

## Customer Success Story

# High Performance Computing chops rendering time for world-class animation studios

## Customer

Hollywood studio

## Industry

Entertainment

## Challenges

- Perform 2,000 CPU-years worth of complex rendering jobs in a single year
- Provide seamless, controlled access to one of the world's largest render farms for hundreds of CG artists, animators and technical directors working on features films and animated shorts

## Solution

Platform LSF

## Business Results

- 150 animators, technical directors and lighters collaborate on feature films, running compute intensive jobs on a dedicated shared HPC grid
- Roughly 2,000 processor years of computer simulation required to render a CG film compressed into a single year
- Measured overnight grid utilization of 97%
- Increased compute capacity allows release of two major feature films and multiple animated shorts per year
- Resource accounting mechanism ensures that deadlines are met and competing project teams have access to a fair share of grid resources

## Children's Film Brought to

## Life With Help From Platform LSF

This major Hollywood studio produces high-quality family entertainment through the use of computer-generated (CG) animation. The company's world-class creative talent and technological capabilities, allow it to deliver great stories, breathtaking visual imagery and a sensibility that appeals to both children and adults.

"Impossible" is a word that does not exist in the hyper-competitive world of CG film. Every step unfolds according to a tight schedule in order to meet release dates. Yet the amount of computer time required to render animated films grows with each technological improvement. As such, High Performance Computing (HPC) in the form of massive computer grids is a critical technology in CG film-making.

The studio's latest blockbuster, a children's film required the equivalent of over 17 million processor-hours of computing time on some of the world's fastest commercially available processors. Using a powerful HPC solution powered by Platform LSF, the studio's technicians were able to complete this complex rendering job in time to get the film released before the summer blockbuster season. Advances in animation and lighting software along with HPC infrastructure software like Platform LSF combine to make this possible.

## Producing a CG Film

A typical 90-minute film shot at 24 frames per second results in 130,000 frames. Each frame is broken down into elements for rendering purposes – the characters, rocks, trees, clouds – which are composited into the frame. Rendering a single element having a complex geometry (a character with realistic looking fur for example) and taking into account lighting effects can take a few hours to compute. It is little wonder that 17.7 million hours of rendering time (approximately 2,020 CPU-years) was required in the making of the film.

Technologies developed at the studio allow for full scenes consisting of multiple shots to be rendered and worked as a single unit. In-house developed software helps maximize the efficiency of rendering by ensuring that objects that do not move from frame to frame are not re-rendered. This saves tremendous amounts of processing time.

## Making the Impossible Possible

Since technology choices can directly impact time-to-market, the studio sets the bar high in the technology selection process. The company chose Platform LSF as the heart of the HPC environment that underpins the render-farm grid. Platform LSF manages 4,000 CPUs in two facilities, and vast numbers of jobs in a virtual computing environment that never goes down.

Platform LSF allows all of the processors to act as a single, large shared render farm operated as two large Platform LSF clusters, each composed of approximately 2,000 CPUs. In addition to the dedicated server farm, animators and designers also have several hundred desktop computers running Linux at each major facility. Up to 300 people, including animators and lighting technicians, submit work and run models against the compute farm on a typical day.

## 97% Utilization of Available Compute Resources

Overnight the desktop systems join the render farm, contributing several hundred more computers to the powerful grid computing infrastructure. On average, between 20,000 and 30,000 jobs run overnight, but as many as 100,000 jobs can run during the busy "crunch" time that precedes a major feature release. At night, when full quality rendering is done for review the following morning, the render farm has an average utilization of over 97%, including the desktop systems pressed into service by the Platform LSF cluster.

Platform LSF resource accounting and fair scheduling functionality help the studio manage the film making process by enforcing business policies related to resource consumption budgets. Resource accounting allows managers to refine budgets and predict future demand based on the creative needs of their animators and technicians. The predictability, stability and scalability this brings to the process of CG film making, is a source of competitive

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advantage, allowing the company to focus its energies on producing high quality family films for all to enjoy.

## Platform LSF Plays a Key Role

Creating films with the sophistication and complexity of today's feature-length animated films would not be possible without Platform LSF. Technicians routinely come up with ever more creative approaches to support the film making process with technology.

"Platform LSF plays a key role for us. Not only does it manage our grid computing environment, but it gives us capabilities to help manage the balance between artistic creativity and the need to meet production deadlines," says a representative of the studio's Animation Technology Division.

With Platform LSF, the studio has been able to make as many as 6,000 processors across their two facilities look like a single large computer. While there are two logical Platform LSF clusters, they actually overlap with many nodes shared between the clusters. When administrators wish to target jobs so that they run only in a single data center they can "shut" the Platform LSF hosts in the remote data center forcing jobs to be dispatched to local hosts. Platform LSF's sophisticated load indices make it possible for host computers to co-exist in both clusters at once without conflict. When one cluster dispatches work to a node, the other cluster will immediately sense that it is busy.

## Resource Sharing as a Sound Business Policy

The studio has developed its own "currency" for the use of the grid called "RU"s or "render units." Based on internal capacity planning activities, a number of render units are distributed between each competing feature and work with feature directors to allocate rendering budgets within each film. Using this approach, Platform LSF ensures that each production is getting their prescribed "fair share." This allows the studio to control how resources are shared by different production efforts and different functions competing for resources on the grid according to predetermined allocations.

Platform Computing is the leader in cluster, grid and cloud management software - serving more than 2,000 of the world's most demanding organizations since 1992. Our workload and resource management solutions deliver IT responsiveness and lower costs for enterprise and HPC applications. Platform has strategic relationships with Cray, Dell™, HP, IBM®, Intel®, Microsoft®, Red Hat®, Fujitsu and SAS®. Visit [www.platform.com](http://www.platform.com).

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