



Case Study

Intel® Xeon® Processor

Service Providers & Media

High-Performance Computing



CREST ANIMATION STUDIOS LIMITED

Animation Reaches a Crest

Crest Animation Studios drives rendering to new heights with the Intel® Xeon® processor

The success that award-winning Crest Animation Studios (Crest), based in Mumbai, India, enjoyed over the past decade was such that it has become one of the most sought after animation studios in Asia. The company's impressive credentials have brought it increasing business in both the domestic and international markets. Today, Crest is one of the largest producers by volume of Computer-Generated Imagery (CGI) for the broadcast industry. Crest's success and increasing business from international markets also translated into higher scene-complexity demands and shorter delivery times for their work. To handle the increasing demands, Crest developed a High-Performance Computing (HPC) Cluster system featuring the Intel® Xeon® processor to handle the high demands of image rendering for their work.

Challenge

- **More business, less time.** Increasing international business, higher complexity media content were resulting in Crest having to produce more content in less time.
- **Improve computing efficiency.** Lower the high cost of rendering and shorten the content creation cycle time.

Solution

- **Expand Render Farm.** Deploy additional HPC cluster solution using the 64-bit Intel® Xeon® processor to Crest's render farm.
- **Custom build HPC software.** Develop customized script routines, Open Source grid engines and stripped-down Linux* kernels to manage workflow and rendering in the HPC cluster.

Assessing the Situation


Today, the talented employees at Crest Animation Studios (Crest) are enjoying their work, churning out CGI sequences used in animated films, cartoons, animated television series, and commercials that are produced on the company's render farm consisting of high-end servers featuring Intel Xeon processors. The render farm keeps up with the buzz of creativity of Crest's employees, turning out completed work to meet their customer's tight deadlines.

But, it was not always this way.

Previously, talented designers, animators and modelers at Mumbai-based Crest Animation Studios (Crest) felt their creative efforts were being stifled by the lack of appropriate computing infrastructure. Simple scenes that take up a few minutes on the TV screen would take three or four hours to render, while complex scenes would take up more than 15 hours, sometimes

"It has given lots of comfort for our organization using Intel®-based servers because of cost factor which leads to affordability. This adds up to our strength of pitching for more challenging orders and planned future expansions."

Vinayak Purohit
Chief Financial Officer
Crest Animation Studios



Crest took full advantage of the Intel® Xeon® processor architecture to increase production quality, reduce rendering times, and improve customer satisfaction.

stretching to an agonizing 24 hours to render. Even more frustrating, very complex scenes would fail to render, forcing the animators to remodel the scenes for less complexity. To work around the situation, they would create scenes in the day, render them overnight, and resume work the next morning.

While India is still largely associated with strengths in 2D animation, Crest—one of the early entrants and a pioneer in the business—had gone ahead and focused on 3D. 3D animation is done on computers with specialized 3D software. Creating 3D animation is very demanding in terms of processing and rendering power. And Crest's success in the international market was bringing in more work which translated into increasing pressure to deliver more jobs on time. "We are getting more job orders and we have to render more scenes per day to meet our deadlines," says Crest Technology Head, Krishna Prasad.

To facilitate increasing demand, increasing rendering speed is critical. Rendering is a process of creating images from three-dimensional models that takes

into account geometry, camera viewpoint, surface texture, and lighting information. Rendering times for individual frames for an animated film or video can vary from a few seconds to an hour or more for complex scenes. A typical 30-minute cartoon running at 25 frames per second would contain a total of 45,000 frames—a lot of images to render.

"We have several high-end servers to render these scenes, but the additional load made rendering times very slow. Some complex scenes can take hours or even days to render, and if a problem crops up we have to start the whole process again to re-render the scene," says Prasad.

It was clear that Crest needed to augment its render farm to handle the challenges of meeting international deadlines, and the pressure to do so was mounting as the company was already receiving orders for new jobs. Prasad bought into a network distributed rendering solution to automate the distribution of rendering processes but soon discovered that performance was slower than rendering on a local workstation. Crest then tried out another network rendering solution and although performance increased, it "was not up to the level to meet our project requirements," as Prasad puts it.

Prasad decided they needed to take yet another approach to the problem as "the solution was not readily available". He says, "Many studios use one form of technology or another for high quality rendering, but these are all proprietary. So the only way for us was to innovate and come up with our own approach to rendering based on High-Performance Computing."

Delivering the Solution

To achieve the goal of improving rendering performance, Prasad set out to design a High-Performance Computing (HPC) clustering system optimized to suit Crest's needs.



"We are using state-of-the-art hardware. Today, all our workstations are 64-bit, my renders and my nodes are all 64-bit architectures."

A.K. Madhavan
CEO
Crest Animation Studios

Spotlight: Crest Animation Studios Limited

- While India is largely associated with 2D animation in the animation industry, Crest Animation Studios has surged ahead into 3D computer generated imaging, joining global giants such as Pixar and Dreamworks in creating 3D animated feature films.
- Crest has won acclaim in its field, including the recent Annie Award nomination for "Best Animation Television Production for Children" in which the company produced the computer animated TV series, "Jakers! The Adventures of Piggley Winks" for its US client.



“Intel gave us the advantage of affordability with performance and seamless compatible integration with the existing setup to address more productivity in less time.”

Krishna Prasad
Senior Manager, Systems
Crest Animation Studios

Prasad worked with Kushal Shah of Jay Kushal Exports Pvt. Ltd., which is an Intel® Premier Provider to deploy, implement and support the HPC cluster system for Crest. Intel Premier Providers are preferred vendors of Intel® technology-based solutions who have undergone rigorous training and industry certifications, and have demonstrated ability in solution implementations.

Working with Kushal, Crest conducted a series of evaluations and stress testing of servers based on the 64-bit Intel® Xeon® processor and came away satisfied that this solution would meet their needs. Kushal was willing to provide Crest with the required servers with a price versus performance ratio that Prasad found hard to resist. The open standards-based architecture of the Intel Xeon processor-based servers were also compelling factors—Prasad and his team would be able to customize applications and routines that would take advantage of the power of the processor to optimize performance to the fullest possible.

Crest installed 176 servers—which they call Render Units—into their render farm. Each render unit features dual Intel Xeon processors running at 3.2 GHz with Intel® Extended Memory 64 Technology (Intel® EM64T)¹. The Intel Xeon processor offers an industry standard architecture that is well supported by system suppliers and software vendors. Intel

EM64T enables 64-bit computing for Crest’s servers when combined with supporting software, and improves performance by allowing the system to address more than 4 GB of both virtual and physical memory.

Crest grouped the 176 render units into its server farm into clusters with the group size being determined by individual project requirements. Each cluster has a master node for job scheduling and a storage node for storing the files required for rendering, as well as the rendered output. To manage the clusters, Prasad and his team developed their own system called RenderMAX*, which is a combination of scripting routines, Open Source grid engines, and stripped-down Linux* kernels. Crest uses Autodesk Maya* software, an integrated 3D modeling, animation, effects and rendering solution. Maya was also integrated into the grid clusters together with RenderMAX. Maya is a multi-threaded software application that makes use of Hyper Threading Technology (HT Technology) supported on the Intel Xeon processor, which along with Intel NetBurst® microarchitecture, increases compute power and throughput for today’s applications. To Crest, the Intel Xeon processor architecture makes an ideal deployment of multiple servers configured as clusters or grids of pooled computing resources.

Key Technologies

- 176 dual-processor servers or render units featuring the 64-bit Intel® Xeon® processor accelerate the rendering of computer generated images.
- Intel® Extended Memory 64 Technology (Intel® EM64T)

Integral Answers

- Jay Kushal Exports worked side-by-side with Crest to deliver a reliable, high-performance solution.
- Despite the massive amount of computational power and 24x7 uptime requirements, the robustness/reliability of the system is such that Prasad says, “we’ve not had a single processor failure to date.”

The work process is easy for the animators. They copy their work files to the storage node from the central SAN storage and schedule the job using the RenderMAX* job submission web interface. This interface also facilitates monitoring status of running jobs, job rescheduling, job cancellation and reporting.

"It took us almost two months of coding and scripting to achieve what we wanted," says Prasad. But the results are well worth it. To calculate the total power of the HPC cluster, Prasad ran the LINPACK Benchmark* which is widely used as a yardstick of performance for HPC systems, and "the performance is above 690 GFlops," he says. "Rendering scenes that used to take a painstaking four hours are now down to an unbelievable eight minutes."

The increase in rendering speed has made a substantial improvement in the work Crest can deliver to its clients. Completing jobs on time is one thing, increasing the capacity to produce more work is another, and Crest is now in a better position to take on more demanding jobs from its international clients. Prasad observes, "There was a time when we used to output no more than 44 minutes of animation episodes a month. Today, we are producing over 200 minutes a month."

With the business expanding globally, and a state-of-the-art render farm, Crest is all set to expand their offerings and looking forward to working on full-blown 3D animated movies as well.

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Return on Investment

- The new HPC cluster powered by the 64-bit Intel® Xeon® processor with Intel® EM64T¹ provides outstanding performance that makes it possible for Crest animators to shorten rendering time significantly, reducing job cycles and improving deliverables.
- Feature production has improved significantly, "from 44 minutes of animation episodes a month to over 200 minutes a month," observes Prasad.
- Additional rendering capacity enables Crest to develop higher-complexity work, especially for emerging content on High Definition (HD) TV that requires three times the resolution of regular television.
- Crest's enhanced capabilities and its state-of-the-art rendering facilities allows the company to enter into the global market dominated by big players such as Pixar Animation* and Dreamworks*, a major achievement for an India-based company.



Solution provided by:

Jay Kushal Exports Pvt. Ltd

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¹ 64-bit Intel® Xeon® processors with Intel® EM64T requires a computer system with a processor, chipset, BIOS, OS, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel EM64T-enabled OS, BIOS, device drivers and applications may not be available. Check with your vendor for more information.

