Modern applications of GPU assisted ray tracing

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GPU ray tracing has been around since the advent of GPGPU rendering. Previous GPU architectures provided ray tracing solutions via compute shaders. Real hardware accelerated ray tracing on GPUs however has only been introduced recently.

In anticipation of GPU accelerated ray tracing becoming available for all consumers of GPUs, we will take a look at the existing ray tracing techniques and use cases. We would also like to give an overview of existing and upcoming APIs.

- We would like to cover the following topics:
- Introduction to ray tracing
- Acceleration structures
- Generating primary rays for perspective and orthographic cameras
- Differences between CPU and GPU ray tracers
- Stackless traversal
- Forward, backward and hybrid ray tracing
- Use case: Whitted ray tracing
- Use case: Volume ray casting
- Other use cases (picking, ambient occlusion, etc.)
- Ray tracing via the NVIDIA® OptiX™
- Ray tracing via DirextX® Raytracing (DXR)
- Ray tracing via Radeon Rays (OpenCL 1.2)
- Ray tracing via OpenGL compute shaders
- Applications of ray tracing in light field rendering.