SANTA CLARA, Calif., June 27, 2014 – Used for the first time in newly released “How to Train Your Dragon 2,” DreamWorks Animation* has taken the wraps off of their Apollo platform. Two key elements of that platform, PrEMO and Torch, were the result of a substantial collaboration between Intel and DreamWorks engineers. The two tools are built-from-the-ground-up animation and lighting applications that give animators instantaneous feedback on changes made to a scene. Artists can now work in real time with everything turned on and at the highest resolution possible. Previously, animators had to wait anywhere from several seconds to many minutes for their change to render on a separate machine.

These tools were built to ensure all aspects of the hardware and software were optimized to take advantage of the power of each core in Intel’s processors. PrEMO vastly improves the animation process by re-architecting the software for SIMD optimization and parallelization. Torch, a production lighting tool, allows artists to bring focus to characters and scenes by adding, removing or re-positioning lights to bring a unique look and feel to DreamWorks movies.

The engineers used the most advanced algorithms and exploited huge advances in the inherent but never previously exploited parallelism in animation and lighting. Because of this, DreamWorks animators can define new characters and character effects and portray them in ways unimaginable before. And they can deliver results faster than ever before.

**Animation Boosts with PrEMO**

Prior to PrEMO, DreamWorks artists did see 20 percent performance gains because of improvements Intel made to each generation of its processors. But previously existing software for animation did not take full advantage of the multiple cores and threads available in the processor. Achieving orders of
magnitude performance gains required a more substantial re-architecture.

Specifically, Intel and DreamWorks engineers re-architected the character execution engine for the best parallelism using the Intel® Threading Building Blocks. This problem motivated the design of a new low-level scheduling library that was used as part of the core graph evaluation engine. The engineers also developed and implemented a sophisticated animation caching system and improved PrEMO's memory efficiency.

The result was an application that could maximize execution in parallel on separate threads, squeezing all the power possible out of Intel's hardware.

Inside of the individual work steps executing on a thread, the team was able to use the Intel® C++ Compiler to generate SIMD code to further improve performance. With these new tools, the hardware and software is taking full advantage of each of the 24 cores in the machine. This optimization allowed for an order of magnitude bump in performance improvement. The Intel® Xeon® processor’s powerful core with large thread counts and large caches provided a platform to scale performance to interactive levels.

**Lighting Improvements**

Intel further contributed to improvements in the lighting application Torch, a production lighting tool that supports interactive lighting and asset management. Torch enables DreamWorks artists to change or modify lighting in animated scenes throughout the creation process. Intel developed a workflow in the Torch tool that provides interactive lighting using the Intel Embree photo-realistic ray tracing solution both on Intel Xeon processors and Intel® Xeon Phi™ co-processors.

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