



# Industrial Light & Magic's Rango Rides Into the Wild West With Help From NVIDIA Quadro

SANTA CLARA, CA -- In *Rango*, the new Paramount Pictures and Nickelodeon animated film directed by Gore Verbinski, visual effects facility [Industrial Light & Magic \(ILM\)](#) was able to overcome production demands and timeline challenges with the help of [NVIDIA® Quadro® professional graphics solutions](#).

Approximately 450 ILM artists located in San Francisco and Singapore worked on *Rango*, each on a workstation equipped with NVIDIA Quadro solutions. The artists benefited from the speed of the graphics processing unit (GPU) when using animation tools such as Autodesk Maya, along with a range of ILM's in-house applications.

"Whenever you're approaching a film of this scale you need to make your production pipeline operate as efficiently as possible -- especially when it comes to character animation work," said Tim Alexander, VFX supervisor for *Rango*. "By using NVIDIA Quadro processors and building GPU-accelerated processes into our workflow, we saved a huge amount of rendering time."

ILM's proprietary GPU-accelerated fluid solver/renderer "Plume" has been used on several films, including *Harry Potter and the Half-Blood Prince* and *The Last Airbender*. For *Rango*, new shadow and lighting features were built into Plume to make dust and fire simulations more realistic, contributing to the unique look of the environments envisioned for the film.

Alexander explains, "If we have a character standing in the key light, he'll actually cast a shadow into the dust, smoke or fire. In the past we would fake those biometric ray-type effects or any sort of shading in the composite phase. By using the GPU to bake shadows and lighting into the simulation, we saved a tremendous amount of time and achieved a more realistic effect by having all of the detail of the object that's casting the shadow actually in the shadow itself."

Plume was also used to simulate fire; in one scene, the main character Rango belches flames, setting a saloon patron ablaze. "With NVIDIA GPU acceleration in Plume, we're getting real-time feedback on dust and fire. Previously it would have taken one or two days to simulate the same scene," continued Alexander.

*Rango*'s crowd scenes feature up to 120 variations of 75 key characters -- each one with either hair, fur or feathers on their body. In order to accommodate the massive amounts of rendering required to generate the frames, ILM developed a GPU-accelerated process to calculate lighting occlusion. The occlusion data provided a preview of hair or feathers, and was fed into Pixar's RenderMan renderer for a final pass. The pipeline shortcut resulted in speed increases of up to 100 times, depending on how complicated the hair or feathers were within a given sequence.

Furthermore, the hundreds of GPU cores in each artist's workstation also boosted the performance of ILM's GPU render farm during off-business hours. With "ObaQ," ILM's Academy Award-winning render queue system, NVIDIA processors were automatically utilized by the render system when an artist logged out at the end of the workday.

"Our ongoing work with ILM to drive GPU optimization for visual effects and CG creation has led to incredible results," said Dominick Spina, technology manager, Digital Film Group, NVIDIA. "ILM's growing GPU integration and the dramatic impact it has made on their workflow ultimately benefits filmgoers, who continue to be delighted by ILM's innovative visual effects."

The first fully animated feature film by ILM, *Rango* was released in theaters on March 4, 2011 and rocketed to the top box office spot in its opening weekend. In addition to the host of GPU-accelerated tools ILM developed to meet the demands of this film, they're currently developing new GPU-based toolsets in their upcoming productions.

For more information about NVIDIA Quadro Professional Graphics Solutions, please visit [www.nvidia.com/quadro](http://www.nvidia.com/quadro).

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