a NV12 frame to RGBA (NV12 data; texture viewed as G8) |  |
| [FNV12ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNV12ConvertPS) | Pixel shader to convert a NV12 frame to RGBA. |  |
| [FNV21ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FNV21ConvertPS) | Pixel shader to convert a NV21 frame to RGBA. |  |
| [FOculusAlphaInverseShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOculusAlphaInverseShader) |  |  |
| [FOculusBlackShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOculusBlackShader) |  |  |
| [FOculusCubemapPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOculusCubemapPS) | A pixel shader for rendering a textured screen element. |  |
| [FOculusVertexShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOculusVertexShader) |  |  |
| [FOculusWhiteShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOculusWhiteShader) |  |  |
| [FOneColorPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FOneColorPS) | Pixel shader for rendering a single, constant color. |  |
| [FP010\_2101010ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FP010_2101010ConvertPS) | Pixel shader to convert a P010 frame stored as 3 plane RGB2101010 to RGBA. |  |
| [FP010ConvertAsUINT16sPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FP010ConvertAsUINT16sPS) | Pixel shader to convert a P010 frame inside a G16 texture to RGBA. |  |
| [FP010ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FP010ConvertPS) | Pixel shader to convert a P010 frame to RGBA. |  |
| [FPackedArrayInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPackedArrayInfo) |  |  |
| [FPackedNormal](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPackedNormal) | A normal vector, quantized and packed into 32-bits. |  |
| [FPackedPosition](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPackedPosition) | A 3x1 of xyz(11:11:10) format. |  |
| [FPackedRGB10A2N](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPackedRGB10A2N) | A vector, quantized and packed into 32-bits. |  |
| [FPackedRGBA16N](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPackedRGBA16N) | A vector, quantized and packed into 32-bits. |  |
| [FParameterAllocation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FParameterAllocation) |  |  |
| [FParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FParameters) | Shader parameters used to write to write a GPU message. |  |
| [FPendingCleanupObjects](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPendingCleanupObjects) | A set of cleanup objects which are pending deletion. |  |
| [FPendingShaderMapCompileResults](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPendingShaderMapCompileResults) |  |  |
| [FPermsPerPSO](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPermsPerPSO) | Describes a PSO with an array of other stable shaders that could be used with it. |  |
| [FPermutation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPermutation) | Describes a particular combination of shaders. |  |
| [FPixelInspectorRequest](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPixelInspectorRequest) | Class use to add FScene pixel inspect request |  |
| [FPixelRenderCounters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPixelRenderCounters) |  |  |
| [FPixelShaderUtils](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPixelShaderUtils) | All utils for pixel shaders. |  |
| [FPooledRenderTarget](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPooledRenderTarget) | [The reference to a pooled render target, use like this: TRefCountPtr](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Core/Templates/TRefCountPtr) |  |
| [FPooledRenderTargetDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPooledRenderTargetDesc) | All necessary data to create a render target from the pooled render targets. |  |
| [FPostOpaqueRenderParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPostOpaqueRenderParameters) |  |  |
| [FPrimitiveIdDummyBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPrimitiveIdDummyBuffer) | Default PrimitiveId vertex buffer. |  |
| [FPrimitiveIdDummyBufferMobile](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FPrimitiveIdDummyBufferMobile) |  |  |
| [FRayGenShaderUtils](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRayGenShaderUtils) | All utils for ray generation shaders. |  |
| [FRayTracingGeometry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRayTracingGeometry) | A ray tracing geometry resource |  |
| [FRDGAllocator](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGAllocator) | Private allocator used by RDG to track its internal memory. |  |
| [FRDGAllocatorScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGAllocatorScope) | Base class for RDG builder which scopes the allocations and releases them in the destructor. |  |
| [FRDGAsyncComputeBudgetScopeGuard](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGAsyncComputeBudgetScopeGuard) |  |  |
| [FRDGAsyncScatterUploadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGAsyncScatterUploadBuffer) |  |  |
| [FRDGBarrierBatchBegin](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBarrierBatchBegin) |  |  |
| [FRDGBarrierBatchBeginId](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBarrierBatchBeginId) |  |  |
| [FRDGBarrierBatchEnd](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBarrierBatchEnd) |  |  |
| [FRDGBarrierBatchEndId](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBarrierBatchEndId) |  |  |
| [FRDGBarrierValidation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBarrierValidation) | This class validates and logs barriers submitted by the graph. |  |
| [FRDGBlackboard](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBlackboard) | The blackboard is a map of struct instances with a lifetime tied to a render graph allocator. |  |
| [FRDGBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBuffer) | A render graph tracked buffer. |  |
| [FRDGBufferAccess](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferAccess) |  |  |
| [FRDGBufferDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferDesc) | Descriptor for render graph tracked Buffer. |  |
| [FRDGBufferSRV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferSRV) | Render graph tracked buffer SRV. |  |
| [FRDGBufferSRVDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferSRVDesc) |  |  |
| [FRDGBufferUAV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferUAV) | Render graph tracked buffer UAV. |  |
| [FRDGBufferUAVDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBufferUAVDesc) |  |  |
| [FRDGBuilder](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBuilder) | [Use the render graph builder to build up a graph of passes and then call Execute() to process them.](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGBuilder/Execute) |  |
| [FRDGDrawTextureInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGDrawTextureInfo) |  |  |
| [FRDGEventName](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGEventName) | GPU Events - Named hierarchical events emitted to external profiling tools.Stores a GPU event name for the render graph. |  |
| [FRDGEventScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGEventScope) |  |  |
| [FRDGEventScopeGuard](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGEventScopeGuard) |  |  |
| [FRDGEventScopeOpArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGEventScopeOpArray) |  |  |
| [FRDGEventScopeStack](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGEventScopeStack) | Manages a stack of event scopes. |  |
| [FRDGExternalAccessQueue](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGExternalAccessQueue) | Batches up RDG external resource access mode requests and submits them all at once to RDG. |  |
| [FRDGGPUScopeOpArrays](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUScopeOpArrays) |  |  |
| [FRDGGPUScopes](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUScopes) | General GPU scopes |  |
| [FRDGGPUScopeStacks](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUScopeStacks) | The complete set of scope stack implementations. |  |
| [FRDGGPUScopeStacksByPipeline](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUScopeStacksByPipeline) |  |  |
| [FRDGGPUStatScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUStatScope) | GPU Stats - Aggregated counters emitted to the runtime 'stat GPU' profiler. |  |
| [FRDGGPUStatScopeGuard](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUStatScopeGuard) |  |  |
| [FRDGGPUStatScopeOp](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUStatScopeOp) |  |  |
| [FRDGGPUStatScopeOpArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUStatScopeOpArray) |  |  |
| [FRDGGPUStatScopeStack](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGGPUStatScopeStack) |  |  |
| [FRDGParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGParameter) | A helper class for identifying and accessing a render graph pass parameter. |  |
| [FRDGParameterStruct](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGParameterStruct) | Wraps a pass parameter struct payload and provides helpers for traversing members. |  |
| [FRDGPass](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGPass) | Base class of a render graph pass. |  |
| [FRDGPooledBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGPooledBuffer) |  |  |
| [FRDGPooledTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGPooledTexture) |  |  |
| [FRDGProducerState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGProducerState) | Used for tracking pass producer / consumer edges in the graph for culling and pipe fencing. |  |
| [FRDGResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGResource) | Generic graph resource. |  |
| [FRDGScatterUploadBase](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGScatterUploadBase) |  |  |
| [FRDGScatterUploadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGScatterUploadBuffer) |  |  |
| [FRDGScatterUploader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGScatterUploader) |  |  |
| [FRDGScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGScope) |  |  |
| [FRDGSentinelPass](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGSentinelPass) | Render graph pass used for the prologue / epilogue passes. |  |
| [FRDGShaderResourceView](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGShaderResourceView) | Render graph tracked SRV. |  |
| [FRDGSubresourceState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGSubresourceState) | Used for tracking the state of an individual subresource during execution. |  |
| [FRDGTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTexture) | Render graph tracked Texture. |  |
| [FRDGTextureAccess](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureAccess) |  |  |
| [FRDGTextureClearInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureClearInfo) |  |  |
| [FRDGTextureDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureDesc) |  |  |
| [FRDGTextureMSAA](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureMSAA) | Simple pair of RDG textures used for MSAA. |  |
| [FRDGTextureSRV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureSRV) | Render graph tracked SRV. |  |
| [FRDGTextureSRVDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureSRVDesc) | Descriptor for render graph tracked SRV. |  |
| [FRDGTextureSubresource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureSubresource) |  |  |
| [FRDGTextureSubresourceLayout](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureSubresourceLayout) |  |  |
| [FRDGTextureSubresourceRange](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureSubresourceRange) |  |  |
| [FRDGTextureUAV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureUAV) | Render graph tracked texture UAV. |  |
| [FRDGTextureUAVDesc](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTextureUAVDesc) | Descriptor for render graph tracked UAV. |  |
| [FRDGTimingScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTimingScope) | GPU Timing |  |
| [FRDGTimingScopeOpArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTimingScopeOpArray) |  |  |
| [FRDGTimingScopeStack](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGTimingScopeStack) |  |  |
| [FRDGUniformBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGUniformBuffer) |  |  |
| [FRDGUniformBufferBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGUniformBufferBinding) |  |  |
| [FRDGUnorderedAccessView](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGUnorderedAccessView) | Render graph tracked UAV. |  |
| [FRDGUploadData](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGUploadData) | Helper class to allocate data from a GraphBuilder in order to upload said data to an RDG resource. |  |
| [FRDGUserValidation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGUserValidation) | Used by the render graph builder to validate correct usage of the graph API from setup to execution. |  |
| [FRDGView](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGView) | A render graph resource (e.g. a view) which references a single viewable resource (e.g. a texture / buffer). |  |
| [FRDGViewableResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGViewableResource) | A render graph resource with an allocation lifetime tracked by the graph. |  |
| [FRDGWaitForTasksScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRDGWaitForTasksScope) | Scope used to wait for outstanding tasks when the scope destructor is called. |  |
| [FReadbackBufferParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FReadbackBufferParameters) |  |  |
| [FReadbackTextureParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FReadbackTextureParameters) |  |  |
| [FReader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FReader) | Interface for the handelr to read data from the GPU buffer during readback. |  |
| [FReadTextureExternalPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FReadTextureExternalPS) | Pixel shader to read from TextureExternal source |  |
| [FRegisterRayTracingPayloadTypeHelper](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRegisterRayTracingPayloadTypeHe-) |  |  |
| [FRenderBounds](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderBounds) |  |  |
| [FRenderCommand](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderCommand) | Render commands. |  |
| [FRenderCommandFence](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderCommandFence) | Render fences. |  |
| [FRenderResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderResource) | A rendering resource which is owned by the rendering thread. |  |
| [FRenderTargetBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTargetBinding) | Render graph information about how to bind a render target. |  |
| [FRenderTargetBindingSlots](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTargetBindingSlots) | Special shader parameters type for a pass parameter to setup render targets. |  |
| [FRenderTargetParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTargetParameters) | Useful parameter struct that only have render targets. |  |
| [FRenderTargetPool](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTargetPool) | Encapsulates the render targets pools that allows easy sharing (mostly used on the render thread side) |  |
| [FRenderThreadScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderThreadScope) |  |  |
| [FRenderThreadStructBase](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderThreadStructBase) |  |  |
| [FRenderTimer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTimer) | Timer helper class. |  |
| [FRenderTransform](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRenderTransform) | TODO: Further compress data size with tighter encoding LWC\_TODO: Rebasing support (no 64bit types in here) TODO: Optimization (avoid full 4x4 math) |  |
| [FResizeResourceSOAParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResizeResourceSOAParams) |  |  |
| [FResolveArrayVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveArrayVS) |  |  |
| [FResolveDepth2XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepth2XPS) |  |  |
| [FResolveDepth4XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepth4XPS) |  |  |
| [FResolveDepth8XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepth8XPS) |  |  |
| [FResolveDepthArray2XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepthArray2XPS) |  |  |
| [FResolveDepthArray4XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepthArray4XPS) |  |  |
| [FResolveDepthArray8XPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepthArray8XPS) |  |  |
| [FResolveDepthArrayPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepthArrayPS) |  |  |
| [FResolveDepthPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveDepthPS) |  |  |
| [FResolveSingleSamplePS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveSingleSamplePS) |  |  |
| [FResolveVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FResolveVS) | A vertex shader for rendering a textured screen element. |  |
| [FRGB10toYUVv210ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRGB10toYUVv210ConvertPS) | Pixel shader to convert RGB 10 bits to YUV v210 |  |
| [FRGB8toUYVY8ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRGB8toUYVY8ConvertPS) | Pixel shader to convert RGB 8 bits to UYVY 8 bits |  |
| [FRGB8toY8ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRGB8toY8ConvertPS) | Pixel shader to convert RGB 8 bits to Y 8 bits |  |
| [FRGBConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRGBConvertPS) | Pixel shader to convert an RGB texture. |  |
| [FRGBToYUVConversion](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRGBToYUVConversion) | Struct of common parameters used in media capture shaders to do RGB to YUV conversions |  |
| [FRHIAsyncCommandList](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FRHIAsyncCommandList) | RenderThread scoped work. |  |
| [FScatterCopyParams](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScatterCopyParams) |  |  |
| [FScatterUploadBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScatterUploadBuffer) |  |  |
| [FScenePrimitiveRenderingContextScopeHelper](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScenePrimitiveRenderingContextS-) |  |  |
| [FSceneRenderingBlockAllocationTag](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSceneRenderingBlockAllocationTa-) |  |  |
| [FSceneRenderTargetItem](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSceneRenderTargetItem) | Single render target item consists of a render surface and its resolve texture, Render thread side |  |
| [FScope](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScope) | RAII object for controlling a new GPU message scope. |  |
| [FScopedCapture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScopedCapture) | Helper for capturing within a scope. |  |
| [FScreenRectangleIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScreenRectangleIndexBuffer) |  |  |
| [FScreenRectangleVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScreenRectangleVertexBuffer) | Static vertex and index buffer used for 2D screen rectangles. |  |
| [FScreenSpaceVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScreenSpaceVertexBuffer) |  |  |
| [FScreenVertexShaderVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FScreenVertexShaderVS) | Vertex shader to draw a screen quad that works on all platforms. |  |
| [FSCWErrorCode](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSCWErrorCode) |  |  |
| [FSerializationHistory](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSerializationHistory) | Encapsulates information about a shader's serialization behavior, used to detect when C++ serialization changes to auto-recompile. |  |
| [FSerializationHistoryTraversalState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSerializationHistoryTraversalSt-) | [Tracks state when traversing a FSerializationHistory.](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSerializationHistory) |  |
| [FSerializedShaderArchive](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSerializedShaderArchive) | Portion of shader code archive that's serialize to disk. |  |
| [FShader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShader) | A compiled shader and its parameter bindings. |  |
| [FShaderBindingInOutMask](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderBindingInOutMask) |  |  |
| [FShaderBindings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderBindings) |  |  |
| [FShaderCode](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCode) |  |  |
| [FShaderCodeArchive](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeArchive) |  |  |
| [FShaderCodeEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeEntry) |  |  |
| [FShaderCodeFeatures](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeFeatures) |  |  |
| [FShaderCodeLibrary](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeLibrary) | Collection of unique shader code Populated at cook time |  |
| [FShaderCodeLibraryPipeline](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeLibraryPipeline) |  |  |
| [FShaderCodeName](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeName) | If this changes you need to make sure all shaders get invalidated |  |
| [FShaderCodePackedResourceCounts](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodePackedResourceCounts) | If this changes you need to make sure all shaders get invalidated |  |
| [FShaderCodeReader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeReader) | Later we can transform that to the actual class passed around at the RHI level |  |
| [FShaderCodeResourceMasks](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeResourceMasks) |  |  |
| [FShaderCodeUniformBuffers](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeUniformBuffers) |  |  |
| [FShaderCodeValidationExtension](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeValidationExtension) |  |  |
| [FShaderCodeVendorExtension](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCodeVendorExtension) | If this changes you need to make sure all shaders get invalidated |  |
| [FShaderCommonCompileJob](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCommonCompileJob) | Stores all of the common information used to compile a shader or pipeline. |  |
| [FShaderCompiledShaderInitializerType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompiledShaderInitializer-) |  |  |
| [FShaderCompileJob](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompileJob) | Stores all of the input and output information used to compile a single shader. |  |
| [FShaderCompileJobKey](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompileJobKey) |  |  |
| [FShaderCompilerDefines](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerDefines) | These are also the platform defines. |  |
| [FShaderCompilerDefinitions](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerDefinitions) | Container for shader compiler definitions. |  |
| [FShaderCompilerEnvironment](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerEnvironment) | The environment used to compile a shader. |  |
| [FShaderCompilerError](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerError) | A shader compiler error or warning. |  |
| [FShaderCompilerFlags](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerFlags) | [Simple wrapper for a uint64 bitfield; doesn't use TBitArray as it is fixed size and doesn't need dynamic memory allocations.](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Core/Containers/TBitArray) |  |
| [FShaderCompilerInput](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerInput) | Struct that gathers all readonly inputs needed for the compilation of a single shader. |  |
| [FShaderCompilerOutput](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerOutput) | The output of the shader compiler. |  |
| [FShaderCompilerResourceTable](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderCompilerResourceTable) |  |  |
| [FShaderDiagnosticRemapper](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderDiagnosticRemapper) | Helper class used to remap compiler diagnostic messages from stripped preprocessed source (i.e. source with all whitespace normalized and comments and line directives removed) back to line numbers/locations from the original source. |  |
| [FShaderGlobalDefines](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderGlobalDefines) |  |  |
| [FShaderId](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderId) | [Uniquely identifies an FShader instance.](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShader) |  |
| [FShaderKey](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderKey) |  |  |
| [FShaderLibraryCooker](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderLibraryCooker) |  |  |
| [FShaderLightmapPropertyDefines](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderLightmapPropertyDefines) | Maybe should rename this to VertexFactoryDefines? |  |
| [FShaderLooseParameterBufferInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderLooseParameterBufferInfo) |  |  |
| [FShaderLooseParameterInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderLooseParameterInfo) |  |  |
| [FShaderMapBase](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapBase) |  |  |
| [FShaderMapCompileResults](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapCompileResults) | Results for a single compiled shader map. |  |
| [FShaderMapContent](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapContent) | A collection of shaders of different types |  |
| [FShaderMapEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapEntry) |  |  |
| [FShaderMapPointerTable](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapPointerTable) |  |  |
| [FShaderMapResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapResource) |  |  |
| [FShaderMapResource\_InlineCode](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapResource_InlineCode) |  |  |
| [FShaderMapResourceCode](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMapResourceCode) |  |  |
| [FShaderMaterialDerivedDefines](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMaterialDerivedDefines) |  |  |
| [FShaderMaterialPropertyDefines](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderMaterialPropertyDefines) |  |  |
| [FShaderParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParameter) | A shader parameter's register binding. e.g. float1/2/3/4, can be an array, UAV |  |
| [FShaderParameterBindings](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParameterBindings) | Stores all shader parameter bindings and their corresponding offset and size in the shader's parameters struct. |  |
| [FShaderParameterMap](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParameterMap) | A map of shader parameter names to registers allocated to that parameter. |  |
| [FShaderParameterMapInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParameterMapInfo) |  |  |
| [FShaderParameterParser](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParameterParser) | Validates and moves all the shader loose data parameter defined in the root scope of the shader into the root uniform buffer. |  |
| [FShaderParametersMetadata](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParametersMetadata) | A uniform buffer struct. |  |
| [FShaderParametersMetadataBuilder](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParametersMetadataBuilder) |  |  |
| [FShaderParametersMetadataRegistration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderParametersMetadataRegistr-) |  |  |
| [FShaderPermutationBool](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPermutationBool) | Defines at compile time a boolean permutation dimension. |  |
| [FShaderPermutationParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPermutationParameters) |  |  |
| [FShaderPipeline](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipeline) | A Shader Pipeline instance with compiled stages. |  |
| [FShaderPipelineCache](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineCache) | FShaderPipelineCache: The FShaderPipelineCache provides the new Pipeline State Object (PSO) logging, serialisation & precompilation mechanism that replaces FShaderCache. |  |
| [FShaderPipelineCompileJob](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineCompileJob) |  |  |
| [FShaderPipelineCompileJobKey](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineCompileJobKey) |  |  |
| [FShaderPipelineRef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineRef) |  |  |
| [FShaderPipelineType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineType) | Binding of a set of shader stages in a single pipeline. |  |
| [FShaderPipelineTypeDependency](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPipelineTypeDependency) |  |  |
| [FShaderPlatformCachedIniValue](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPlatformCachedIniValue) |  |  |
| [FShaderPreprocessOutput](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderPreprocessOutput) |  |  |
| [FShaderResourceParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderResourceParameter) | A shader resource binding (textures or samplerstates). |  |
| [FShaderResourceParameterInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderResourceParameterInfo) |  |  |
| [FShaderResourceTable](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderResourceTable) |  |  |
| [FShaderResourceTableMap](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderResourceTableMap) |  |  |
| [FShaderSaveArchive](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderSaveArchive) | Archive used when saving shaders, which generates data used to detect serialization mismatches on load. |  |
| [FShaderStableKeyDebugInfoReader](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderStableKeyDebugInfoReader) | Class that uses build metadata (\*.shk files storing mapping of stable shader keys to their hashes) to provide high level info on shaders and PSOs. |  |
| [FShaderTarget](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderTarget) |  |  |
| [FShaderType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderType) | An object which is used to serialize/deserialize, compile, and cache a particular shader class. |  |
| [FShaderTypeDependency](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderTypeDependency) | Encapsulates a dependency on a shader type and saved state from that shader type. |  |
| [FShaderTypeRegistration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderTypeRegistration) | Registers a shader type in various systems. |  |
| [FShaderUniformBufferParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderUniformBufferParameter) |  |  |
| [FShaderUniformBufferParameterInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderUniformBufferParameterInf-) |  |  |
| [FShaderUsageVisualizer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FShaderUsageVisualizer) | Run-time only debugging facility |  |
| [FSharedShaderCompilerEnvironment](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSharedShaderCompilerEnvironment) |  |  |
| [FSocket](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSocket) | A socket object mapped to a persistently registered handler. |  |
| [FStableShaderKeyAndValue](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FStableShaderKeyAndValue) |  |  |
| [FStereoShaderAspects](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FStereoShaderAspects) | Detect the single-draw stereo shader variant, in order to support usage across different platforms |  |
| [FSuspendRenderingThread](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FSuspendRenderingThread) | Render thread suspension. |  |
| [FTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTexture) | A textures resource. |  |
| [FTextureReference](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTextureReference) | A texture reference resource. |  |
| [FTextureRenderTargetBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTextureRenderTargetBinding) |  |  |
| [FTextureWithSRV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTextureWithSRV) | A textures resource that includes an SRV. |  |
| [FTickableObjectRenderThread](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTickableObjectRenderThread) | This class provides common registration for render thread tickable objects. |  |
| [FTileVertexDeclaration](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTileVertexDeclaration) |  |  |
| [FTwoTrianglesIndexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FTwoTrianglesIndexBuffer) |  |  |
| [FUniformBufferBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferBinding) |  |  |
| [FUniformBufferCopyInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferCopyInfo) | Information for copying members from uniform buffers to packed. |  |
| [FUniformBufferEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferEntry) | Minimal information about each uniform buffer entry fed to the shader compiler. |  |
| [FUniformBufferNameSortOrder](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferNameSortOrder) |  |  |
| [FUniformBufferStaticSlotRegistrar](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferStaticSlotRegistra-) | Simple class that registers a uniform buffer static slot in the constructor. |  |
| [FUniformBufferStaticSlotRegistry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformBufferStaticSlotRegistry) | Registry for uniform buffer static slots. |  |
| [FUniformResourceEntry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUniformResourceEntry) | Each entry in a resource table is provided to the shader compiler for creating mappings. |  |
| [FUYVYConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FUYVYConvertPS) | Pixel shader to convert a UYVY (Y422, UYNV) frame to RGBA. |  |
| [FVertexBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexBuffer) | A vertex buffer resource |  |
| [FVertexBufferWithSRV](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexBufferWithSRV) |  |  |
| [FVertexFactory](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexFactory) | Encapsulates a vertex data source which can be linked into a vertex shader. |  |
| [FVertexFactoryShaderParameters](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexFactoryShaderParameters) | An interface to the parameter bindings for the vertex factory used by a shader. |  |
| [FVertexFactoryType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexFactoryType) | An object used to represent the type of a vertex factory. |  |
| [FVertexFactoryTypeDependency](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexFactoryTypeDependency) | Encapsulates a dependency on a vertex factory type and saved state from that vertex factory type. |  |
| [FVertexInputStream](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexInputStream) |  |  |
| [FVertexStreamComponent](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVertexStreamComponent) | A typed data source for a vertex factory which streams data from a vertex buffer. |  |
| [FVirtualTextureLocalTile](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVirtualTextureLocalTile) | Identifies a VT tile within a given producer |  |
| [FVirtualTextureProducerHandle](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVirtualTextureProducerHandle) |  |  |
| [FVisualizeTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVisualizeTexture) |  |  |
| [FVTProducerDescription](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVTProducerDescription) |  |  |
| [FVTProduceTargetLayer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVTProduceTargetLayer) | Describes a location to write a single layer of a VT tile |  |
| [FVTRequestPageResult](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FVTRequestPageResult) |  |  |
| [FYCbCrConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYCbCrConvertPS) | Pixel shader to convert a PS4 YCbCr texture to RGBA. |  |
| [FYCbCrConvertPS\_4x4Matrix](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYCbCrConvertPS_4x4Matrix) |  |  |
| [FYCoCgConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYCoCgConvertPS) | Pixel convert to resize an YCoCg texture. |  |
| [FYUVConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYUVConvertPS) | Pixel shader to convert Y, U, and V planes to RGBA. |  |
| [FYUVv210ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYUVv210ConvertPS) | Pixel shader to convert YUV v210 to RGB |  |
| [FYUVv216ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYUVv216ConvertPS) | Pixel shader to convert YUV v216/2vuy/yuv2 to RGB |  |
| [FYUVY416ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYUVY416ConvertPS) | Pixel shader to convert YUV Y416 to RGB |  |
| [FYUY2ConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYUY2ConvertPS) | Pixel shader to convert a YUY2 frame to RGBA. |  |
| [FYVYUConvertPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FYVYUConvertPS) | Pixel shader to convert a YVYU frame to RGBA. |  |
| [IAdaptiveVirtualTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IAdaptiveVirtualTexture) | Interface for adaptive virtual textures. |  |
| [IAllocatedVirtualTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IAllocatedVirtualTexture) | This interface represents a chunk of VT data allocated and owned by the renderer module, backed by both a page table texture, and a physical texture cache for each layer. |  |
| [ICustomCulling](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/ICustomCulling) |  |  |
| [ICustomResourcePool](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/ICustomResourcePool) |  |  |
| [ICustomVisibilityQuery](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/ICustomVisibilityQuery) |  |  |
| [IDumpGPUUploadServiceProvider](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IDumpGPUUploadServiceProvider) |  |  |
| [IPersistentViewUniformBufferExtension](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IPersistentViewUniformBufferExte-) |  |  |
| [IPooledRenderTarget](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IPooledRenderTarget) | [Render thread side, use TRefCountPtr, allows sharing and VisualizeTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/Core/Templates/TRefCountPtr) |  |
| [IRenderCaptureProvider](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IRenderCaptureProvider) |  |  |
| [IRendererModule](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IRendererModule) | The public interface of the renderer module. |  |
| [IScenePrimitiveRenderingContext](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IScenePrimitiveRenderingContext) |  |  |
| [IVirtualTexture](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IVirtualTexture) | This is the interface that can produce tiles of virtual texture data This can be extended to represent different ways of generating VT, such as disk streaming, runtime compositing, or whatever It's provided to the renderer module |  |
| [IVirtualTextureFinalizer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/IVirtualTextureFinalizer) |  |  |
| [TAlignedShaderParameterPtr](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TAlignedShaderParameterPtr) | PLATFORM\_64BITS. |  |
| [TAlignedTypedef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TAlignedTypedef) | Alignements tools because alignas() does not work on type in clang. |  |
| [TClearReplacementBase](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TClearReplacementBase) |  |  |
| [TClearReplacementCS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TClearReplacementCS) |  |  |
| [TClearReplacementPS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TClearReplacementPS) |  |  |
| [TClearReplacementTypeSelector](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TClearReplacementTypeSelector) |  |  |
| [TClearReplacementVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TClearReplacementVS) |  |  |
| [TCompareShaderTypePermutation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TCompareShaderTypePermutation) | Used to compare order shader types permutation deterministically. |  |
| [TCopyResourceCS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TCopyResourceCS) |  |  |
| [TEnqueueUniqueRenderCommandType](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TEnqueueUniqueRenderCommandType) |  |  |
| [TGlobalResource](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TGlobalResource) | Used to declare a render resource that is initialized/released by static initialization/destruction. |  |
| [TLambdaHandler](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TLambdaHandler) | Lambda persistent handler which calls the provided lambda when a message is received. |  |
| [TMap](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TMap) | [Map of FBudget -> .](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/FBudget) |  |
| [TOneColorPixelShaderMRT](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TOneColorPixelShaderMRT) | Pixel shader for rendering a single, constant color to MRTs. |  |
| [TOneColorVS](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TOneColorVS) | Vertex shader for rendering a single, constant color. |  |
| [TOptionalShaderMapRef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TOptionalShaderMapRef) | A reference to an optional shader, initialized with a shader type from a shader map if it is available or nullptr if it is not. |  |
| [TRDGArrayAllocator](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGArrayAllocator) | A container allocator that allocates from a global RDG allocator instance. |  |
| [TRDGBufferAccess](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGBufferAccess) |  |  |
| [TRDGEmptyLambdaPass](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGEmptyLambdaPass) |  |  |
| [TRDGHandle](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGHandle) | HANDLE UTILITIES Handle helper class for internal tracking of RDG types. |  |
| [TRDGHandleBitArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGHandleBitArray) | Specialization of bit array with compile-time type checking for handles and a pre-configured allocator. |  |
| [TRDGHandleRegistry](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGHandleRegistry) | Helper handle registry class for internal tracking of RDG types. |  |
| [TRDGHandleUniqueFilter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGHandleUniqueFilter) | Esoteric helper class which accumulates handles and will return a valid handle only if a single unique handle was added. |  |
| [TRDGLambdaPass](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGLambdaPass) | Render graph pass with lambda execute function. |  |
| [TRDGParameterStruct](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGParameterStruct) |  |  |
| [TRDGResourceAccessArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGResourceAccessArray) |  |  |
| [TRDGResourceAccessTypeInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGResourceAccessTypeInfo) |  |  |
| [TRDGScopeOp](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGScopeOp) |  |  |
| [TRDGScopeOpArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGScopeOpArray) |  |  |
| [TRDGScopeStack](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGScopeStack) | A helper profiler class for tracking and evaluating hierarchical scopes in the context of render graph. |  |
| [TRDGScopeStackHelper](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGScopeStackHelper) |  |  |
| [TRDGTextureAccess](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGTextureAccess) |  |  |
| [TRDGUniformBuffer](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGUniformBuffer) |  |  |
| [TRDGUniformBufferBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRDGUniformBufferBinding) |  |  |
| [TRenderThreadStruct](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TRenderThreadStruct) | Represents a struct with a lifetime that spans multiple render commands with scoped initialization and release on the render thread. |  |
| [TShaderMap](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderMap) |  |  |
| [TShaderMapRef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderMapRef) | A reference which is initialized with the requested shader type from a shader map. |  |
| [TShaderParameterScalarArrayTypeInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderParameterScalarArrayTypeI-) | Upgrade the scalar type to a vector for storage. |  |
| [TShaderParameterStructTypeInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderParameterStructTypeInfo) |  |  |
| [TShaderParameterTypeInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderParameterTypeInfo) | Template to transcode some meta data information for a type not specific to shader parameters API. |  |
| [TShaderPermutationDomain](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderPermutationDomain) | Variadic template that defines an arbitrary multi-dimensional permutation domain, that can be instantiated to represent a vector within the domain. |  |
| [TShaderPermutationDomainSpetialization](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderPermutationDomainSpetiali-) | C++11 doesn't allow partial specialization of templates method or function. |  |
| [TShaderPermutationInt](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderPermutationInt) | Defines at compile time a permutation dimension made of int32 from 0 to N -1. |  |
| [TShaderPermutationSparseInt](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderPermutationSparseInt) | Defines at compile time a permutation dimension made of specific int32. |  |
| [TShaderRefBase](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderRefBase) |  |  |
| [TShaderResourceParameterArray](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderResourceParameterArray) | Static array of shader resource shader that is initialized to nullptr. |  |
| [TShaderResourceParameterTypeInfo](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderResourceParameterTypeInfo) |  |  |
| [TShaderTypePermutation](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderTypePermutation) | Define a shader permutation uniquely according to its type, and permutation id. |  |
| [TShaderUniformBufferParameter](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TShaderUniformBufferParameter) | A shader uniform buffer binding with a specific structure. |  |
| [TStaticBlendState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticBlendState) | A static RHI blend state resource. |  |
| [TStaticBlendStateWriteMask](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticBlendStateWriteMask) | A static RHI blend state resource which only allows controlling MRT write masks, for use when only opaque blending is needed. |  |
| [TStaticDepthStencilState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticDepthStencilState) | A static RHI stencil state resource. |  |
| [TStaticRasterizerState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticRasterizerState) | A static RHI rasterizer state resource. |  |
| [TStaticSamplerState](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticSamplerState) | A static RHI sampler state resource. |  |
| [TStaticStateRHI](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TStaticStateRHI) | The base class of the static RHI state classes. |  |
| [TThreadGroupSize](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TThreadGroupSize_1) |  |  |
| [TThreadGroupSize](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TThreadGroupSize) |  |  |
| [TUniformBufferBinding](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TUniformBufferBinding) |  |  |
| [TUniformBufferMetadataHelper](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TUniformBufferMetadataHelper) | Retrieve the metadata of a UB type |  |
| [TUniformBufferRef](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TUniformBufferRef) | A reference to a uniform buffer RHI resource with a specific structure. |  |
| [TVertexFactoryParameterTraits](https://docs.unrealengine.com/5.3/en-US/API/Runtime/RenderCore/TVertexFactoryParameterTraits) |  |  |

언리얼 스태틱 메쉬에 대한 버텍스 정보

Vec3 position

Color color == vertex color

Vec3 tanX

Vec3 tanY

Vec3 tanZ

Ve2[8] uvs