



CINEMA CLOUD: AN ENABLING TECHNOLOGY FOR THE MOVIE INDUSTRY

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ABSTRACT

With the promise of high definition and advanced special effects, movie theaters worldwide have evolved from traditional film projection to digital cinema projection. There are many things people think about when it comes to the film industry: glamour, money, success, movies stars; but IT is probably low on the list. However, it is cloud computing that is causing a revolution in the film industry. The film industry has decided to fully embrace cloud computing. This makes sense: the film industry is vast and sprawling, it is not just based in Hollywood, but all over the world. The film industry is more like a global village.

Keywords: Motion pictures, entertainment industry, cloud computing, films, web and internet services.

I. Introduction

Technology, such as the 3D one, has been rapidly advancing and changing the film industry. But it's not the only one. Cloud computing and film aren't necessarily two things together; one deals with entertaining people whereas the other aids people with saving and transferring of data from one place to another. From a business perspective, one of the biggest advantages of the cloud is the cost savings, but there actually ends up being a creative advantage, too.

II. Moving to cloud

Nonetheless, the cloud offers some tempting advantages, with budget pressures limiting the resources production companies can spend on media management, the cost savings of replacing on-premise hardware with cloud infrastructure can be substantial. Additionally, the importance of cloud

delivery is growing, and organizations that can enable seamless file distribution will be best positioned to move quickly in a changing environment. Cloud will enable media companies to keep pace with turbulent times by providing:

- Faster time to market
- Increased sales by increasing exposure to content
- A richer flow of information to adapt quickly to changing consumer interests and demand
- Decreased labor, inventory, and working capital costs
- Faster, fresher content packaged, identified, and available to the right consumer anywhere, anytime

III. How does it help?

At first glance it can seem quite hard to see how cloud technology and film fit hand in hand, but if you look at the techniques that are used within the film industry to actually create the feature film; the reasoning behind why many studios are turning to cloud-based systems becomes apparent. The rendering process is one of the most power-hungry aspects of film making; compositing all the scenes of a film with visual effects and audio can take a very long time and requires a huge amount of computing power. The savings can be greater if compared to purchasing the computer equipment needed instead of leasing it. Cloud services can substantially reduce both the capital expenditure and the fixed costs of a visual effects company. They also can get things done a lot faster. Visual effects company Atomic Fiction advocates of using this cloud technology. For example one technology Lionsgate (Entertainment Company) is utilizing to manage the release of its films can be found in the cloud. Distributing productions through services such as Amazon Prime, Netflix, and others is one way this company is adapting to a new era in media consumption. In addition, a great deal of Lionsgate's infrastructure is managed in the cloud, saving the company a great deal of headache of managing its own data centers and bandwidth allocation.

IV. Cloud Computing 3D rendering and animation:

Today, if you look at a nicely 3D rendered image, it's quite difficult to distinguish it from a real photography. Yes the computer which renders it needs a huge system resource. The main barrier for creating such realistic, even more real than a camera can capture is the lack of computing power and partially lack of more advanced software needed for 3D rendering. Just one realistic image consumes more than 4 GB physical RAM and 512 MB Graphical RAM. One minute running video needs at least 30 x 60 = 1800 such images. This needs a huge resource. Four seconds of animation frames, requires about 10K computing cycles to ensure a precise and realistic animated frame. So basically the current barrier to create **Cloud computing 3D Rendering** is the cost and lack of more advanced software.

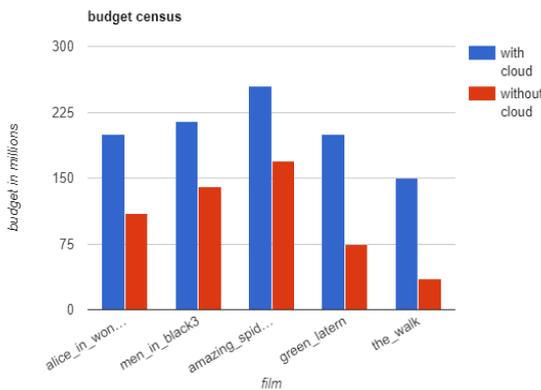
V. Rendering with & without cloud

Cloud-based performance has the potential to cut costs for everyone, if service providers can cater to small studios by thinking big. The 3D animation & visual effects (VFX) industries require substantial data storage and processor-intensive resources. An animated film has taken a larger market share of distributed media. Large production studios have access to substantial resources such as unprecedented server power to support the incredibly expensive and time consuming process of rendering animation data. And since then, for every advancement in technology that creates a

more efficient render system to speed up render times, an increase in data, resolution, and output capability slow them back down again. Cloud-based performance allows multiple workflow streams to benefit from a single cloud-infrastructure. Cloud-based performance certainly benefits large film studios and VFX studios that employ hundreds of animators working towards a similar goal. By queuing performers to the cloud, the animators do not idle their machines rendering frames locally, or slow down their local network with server overload. Studios also do not incur the direct costs of building servers, maintaining them, and hiring staff to manage the workflows. With pay-as-you-use terms, the animation companies can also budget more appropriately the processing needs of a project to their clients.

An animation company believes that company would not have been able to compete with larger studios without access to outsourced cloud computing power. The rendering process of assembling all the component elements of a film such as video, audio, graphics, filters and so on into one final version, can take an agonizingly long time and requires vast computing power. This can be solved with the computing resources of cloud at beneficial cost.

Film	Budget in million(without cloud)	Budget in million(with cloud)
Alice in wonderland	200	110
Men in black 3	215	140
Amazing spider man 2	255	170
Green lantern	200	75
The walk	150	35



Source: 1: <http://getwrightonit.com/how-much-does-3d-animation-cost/>

Source: 2: https://library.creativecow.net/article.php?author_folder=cow_new_s&article_folder=VFX_The-Walk-Cloud-Post-Production&page=1

VI. VFX In The Cloud

Overall there are two chief uses VFX artists and firms have for cloud computing: storage and rendering. Storage is important – but for many VFX artists it’s incidental. Rendering is the vital — time-consuming — part of the equation. And rendering is increasingly a task moved onto the cloud. Cloud rendering solves one of, if not the largest barrier to entry in the VFX industry. We have some featured VFX tools such as Maya (3D animation, VFX simulation),

MotionBuilder (3D character animation and virtual production software), MubBox (3D digital sculpting and texture painting software), 3ds Max (3D software for modeling, animation and rendering).

A. Flexible Computing

Atomic Fiction movies use the cloud for 90-95% of its “heavy data lifting” and have completed notable feature film projects. Zync cloud interface. Zync (maker of visual effects software), one of several similar tools, is a plug-in (is a **software** component that adds a specific feature to an existing computer program. When a program supports plug-ins, it enables customization.) compatible with commercial VFX software that lets an artist access cloud-based rendering functions much in the same way as a local render farm. Zync uses the idle computer time of Amazon’s vast data centers they’ve built all over.

B. Real Time Rendering

One of the most interesting technologies that will propel cloud render farms to even better performance is graphics processor unit or GPU (Graphics processing unit) rendering. GPUs have long been used by gamers to produce stunning graphics in real time that harnesses a GPU’s computing power in most commercial 3D packages.

C. Scalability

Decreased cloud render times aren’t just time and money saver; there are creative benefits as well. For smaller VFX shops and freelancers access to cloud services allow them to implement more aggressive, complex 3D shots that normally would require hundreds of thousands of hours of computing time with a small render farm.

VII. Cloud gains momentum in media

From the surveys cited, it can be observed that despite the challenges, cloud computing, mainly due to its economic attractiveness, continues to grow. There are good reasons to switch to cloud: low costs, low barriers to entry, increased mobility and scalability. There has been an emergence of content clouds recently. As technical and cost barriers fall and security issues are addressed, the cloud has become a viable platform not only for back-end operations, but also for key business practices, including content management and distribution. During the 2008 presidential election in the United States, the New York Times online was able to handle record traffic using cloud technology. The on-demand nature of massively scalable clouds has enabled media companies to provide more video on demand (VOD) without having to make investments in content delivery networks. By harvesting, hosting and combining their content with other content in the cloud, publishers and media companies can answer a higher level of questions for the customer. Consumer demand rules—getting content to the consumer fast is the key to cloud success.

VIII. Security concerns

While cloud computing is a huge help for the industry when it comes to compiling the final cut, there is still some doubts with regards to the security of this technology, especially in an industry which relies on complete secrecy until the film is ready to be released.

Studios are combating this worry by creating their own, private cloud systems, meaning that they don't necessarily have to worry about the public – or other studios – gaining access to their systems like they would if they used the same cloud systems that Netflix, Amazon and Google do.

This is essentially a huge investment for studios to undertake, but for the sole reason that they can essentially guarantee their work's safety – which is more than enough of an excuse to spend so much when cheaper cloud solutions are available to them.

Security is something that we take very seriously here at Video2DVD, and while we don't use cloud technology to process your VHS (Video Home System) tapes to DVD format.

IX. Conclusion

Cloud computing is here to stay in the film industry, for every frame of film 24 GB of data is processed. The truth is: what is really pushing the film industry forward and lowering costs is possibly the least glamorous thing of all: the cloud. Storing information in the cloud gives you almost unlimited storage capacity. Cloud computing is probably the most cost-efficient method to use, maintain and upgrade. From the graph, we can conclude that the cost spent on creating the movie with cloud is lower compared to the movie without cloud. There are many one-time-payments, pay-as-you-go and other scalable options available, which make it very reasonable for the company in question.

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