



Unreal Fest 2024 Seoul

Unreal Engine 5.4 – Roadmap Media and Entertainment

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What's new in Unreal Engine 5.4

- Updates in **rigging** and **animation**
- Production ready **Vcam**
- **VR scouting** quality of life
- Quality and speed improvements in **rendering**
- New tools for **ICVFX**
- Further integration of **2110** for **nDisplay**
- Scalable production rendering with **MRG**
- **Media Input Output** expansion
- Fully qualified **DMX** integration



Animation Authoring in Unreal Engine 5.4

Unreal Engine for Animators



Animation Aims

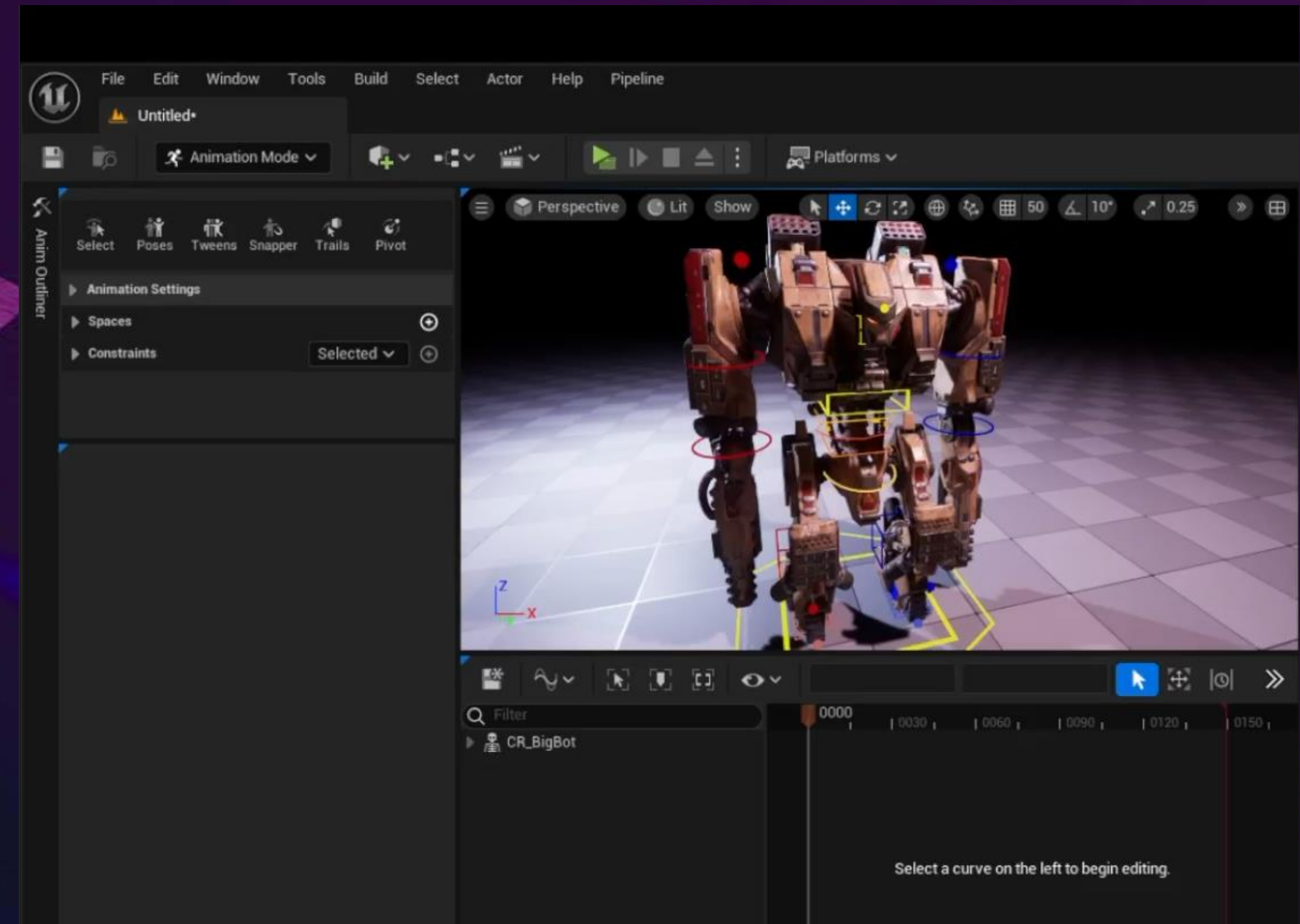
Provide best-in-class tools and technology

Improve roundtripping times by animating in context

Animate in Final Pixel

Build an open, flexible and extensible animation framework

Empower non-expert creators.



Skeletal Editor *(Beta)*

A new **Component Editor** for easier creation of bones with new **bone snapping tools**.

Quickly build skeletons

Previewing Reference Pose

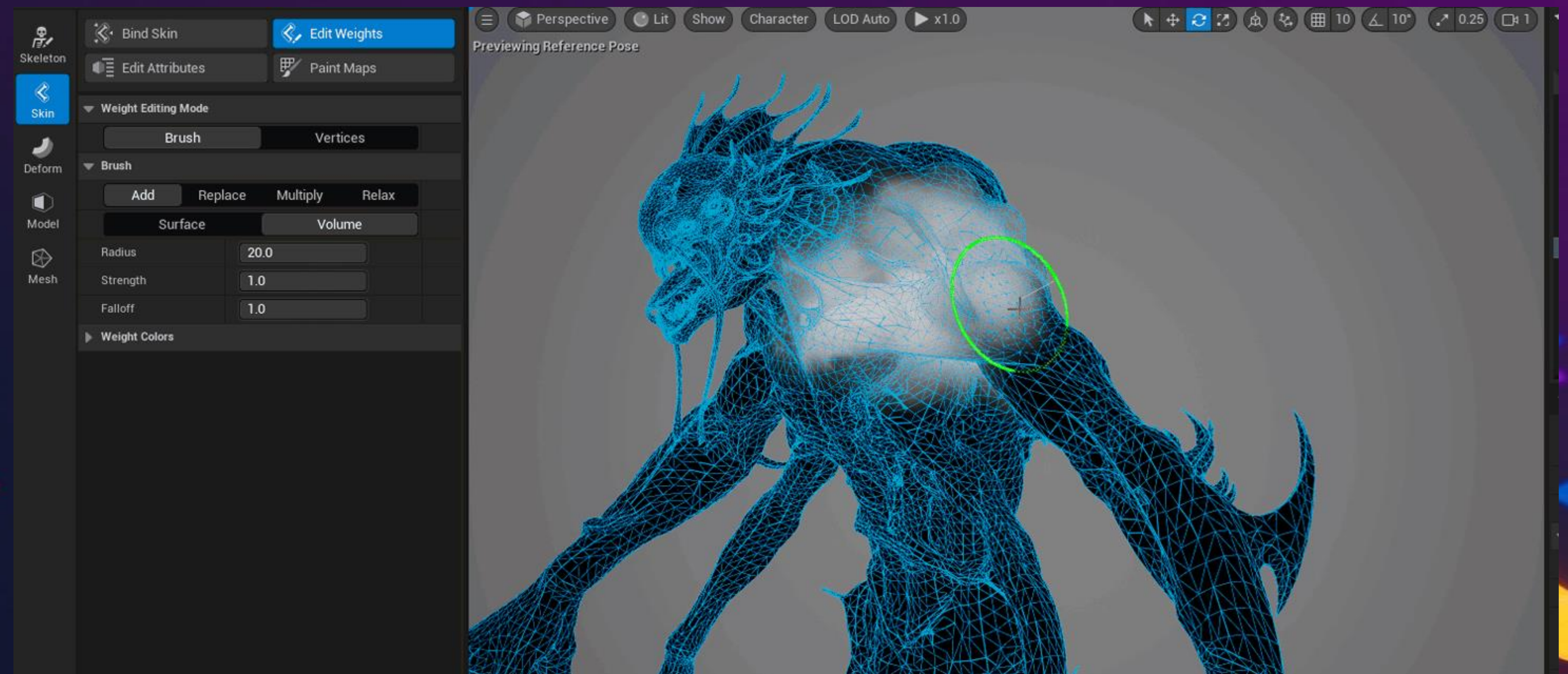


Skeletal Editor *(Beta)*

Edit skin weights directly in the Unreal Editor, eliminating need for external DCC.

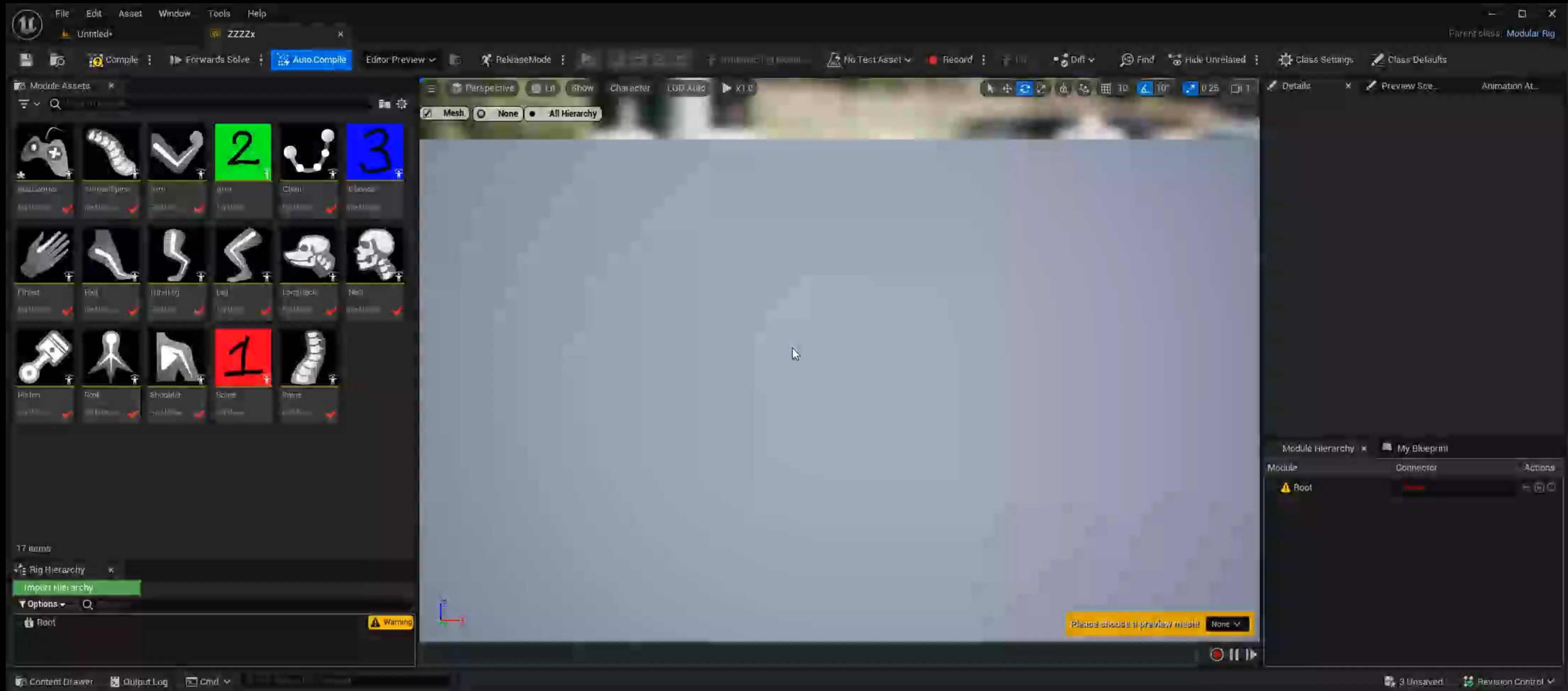
Create bones and weights in context to your animation

Generate and paint poly groups in Quad mesh display.



Rigging

Modular Rigging Framework Skeletal Editor (Beta)



Control Rig

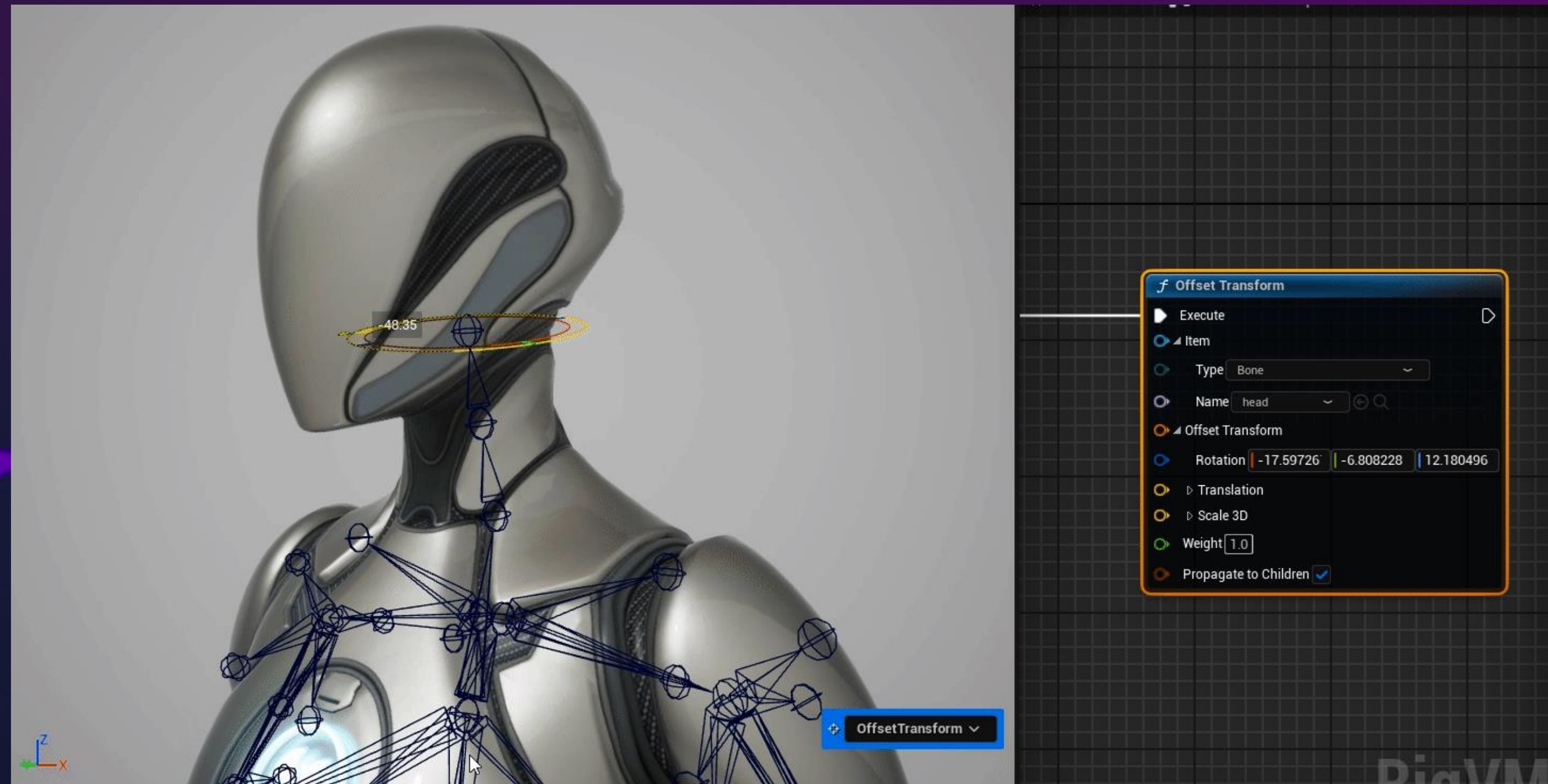
Direct manipulation = Easier interaction

Visually pose rig elements

Quality of Life Improvements

Marquees Selection

Greater Anim Blueprint Functionality

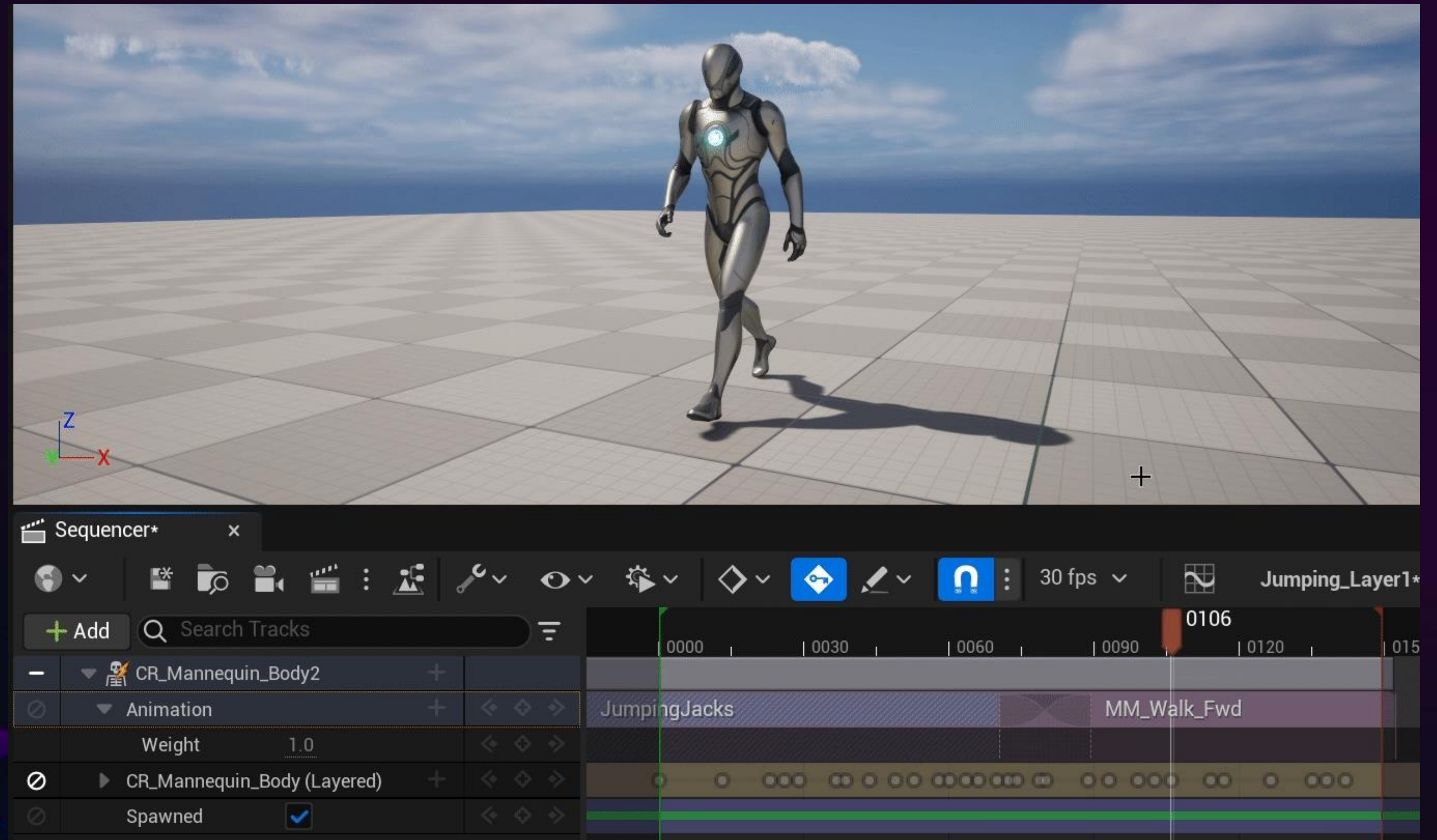


Layered Control Rigs

New Layered Control Rigs

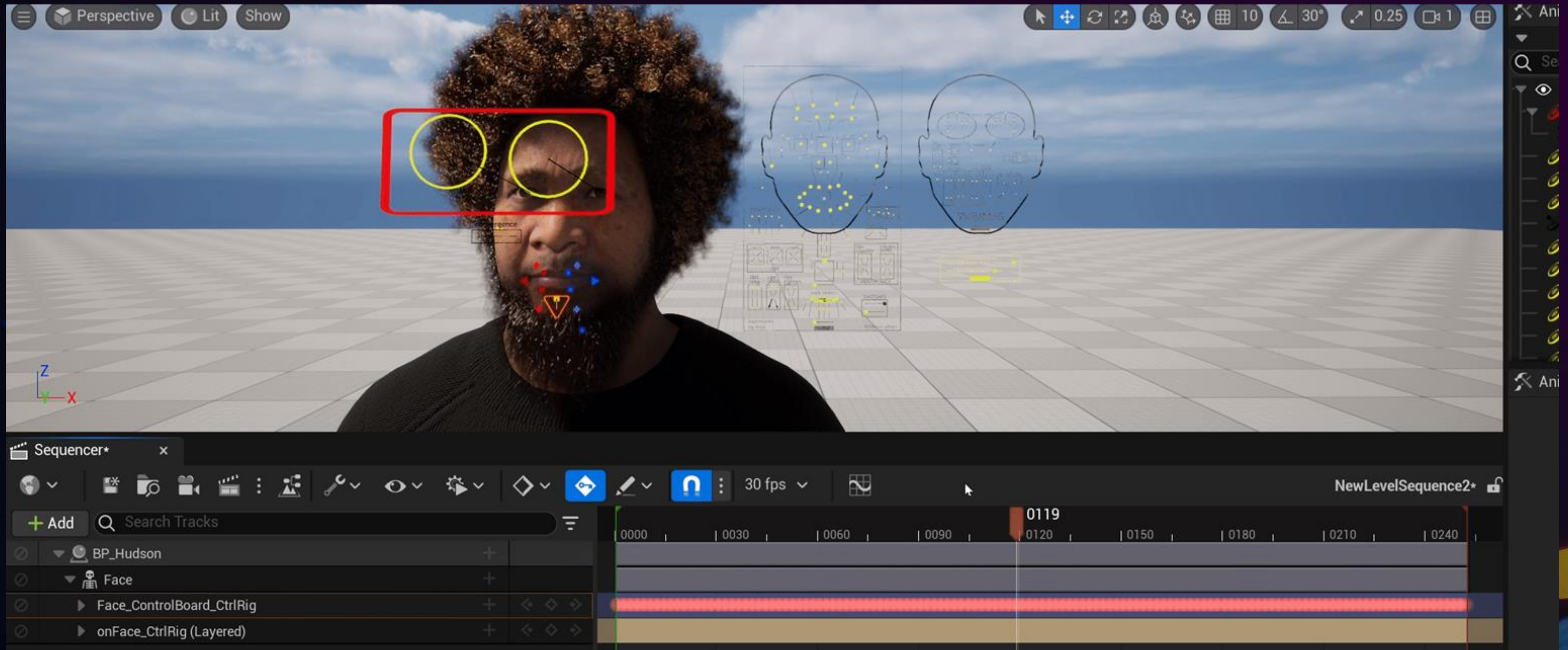
Less baking to control rigs.

Take advantage of additive constraints and blendable weights.



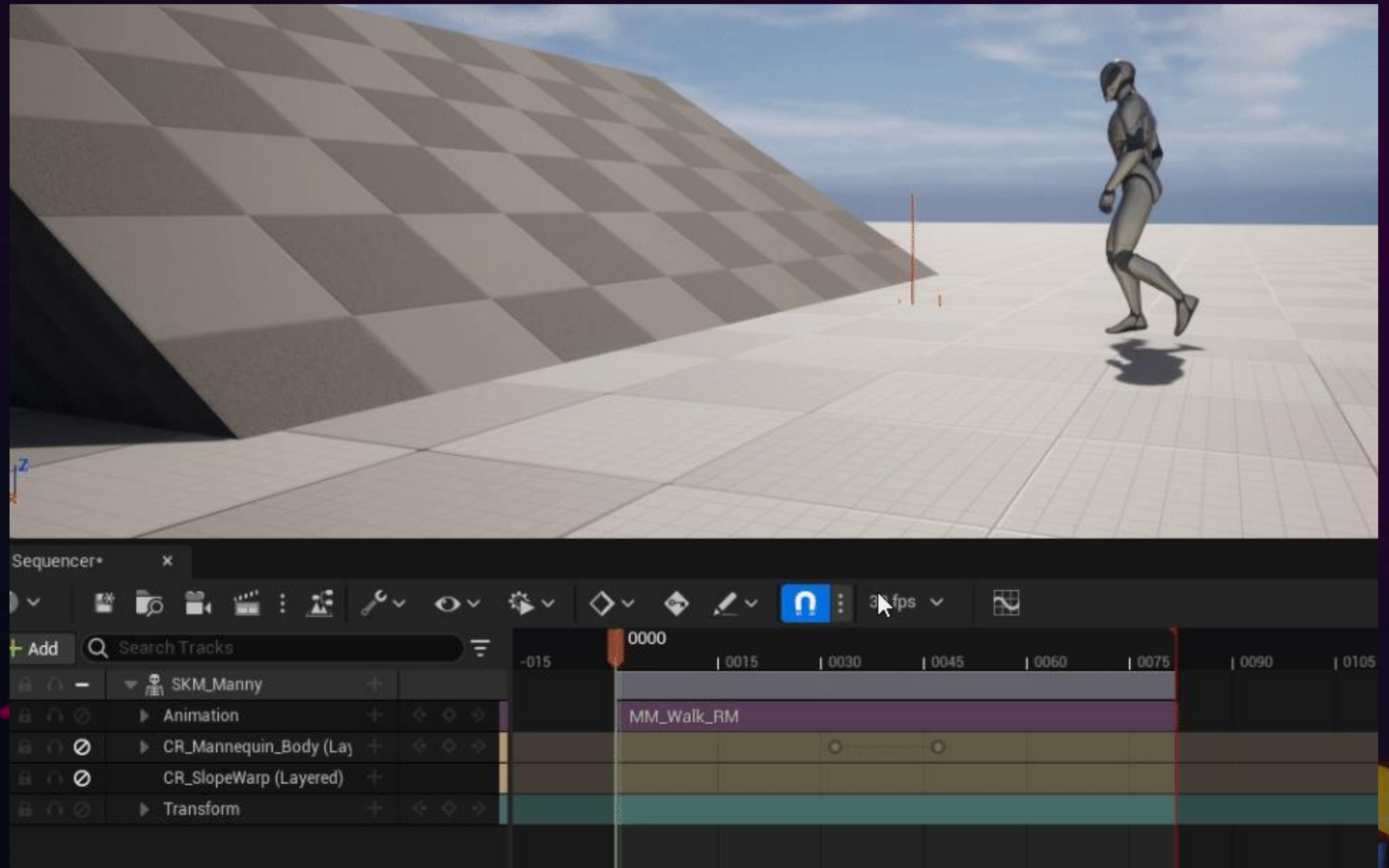
Layered Control Rigs

Multiple rigs can be stacked



Layered Control Rigs

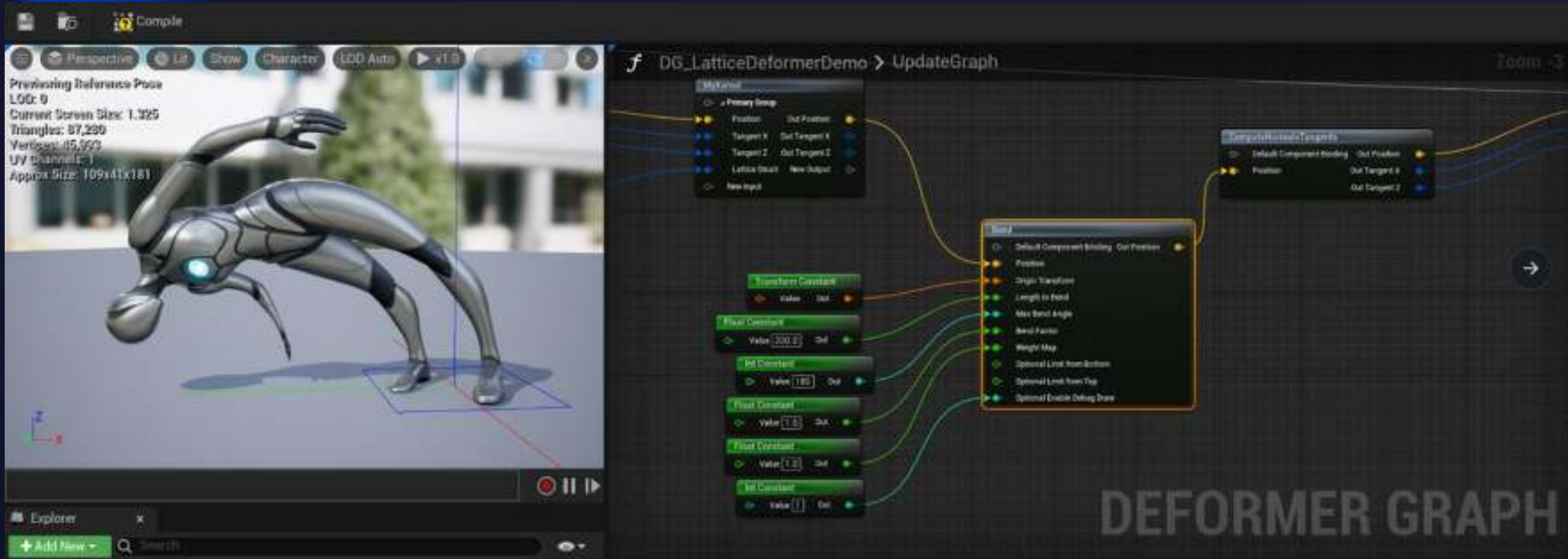
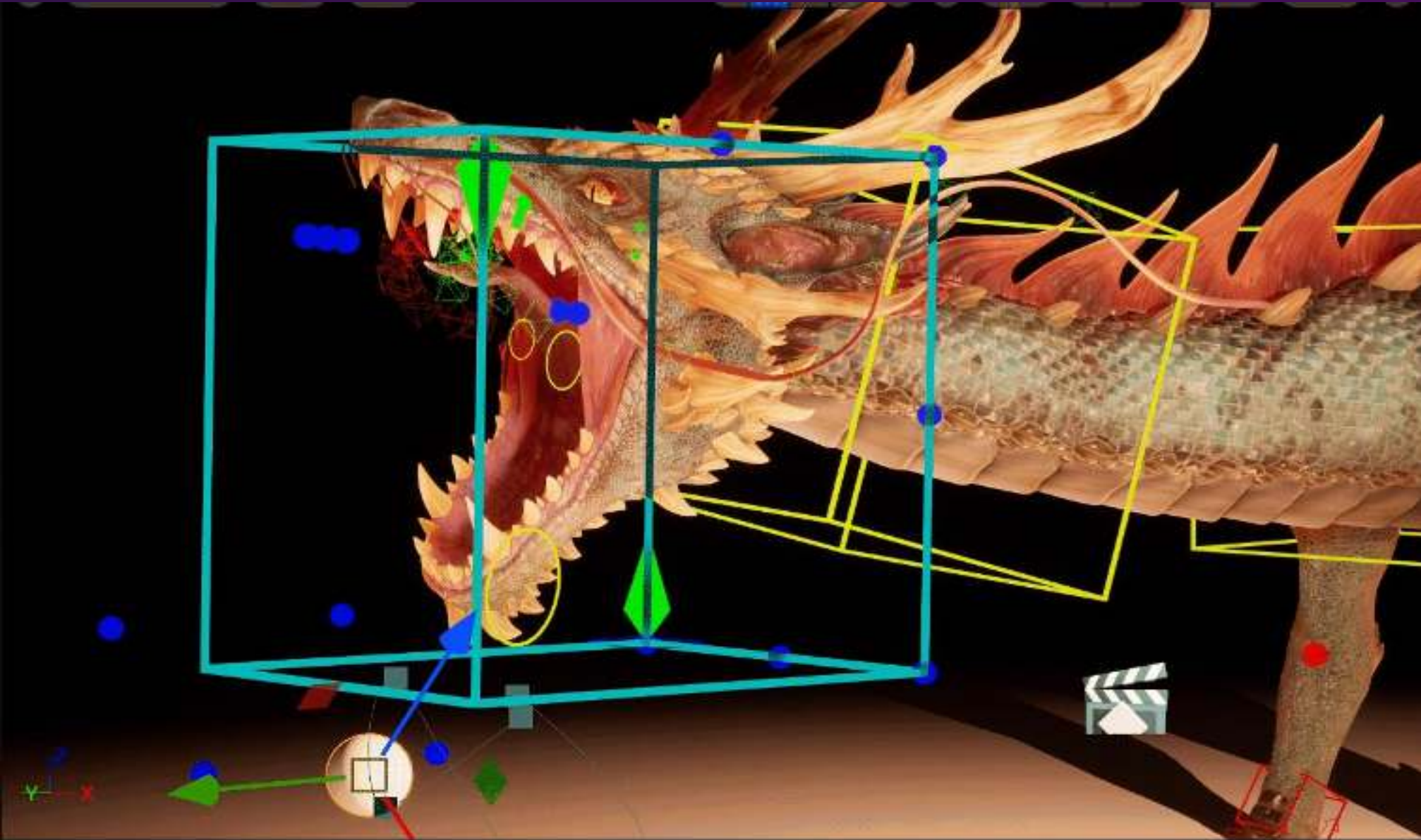
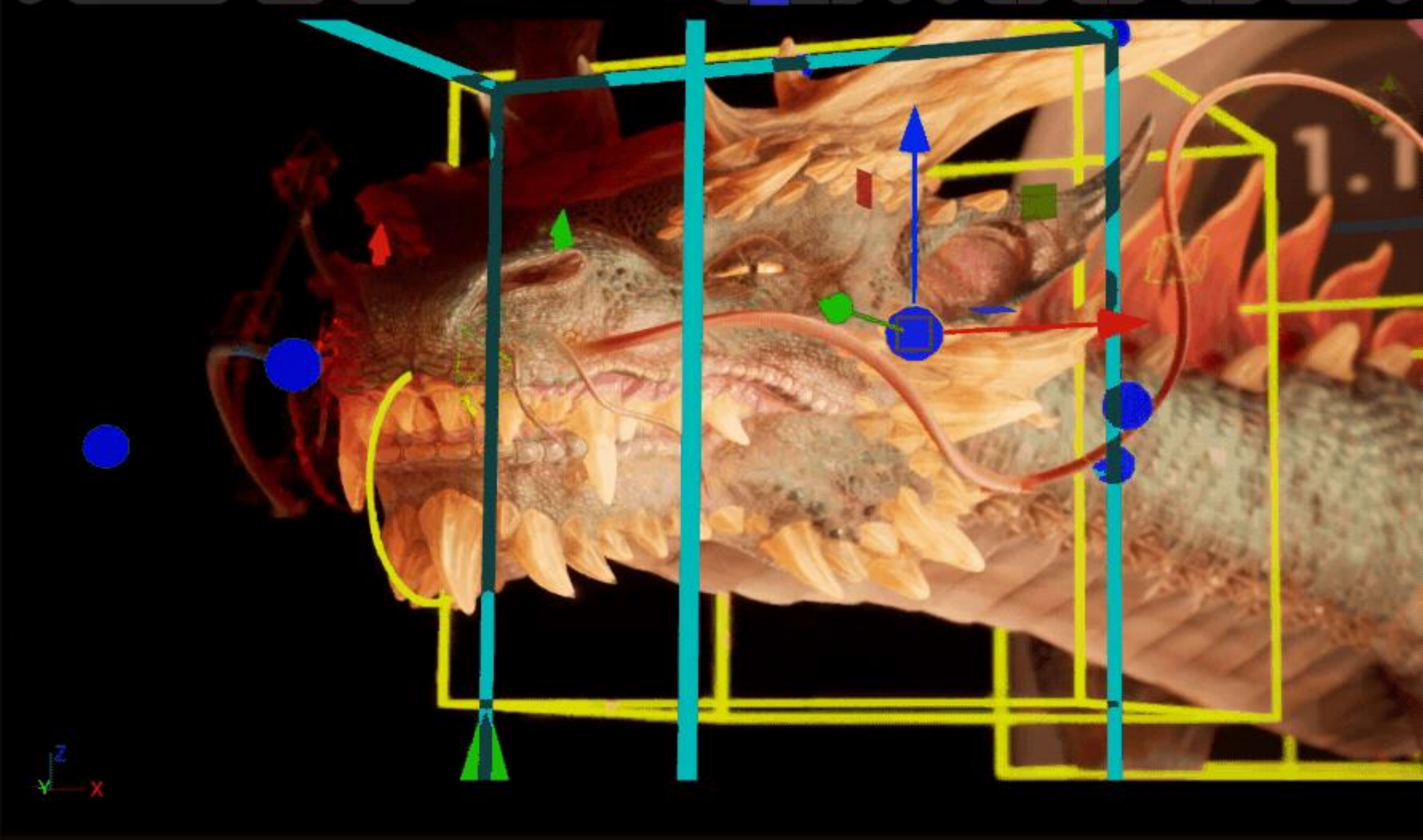
Realtime
Slope
Warping



Deformers

Deformer Graph (Beta)

Create complex deformer animation such as Squash and Stretch natively in engine.



Rigging New Deformer Graph Functions

The image displays the Unreal Engine interface, split into two main sections. On the left is a 3D viewport showing a blue dinosaur character with a black skeletal rig. The viewport includes a top toolbar with icons for Perspective, Lit, Show, Character, LOD Auto, and playback controls. A status bar on the left provides technical details: "Previewing Animation DinoAnim", "LOD: 0", "Current Screen Size: 1.016", "Triangles: 164,434", "Vertices: 85,540", "UV Channels: 1", "Approx Size: 188x573x223", and "Framerate: 30 fps". A timeline at the bottom shows a sequence of frames from 0 to 300, with a red bar indicating the current frame at approximately 210. Below the timeline is a "Details" panel with a search bar and a "Value" field set to 0.0.

On the right is the "Deformer Graph" editor for the "DG_TwistAndSquash" component. The graph is titled "UpdateGraph" and features a "Zoom -3" indicator. It contains several interconnected nodes:

- Skinned Mesh**: A node with inputs for Position, Tangent X, Tangent Z, Num UVChannels, UV, Color, Num Triangles, and Index Buffer.
- LinearBlendSkin_PositionOnly**: A node with inputs for Default Component Binding Out Position and Position.
- Twist**: A node with inputs for Default Component Binding Out Position, In Position, and Amount.
- Float Constant**: Two nodes, each with a "Value" input set to 0.0 and an "Out" output.
- ComputeNormalsTangents**: A node with inputs for Default Component Binding, Out Position, Position, Out Tangent X, and Out Tangent Z.
- Write Skinned Mesh**: A node with inputs for Skinned Mesh, Position, Tangent X, Tangent Z, and Color.

The graph shows data flow from the Skinned Mesh node to the LinearBlendSkin_PositionOnly node, then to the Twist node. The Twist node's Amount input is connected to the first Float Constant node. The second Float Constant node is connected to the ComputeNormalsTangents node. The ComputeNormalsTangents node's Position, Out Tangent X, and Out Tangent Z outputs are connected to the Write Skinned Mesh node. The Write Skinned Mesh node's Skinned Mesh input is connected to the Skinned Mesh node's Position input.

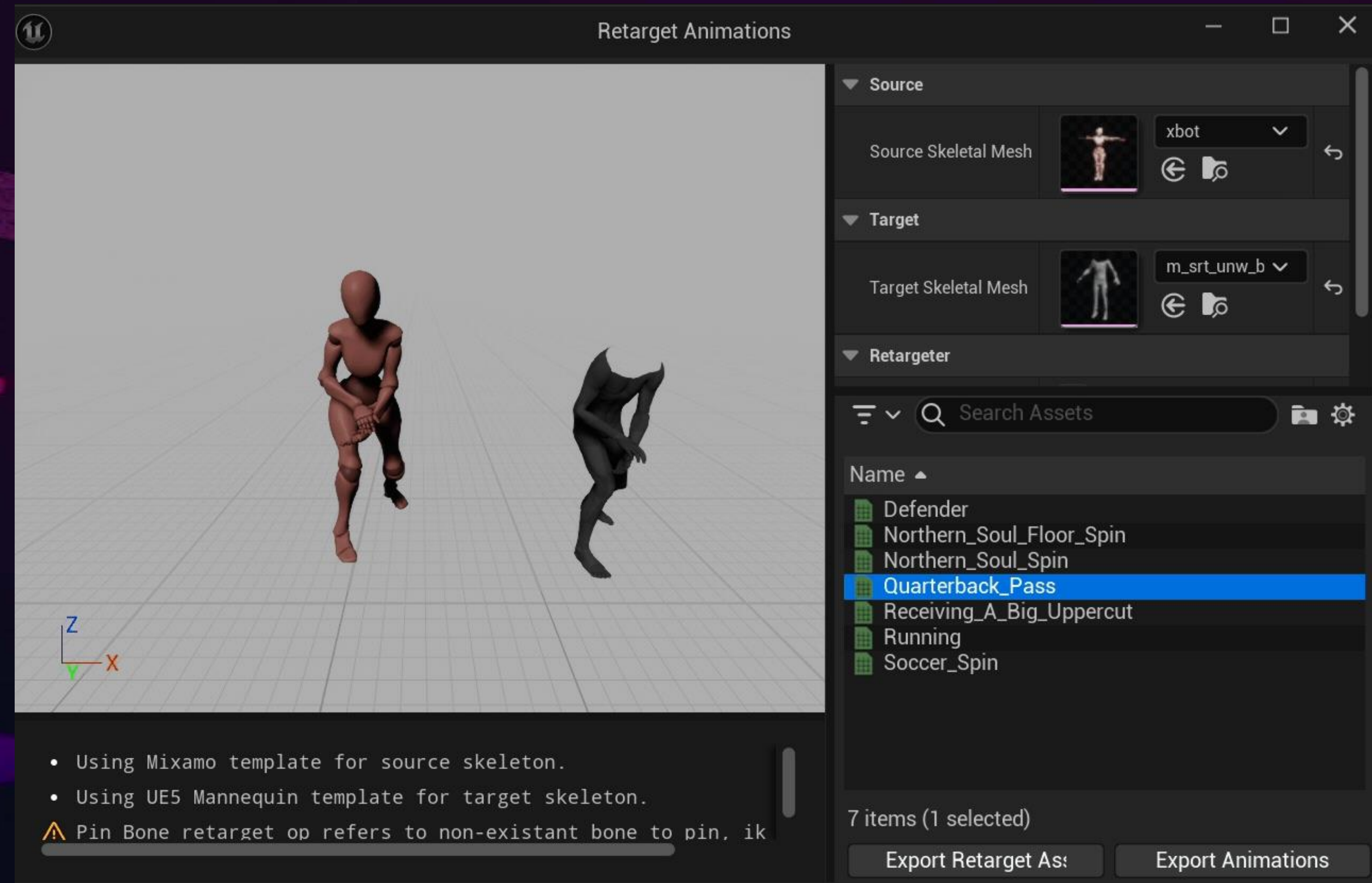
DEFORMER GRAPH

Automated Retargeting

Auto Retargeting for Bipedals (*Production Ready*)

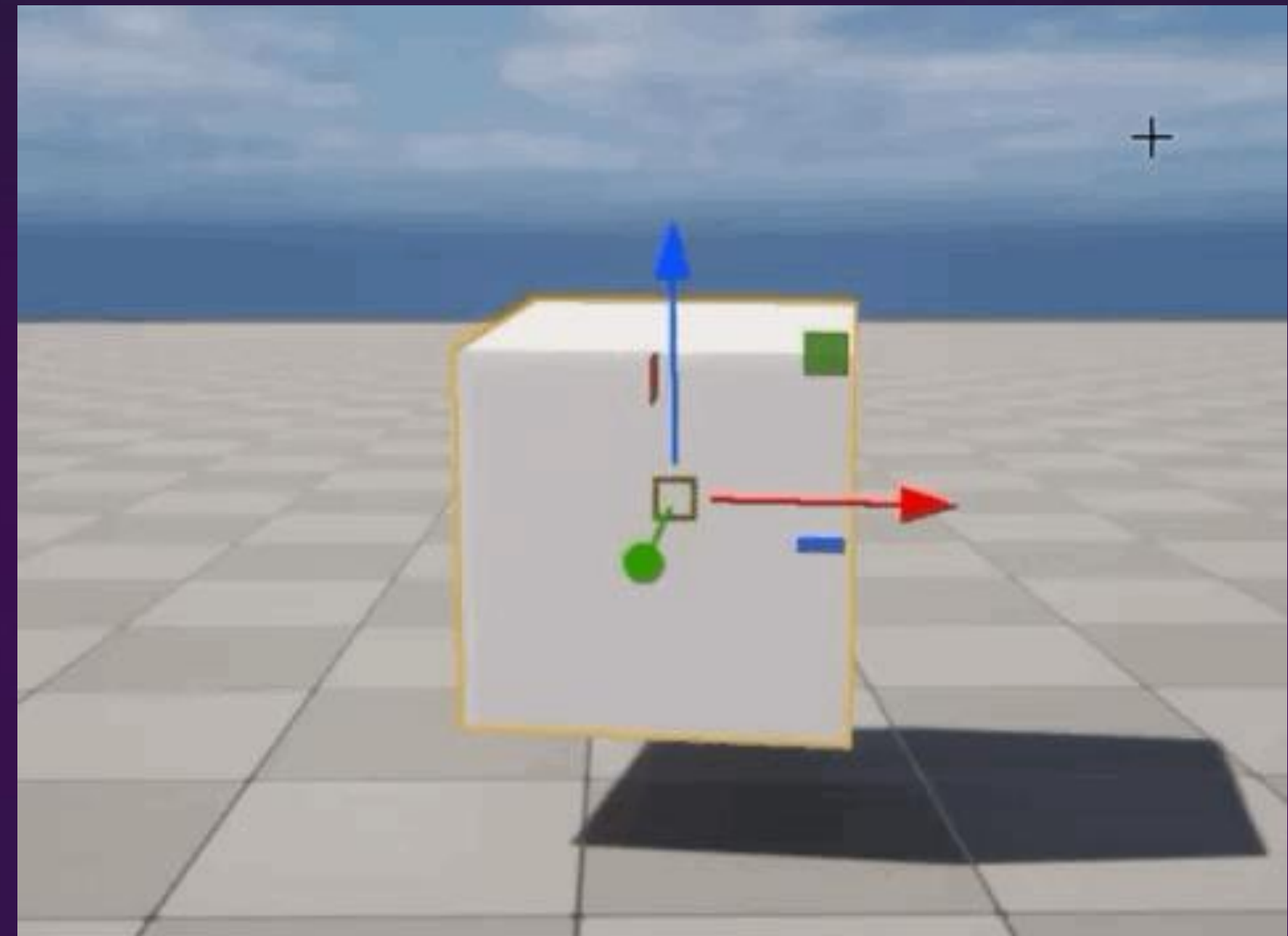
New workflow within **IK Retargeting** to **simplify** the workflow for common bipedal skeletons.

- Auto Create Retarget Chains
- Auto Full Body IK
- Auto Align Retarget Pose
- Post Retarget Phase



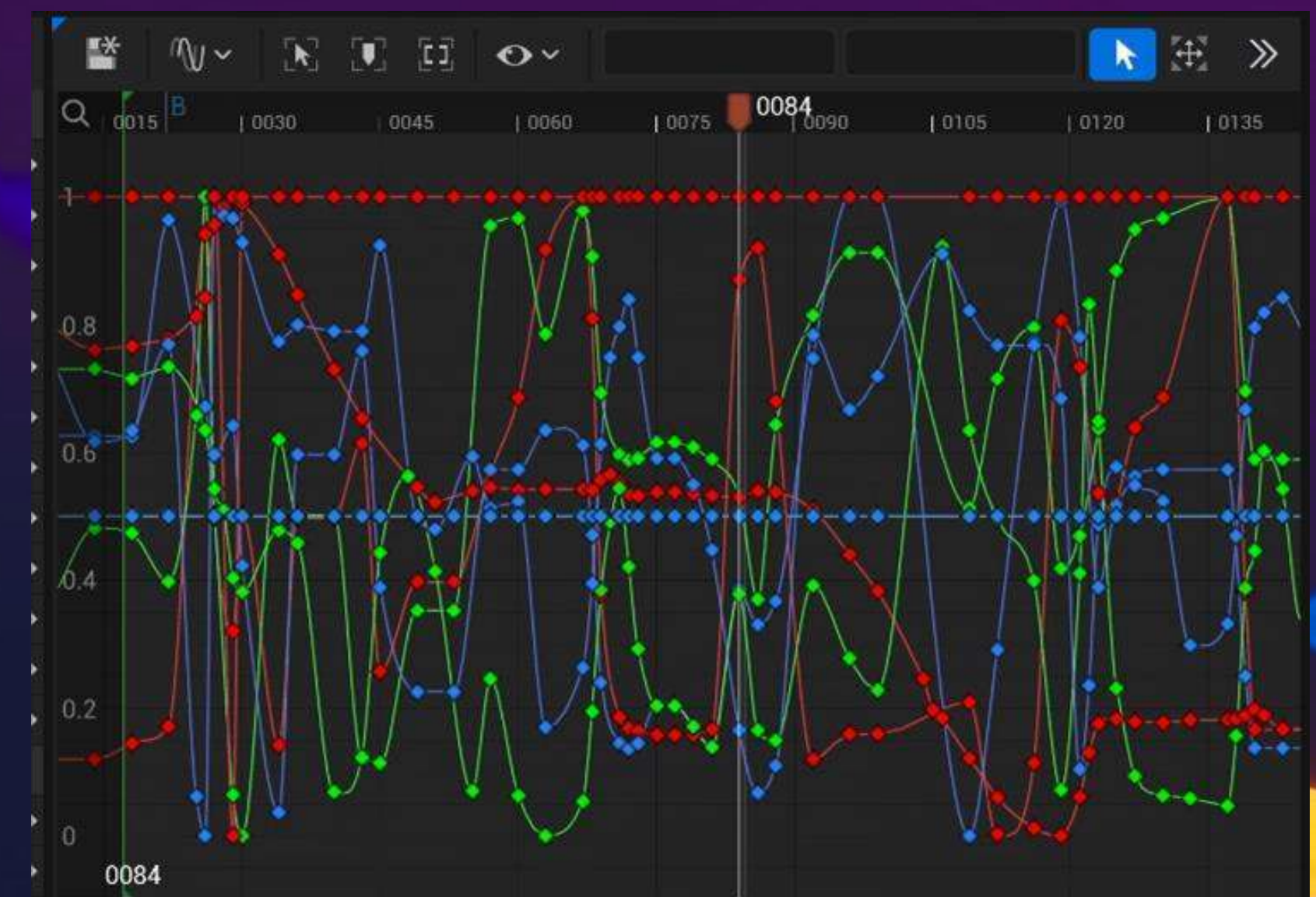
Animation Authoring

New **Gizmos** for
manipulation
(Experimental) for 5.4



An upgraded version of
Animation Details

Search	
▼ arm_r_ctrl	
▼ Location	
LX	2.49657
LY	-1.162443
LZ	-1.903774
▼ Rotation	
RX	-294.649445
RY	-0.079531
RZ	-72.306168
▼ Scale	
SX	1.0
SY	1.0
SZ	1.0
▼ Attributes	
Offset	0.0
World Rotation	



Sequencer

UX: Look and Feel (Production Ready)

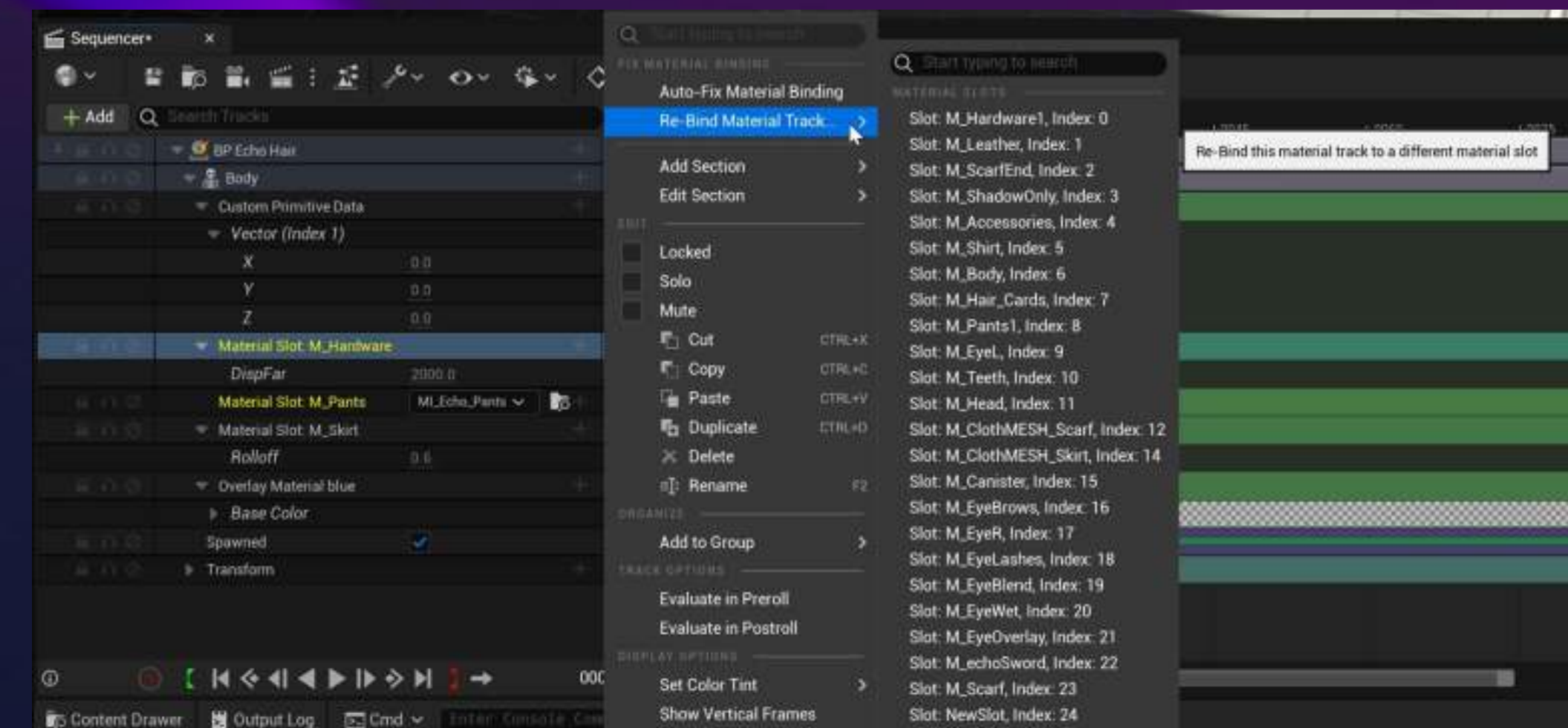
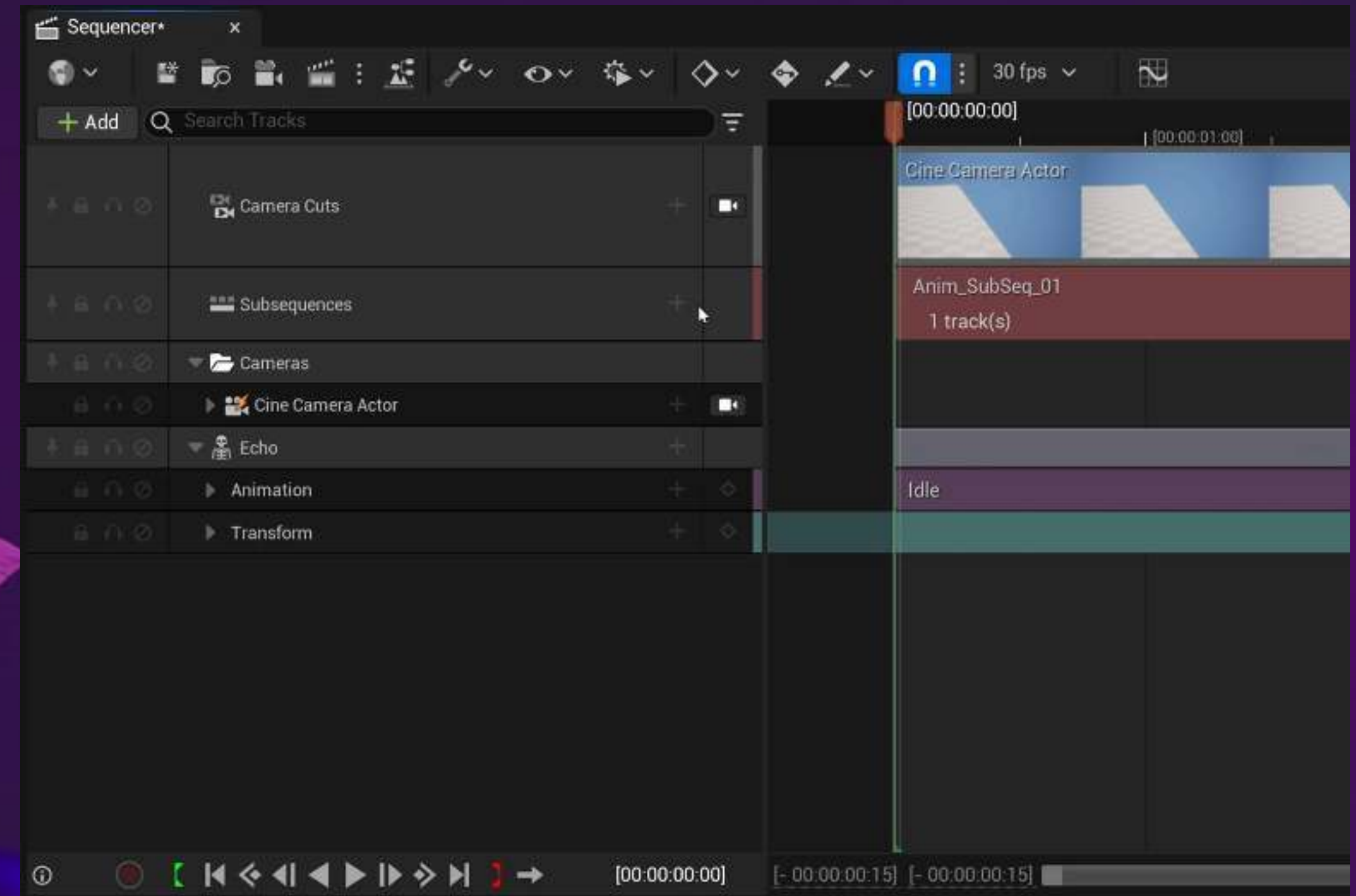
- Easier to look at the contents of the Sequencer Tree
- New toggleable columns

Material Animation Improvements (Production Ready)

- Simplify usage of Material Slots
- Expanded support for all any accessible material edits

Support for Layered Material Parameters,

Include Overlay Materials, Volumetric Cloud Components, and Custom Primitive Data Support.



Virtual Camera in Unreal Engine 5.4

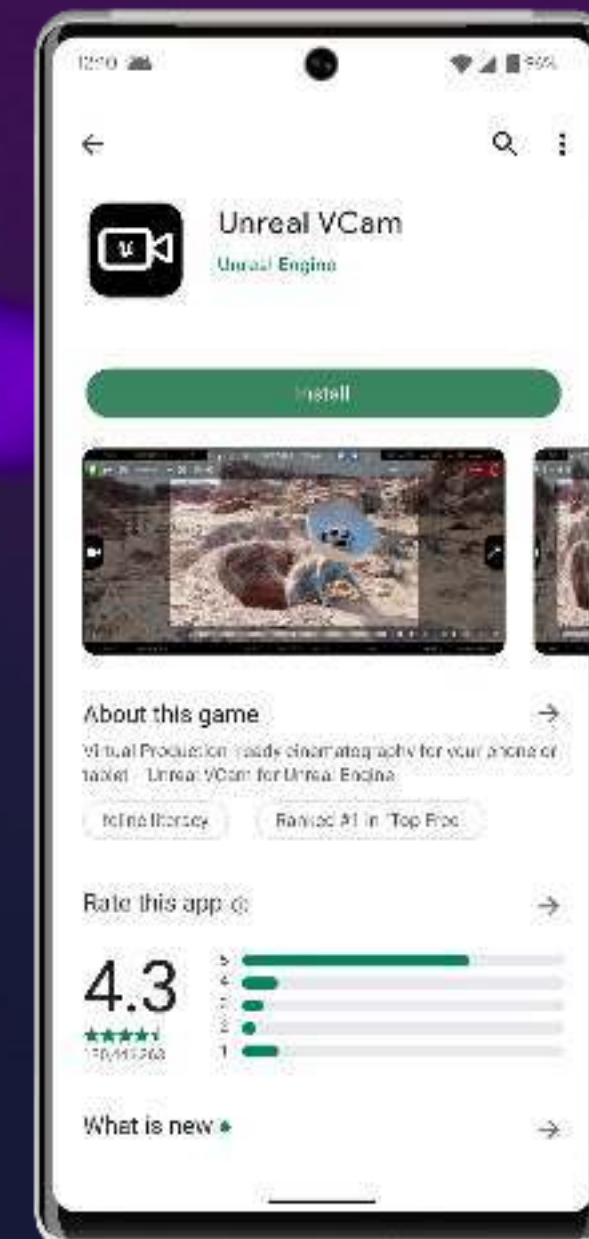
Production Ready

Virtual Camera

Mac & Android Support

Production Ready

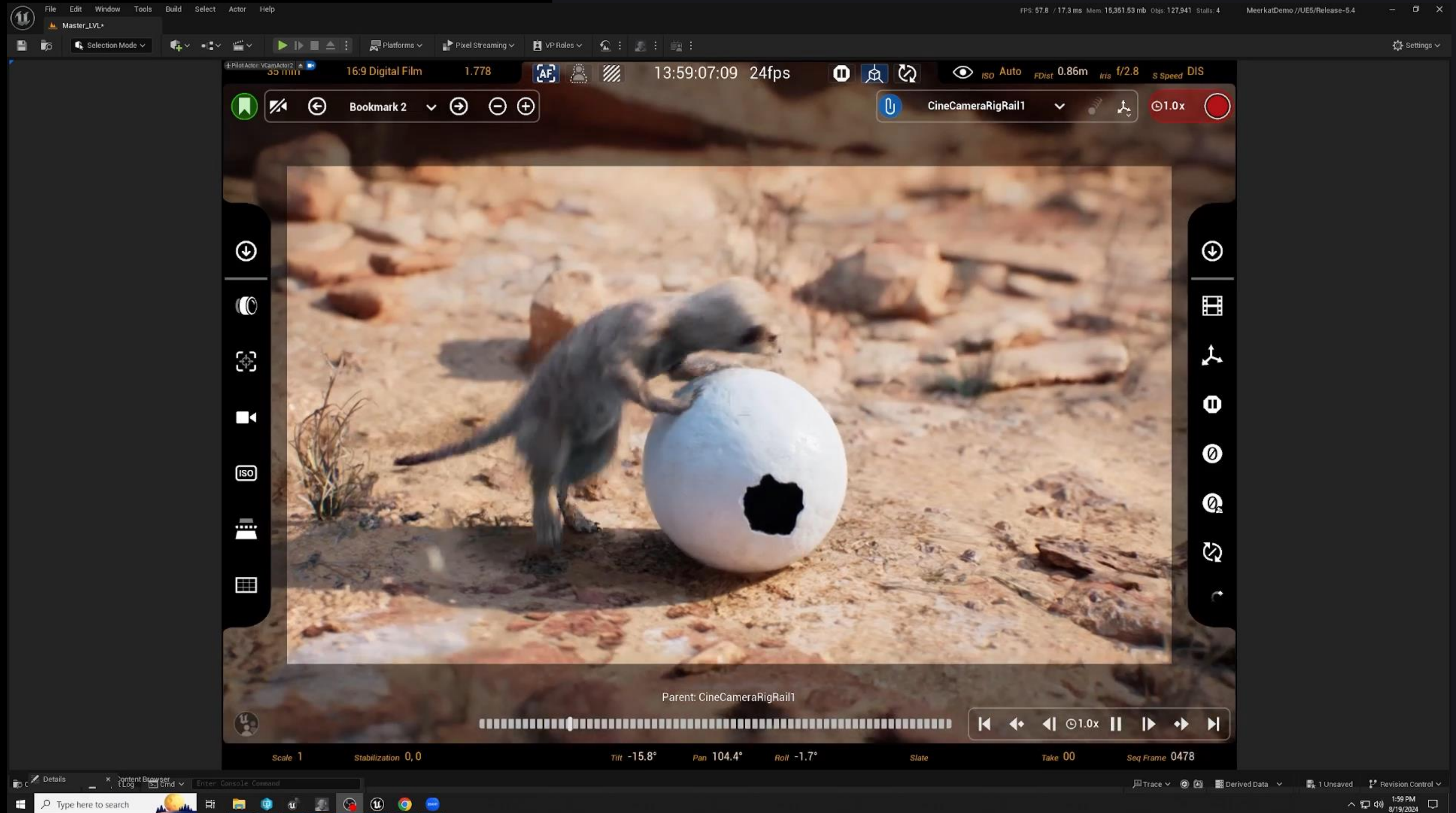
Updated and Rebranded Mobile App



Parenting and platforming support



Slow Motion Playback



Vcam features coming in 5.5

Non-destructively smooth the camera on VCam takes Anim Details Revamp

Capture camera as a photograph to disk or to Utexture Layered Control Rigs

Browse Vcam bookmarks from a visual browser

Tag selects, with flags, and no good takes directly from the VCam review mode

Virtual Scouting

New virtual scouting tools

View, edit and annotate in VR

Multiple users collaborate in MU

New UX based on XR Framework.

Easier use and development



Rendering in Unreal Engine 5.4

Pretty Pixels



Rendering Features 5.4

Orthographic Camera Support (*Beta*)

Deferred render is now supported

Temporal Super Resolution

Improved Stability

History Resurrection

“Has Pixel Animation” *Flag*

“Visualize TSR show” *Flag*

Lumen improvements

Performance Improvements

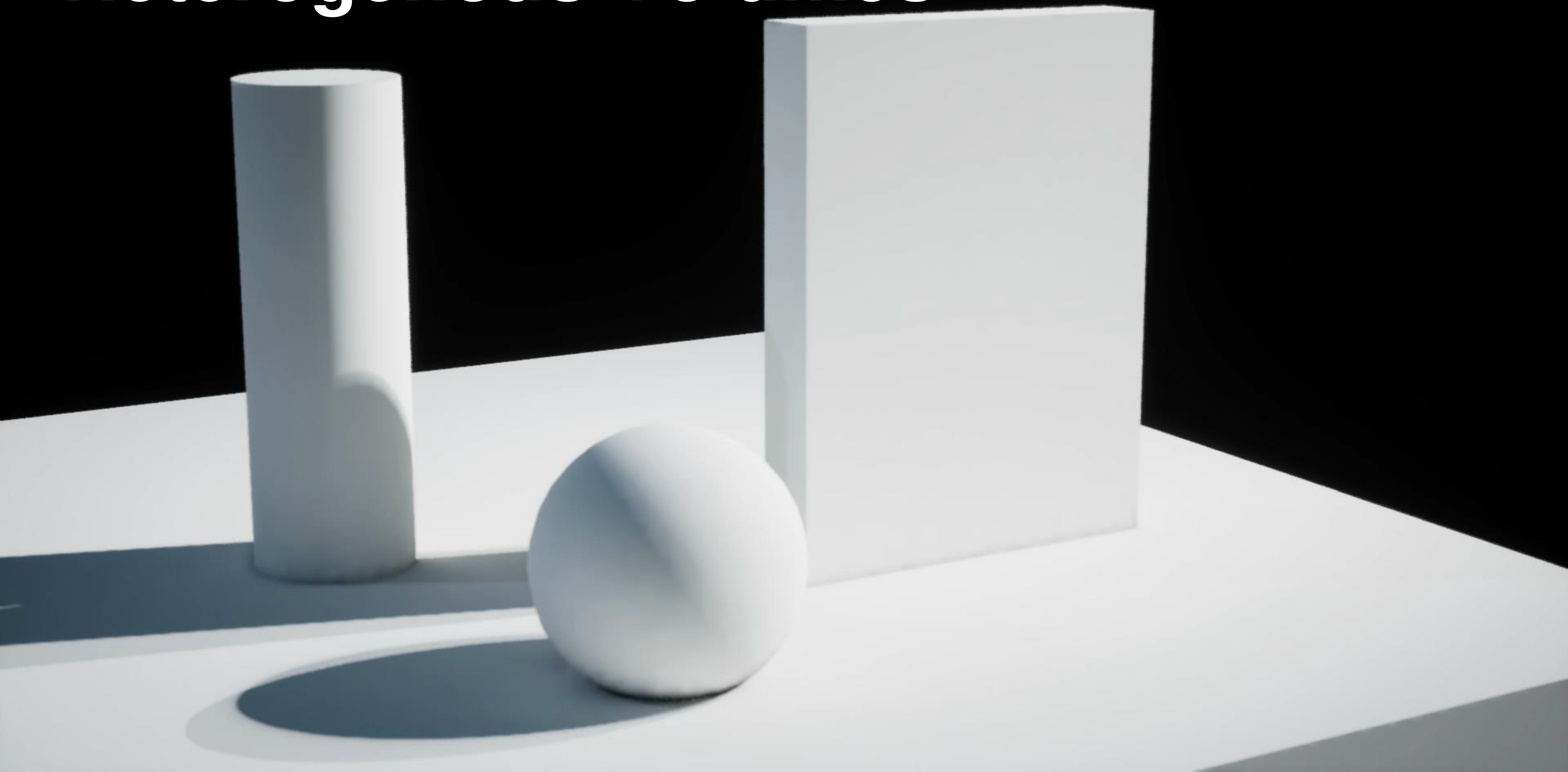
Cleaner Global Illumination solution

Many lights support



Deferred Renderer Support

Heterogenous Volumes



In-Camera VFX in Unreal Engine 5.4

Picture Quality + Resolution



In-Camera VFX

Depth of Field Compensation



ICVFX

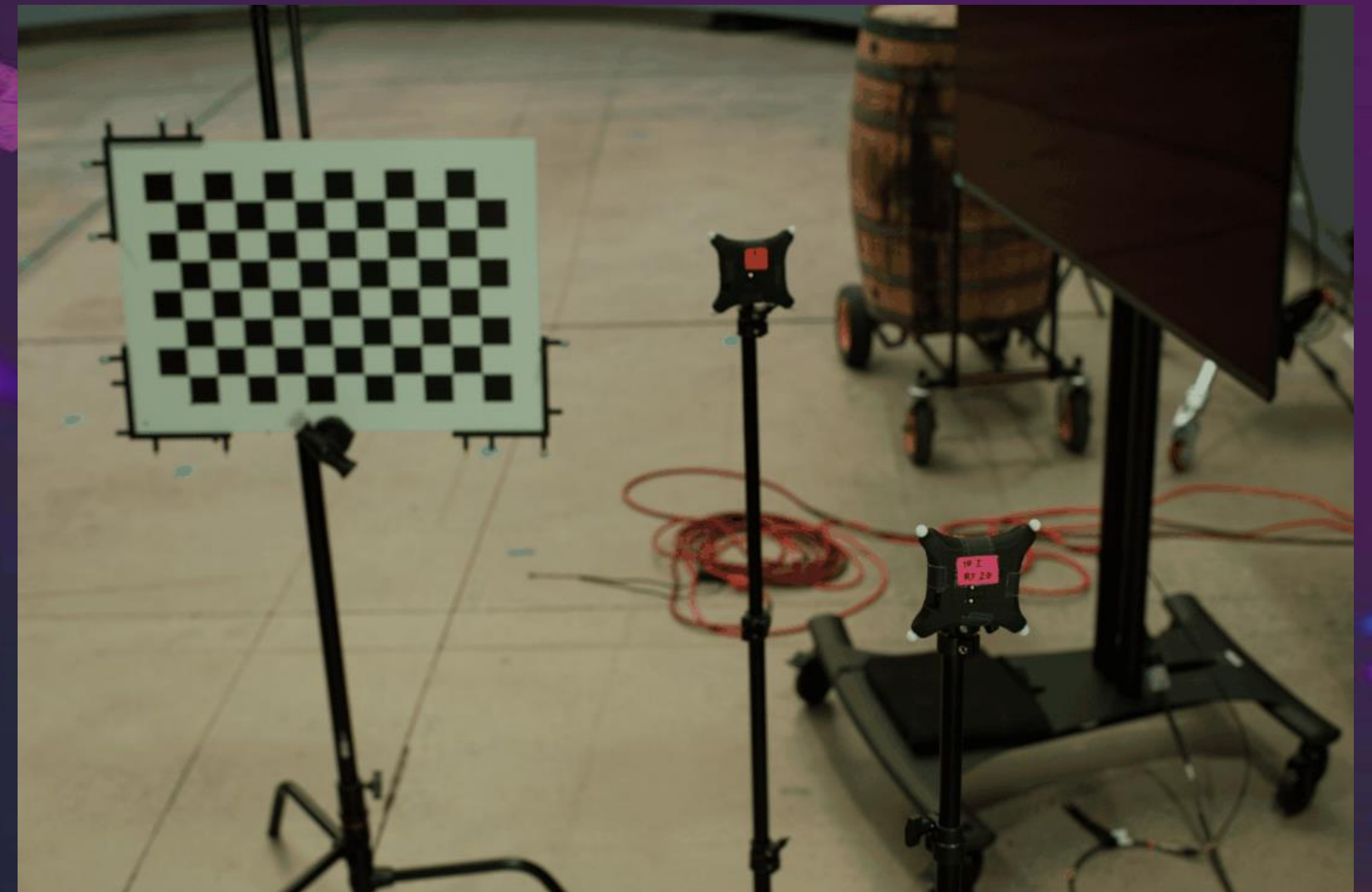
Lens Calibration 5.5

Improved solver Spherical and Anamorphic
Lens.

Simultaneous solve of distortion, Camera
intrinsic and nodal offset.

Updated UX

Improved asset Management



In-Camera VFX in Unreal Engine 5.4

SMPTE 2110 Recap

Production- Ready SMPTE 2110 in UE 5.5

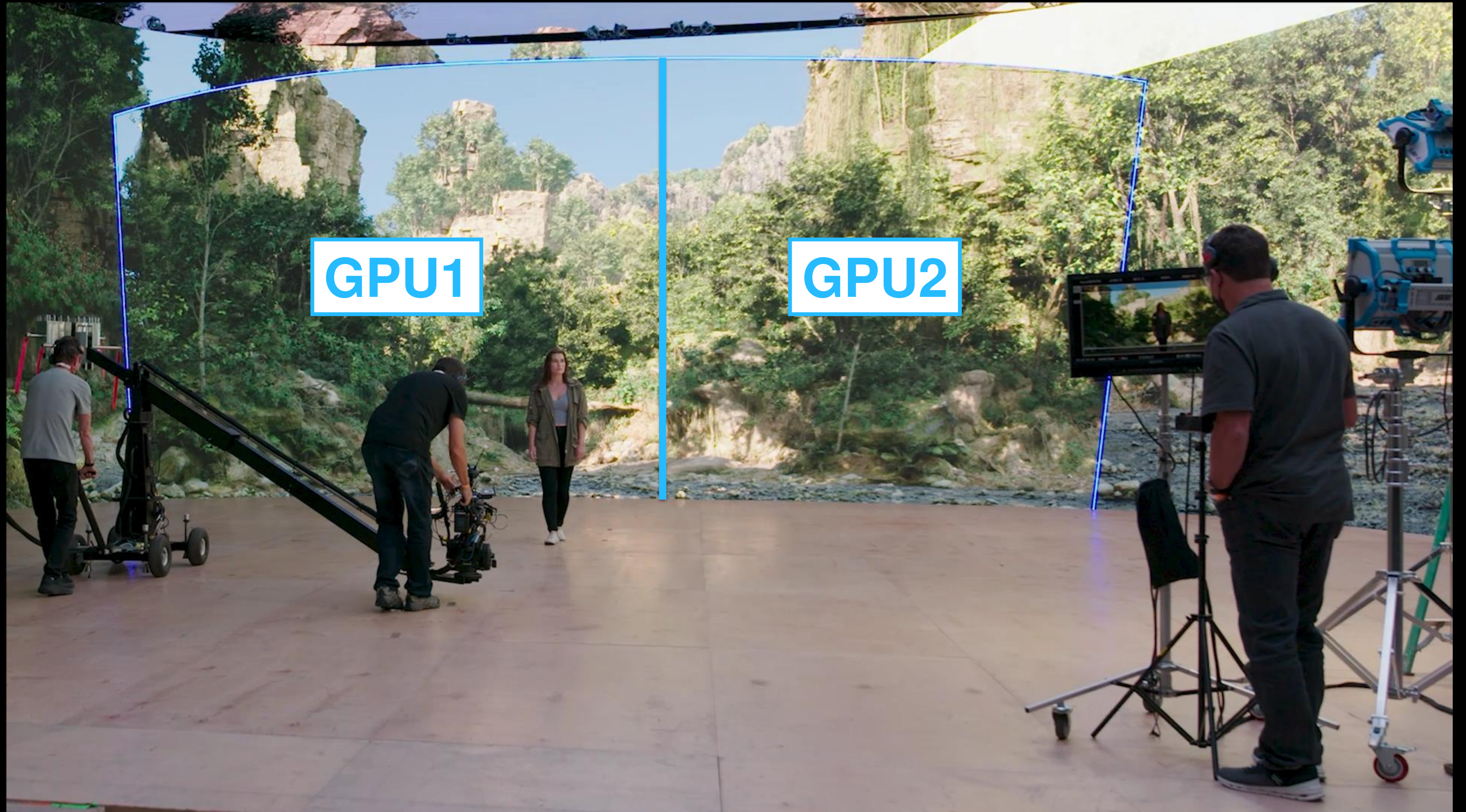
- **Dedicate** a render node to the inner frustum(s)
- Render the inner Frustum **once**
- Efficiency of resources
- **Flexibility** in deployment
- Possible rendering of more nodes with **less hardware**
- **Shared memory** between GPUs need for Nvlink
- Simplify **Synchronization** hardware
- Sync handled by **PTP** which gets rid of need for Quadro sync

In-Camera VFX

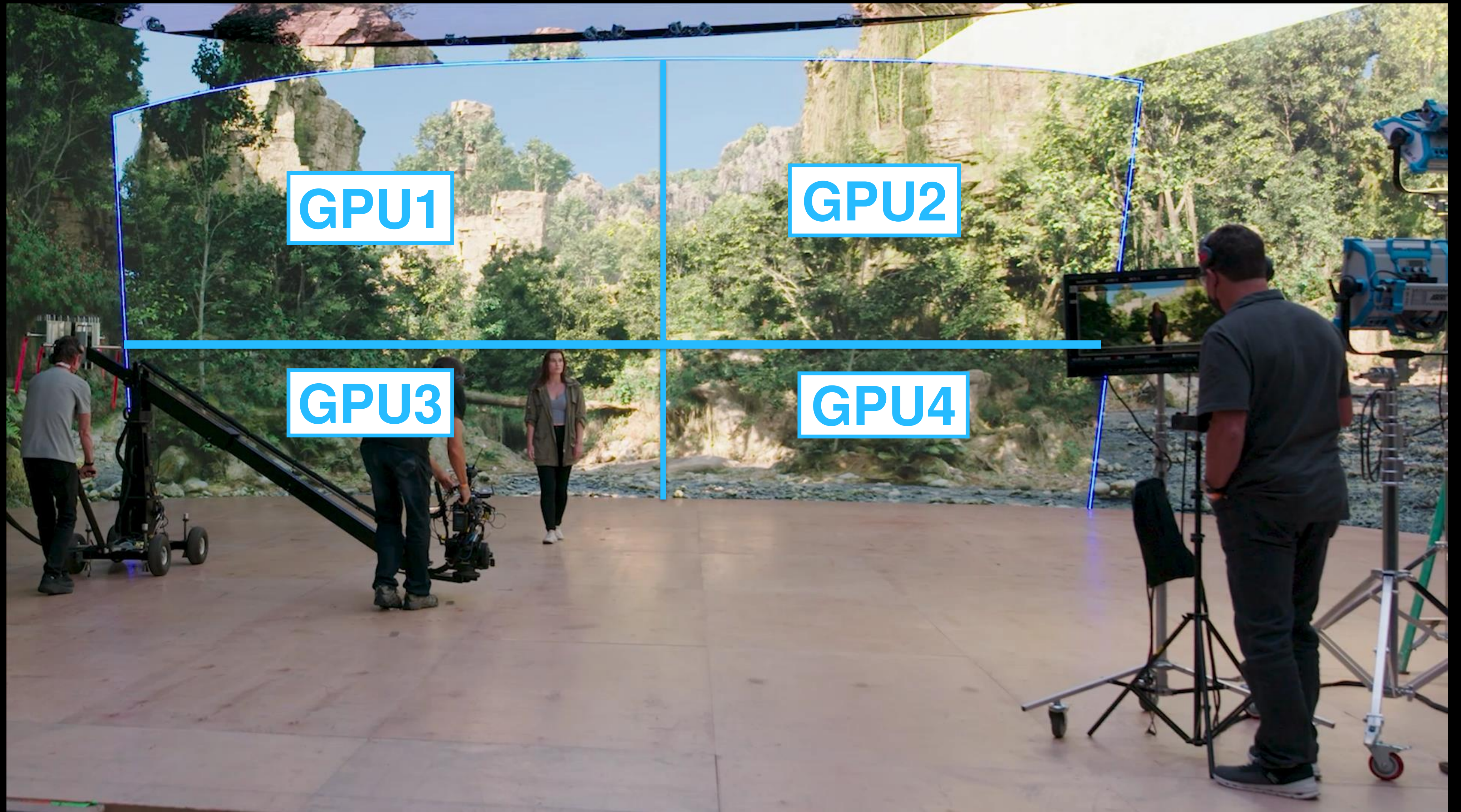
Inner Frustum Split



Inner Frustum Split between 2 GPUs



Inner Frustum Split between 4 GPUs



Movie Render Queue in Unreal Engine 5.4

Scalable Production Rendering





Outliner

Search...

Item Label	Sequencer	Type
Main_LVL (Editor)		Folder
mktPrp_eggEndA_SKI	Main_SEQ	SkeletalMes
mktPrp_eggEndB_SKI	Main_SEQ	SkeletalMes
mktPrp_eggOstrichBr	Main_SEQ, shot0240	SkeletalMes
mktPrp_eggOstrichCc	Main_SEQ, shot0100	SkeletalMes
mktPrp_eggOstrich_r	Main_SEQ	SkeletalMes
InstancedFoliageActor		InstancedF
Master_SEQ		LevelSeque
PlayerStart		PlayerStart
VisualSettings_BP	Main_SEQ, shot0010, shot0020, sl	Edit BP_Visi

588 actors (1 selected)

Details

InstancedFoliageActor

InstancedFoliageActor (Instance)

RootComponent (RootComponent0) Edit in C++

Search

General Actor Misc Streaming All

Transform

Location 0.0 0.0 0.0

Rotation 0.0° 0.0° 0.0°

Scale 1.0 1.0 1.0

Replication

Net Load on Client

Collision

Generate Overlap Events During Level Str...

Update Overlaps Method During Level Str... Use Config Default

Default Update Overlaps Method During L... Only Update Movable

Advanced

HLOD

Include Actor in HLOD

Physics

Sequencer

30 fps

Main_SEQ

Track Search Tracks 0671 672 of 2522

Shots

Audio

amlEagle_BP

amlMeerkat_BP

NS Blow Across Ground

NS Dust Puff

NS Dust Puff02

NS Dust Puff Impact

183 items rp_eggEndA_SKM

0000 0300 0600 0900 1200 1500 1800 2100 2400 2700

shot0010 shot0020 shot0030 shot0040 shot0050 shot0060 shot0070 shot0080 shot0090 shot0100 shot0110 shot0120 shot0130 shot0140 shot0150 shot0160 shot0170 shot0180 shot0190 shot0200 shot0210 shot0220 shot0230 shot0240 shot0250 shot0260 shot0270

MeerkatAudio

Timeline playback controls and progress bar.

00:00 01:10:00:00 01:20:00:00 01:30:00:00 01:40:00:00 01:50:00:00 02:00:00:00 02:10:00:00 02:20:00:00 02:30:00:00 02:40:00:00 02:50:00:00 03:00:00:00 03:10:00:00 03:20:00:00

Timeline tracks including:

- Filler
- ROYALTY_ROYALTY_R1_25FC_sc 1 -
- ROYALTY_R2_25FC_sc 19 -
- ROYALTY_R3_25FC_sc 44-AAA55_122
- ROYALTY_R5_25FC_sc 55 - 90
- ROYALTY_R6_25FC_sc 90
- ROYALTY_R7_25FC
- ROYALTY_R8_25FC
- SCOPE - IMAX to 2.39 mask
- SCOPE - IMAX

RLTY_R1_25FC_1216_24fps_DX_Mono_Crash.w	RLTY_R2_25FC_1214_24fps_DX_Mono_Crash.w	RLTY_R3_25FC_1216_24fps_DX_Mono_Crash.w	RLTY_R4_25FC_1216_24fps_DX_Mono_Crash.w	RLTY_R5_25FC_1218_24fps_DX_Mono_Crash.w	RLTY_R6_25FC_1215_24fps_DX_Mono_Crash.w	RLTY_R7_25FC_1217_24fps_DX_Mono_Crash.w	RLTY_R8_25FC_1217_24fps_DX_Mono_Crash.w
RLTY_R1_25FC_1216_24fps_GRP_Stereo_Crash	RLTY_R2_25FC_1214_24fps_GRP_Stereo_Crash.w	RLTY_R3_25FC_1216_24fps_GRP_Stereo_Crash.w	RLTY_R4_25FC_1216_24fps_GRP_Stereo_Crash.w	RLTY_R5_25FC_1218_24fps_GRP_Stereo_Crash.w	RLTY_R6_25FC_1215_24fps_GRP_Stereo_Crash.w	RLTY_R7_25FC_1217_24fps_GRP_Stereo_Crash.w	RLTY_R8_25FC_1217_24fps_GRP_Stereo_Crash.w
RLTY_R1_25FC_1216_24fps_FXFOL_Stereo_Cra	RLTY_R2_25FC_1214_24fps_FXFOL_Stereo_Crash	RLTY_R3_25FC_1216_24fps_FXFOL_Stereo_Crash.w	RLTY_R4_25FC_1216_24fps_FXFOL_Stereo_Crash.w	RLTY_R5_25FC_1218_24fps_FXFOL_Stereo_Crash.w	RLTY_R6_25FC_1215_24fps_FXFOL_Stereo_Crash.w	RLTY_R7_25FC_1217_24fps_FXFOL_Stereo_Crash.w	RLTY_R8_25FC_1217_24fps_FXFOL_Stereo_Crash.w
RLTY_R1_25FC_1216_24fps_DZN_Stereo_Crash	RLTY_R2_25FC_1214_24fps_DZN_Stereo_Crash.w	RLTY_R3_25FC_1216_24fps_DZN_Stereo_Crash.w	RLTY_R4_25FC_1216_24fps_DZN_Stereo_Crash.w	RLTY_R5_25FC_1218_24fps_DZN_Stereo_Crash.w	RLTY_R6_25FC_1215_24fps_DZN_Stereo_Crash.w	RLTY_R7_25FC_1217_24fps_DZN_Stereo_Crash.w	RLTY_R8_25FC_1217_24fps_DZN_Stereo_Crash.w
RLTY_R1_25FC_1216_24fps_BG_Stereo_Crash.w	RLTY_R2_25FC_1214_24fps_BG_Stereo_Crash.w	RLTY_R3_25FC_1216_24fps_BG_Stereo_Crash.w	RLTY_R4_25FC_1216_24fps_BG_Stereo_Crash.w	RLTY_R5_25FC_1218_24fps_BG_Stereo_Crash.w	RLTY_R6_25FC_1215_24fps_BG_Stereo_Crash.w	RLTY_R7_25FC_1217_24fps_BG_Stereo_Crash.w	RLTY_R8_25FC_1217_24fps_BG_Stereo_Crash.w

Timeline tracks including:

- RLTY_R1_25FC_1216_24fps_MX_Stereo_Crash
- RLTY_R2_25FC_1214_24fps_MX_Stereo_Crash.w
- RLTY_R3_25FC_1216_24fps_MX_Stereo_Crash.w
- RLTY_R4_25FC_1216_24fps_MX_Stereo_Crash.w
- RLTY_R5_25FC_1218_24fps_MX_Stereo_Crash.w
- RLTY_R6_25FC_1215_24fps_MX_Stereo_Crash.w
- RLTY_R7_25FC_1217_24fps_MX_Stereo_Crash.w
- RLTY_R8_25FC_1217_24fps_MX_Stereo_Crash.w

RLTY_R1_25FC_1216_24fps_MX_Stereo_Crash	RLTY_R2_25FC_1214_24fps_MX_Stereo_Crash.w	RLTY_R3_25FC_1216_24fps_MX_Stereo_Crash.w	RLTY_R4_25FC_1216_24fps_MX_Stereo_Crash.w	RLTY_R5_25FC_1218_24fps_MX_Stereo_Crash.w	RLTY_R6_25FC_1215_24fps_MX_Stereo_Crash.w	RLTY_R7_25FC_1217_24fps_MX_Stereo_Crash.w	RLTY_R8_25FC_1217_24fps_MX_Stereo_Crash.w
---	---	---	---	---	---	---	---

00:00 01:10:00:00 01:20:00:00 01:30:00:00 01:40:00:00 01:50:00:00 02:00:00:00 02:10:00:00 02:20:00:00 02:30:00:00 02:40:00:00 02:50:00:00 03:00:00:00 03:10:00:00 03:20:00:00

Scalable Production Rendering

- Render Layers
- Render Settings **Inheritance**
- Render Settings **Overrides**
- Render Settings **Visibility**



Movie Render Queue

+ Render -

Job	Settings	Output
<ul style="list-style-type: none"> shot0010 ShotCam_0 Edit shot0020 ShotCam_0 Edit shot0030 ShotCam_0 Edit shot0040 ShotCam_0 Edit shot0050 ShotCam_0 Edit shot0060 ShotCam_0 Edit shot0070 ShotCam_0 Edit shot0080 ShotCam_0 Edit shot0090 ShotCam_0 Edit shot0100 ShotCam_0 Edit shot0110 ShotCam_0 Edit shot0120 ShotCam_0 Edit shot0130 ShotCam_0 Edit shot0140 ShotCam_0 Edit shot0150 ShotCam_0 Edit shot0160 ShotCam_0 Edit shot0170 ShotCam_0 Edit shot0180 ShotCam_0 Edit 	Unsaved Config *	{project_dir}/Saved/MovieRenders/

Unsaved Queue

+ Setting

- Exports
 - .exr Sequence [16bit]
 - .jpg Sequence [8bit]
- Rendering
 - Deferred Rendering
- Settings
 - Game Overrides

Output

Unsaved Config

File Output

Output Directory: {project_dir}/Saved/MovieRe ...

File Name Format: {sequence_name}.{frame_nurr

Output Resolution: 1920 1080

Use Custom Frame Rate:

Output Frame Rate: 24 fps (film)

Override Existing Output:

Advanced

Frames

Handle Frame Count: 0

Output Frame Step: 1

Use Custom Playback Range:

Custom Start Frame: 0

Custom End Frame: 0

Versioning

Version Number: 1

Auto Version:

A list of {format_strings} and example values that are valid to use in the File Name Format:

level_name => Main_LVL
 sequence_name => Main_SEQ
 job_name => Main_SEQ

Cancel Accept

Layers and Passes in Unreal Engine

- Balance between **real-time performance** and **post-production flexibility**
- Unreal Engine **will not** aim for equivalent AOVs to offline renderers
- Embrace the idea of **fast artistic iteration** that can provide **high quality elements for compositing**
- Maximize Unreal Engine's **lighting** and **rendering** to its fullest
- Recognize that **compositing** is necessary and important
- Connect efficiently within a **studio pipeline**
- Support in **both** the **Path Tracer** and **Deferred Renderer**

Movie Render Graph

Node-Based

Artist-friendly node-based interface to manage render settings

.exr Sequence [16bit]

Deferred Rendering

Game Overrides

Output

Global Game Overrides

Output

Globals

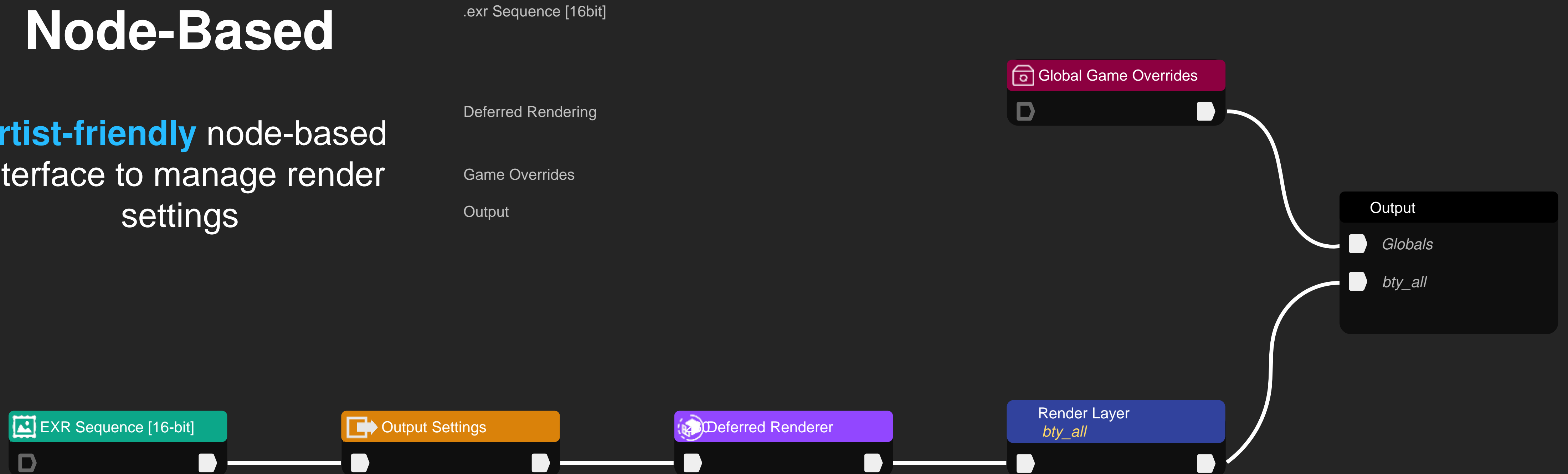
bty_all

EXR Sequence [16-bit]

Output Settings

Deferred Renderer

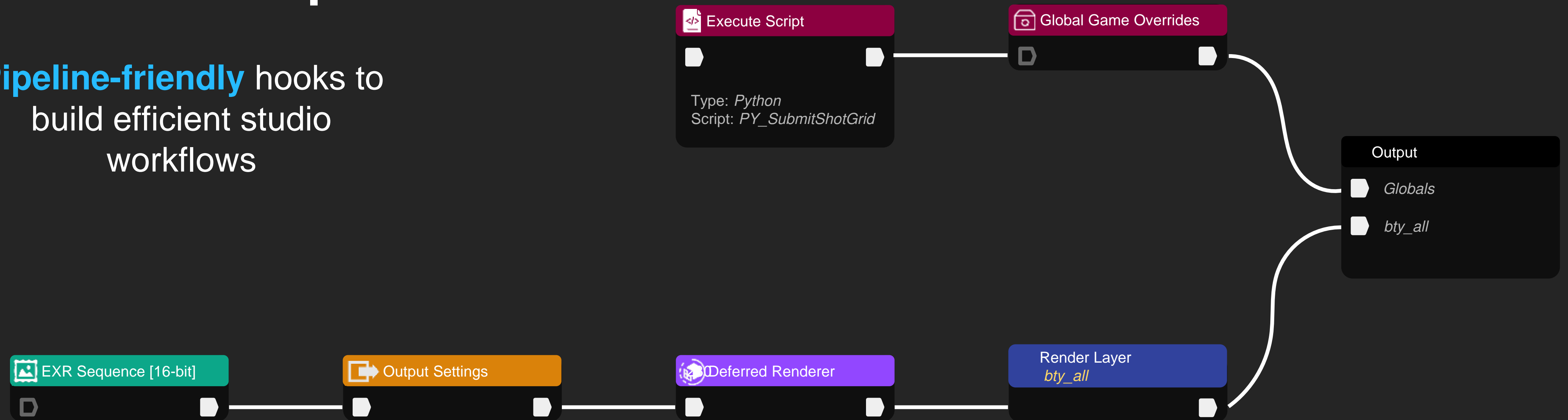
Render Layer
bty_all



Movie Render Graph

Pre/Post Scripts

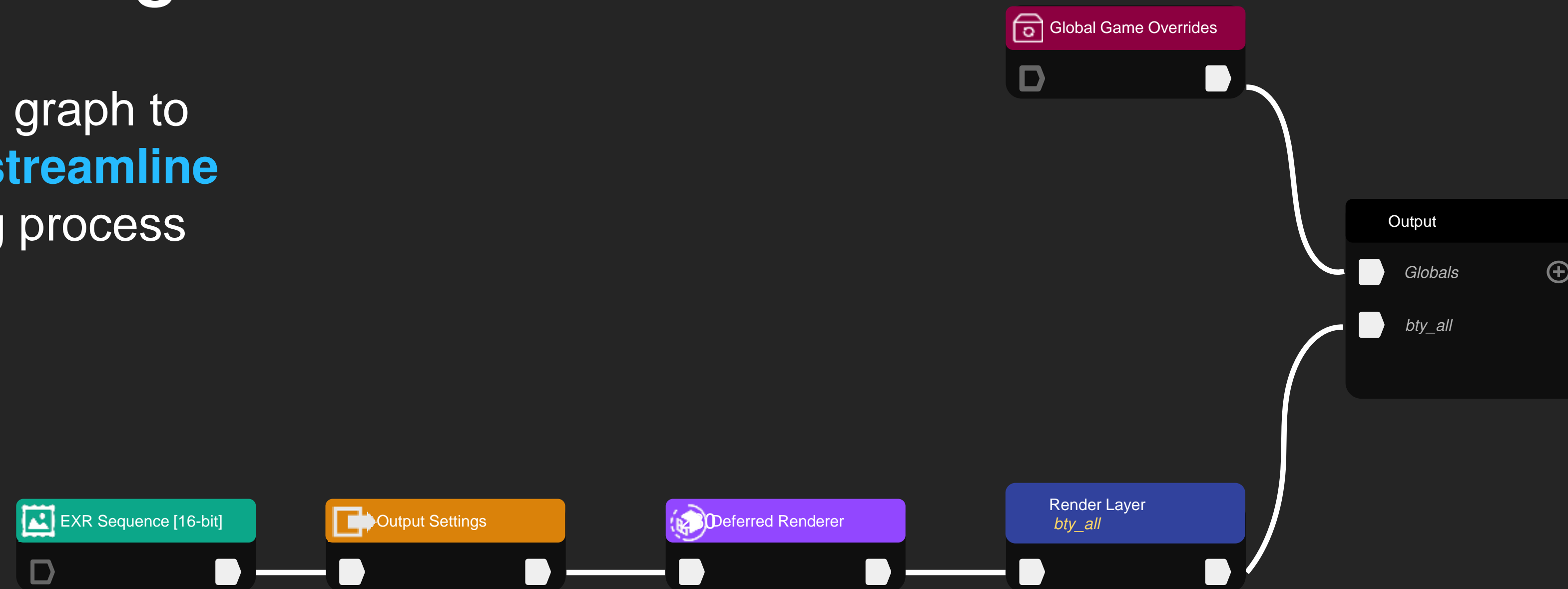
Pipeline-friendly hooks to
build efficient studio
workflows



Switch Example: 2K vs. 4K

Data Flow/Logic

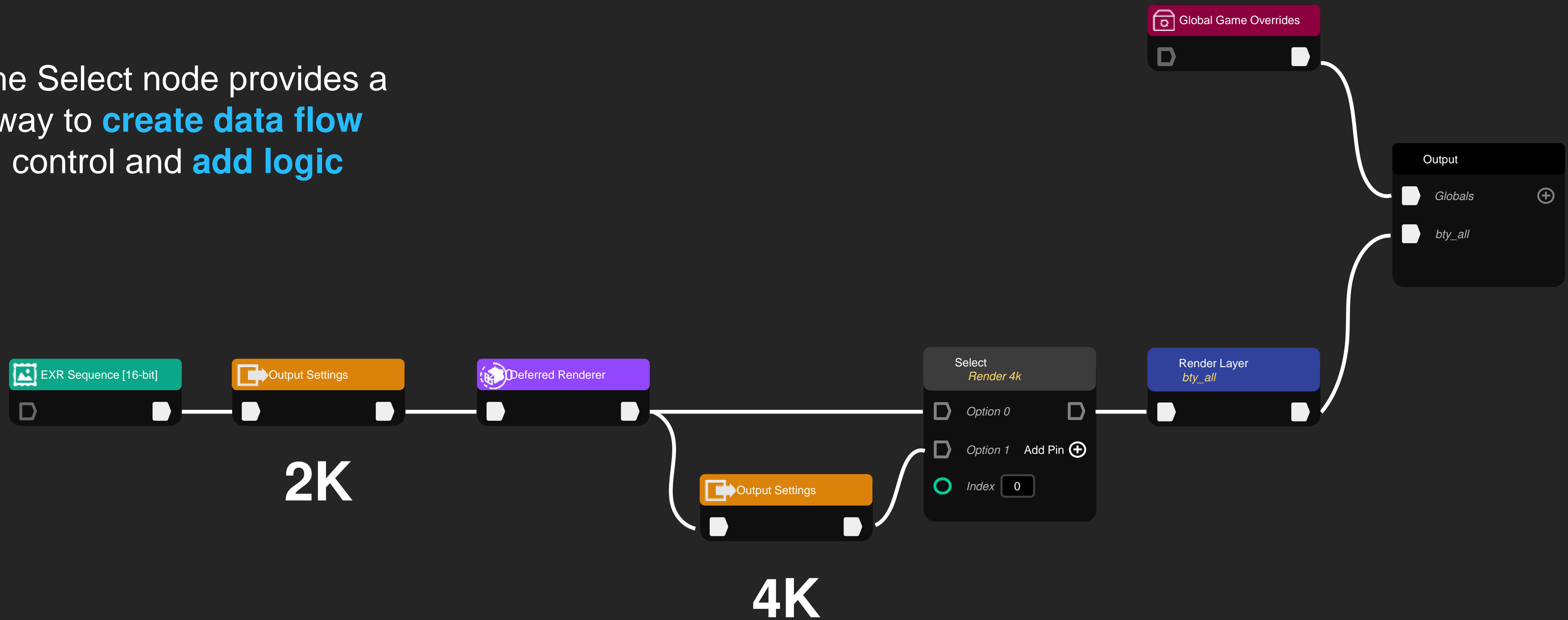
Leverage the graph to
simplify and **streamline**
the rendering process



Switch Example: 2K vs. 4K

Select

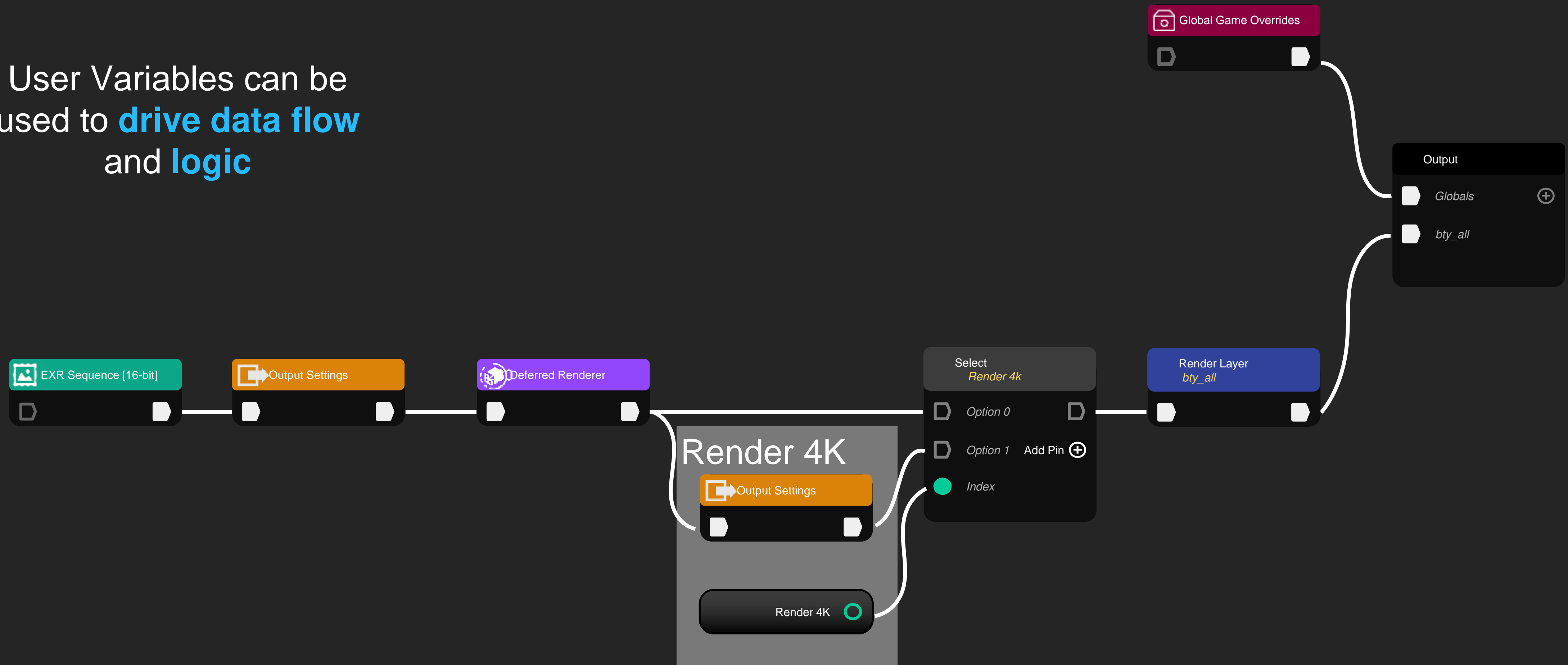
The Select node provides a way to **create data flow control** and **add logic**



Switch Example: 2K vs. 4K

User Variables

User Variables can be used to **drive data flow** and **logic**



Switch Example: 2K vs. 4K

The screenshot displays the 'Movie Render Queue' window. The main table lists 18 jobs under the 'Main_SEQ' sequence, all with a 'Ready' status. The 'Settings' column for each job includes an 'Edit' link. The 'Output' column shows the path '{project_dir}/Saved/MovieRenders/'.

The 'Movie Render Pipeline' panel on the right shows the following settings:

- Job Name: Main_SEQ
- Sequence: Main_SEQ
- Map: Main_LVL
- Author: taylor.swift
- Comment: None at this time
- Movie Render Graph Variables: Render 4K (checked)

The 'Render 4K' checkbox is highlighted with a red box. Below the pipeline panel, there are buttons for 'Render (Local)' and 'Render (Remote)'. An 'Output' panel on the right shows 'Globals' and 'bty_all'.

At the bottom center, there is a small inset window showing a 'Render 4K' button with a green progress indicator.

Switch Example: 2K vs. 4K

The screenshot shows the Unreal Engine interface. On the left, the 'Movie Render Queue' is visible with a list of jobs under 'Main_SEQ', including 'shot0010 ShotCam_0010' through 'shot0170 ShotCam_0170'. A 'Render' button is at the top of the queue. In the center, the 'Settings' menu is open, with the 'Output' option highlighted in blue. The 'Output' settings are expanded, showing options for 'Output Directory', 'File Name Format', 'Output Resolution', 'Use Custom Frame', 'Output Frame Rate', 'Override Existing O', 'Advanced', 'Frames', 'Handle Frame Count', 'Output Frame Step', 'Use Custom Playba', 'Custom Start Fram', and 'Custom End Fram'. The 'Versioning' section is also visible, showing 'Version Number' and 'Auto Version'.

Current Preset: None

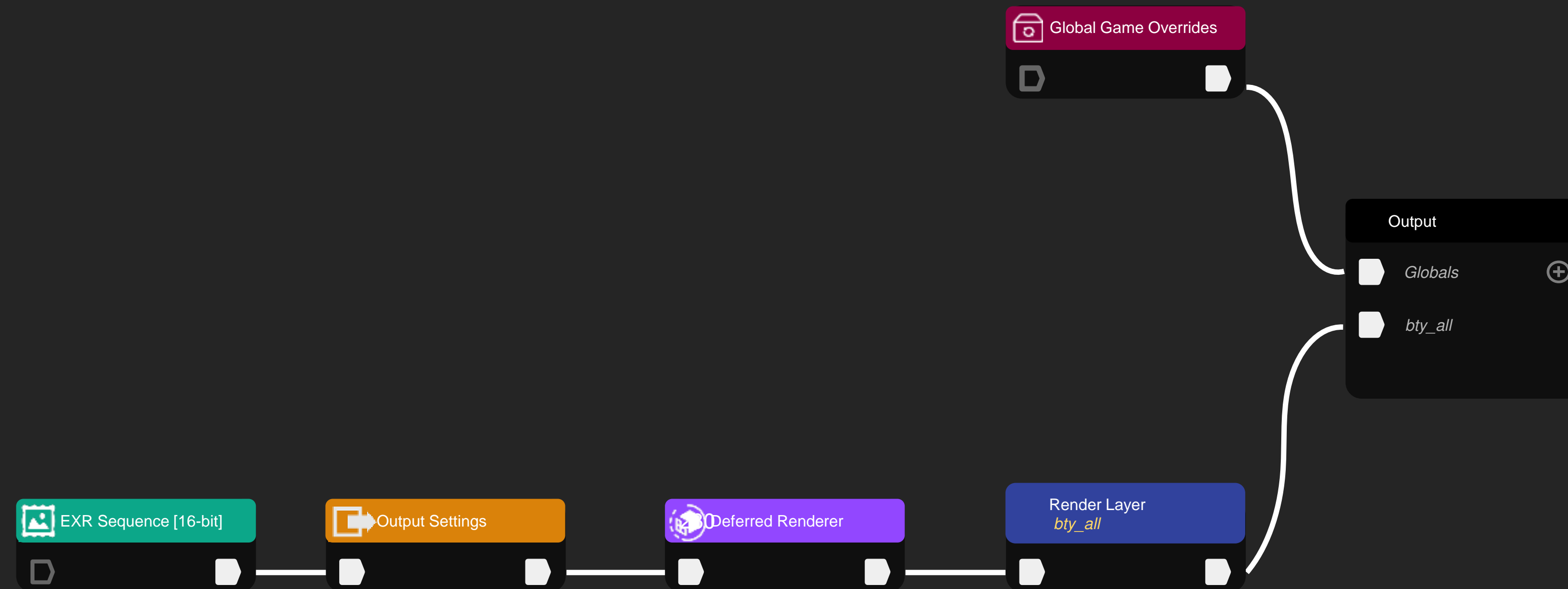
Save Preset
Save Preset As

IMPORT PRESET

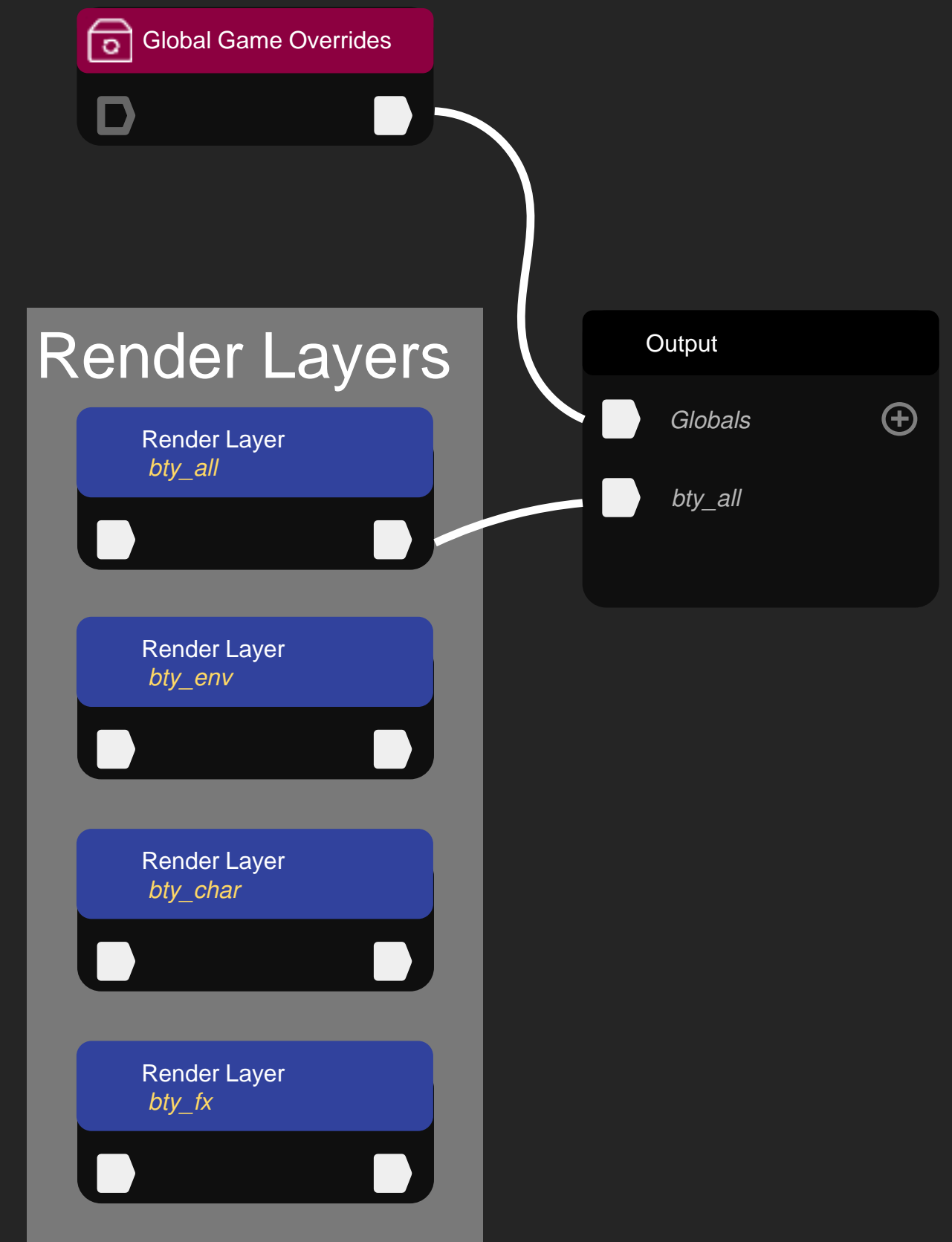
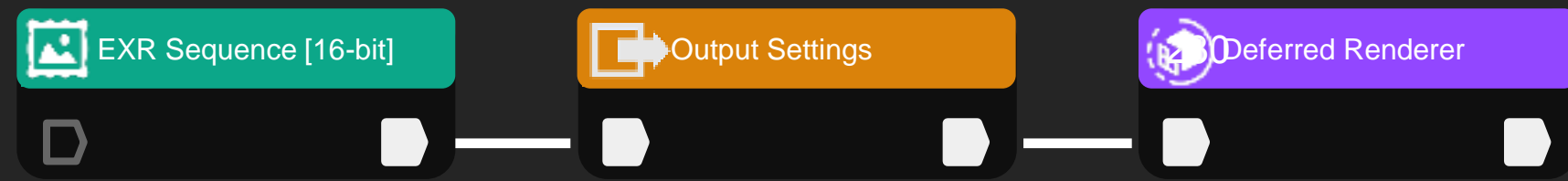
Search

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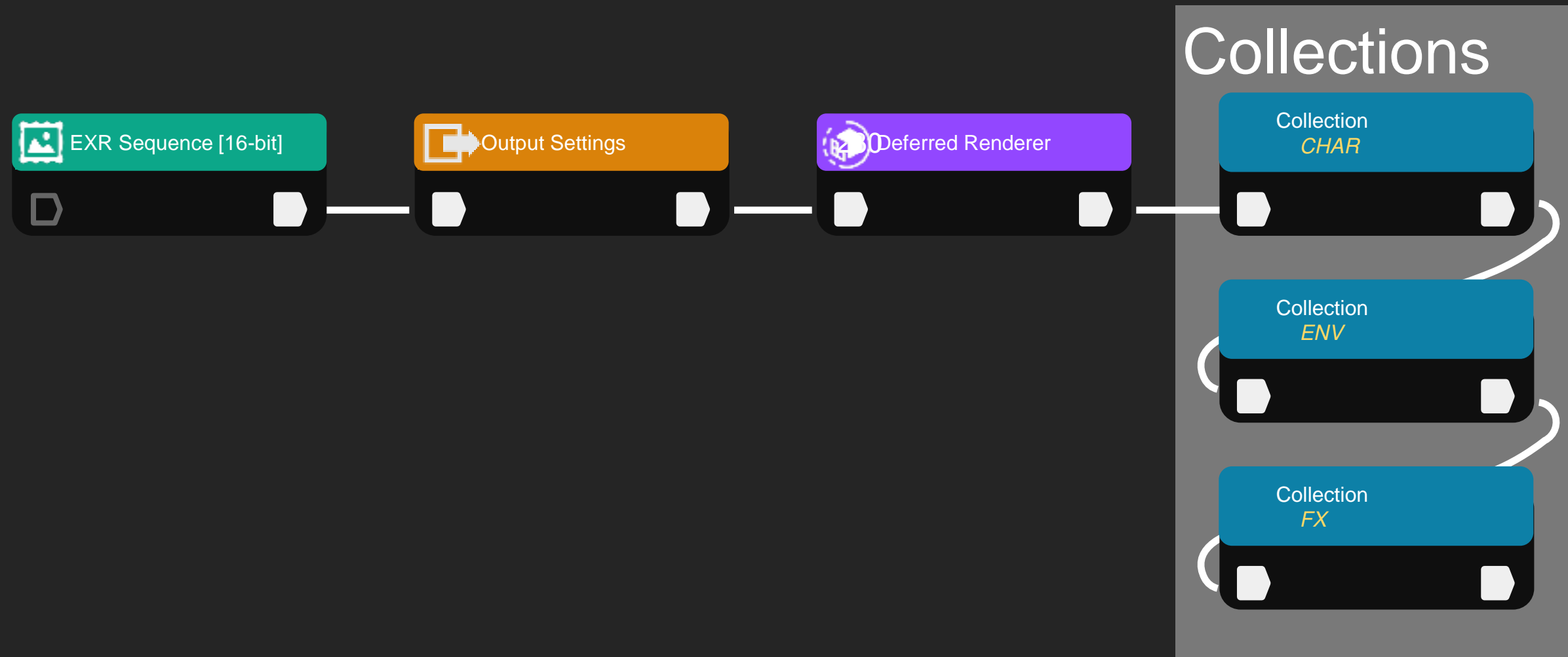
Render Layers Example



Render Layers Example

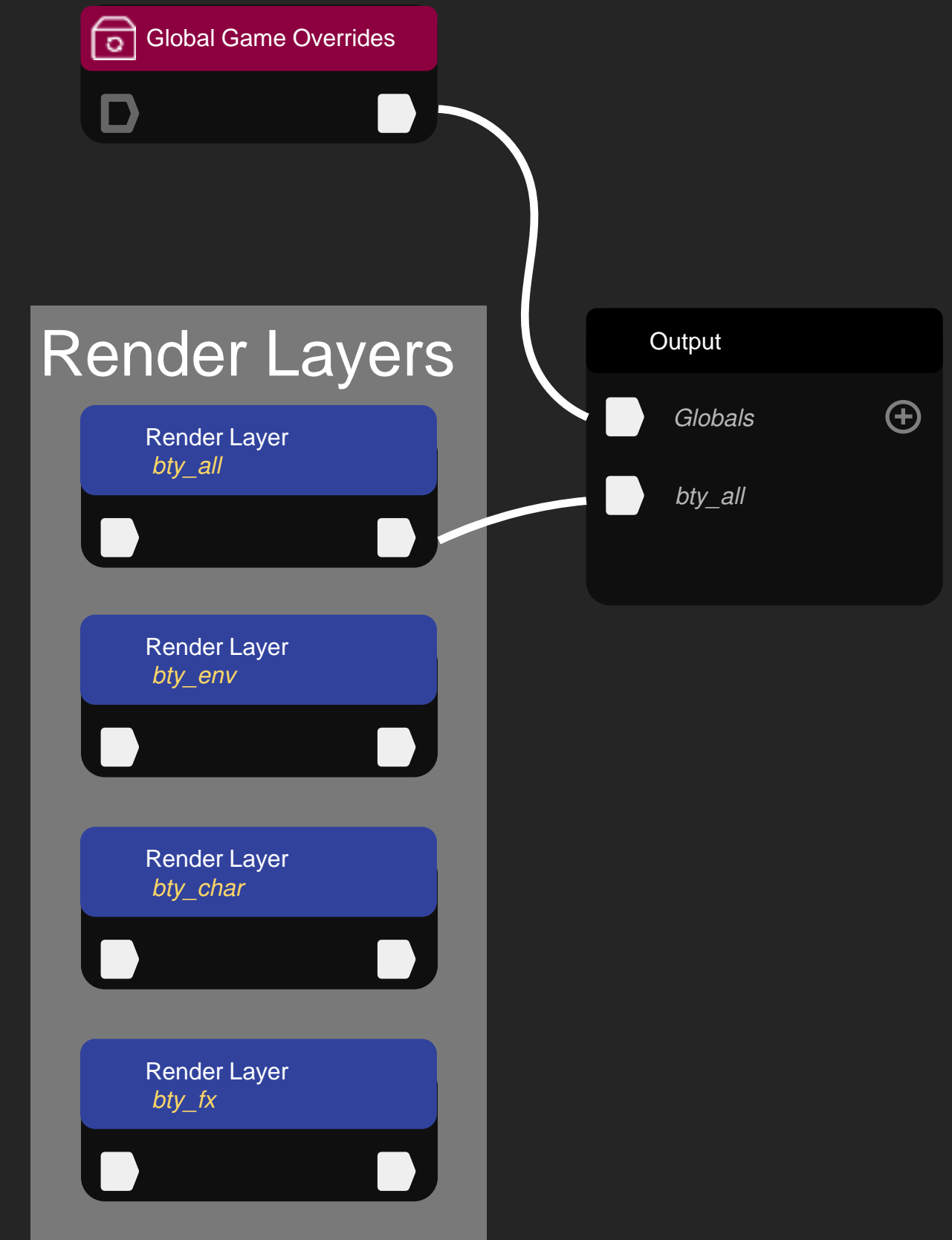


Render Layers Example



Collections

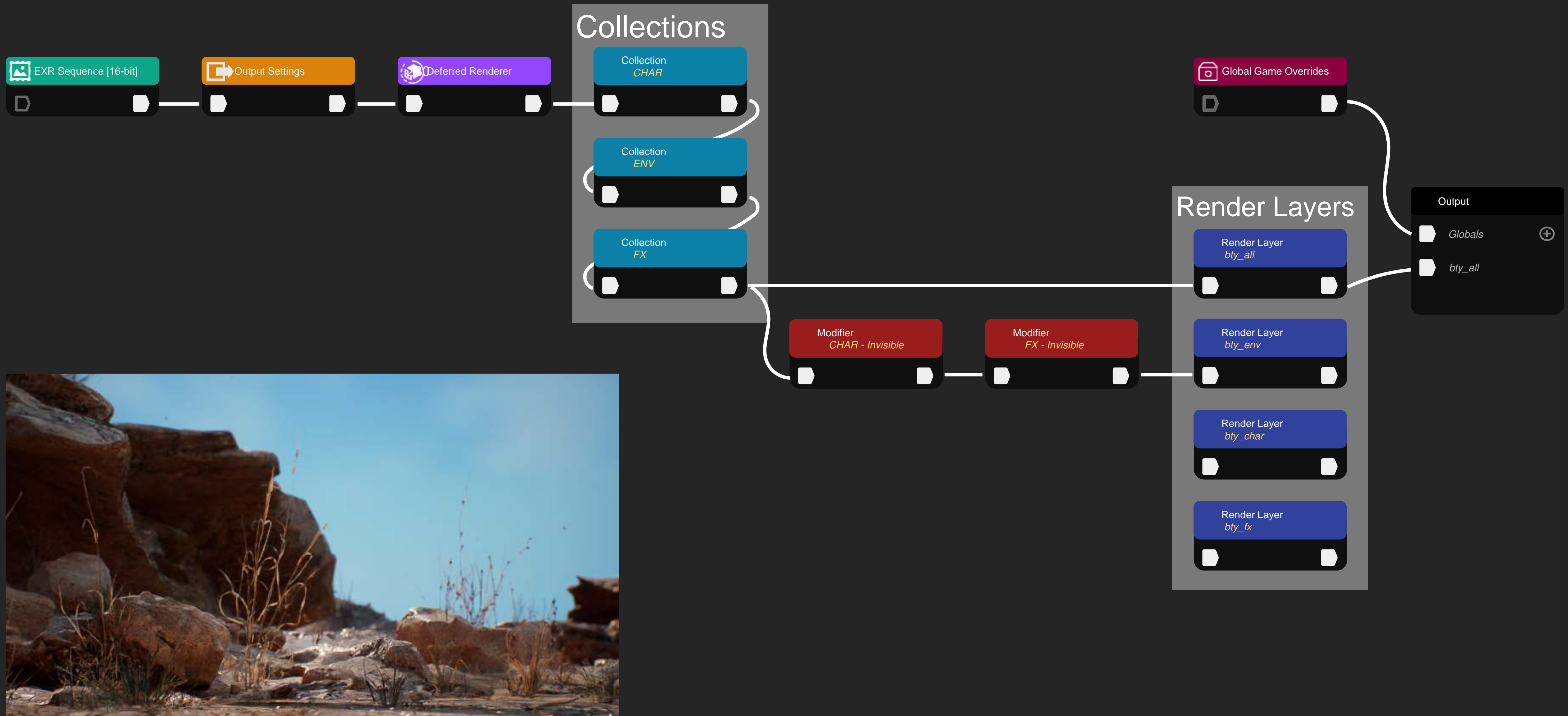
Rule-based definitions of Actors within the scene that are of interest for adjustments



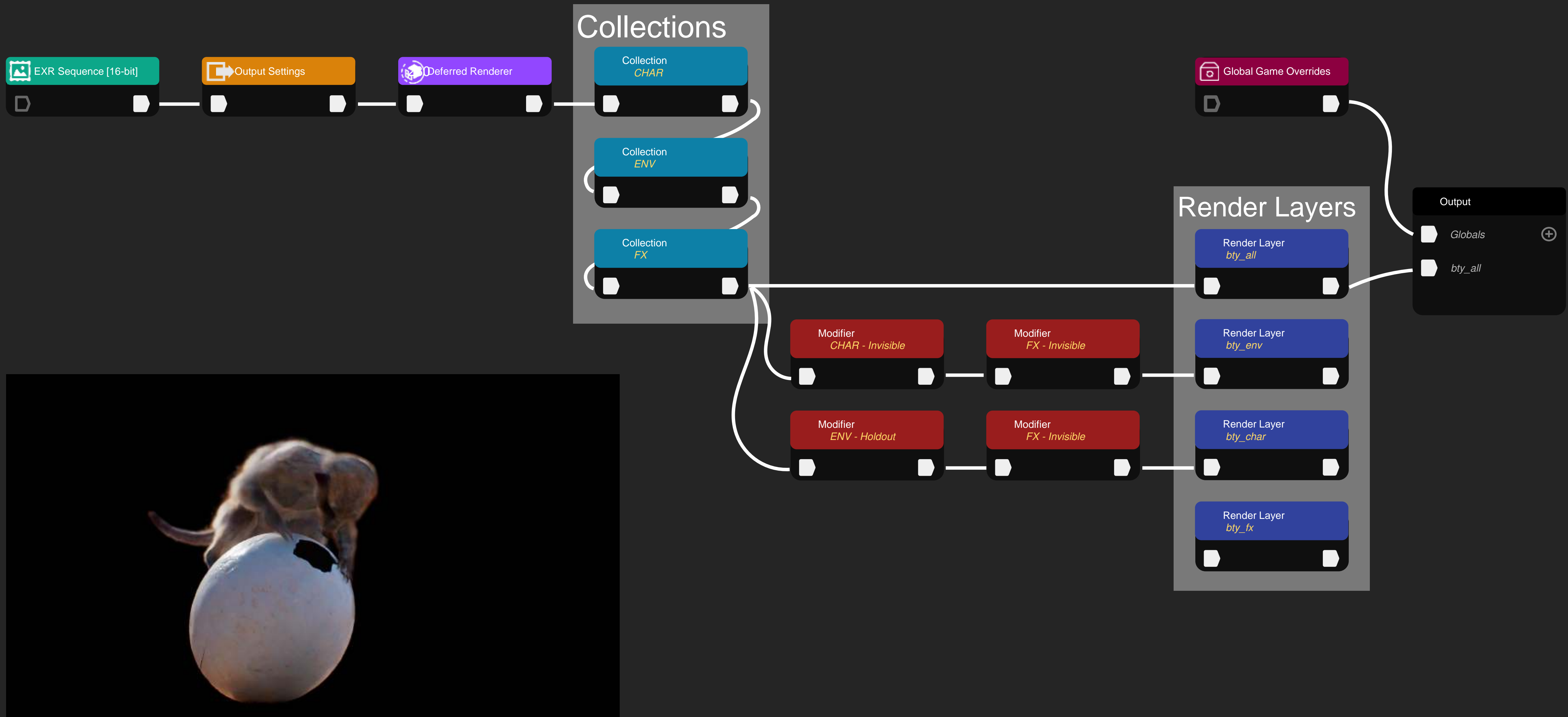
Render Layers Example



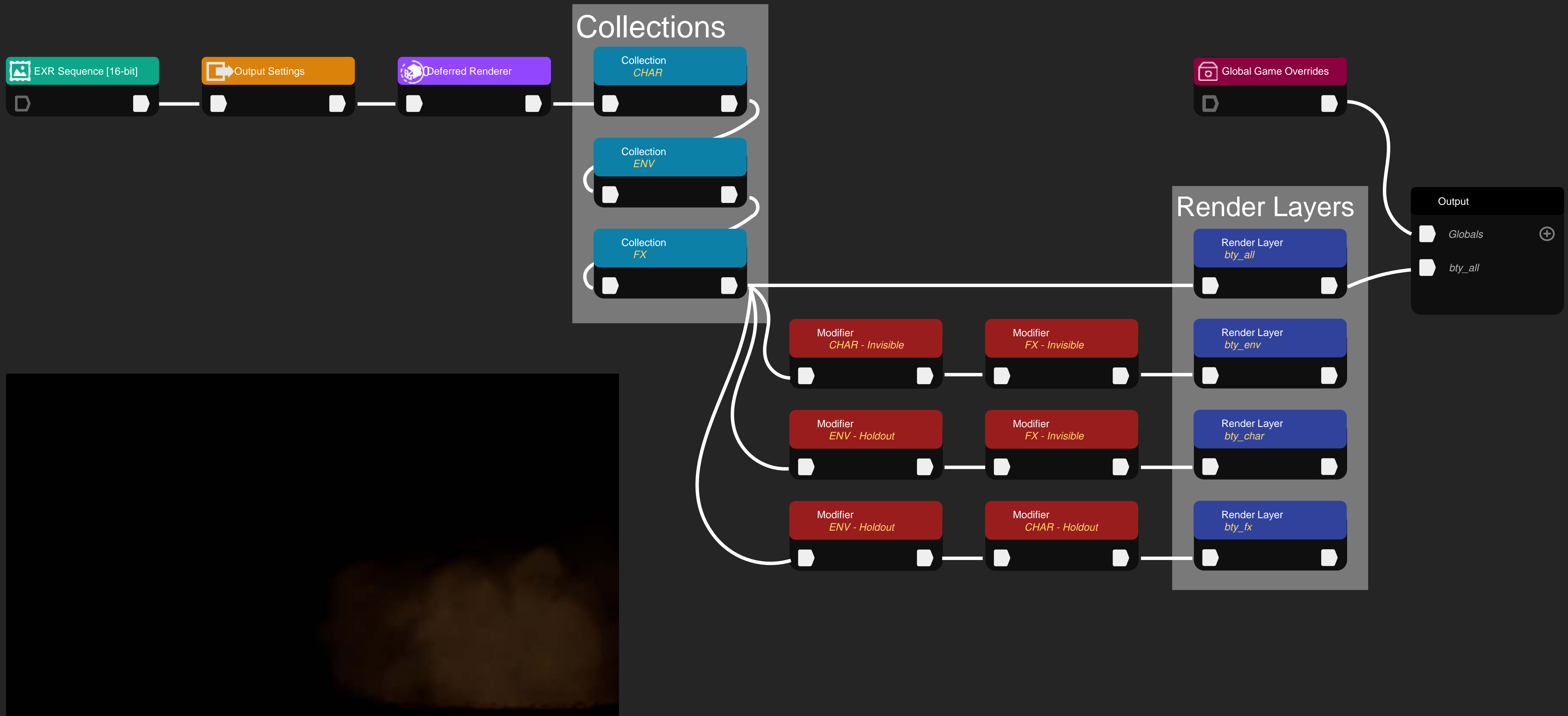
Render Layers Example



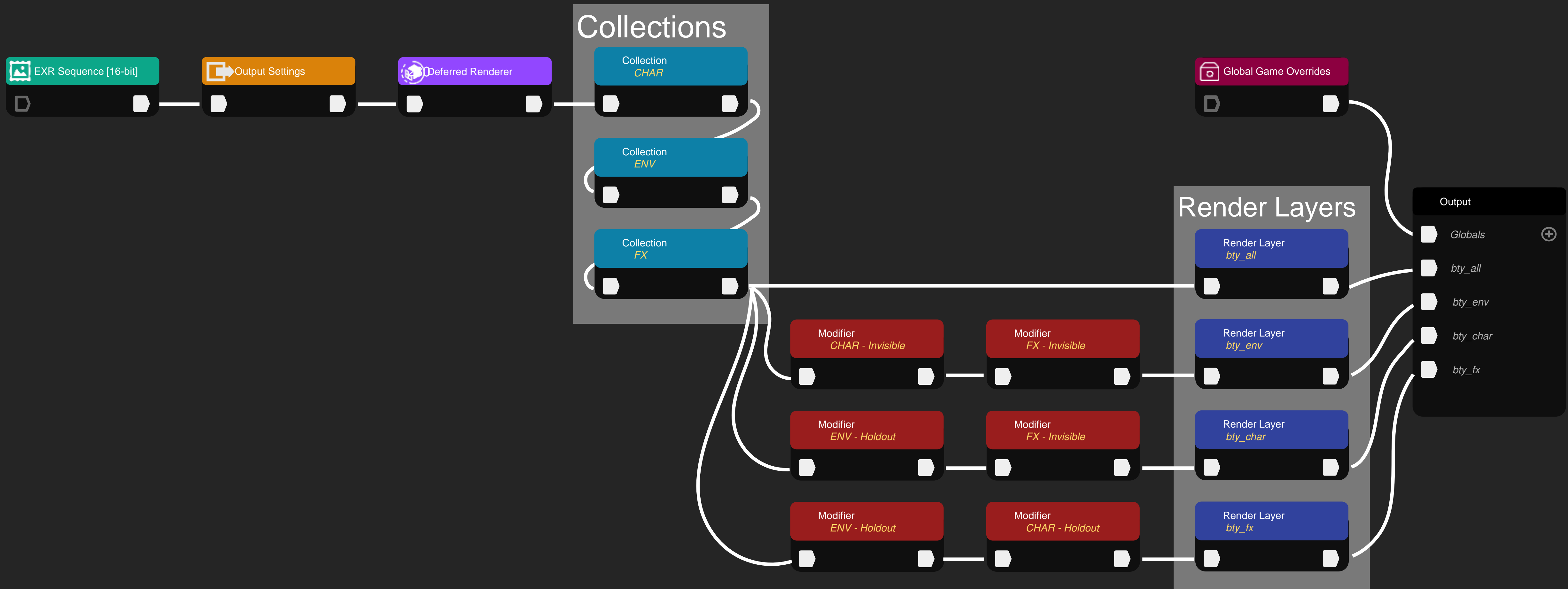
Render Layers Example



Render Layers Example








Render Layers Example



Subgraphs

Sub Graph
ShowSettings

- Globals* 
- bty_all* 
- bty_env* 
- bty_char* 
- bty_fx* 



Subgraphs



Subgraphs



The **current
Movie Render
Queue isn't
going away
(yet)**

All **existing
settings will
be available as
nodes
(eventually)**

A close-up portrait of a woman's face, focusing on her eyes. She has striking, vibrant eye makeup consisting of bright orange and red shades around her eyes. Her hair is pulled back, and she has a neutral expression. The background is a solid, deep blue color.

Media IO

**Simplified video
playback for UE.**



Media IO

What we are working on now.

Frame Accuracy

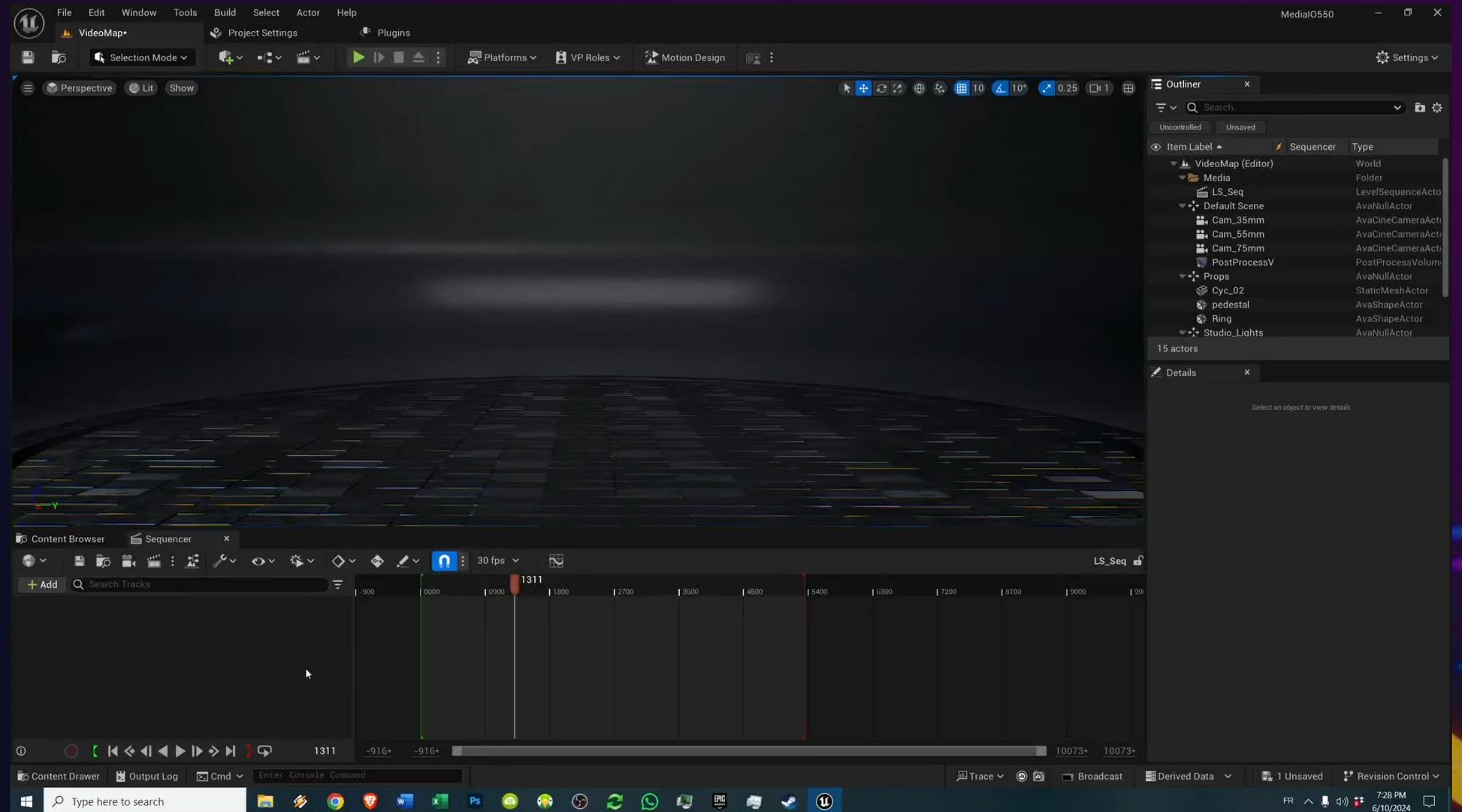
Image Quality

Codecs

Sequencing

Performance

Ease of use



Media IO

Upcoming

Media Plate Actor

New Composite Plugin

Pixel Mapper UX

Sequencer Integration + Audio

To support audio scrubbing

Continued work on editor performance,
synchronization and looping with Sequencer.

Codecs





DMX

Empowering live events,
concerts and previs.

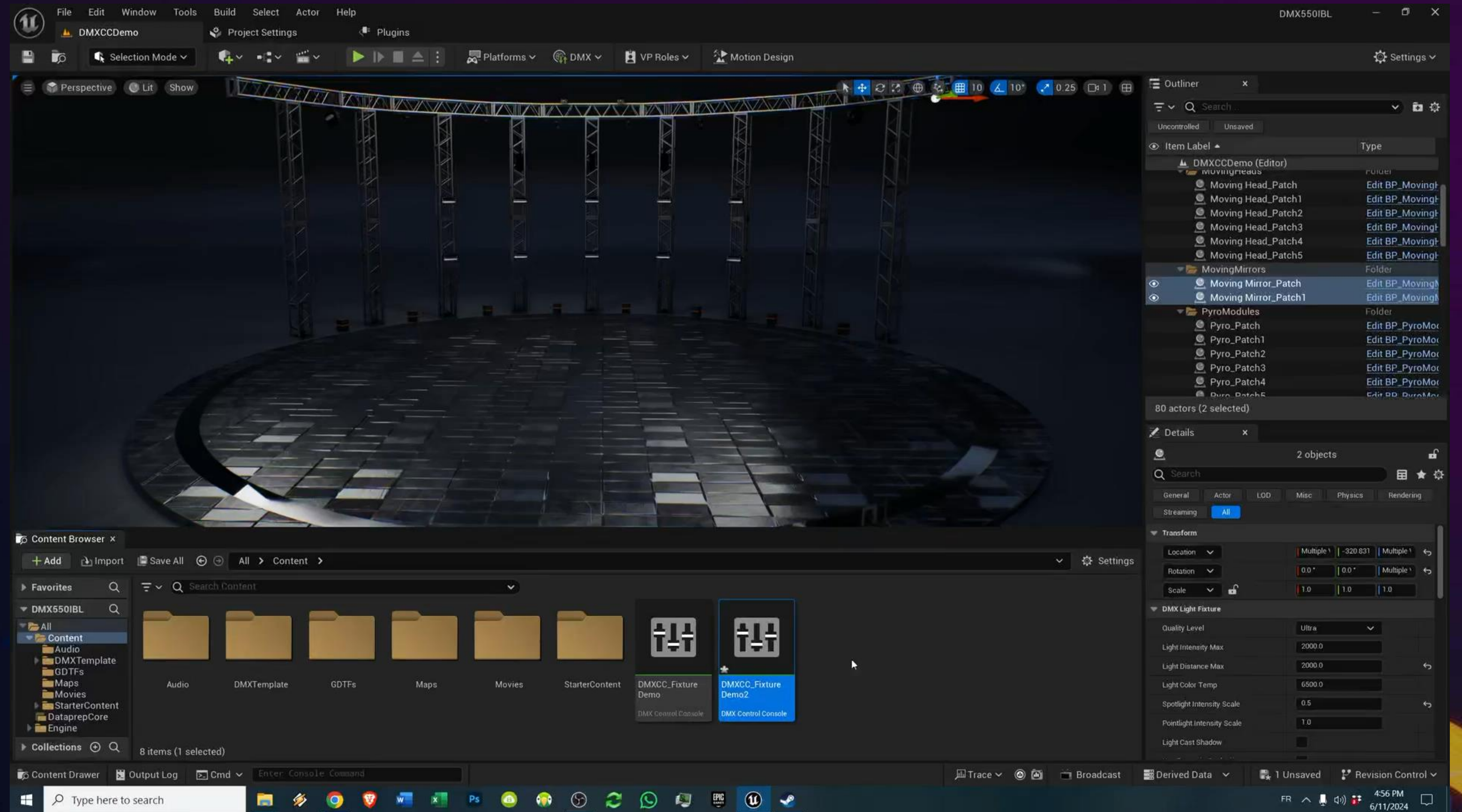
DMX

Upcoming, Prod. Ready

Control Console
(Cues)

Patching System

Sequencer & Take
Recorder
Integration



DMX

Upcoming, Prod. Ready

Pixel Mapping

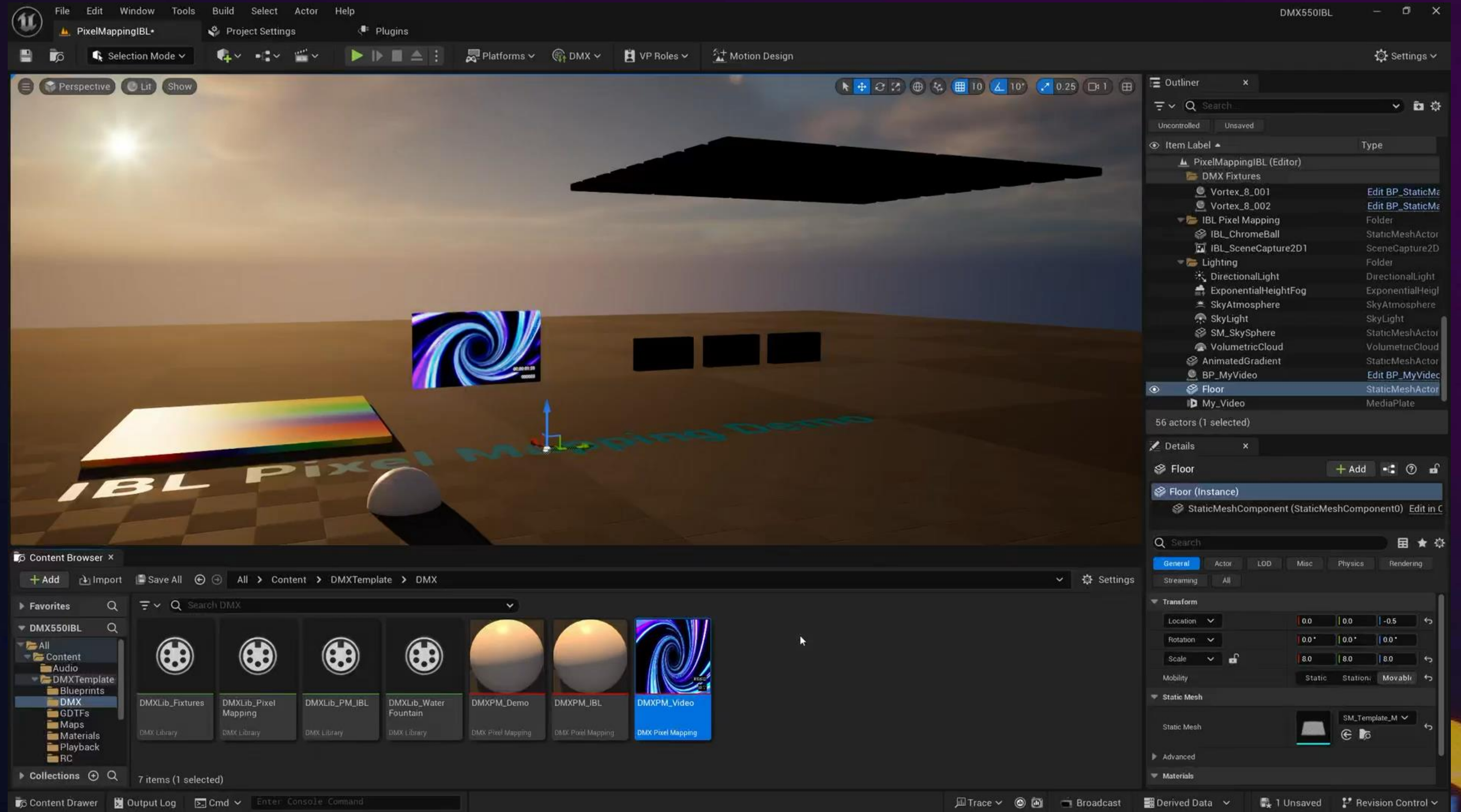


DMX

Upcoming, Prod. Ready

Conflict Monitor

GDTF & MVR
Import/Export



In Summary

- Updates in **rigging** and **animation**
- Production ready **Vcam**
- **VR scouting** quality of life
- Quality and speed improvements in **rendering**
- New tools for **ICVFX**
- Further integration of **2110** for **nDisplay**
- Scalable production rendering with **MRG**
- **Media Input Output** expansion
- Production ready **DMX** integration



THANK YOU

Kevin Cushing
Virtual Production Supervisor
Epic Games Innovation Lab, Los Angeles

