

Tiled Mipmap Video:

OpenAPV in Unreal Engine 5.8

Ryan Mayeda, Epic Games
Lead Technical Product Manager

/* ACADEMY SOFTWARE FOUNDATION

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Source
days^{'26}

OPEN SOURCE FORUM

hosted by Academy Software Foundation

An approach to scalable, high-performance video:

Tiled Mipmapped Video (TMV) with OpenAPV

Alejandro Arango

EPIC GAMES







Cue-Commons [1] (LA-LAC)

An Approach To Scalable, High-performance Video: Tiled Mipmapped Video (TMV)...

Alejandro Arango

ASWF Academy Software Foundation

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News

Unreal Engine 5.8 is now available

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With [Unreal Engine 5.8](#), you can push performance and customization further, thanks to advanced worldbuilding and terrain creation tools, high-quality real-time vegetation authoring, and simplified lighting workflows.

You'll also discover faster in-engine character and animation creation tools, advances in virtual production, high-fidelity full-body performance capture, accelerated content creation with integrated LLM workflows, and much more.

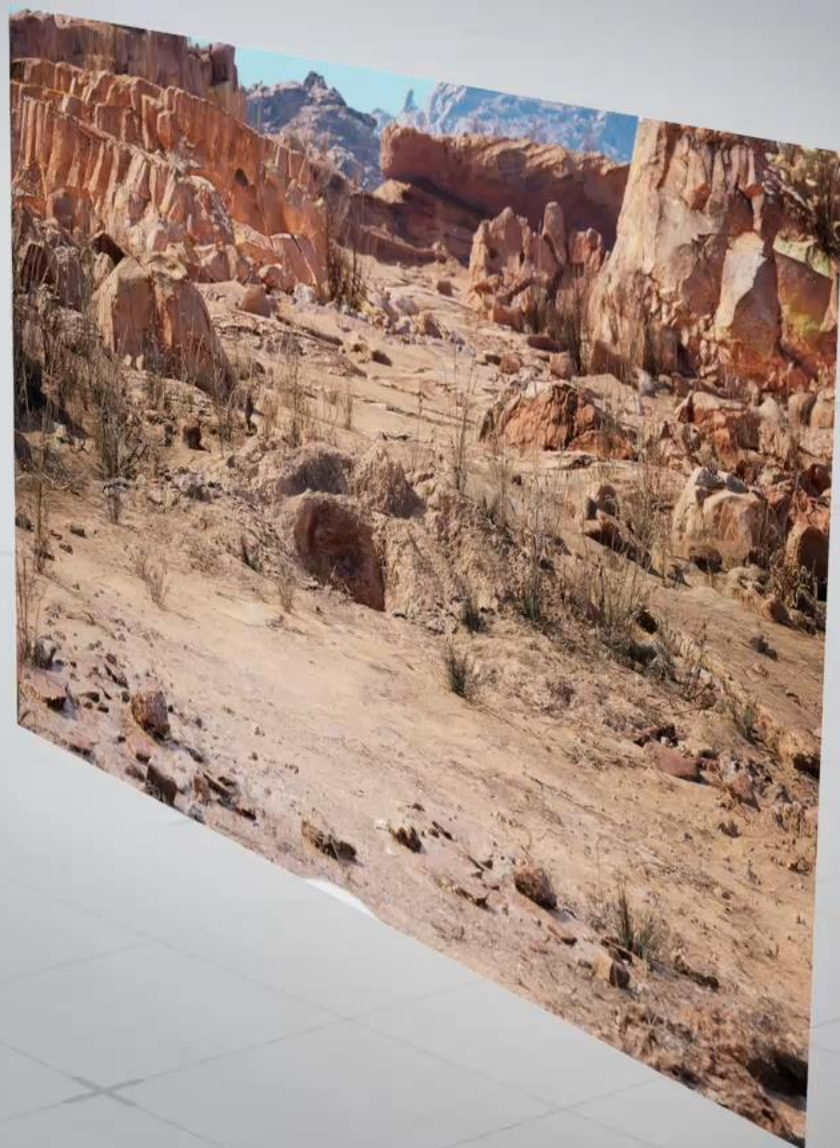
UE 5.8 is the last planned major Unreal Engine 5 release on our roadmap as we ramp up work on UE6. We will continue to support UE5 for bug fixes and regressions, and may add another official release if circumstances warrant it. Meanwhile, let's take a look at the 5.8 details.



News

Unreal Engine 5.8 feature highlights





Frontal: 16.68 ms
Scene: 3.29 ms
Draw: 16.02 ms
Text: 2.09 ms
CudaTotal: 7.71 ms
Memory: 4.56 GB
Framerate: 7.23 FPS / 14.09 FPS
RenderSize: 1920x1080 (1920x1080)
Material: 73
Physics: 37.40%

2D (Render Settings)



33.9 ms (Render)
- 100.0% x - 100.0% (max)
10.0% x 70.0% (min)





A031_C014_0225D4_001.R3D

11:07:13:14

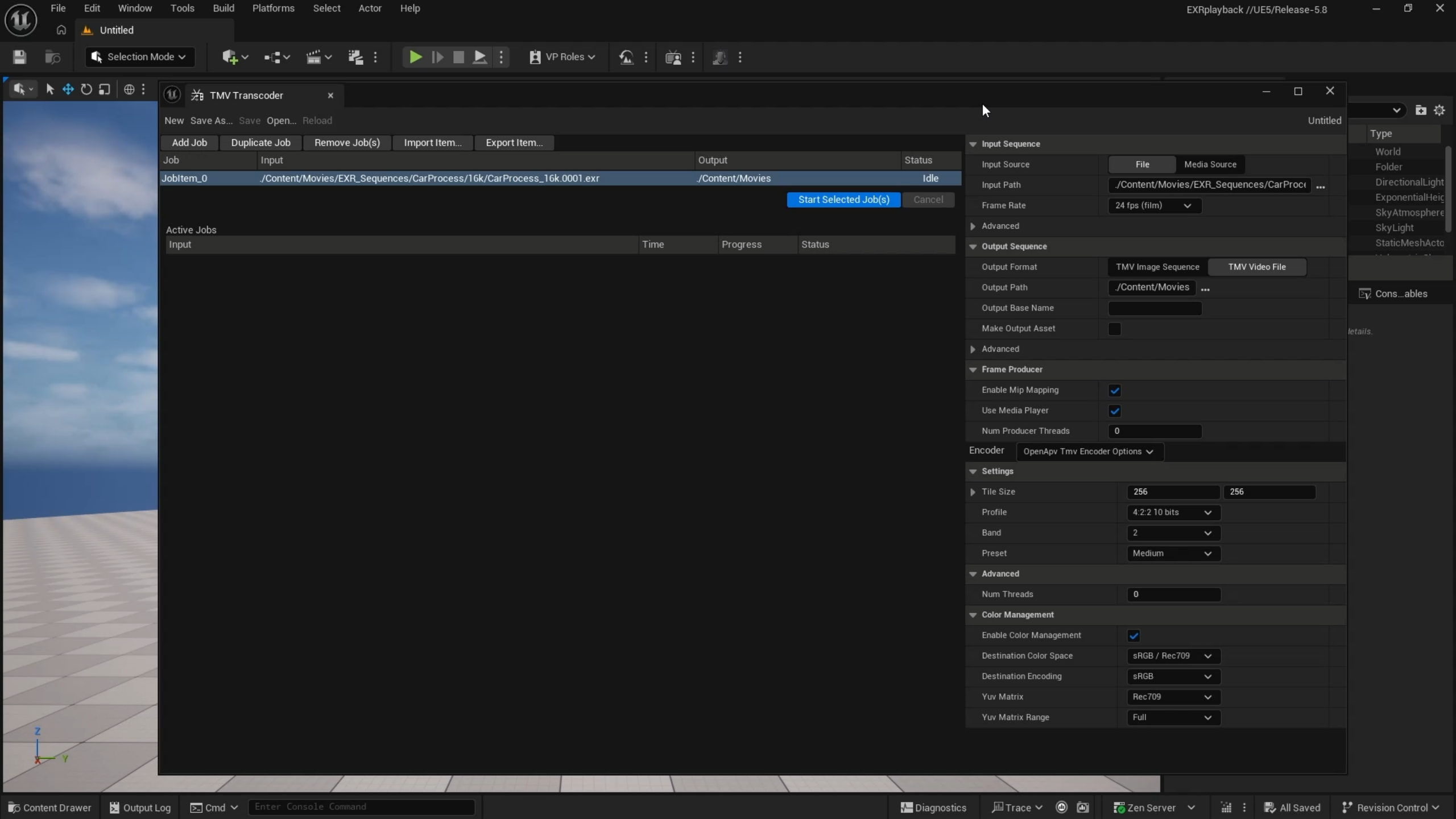
New in Unreal Engine 5.8

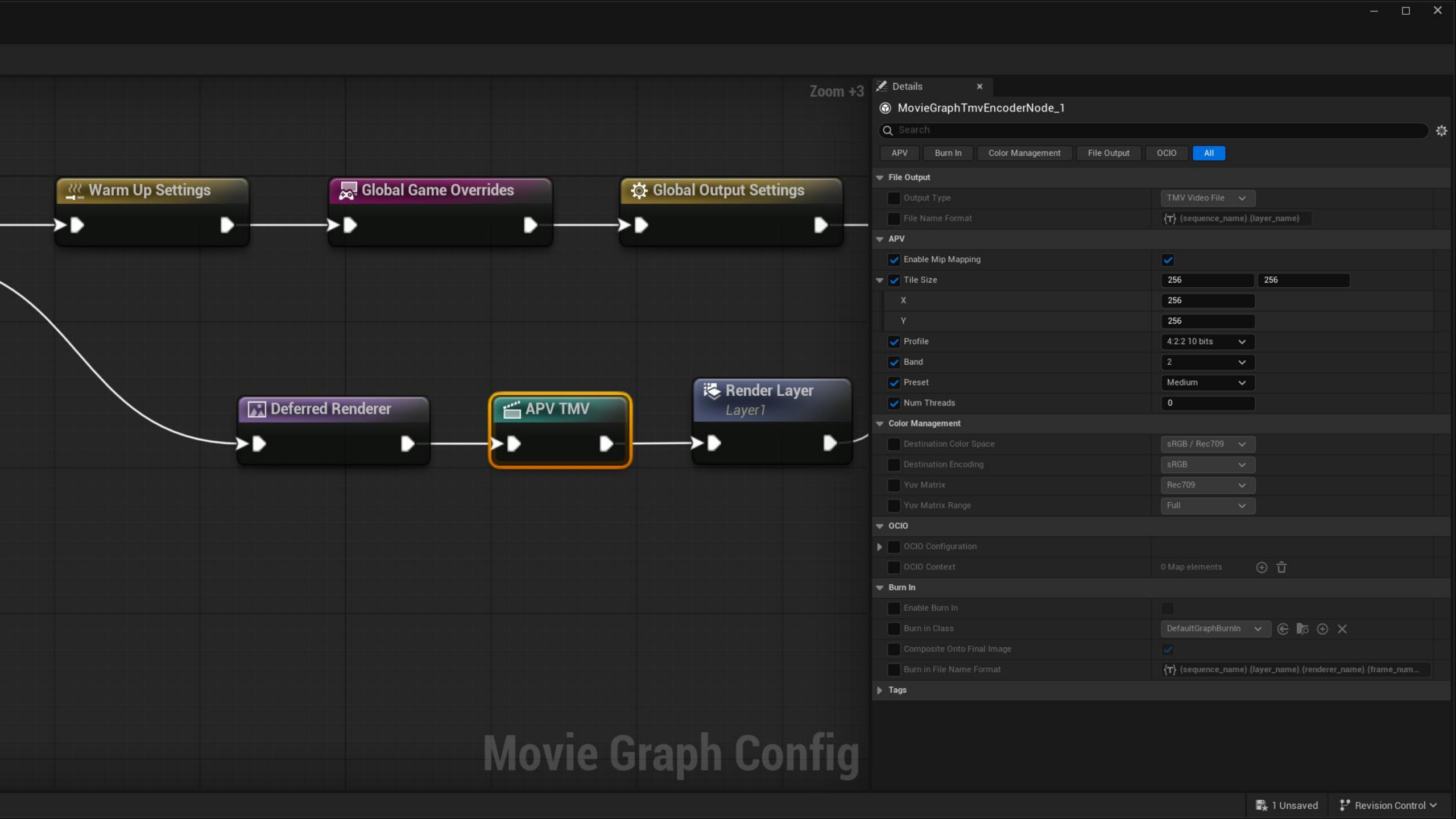
Tiled Mipmap Video

- A new option for fast and memory efficient plate playback.
- Only decodes necessary mip level tiles.
- Smooth scrubbing.
- Support for HDR and Alpha channel.









Movie Graph Config



100 Frame Plate

16k Res

Processed EXR

100 GB

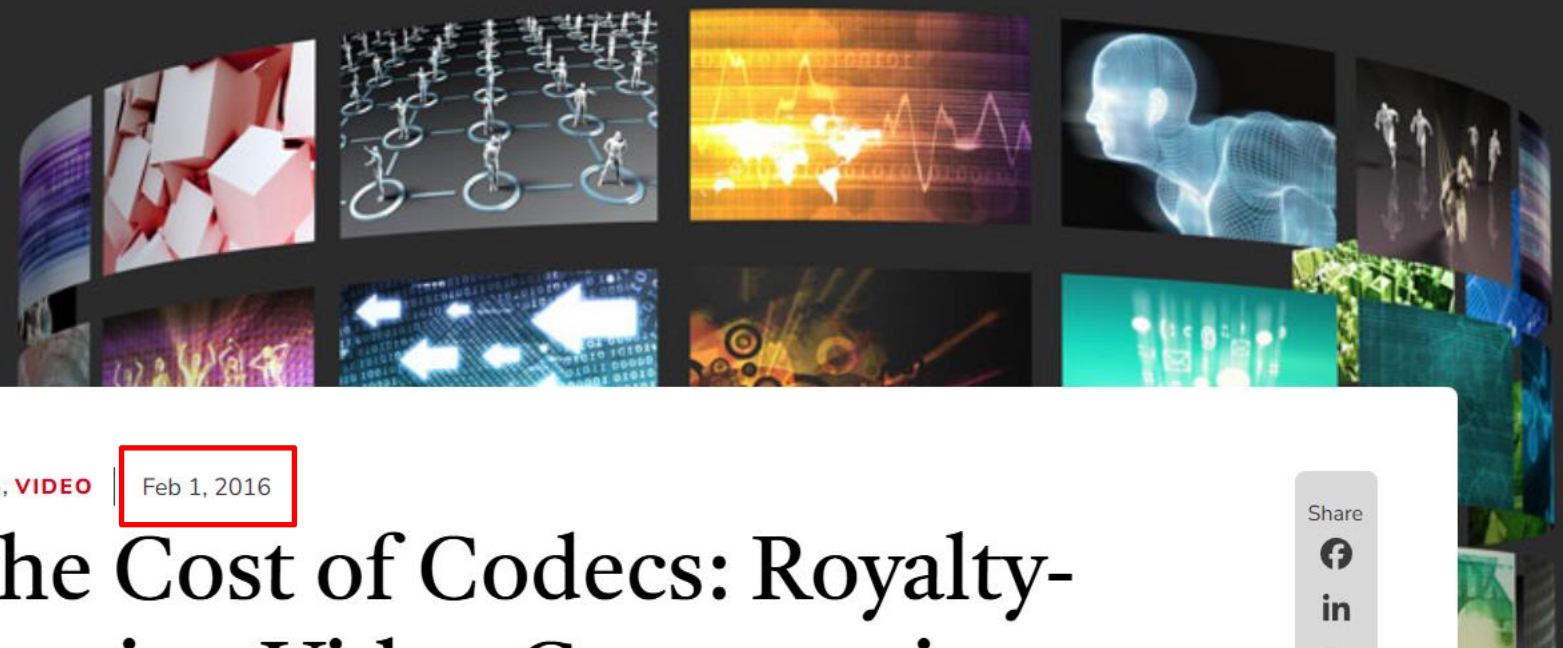
TMV Movie

2.1 GB

smoke_002
F= 183

29996





LABS, VIDEO

Feb 1, 2016

The Cost of Codecs: Royalty-Bearing Video Compression Standards and the Road that Lies Ahead

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Since the dawn of digital video, royalty-bearing codecs have always been the gold standard for much of the distribution and consumption of our favorite TV shows, movies, and other personal and commercial content. Since the early 90's, the [Moving Picture Expert Group](#) (MPEG) has defined the formats and technologies for video compression that allow all those pixels and frames to be squeezed into smaller and smaller files. For better or for worse, along with these technologies comes the intellectual property of the individuals and organizations that created them. In the United States and in many other countries, this means patents and royalties.



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OpenAPV

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 BSD-3-Clause license

 Activity

Custom properties

☆ 210 stars

👁 19 watching

44 forks

Report repository

Releases 32

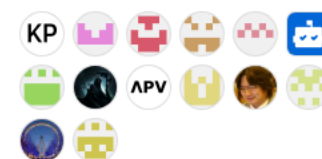
v0.2.1.3 **Latest**
on Apr 28

+ 31 releases

Packages

No packages published

Contributors 23

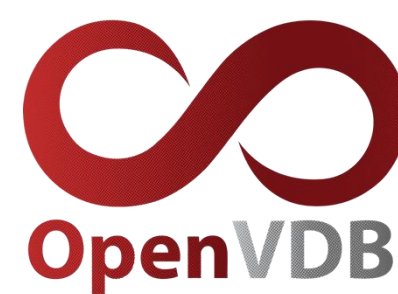
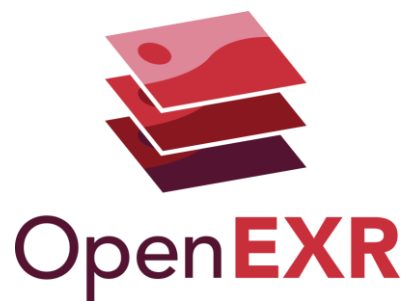


+ 9 contributors

Languages



Unreal Engine ASWF Features



Add selective multi-mip tiled decoding, 16K tile support, per-frame RC, and codec callbacks #228

View status

Code

 Draft

 jsperrier1 wants to merge 15 commits into AcademySoftwareFoundation:main from alejandro-arango-epicgames:tmv_multi_mip_16k

Conversation 0 Commits 15 Checks 1 Files changed 14

+2,172 -50



jsperrier1 commented 3 hours ago

...

Title: Add selective multi-mip tiled decoding, 16K tile support, per-frame RC, and codec callbacks

Summary

This PR adds a set of decoder/encoder capabilities developed for a tiled, multi-resolution ("mip") streaming workflow, ported onto current `main`. The headline addition is a **selective multi-mip tile decoder** that decodes an arbitrary subset of tiles across multiple mip levels of an access unit in a single call, with coalesced I/O and multi-threaded tile decode. Supporting changes extend tile limits to 16K, add per-frame rate control, and introduce pluggable memory/logging/CPU-trace callbacks.

Library (`src/`, `inc/`) and app (`app/`) changes only. The test harness and media for this feature are substantial and are being finished on a separate branch; I'd like to land the library first and follow up with tests. Happy to reorder if you'd prefer them together.

Motivation

For large images (up to 16K) encoded as tiled mip pyramids, clients often need only a viewport-dependent subset of tiles at a chosen resolution rather than a full-frame decode. The existing API decodes whole access units. This adds a random-access path that locates the requested mip frames, reads only the needed tile payloads (coalescing adjacent requests), and decodes selected tiles in parallel.

What's included

Selective multi-mip decode (core)

- `oapvd_decode_selective_multi_mips()` — decode a set of `{mip_level, tile_coords}` requests in context of a supplied random-access `oapvd_istream_t` (seek/read/tell). Per-request status is reported per mip; minimizes seeks; tiles decode across worker threads.
- Decodes into caller output buffers with either standard planar or tile-major ("tiled") layout, with optional destination-slot routing for bounded output buffers.

16K tile support

Reviewers

No reviews

Assignees

No one assigned

Labels

None yet

Projects

None yet

Milestone

No milestone

Development

Successfully merging this pull request may close these issues.

Github

Pull Request In!



Next Step: Adoption



Jean-Sebastien Perrier



Alejandro Arango



Thanks!