SUCCESS STORY

The Lord of the Rings: The Return of the King

CHALLENGE	SOLUTION	BENEFIT
Develop and run state-of-the-art color-grading software capable of producing sophisticated color and lighting effects for post-production work on feature-length films; devise a process that enables multiple workers to color-grade film simultaneously to accommodate projects of enormous scope	Custom-develop software-based digital grading and finishing software; run a render program for the digital color grading software on Dell™ PowerEdge™ 2650 servers running the Red Hat® Linux® operating system	Significantly improved speed and productivity by enabling multiple color graders to quickly process film footage on powerful Dell servers; a reliable platform that enables film scenes to be moved from physical film to digital-only format without risk of data loss

A completed quest for computing power and reliability

A sophisticated color-grading process running on Dell PowerEdge servers was a triumph for *The Lord of the Rings: The Return of the King* filmmakers

Released in December of 2001, *The Lord of the Rings: The Fellowship of the Ring* met with instant box-office and critical success, and grossed US$860 million worldwide in two years. The second movie in the trilogy, *The Lord of the Rings: The Two Towers*, surpassed the first, grossing US$920 million in one year, earning both pictures spots on the list of the top ten highest grossing films of all time. The eagerly awaited third movie, *The Lord of the Rings: The Return of the King*, was released on December 17, 2003 and, to date (February 13, 2004), has grossed more than US$1 billion worldwide and won 11 Oscars® at the 76th annual Academy Awards® on February 29, 2004.

The PostHouse embarks on quest for an efficient way to color-grade feature films

Much of the success of these films can be attributed to their stunning visual depiction of the imaginary world of Middle Earth—a land of incredible creatures and grand clashes between good and evil brought to life in the enduring trilogy of mid-20th century novels. Translating *The Lord of the Rings* to the big screen presented a daunting challenge for filmmakers. The story line demanded that a great variety of extraordinary landscapes be represented as well as close to a dozen physically distinct races—including Elves, Dwarves, Hobbits, Trolls, and Wizards.

New Line Cinema created an army of its own—special effects engineers, artists, animators, and modelers—to bring the imagery from the epic trilogy to film, and joined forces with The PostHouse AG, a German-headquartered color-grading services company, to resolve two key visual challenges for the trilogy. Multiple shoots across two years, some under adverse weather conditions, had resulted in color and lighting discrepancies between different scenes. The filmmakers hoped color grading would even out the inconsistencies. Another issue was the director's need to produce a look that complemented the mood of the films. Although dramatic, the New Zealand shooting locations were characterized by harsh lighting that needed to be softened to evoke the romantic, fairytale magic of the story.

As the supervising digital colorist for the trilogy—and president of The PostHouse—Peter Doyle was challenged with incorporating art direction from the director of photography (DOP) and the director to produce the desired look. However, the sheer size and complexity of the three-film project made existing color-grading products and techniques unworkable for Doyle. The classic movie model for color-grading—based on chemical processes in the film lab—does not allow multiple graders to work on a movie at the same time. The somewhat different model used for television relies on hardware-based technology, which also limits labor to a single colorist.

"The scope of the project was such that it would have been physically impossible for me to grade all three films myself," Doyle says. "Lab work is archaic, hardware-based tools are too slow, and existing software tools are not designed to manipulate feature-length films."

Efficient digital process enables colorists to grade epic amounts of film

Doyle saw an opportunity to pioneer a new way of color grading feature-length films. He presented a specification for the type of software tools that he needed to Colorfront, a software development company in Budapest, Hungary, that produces professional film and video post-production products. Colorfront, in close cooperation with another media-solutions company, custom-developed a software-based digital grading and finishing solution. The three pictures in *The Lord of the Rings* trilogy are the first commercially released motion pictures to incorporate this new technology.

Using the new software-based method, the color negative is digitized, and color graders use fast, powerful servers to then manipulate the film's appearance as requested by the director. The results are transferred onto a new negative, which forms the basis of the final film. "The digital model saved time by enabling multiple graders to work on the film simultaneously—a revolutionary way of working before *The Lord of the Rings*," Doyle says. "We also eliminated time-consuming, labor-intensive manual film assembly—that is, physically cutting the negative and splicing it together—by moving this task online. Our operations are much more productive and streamlined now."

Dell reliability was critical to finishing *The Return of the King* on time

For the third movie, *The Lord of the Rings: The Return of the King*, The PostHouse used Dell hardware to process color-grading decisions. Doyle's team ran a render program for the digital color-grading software on Dell PowerEdge 2650 servers running the Red Hat Linux operating system.

"Using the Dell machines made a significant improvement to our productivity," Doyle says. "One of the challenges of digitally grading feature films is just the sheer amount of bandwidth required. The power of the Dell machines impressed us." Hardware reliability also was imperative, according to Doyle. "As we do our post-production work, the entire film is on our disks—on the hardware. The movie basically doesn't exist in any other form until we finish color grading and record it onto a new negative. Dell reliability was therefore quite critical to the survival of the production."

Color grading makes fantasy look real and reality look fantastic

Doyle originally expected The PostHouse to supply color-grading services for about 30 percent of the first film in the trilogy, *The Lord of the Rings: The Fellowship of the Ring*. However, when the new color-grading method proved even more efficient than anticipated, the director and DOP began to apply the process far more extensively. As a result, Doyle delivered 78 percent of the first movie and 100 percent of the subsequent two movies in digital format.

The use of digital color-grading software enables much greater control over the appearance of images than previous technologies. During post-production of all three *The Lord of the Rings* pictures, this capability was harnessed to provide much more subtle integration between live action and visual effects than has previously been possible in movies, a strong benefit for a project in which some of the most pivotal characters—including the infamous character Gollum—are computer-generated (CG) creations.

"Whether a character is CG is now irrelevant from our viewpoint," Doyle says, "because we can apply the same aesthetics to CG characters as we would for a live actor. With equal ease, we can art-direct the visual effects to fit the live action, and manipulate the live action to sit well with the visual effects. As a result, we can get a lot more consistency between the two, which I think looks quite extraordinary."

Dell-enabled software helps filmmakers manipulate the powers of darkness and light

Perhaps even more so than special effects, lighting was a key challenge for *The Lord of the Rings* filmmakers—in part because of the many dark environments and nighttime scenes in the story. Digital color grading enabled Doyle's team to strike a judicious balance between light and dark.

"If you grade the night scenes too dark, you can end up with a really oppressive film—one that's difficult to sit through," Doyle says. "But darkness is a relative thing. Our color-grading software enabled us to manipulate the look of scenes so that they appeared to be night even though the lighting was actually brighter than in some of the daytime scenes. This flexibility really helped improve audience acceptance of the film."

Conversely, the digital software also allowed Doyle's team to render some scenes brighter than can normally be achieved with traditional, chemically based film-lab processing. "Believe it or not, one of the reasons why we needed so much rendering power was because our software allowed us to light some of the sets very brightly to bring out all the amazing details in the set design. The downside, of course, is that producing these looks takes an enormous amount of processing power. The Dell servers helped us get through that, and we ended up with some amazing imagery for *The Lord of the Rings: The Return of the King*."

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