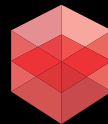


R E D S H I F T

**Production-quality, final-frame
rendering on the GPU**

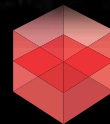
Redshift 2.6 Recap (part 1)

- New features since GTC 2018
 - Area light spread
 - Fake barn-door effect
 - Had to be as efficient as regular area lights
 - Had to conserve energy
 - Shader-driven global volume scattering
 - Allows greater lighting detail
 - Limited to scattering, not transmission
 - Specular light bending through refractions
 - Important for realistic-looking specular reflections
 - Direct Lighting
 - Samples lights by shooting rays *directly* towards light sources
 - Very efficient for sampling area lights (when using MIS)
 - But no ray bending through refractive shadow casters
 - Indirect Lighting
 - Samples the scene *indirectly* by shooting rays based on the surface BRDF
 - Allows ray bending through refractive objects
 - Not as efficient for sampling area lights... so we don't bother!
 - Let's marry the two techniques for the best of both worlds!
 - Direct Lighting for lights that we know are not refracted
 - Indirect Lighting for lights that we know are refracted
 - A mixture of the two for rough surfaces
 - Cryptomatte
 - Solves the matte coverage problem



Redshift 2.6 Recap (part 2)

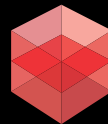
- Redshift Renderview Improvements (Post-FX)
 - Photographic Exposure and vignetting
 - Color Control / LUTs
 - Great for applying a final color grade to make the image more dramatic
 - Bloom
 - That dreamy effect, popular with glamour shots in the 1960s!
 - Streaks
 - Make those hot-spots pop!
 - Fully directional, with tweakable tails
 - Flare
 - Cool lens effect based on boken hexagonal shapes, with tweakable chromatic aberration
 - Physically-based version coming soon
 - Intuitive controls but tons of flexibility
 - Real-time in the RS RV, but available in batch too
 - Post-FX AOV



R E D S H I F T

General Core Improvements

- Volume color channels
 - Color ramps
 - Color transmission
- Direct Lighting cut-offs sampling improvements
 - Faster rendering with fewer samples
- Better importance sampling for single scattering
- Multi-step deformation blur
- Custom AOV visibility through reflections/refractions
 - More to come in 3.0



Redshift 3.0 (part 1)

- Our next major release, with big changes!
 - ‘Alpha’ scheduled for April 2019
 - Designed to be faster and easier to use
 - Major refactor of the core...
- Refactor: Ray tracing facelift
 - Smarter ray management for huge performance boost
 - GPUs really shine when they’re given a lot of work to do
 - New technique requires less memory than RRM/AMM, with better performance
 - Big win for multi-sampled rough rays with many bounces
 - up to 4x faster!
 - Benefit for simple scenes too!
 - Increased the trace-depth limits
 - Up to 64 indirect bounces
 - Up to 256 transparency depth



Redshift 3.0 (part 1)



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Redshift 3.0 (OptiX)

(3840 x 2160)

CUDA: 6m:18s

RTX: 3m:2s

2X faster!

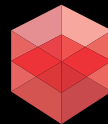
- NVIDIA OptiX™
- Shared GPU caches for geo and textures = better performance for heavy scenes



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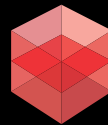
Redshift 3.0 (part 2)

- Refactor: Shading system overhaul
 - Required for the Shader SDK (yes, it's finally happening!)
 - Automatic Sampling
 - Like unified sampling, but at a shading level
 - Two goals: simpler and faster
 - Uses smart noise metrics to determine how many samples the shaders actually need
 - More accurate cut-offs



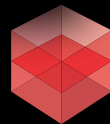
Redshift 3.0 (Shader SDK)

- Let me write shaders already!
- Major shader system re-factor and clean-up
 - Goal: remove any notion of ‘inner workings’ for the shader writer
 - Happy side effects...
 - Better blended materials
 - Automatic energy conservation?
 - Better performance!
- What should our SDK look like?
 - Should we re-invent the wheel?
 - OSL support... with extensions!
- MDL to follow
- Maybe MaterialX, if it catches on?



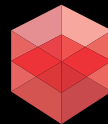
Redshift 3.0 (part 3)

- More tricks up our sleeves
 - Optimization coming for deep transparencies
 - Optimizations coming for many lights
 - New features become feasible...
 - ‘Unbiased’ rendering quality?
 - Ray traced caustics!



Coming Soon

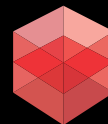
- USD / Hydra support
- Intel Denoiser
- Light blockers
- Random Walk SSS
- Volumetric multiple scattering
- LPEs
- Toon shading
- Distributed rendering



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The Future

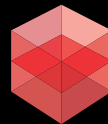
- Blender integration
- Redshift 'RT'
 - All new renderer
 - Actually real-time, DXR accelerated!
 - Fully dcc integrated



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Thanks!

- For more information, please contact us at info@redshift3d.com
- Or meet us right after this presentation!



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