

## Axceleon's CloudFuzion™ Turbocharged 3D Rendering On Amazon Web Services (AWS)

In the movie making, visual effects and 3D animation industries, meeting project and timing deadlines is critical to success. Poor quality images and late projects are unacceptable when you may have only days, hours or minutes available to take advantage of an opportunity, or bring an important project to fruition. As a result, visual effects and 3D animation professionals rely progressively on faster and more robust software applications and tools, this in turn spurs growing demand for computational render power. The benefits of faster image processing and rendering are limited by the speed with which parallel computing solutions are being developed and deployed.

Studios, individual artists and smaller development teams can realize huge increases in rendering throughput by using Axceleon's CloudFuzion™, Aspera's *fast*™ data transport and the Amazon EC2 compute platform. CloudFuzion™ provisions the work on the rendering infrastructure efficiently, automatically adapts to on-demand resource expansion and contraction, and ensures maximum utilization of the cloud. The combined CloudFuzion, Aspera and Amazon EC2 solution offers significant advantages to the rendering process:

- Based on project/ artist requirements, add 100's or 1000's of render nodes to the render pool; quickly, efficiently and with full automation.
- Automate the render workflow: define events that trigger upload and download of data/scene files, schedule resources, render the job and return result back to the artist.
- Increase resource utilization, reduce turn-around times and improve the quality of work done.
- Pay or bill for only what is used, release resources upon completion of task or project.
- Flexible deployment, can be used with homegrown or third-party commercial applications.

### CloudFuzion™ Implementation On AWS:

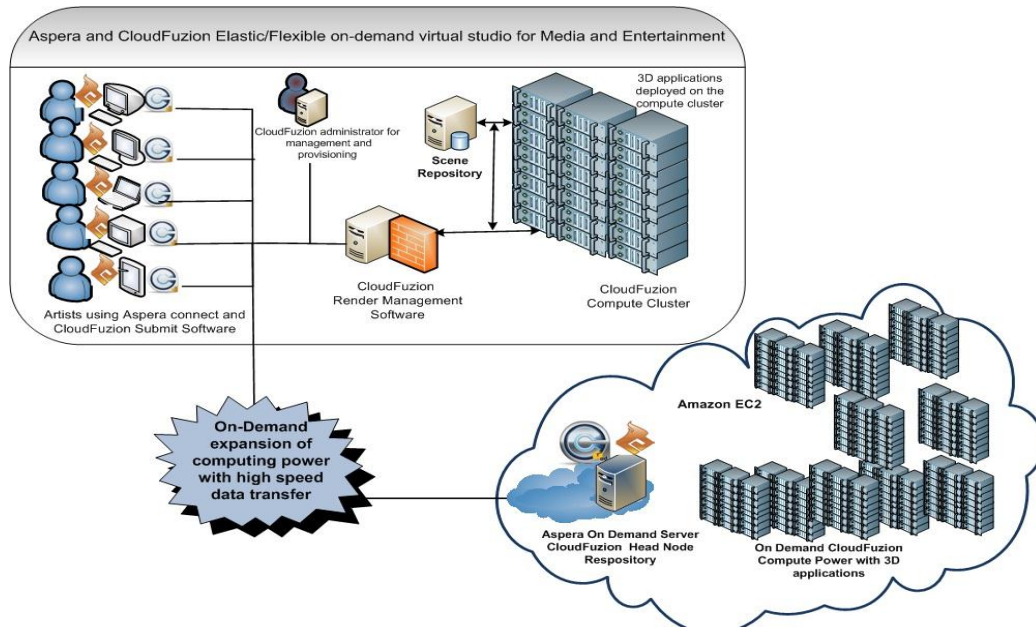


Figure 1: On-demand Virtual Studio Renderfarm with Amazon EC2, Aspera *fast*™ technology and CloudFuzion™ render & resource management.

## Cloud Rendering: How Does It Work?

- Faster, more efficient result generation: image processing and rendering are very often repetitive and are inherently well-suited for parallel execution. All these renders can be run concurrently, the more CPUs available the faster the result.
- On-demand infrastructure: Amazon Web Services (AWS) is the leading Infrastructure as a Service (IaaS) platform and, with an innovative economic model, is ideal for the demanding needs of image rendering. AWS comprises of a highly-scalable, on-demand compute and storage infrastructure.
- High-speed file transfer: fully integrated into CloudFuzion, scene data and results are moved to/from AWS using Aspera's *fast*<sup>TM</sup> protocol, a patented, high-performance transport for bulk data. Aspera's *fast*-enabled client/server software moves bulk data at maximum speed, regardless of file size, transfer distance or network conditions, ensuring significantly greater user and resource productivity.
- Best-in-class render management: CloudFuzion<sup>TM</sup> is a mature application that has evolved over the last decade from academic roots, into a powerful IT tool for the enterprise and manages and monitors rendering progress in real-time.

## CloudFuzion<sup>TM</sup> AWS Cloud Management Features:

- Maximized utilization of compute/render resources with minimum user involvement.
- Easy-to-use, install-on-demand Aspera Connect plug-in for IE6/7/8, Firefox and Safari, allows for rapid data movement into and from Amazon EC2.
- CloudFuzion's intuitive web-based dashboard for system monitoring and control.
- Robust CloudFuzion Desktop for Amazon EC2 render cluster management and control.
- Automated clean-up of compute nodes, control node and restart of recovered compute nodes and restarted control node reschedules for uncompleted jobs.
- Easy-to-use, one-step configuration updates of all render nodes if needed.
- Extensive accounting and reporting capabilities from Amazon EC2 and CloudFuzion<sup>TM</sup>
- Rapid and easy deployment of tens to thousands of compute/render node for image rendering on-demand.

## Conclusions:

CloudFuzion, Aspera and AWS provide fault tolerant "elastic rendering<sup>TM</sup>" within the cloud, and change the economics of rendering while decreasing the need for and management of the hardware and software stockpile in a studio environment. It allows studios and end-users access to massive infrastructure resources, without commitment, when and as needed. This equates to major productivity improvements for the artist and the Creative Director in a 3D animation business and only requires for payment based on usage.

Amazon EC2 is perfect for distributed image rendering and other computational intensive activities. CloudFuzion<sup>TM</sup> manages all compute intensive, parallel data activities with ease, flexibility and total control.

Over the WAN, Aspera's *fast* breaks free of the packet loss and latency bottlenecks of standard TCP transport solutions like NFS, CIFS, FTP and HTTP, allowing for the transfer of large files, and file sets to be up to 1000 times faster.

**Contact:** Please contact Axceleon at [www.axceleon.com](http://www.axceleon.com) to get further information.