RDG Insights

Quick Start Guide

Introduction

- Visualize the RDG graph structure.
  - Resource lifetimes, pass associations, and pool allocation overlap.
  - Fences and async compute overlap.
  - Graph culling and render pass merging.

- Useful debugging and diagnostic tool.
  - Why doesn't my async compute pass overlap?
  - How is my resource being used across the frame?
  - Does my resource allocation overlap with other resources?
  - Which resources are used by post processing?
  - Is my pass culled?

- Implemented as plugin to Unreal Insights.
  - Dedicated timing track.

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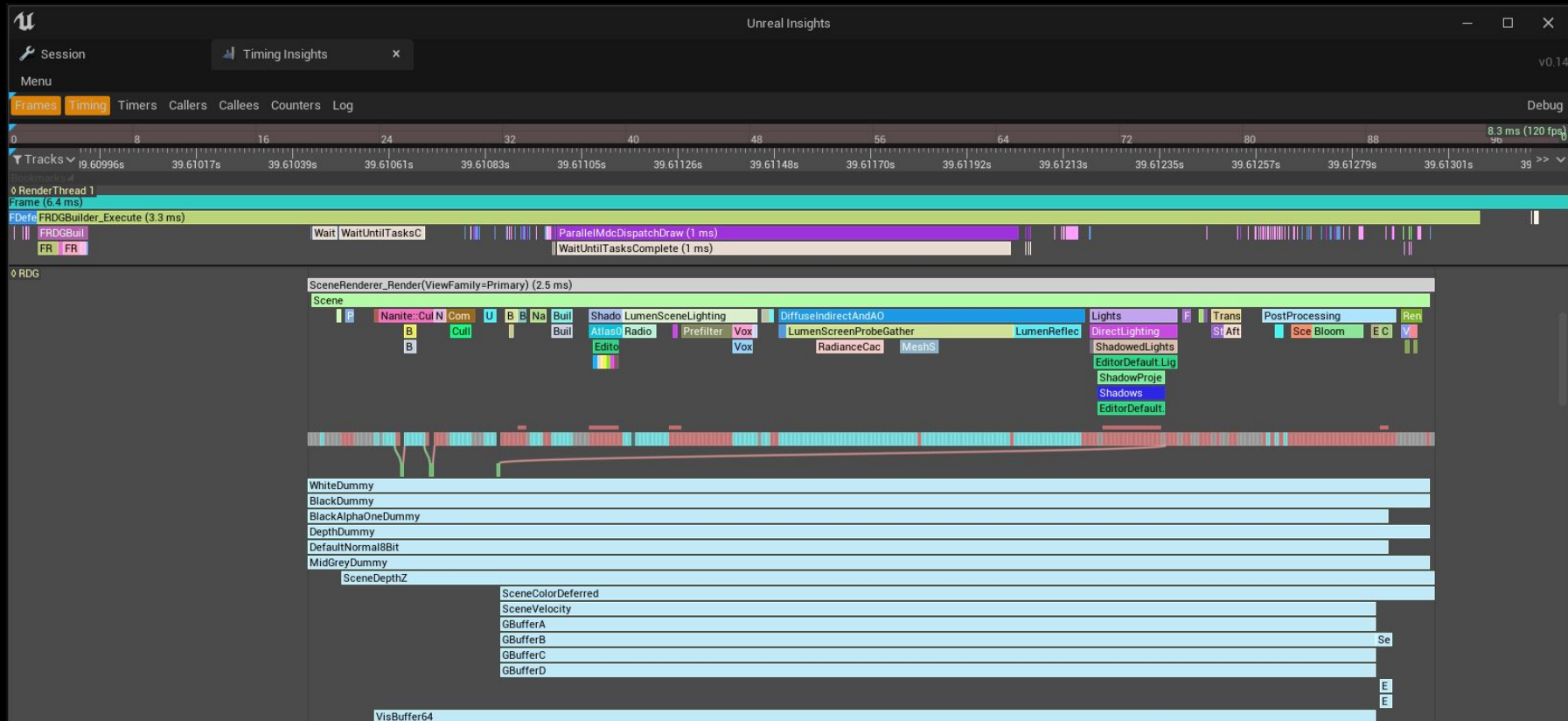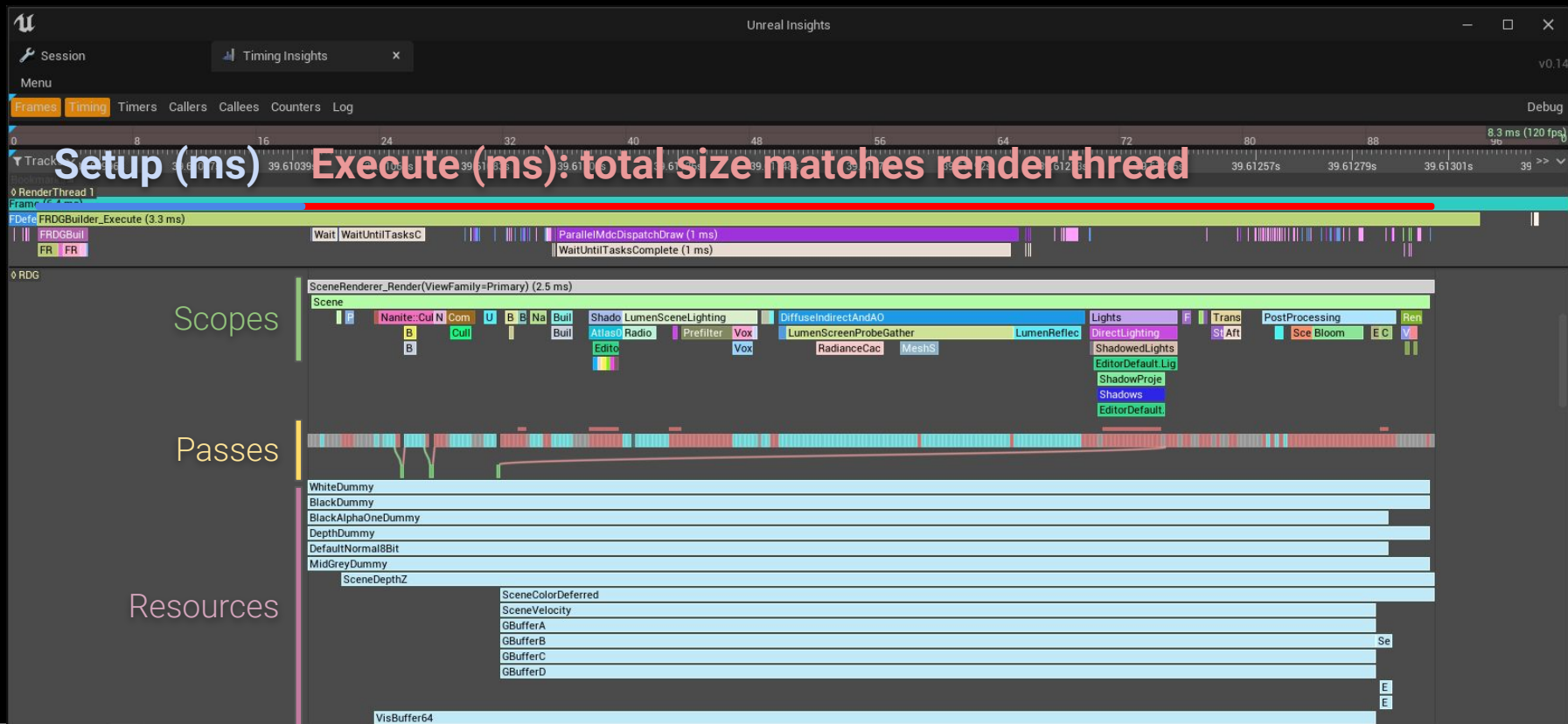
Introduction

Capturing a Trace

Two Options:
- Use `-trace=`**`RDG,`**`defaults -tracehost={IP_ADDRESS}` command line arguments on client.
- Enable the **RDG** channel directly in Insights while connected.

Generates a lot of data. Consider enabling in short bursts.

# New RDG Timing Track

New RDG Timing Track

Passes

- Individual passes are the **uniform** width. Not representative of time.
  - X axis in 'pass' units.

- Color coded for clarity: **raster**, **compute**, **async compute**.
  - Parameterless helper passes are **gray**.
  - Culled passes are partially translucent.
  - Tooltip shows full name and attributes.
  - Merged render passes represented with red bar.

- Separate track for async compute, with **signal** and **wait** fences.
  - Represents **scheduled** fences; not actual GPU execution.
  - Still need GPU profiler to see what actually happened.
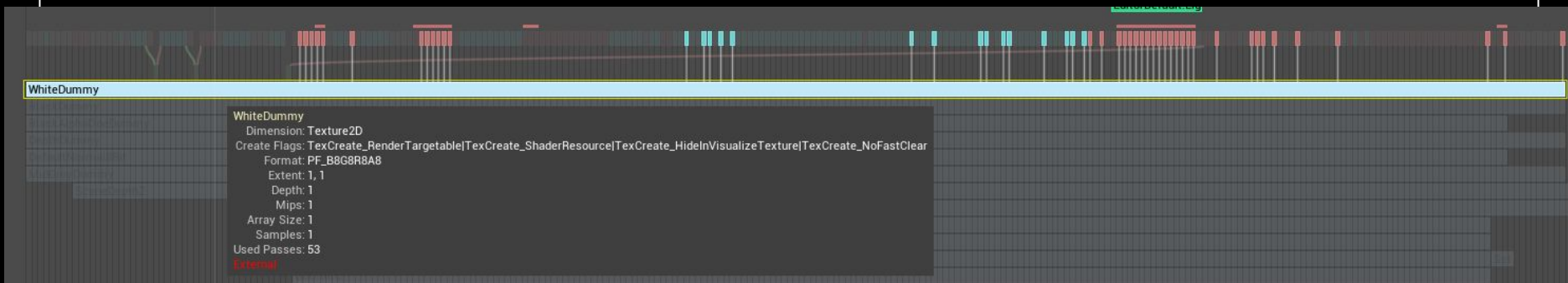 - Useful when tuning async compute for overlap.
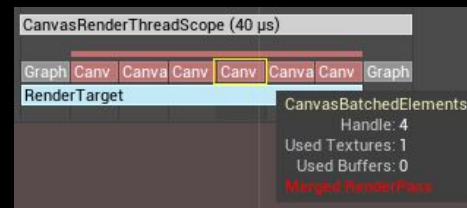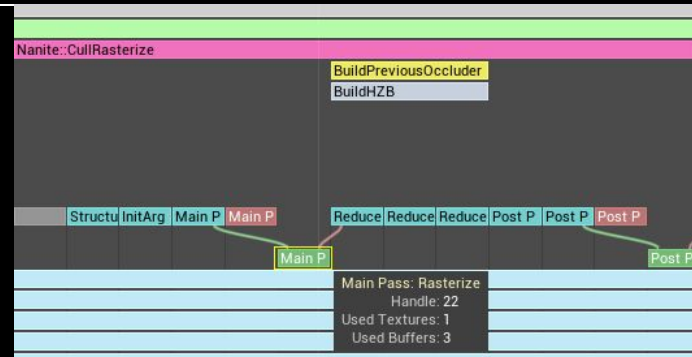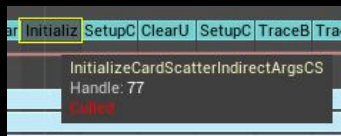
Resources

- **Texture** and **buffer** lifetimes represented in the graph.
  - Each column represents a pass.
  - The first and last pass to use a resource define its **lifetime**.
  - Use right-click context menu to display specific resources.

- Each row represents a pooled resource.
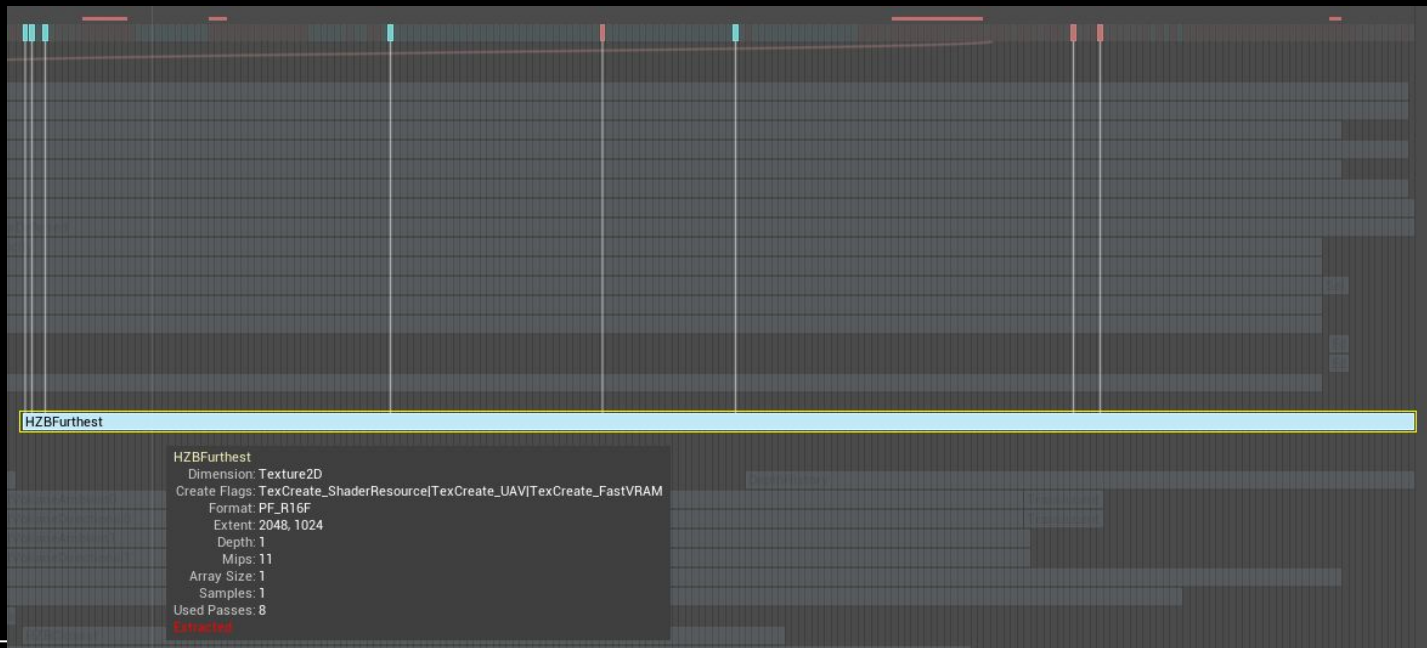 - Consecutive events on the same row represents resource overlap.
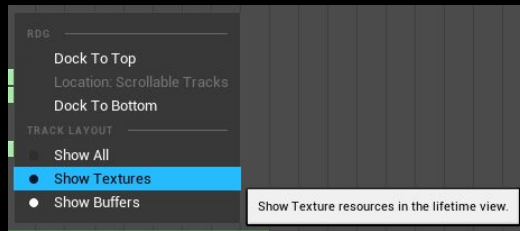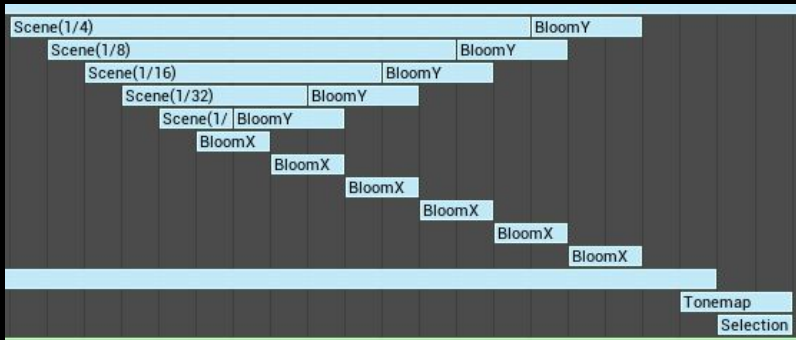
Resources

- **External** resources are registered into the graph or promoted from internal resources.
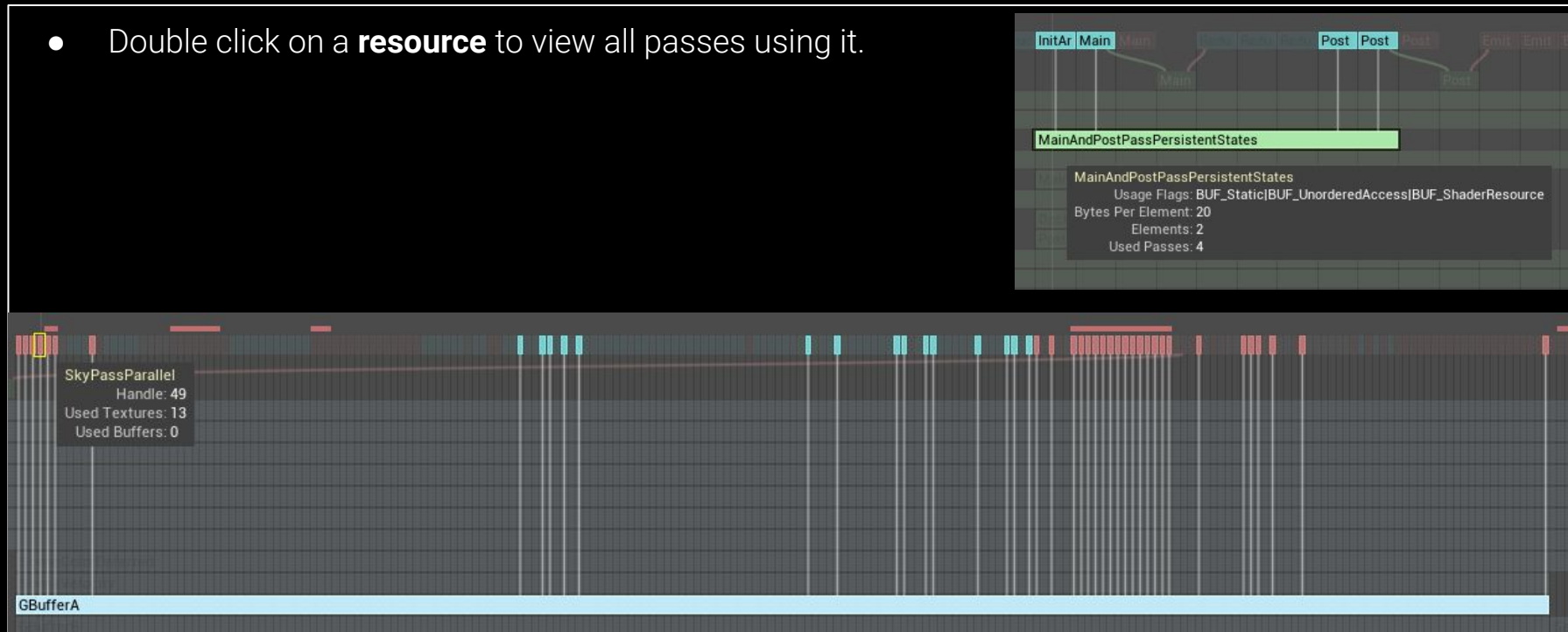 - The lifetime is extended to the start of the graph.

WhiteDummy

WhiteDummy
Dimension: Texture2D
Create Flags: TexCreate_RenderTargetable|TexCreate_ShaderResource|TexCreate_HideInVisualizeTexture|TexCreate_NoFastClear
Format: PF_B8G8R8A8
Extent: 1, 1
Depth: 1
Mips: 1
Array Size: 1
Samples: 1
Used Passes: 53
External

Resources

- **Extracted** resource lifetimes are extended to the end of the graph.

HZBFurthest
HZBFurthest
Dimension: **Texture2D**
Create Flags: **TexCreate_ShaderResource|TexCreate_UAV|TexCreate_FastVRAM**
Format: **PF_R16F**
Extent: **2048, 1024**
Depth: **1**
Mips: **11**
Array Size: **1**
Samples: **1**
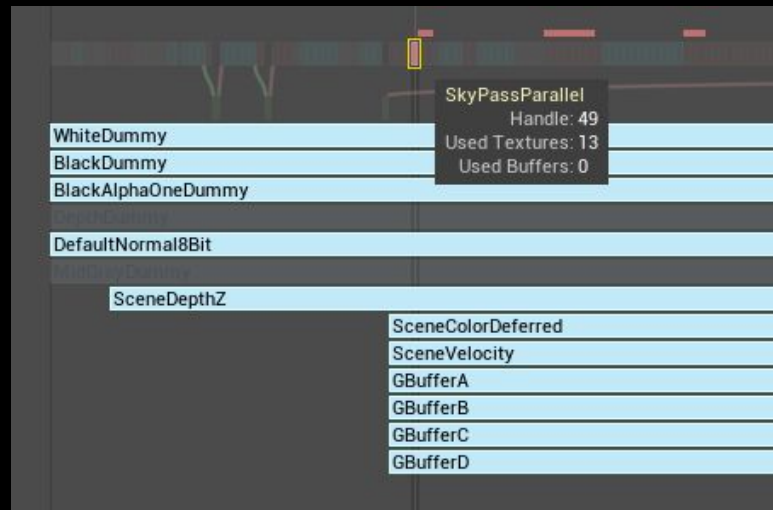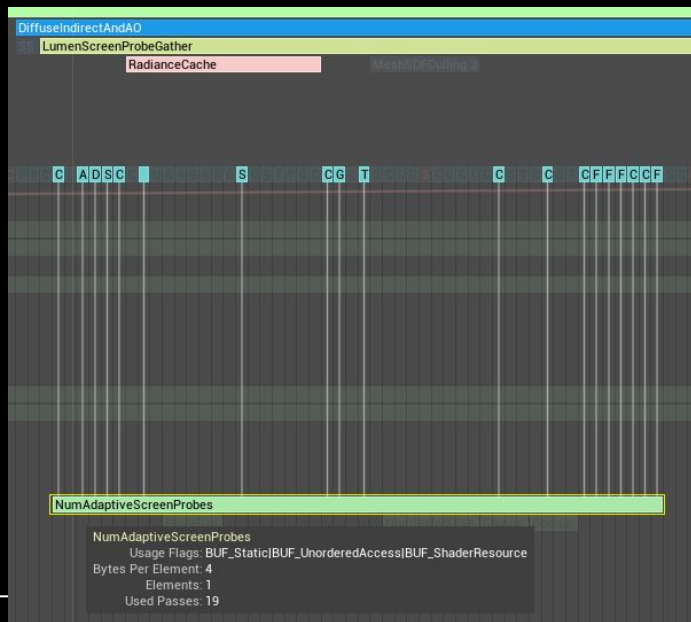Used Passes: **8**
Extracted

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Filtering

- Double click on a **resource** to view all passes using it.

Filtering

- Double click on a **pass** to filter all resources used by it.

Filtering

- Double click on a **scope** to filter all resources and passes under it.

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Filtering

- Right click to show context menu with more filtering options.
  - Show / Hide resources with specific attributes.
  - Sort resource lanes.
  - Colorize resources based on size or type.
  - Show resources matching a name string.
 - Show resources above a certain size.

RDG
Dock To Top
Location: Scrollable Tracks
Dock To Bottom

VISUALIZER MODE
- Resources
- Transient Heaps

TRACK SHOW FLAGS
✓ Show Textures
✓ Show Buffers
✓ Show Transient
✓ Show External
✓ Show Pooled

TRACK SORT BY
- Creation
- Largest Size
- Smallest Size
- Start Of Lifetime
- End Of Lifetime

TRACK RESOURCE COLORATION
- By Type
- By Size

TRACK RESOURCE FILTER
🔍 Filter By Name

Filter By Size (MB)   0.0

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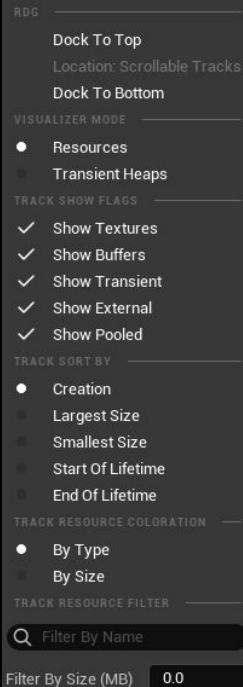
Transient Resource Heap Visualization Mode

- Enable transient heap visualization (if supported by platform).

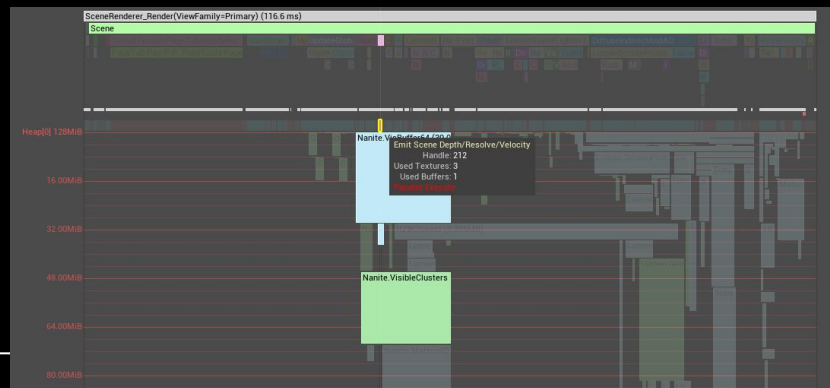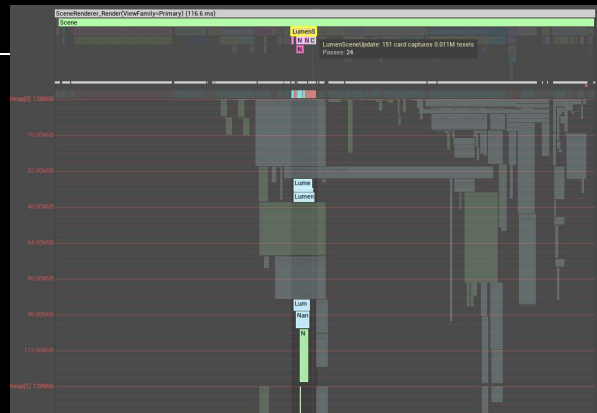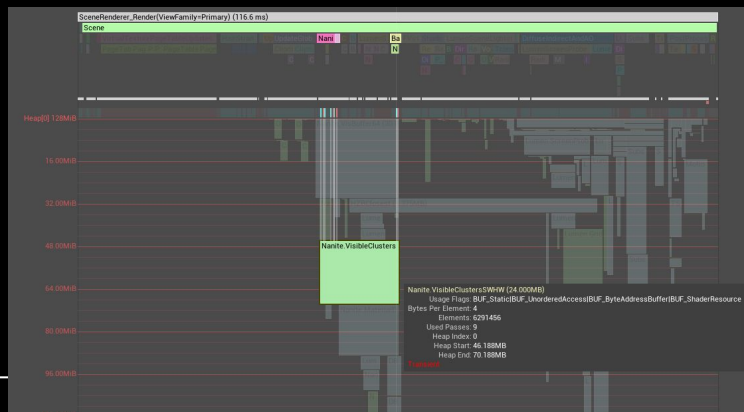UNREAL ENGINE
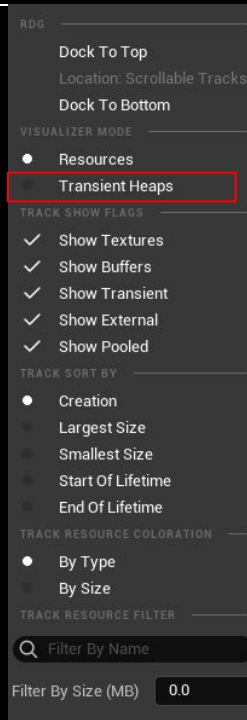
Transient Resource Heap Visualization Mode

- Y axis is heap offset.
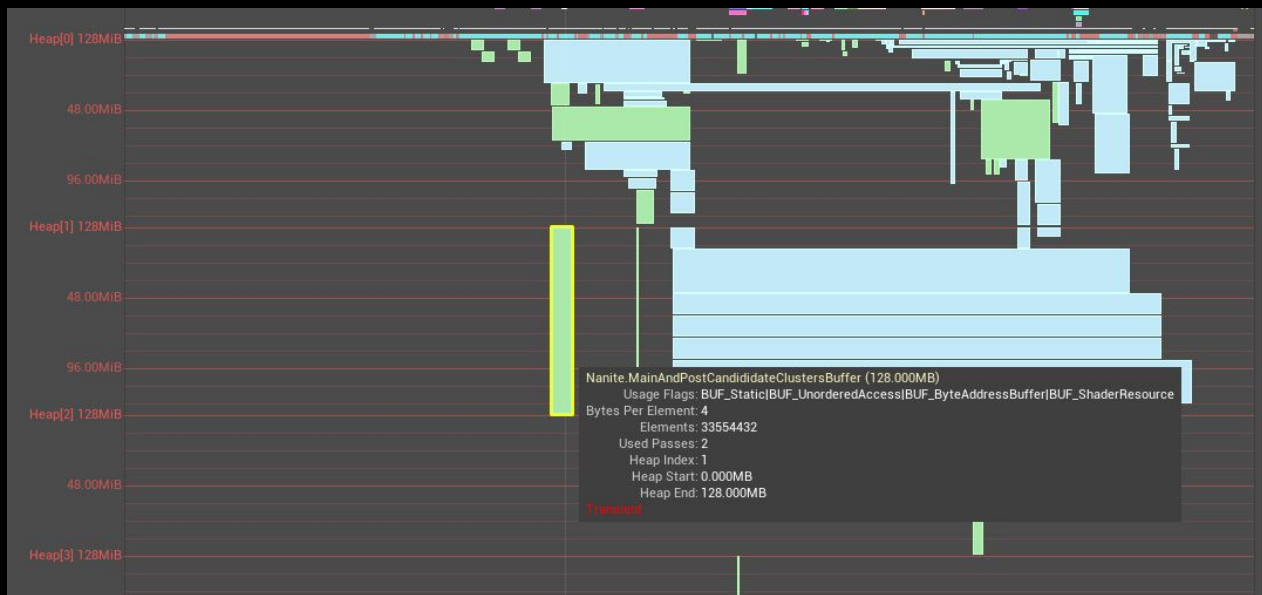- Supports Pass / Scope / Resource filtering.
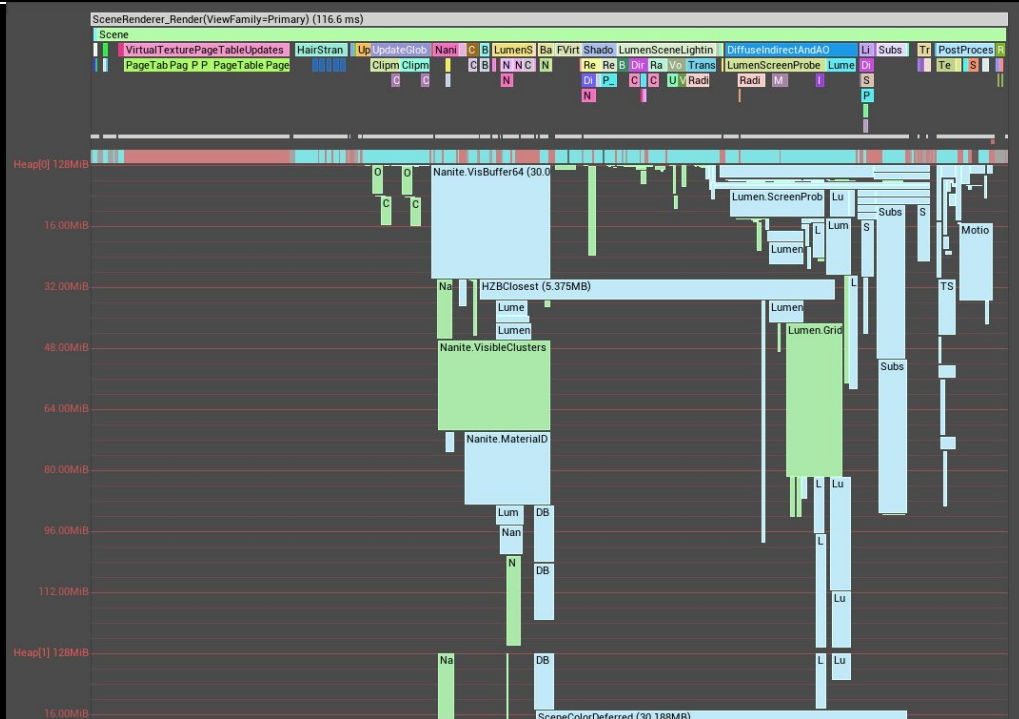
Transient Resource Heap Visualization Mode

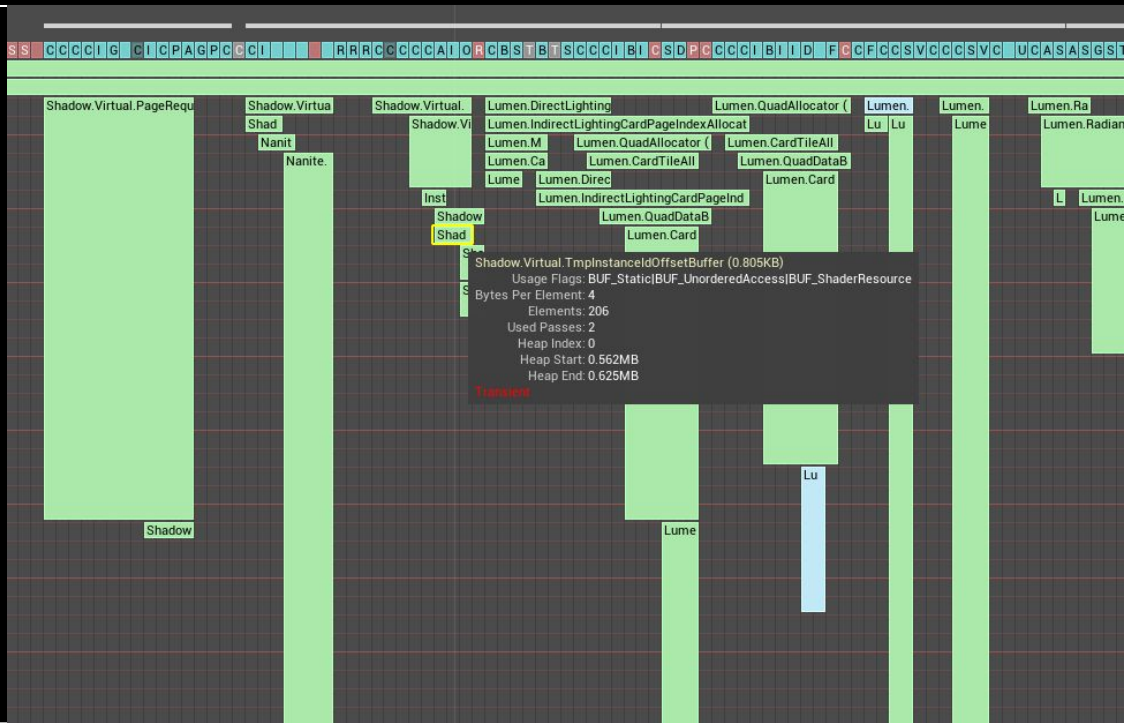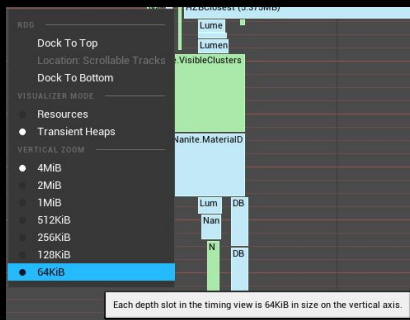- Supports Pass / Scope / Resource filtering.

Transient Resource Heap Visualization Mode

- Supports 'Collapse' mode in Insights (press 'C').

Transient Resource Heap Visualization Mode

- Select zoom level in context menu.
- Useful to visualize small resources.

Conclusion

- Now in UE5.
  - Feedback Welcome!

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