◎ NVIDIA.

Render Audiences Speechless

Create stunning animation and visual effects with energy-efficient render farms.

RTX 6000 render. Image courtesy of Versatile Media.

Introduction

Rendering photoreal visual effects and stylized animation consumes nearly 10 billion CPU core hours annually. Render farms can contain over 50,000 CPU cores working for more than 300 million CPU core hours to render a single feature animated film. These demands can result in a substantial amount of carbon emissions and the need for large physical footprints.

Applications

Visual effects contribute significantly to bringing movies to life. **NVIDIA RTX™ technology** accelerates ray tracing at a scale that was previously not possible. RT Cores accelerate the ray-casting portion of the rendering process, while Tensor Cores enable techniques such as AI denoising to provide high-quality renders that are ready to evaluate within seconds rather than hours. AI can also upscale rendered content, eliminating the need to render at high resolutions, which can reduce render times by up to 4X.

Use Cases

Wylie Co., the visual effects (VFX) studio known for Oscar-winning work on *Dune*, Marvel movies, and HBO/Netflix shows, migrated to GPU rendering and realized a 24X performance boost over CPUs.

Award-winning creative studio Rodeo FX adopted a GPU farm to significantly improve previsualization rendering, and they've achieved real-time performance with RTX-accelerated game engines.

Image Engine, one of the VFX companies behind Marvel movies and *Star Wars*-based television shows, observed a 25X[1] performance boost over CPU rendering with RTX GPUs.

Accelerate, Reclaim, and Save

Rendering has become a central tool for telling engaging visual stories, but demand for both photoreal scenes and environmental responsibility is high.

GPUs significantly reduce environmental impact by increasing performance up to 46X, while reducing capital expense by 6X and energy consumption by 10X. The industry worldwide stands to save $900 million in acquisition costs and 215GWh in energy consumed compared to CPU-based render farms.

Key Points

> GPUs used for traditional rendering and AI

> 10 billion CPU core hours consumed annually

> 46X performance speedup[1]

> $900 million and 215 gigawatt hours (GWh) saved annually

6X Lower Cost and 10X Less Energy
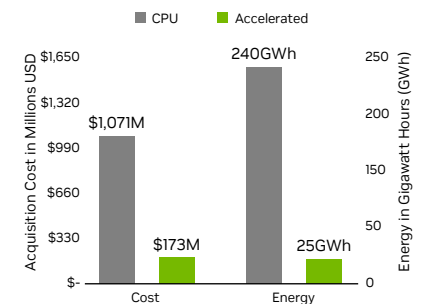
Intel Xeon Gold 6430 (2x 32-core CPUs per node) vs. NVIDIA RTX 6000 Ada Generation (8x GPUs per node).

> "Rodeo FX initially adopted GPU rendering for the sheer performance gains, but we're now seeing improvements in data center density and energy efficiency."
>
> **Tony Zotta**, VP of Technology, Rodeo FX

To learn more, visit: **nvidia.com/sustainable-computing**

1. 25X performance for an NVIDIA Quadro RTXTM 8000 (4x GPUs per node) vs. Intel Xeon Gold 6126 processor (2x 12-core CPUs per node). 46X performance for NVIDIA RTX 6000 Ada generation (8x GPUs per node) vs. Intel Xeon Gold 6430 (2x 32-core CPUs per node). Performance and energy findings based on internal and industry benchmarks.