

Threshold gives a new face to digital animation with an innovative, real-time process.

Overview

■ Challenge

To compete with the giants of the animation business, Threshold needed to gain an advantage in production speed and quality.

■ Why Become an

On Demand Business?

Flexibility across its processes – from animation to rendering – enables unparalleled resource efficiency and creative control.

■ Solution

Working with IBM, Threshold developed a groundbreaking real-time animation process that leapfrogs traditional approaches.

■ Key Benefits

- 30 to 50 percent reduction in overall production cycle time compared with traditional digital animation practices
- Improved budgetary control and faster time-to-market

» On Demand Business defined

An enterprise whose business processes – integrated end-to-end across the company and with key partners, suppliers and customers – can respond with speed to any customer demand, market opportunity or external threat.



Based in Santa Monica, CA, Threshold Animation Studios is a cutting-edge digital animation and visual effects production studio. Using on demand technology from IBM, Threshold is currently in production on its first full-length digitally animated feature film "Foodfight!", the first of a slate of several digitally animated feature films. Pictured: Times Square as rendered in Foodfight!

There's little doubt that digital animation – the creation of films using powerful computer technology – still retains a sheen of "newness," this even as the roster of successful digital films – including sequels – has grown longer. What's also evident is that digital animation has subtly begun to enter a new stage in its development, both from the perspective of the viewing public and of the relatively small number of studios making digitally animated films. Audiences have, within a short time, developed high expectations for animation quality. They've also shown that with even the best effects, a solid, compelling story is still the

"There's no time to sit on your laurels in the digital animation business – especially as an independent producer like us. We have chosen a path of continual innovation so we can do more with less. Our work with IBM is the bedrock of this strategy."

– George Johnsen, Chief Technology Officer and Chief Animation Officer, Threshold Animation Studios

On Demand Business Benefits

- 30 to 50 percent reduction in overall production cycle time compared with traditional digital animation practices
- Improved budgetary control and faster time-to-market
- 20 to 30 percent reduction in lighting-based rendering time through the use of blade servers
- Avoidance of millions of dollars in upfront infrastructure expenditures
- 25 percent reduction in overall IT spending
- Tighter process control through instantaneous data-sharing capability
- Increased flexibility and creative control through real-time motion-capture-based animation process

“Completing animations in record time requires the flexibility that IBM solutions provide. Tivoli Identity Manager is a prime example. It helps ensure animators can quickly access authorized applications so they begin work on new projects without unnecessary delays.”

– George Johnsen

foundation of the best digitally animated films. The message audiences have begun to send more clearly is that quality matters, and failure to deliver quality can easily mean failure at the box office.

Bigger isn't better

Changes are also afoot in the creative and business side of moviemaking, driven largely by the factors discussed above. The short history of modern digitally animated films has thus far been marked by huge budgets, animation staffs in the hundreds and long, *long* production cycles. Call it the “blockbuster model,” built on the basic business assumption that a huge upfront enterprise will produce an even bigger return in the end. In this respect, large digital animation studios can be likened to pharmaceutical or car manufacturers in terms of the magnitude—and the strategic stakes—of their investments in new products. To a large extent, this reflects the labor intensity of the traditional “keyframe” animation process, under which an artist at a workstation meticulously creates a series of separate frames to illustrate action. The fact that with this method a 2½ minute sequence at 24 frames per second involves 3,600 frames and can take up to six months gives an idea of the scale of the effort. The backend of the animation process, in which animation code is translated or rendered into viewable frames, is also resource-hungry, requiring extremely large amounts of processing power.

While that's the experience to date, a mix of business, market and creative factors has sown the seeds for fundamental change in the animation industry. In the foreground of the industry, major digital animation studios are coming to realize that lessening their risk and their time-to-market will require them to make movies faster, cheaper and more flexibly, while maintaining—or even improving on—their quality. Given the long and durable record of innovation in the film business, it's no surprise that innovation has begun to provide a bridge to tomorrow's animation business. What is somewhat of a surprise, however, is that one driver of this innovation—Threshold Animation Studios (www.thresholdanimationstudios.com)—has emerged not from the industry's center stage but from the wings.

While innovation plays a small role in most studio strategies, Threshold's entire business model is built upon it. Employing fewer than 200, the upstart studio broke into the animation business by overcoming one of its most potent barriers to entry—the need to invest in a costly infrastructure to handle the massive processing requirements of rendering—through an innovative agreement with IBM to deliver computing capacity on demand. This gave Threshold access to virtually unlimited processing resources, while enabling it to avoid the large fixed

investments its competitors had made. While rendering resources are critical for any digital animation studio, they are especially critical for Threshold due to the groundbreaking nature of its current project, *Foodfight!*, a film set in a super-market after closing time. With over 300 buildings intricately designed in 3D, thousands of “extras” and more than 100 speaking characters, the film posed an unprecedented rendering challenge. Threshold’s flexible procurement of processing capacity at the back end of its animation process shows that innovation can level the playing field with the larger, resource-rich studios. But that was only the start.

Enabling a quantum leap in animation

Threshold’s truly revolutionary innovation—likely to produce the biggest impact on industry practices—is in the front-end of the animation process. It was an innovation born of necessity. When Threshold set out to make *Foodfight!*, it realized it was breaking new ground in terms of animation complexity, from its sweeping “marketropolis” set to its many characters. Threshold realized that achieving such an order-of-magnitude increase in complexity—on time and within budget—would be impossible without a fundamental change in the animation process. The answer lay in an animation technique known as motion capture, under which the movements of live actors are captured via fiber optic sensors and converted directly and in real time to 3D digital files. Importantly, the key thrust of the innovation was not in the use of “mocap” *per se*. It was instead in the way Threshold took a technology that had thus far played a peripheral role in the animation business, customized and enhanced it and—most importantly—made it the foundation of a new model of moviemaking.

Accomplishing this shift required Threshold to apply a mix of ingenuity and infrastructure. Its most basic challenge was to adapt traditional mocap—which is best at digitally capturing the nuances of human motion—so it can be applied to the wide range of non-human characters that dominate the cast of *Foodfight!* The second key challenge was to put in place the considerable processing capacity required to translate and render the motion data in real time—in short, moving horsepower to the front of the process. Threshold’s answer was to leverage its close collaboration with IBM to create a series of powerful algorithms that enabled it to use live human actors to accurately generate core animation data for all characters. To handle the tremendous increase in processing resulting from real-time animation, Threshold extended the on demand computing model that had powered its backend rendering to its front-end processes. The result is a first-of-its-kind real-time animation system, which—by unshackling Threshold from the process constraints of orthodox animation practices—has delivered revolutionary improvements in throughput and efficiency.

Key Components

Software

- IBM WebSphere® Portal
- IBM WebSphere Application Server
- IBM DB2®
- IBM Tivoli® Identity Manager
- IBM Tivoli Backup Manager

Hardware

- IBM BladeCenter®
- IBM IntelliStation® workstations
- IBM TotalStorage® SAN products

Services

- IBM Media and Entertainment and Digital Media Solutions
- Deep Computing Capacity On Demand Center (Poughkeepsie)

Time frame

- Rendering infrastructure: 6 months
- Motion-capture solution: 9 months
- Infrastructure management: ongoing

Why it matters

By taking a fresh look at the most established animation processes and fundamentally transforming them, upstart digital animation studio Threshold Animation Studios achieved a quantum increase in its animation throughput while at the same time improving both quality and creative flexibility. Working with IBM, Threshold made innovative use of the motion-capture animation process to enable real-time rendering, thus giving the director more interactive control over the process. Threshold’s innovative animation processes—combined with a global collaboration capability—give it the speed and cost control it needs to compete with the giants of the business.

Threshold's computing capacity draws from a pool of thousands of IBM BladeCenter processors located at the IBM Deep Computing Capacity On Demand Center in Poughkeepsie, as well as another nearly 1,000 processors located on its premises used to support the front-end animation process. The fast, flexible storage component of the solution includes IBM TotalStorage SAN products, while IBM DB2 is used to manage its database of millions of animation objects. Threshold's animators use IBM IntelliStation workstations.

A new level of creative control

Threshold's story would be compelling enough were it simply about shortening the animation cycle by transforming the process. Indeed, by moving to a real-time animation process, it expects to cut its cycle time to just 12 months, less than half that of traditionally animated films. But the effects ripple much further into Threshold's creative capabilities. The root enabler of enhanced creative control is the inherent flexibility of Threshold's mocap-based process. For example, in keyframe animation, after the storyboards and animatic are complete, the process by which scenes are conceived, drawn and rendered is marked by relatively little of the interactive director involvement that characterizes live-action films. What's more, the fact that any changes to a keyframed scene (such as a new camera angle) essentially require it to be rebuilt from the ground up puts a damper on the kind of experimentation and spontaneity that can make a film stand out.

Threshold's mocap solution changes all that. The new system enables the director to view a digital scene in sync with the live actors generating it, and the director can act more like...well...the director, notes George Johnsen, Threshold's Chief Technology Officer and Chief Animation Officer. "By freeing ourselves from traditional pipeline methods, we're able to take a more interactive and entrepreneurial approach to animation," says Johnsen. Such a dynamic approach makes it essential that changes can be shared instantaneously. To enable this, Threshold is employing IBM WebSphere Portal to synchronize the animation process across its worldwide animation team.

In the rough and tumble of the movie business, Johnsen sees his company's embrace of process innovation as less a choice than a strategic necessity. "There's no time to sit on your laurels in the digital animation business—especially as an independent producer like us. We have chosen a path of continual innovation so we can do more with less," says Johnsen. "Our work with IBM is the bedrock of this strategy."

For more information

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