Introduction:

SimLab Soft started a new department beginning of 2011 to look over developing a new rendering technology that would complement popular 3D scene building and sharing tools integrated in its flagship product, SimLab Composer.

Efforts focused on a clear goal: to develop a powerful and modern rendering technology with real time rendering capabilities, superior image quality, output fidelity, and rendering speed.

The new department investigated different rendering technologies and hardware requirements (CPU vs GPU) to decide on the best path for the new engine.

Based on multiple studies, SimLab arrived to the conclusion that CPU rendering is the best choice for SimLab Soft and its user base. The remainder of this post clarifies the main points taken into consideration to arrive at this specific conclusion.

Why CPU rendering is the smart choice?

Points from user experience:

Software that runs on your machine:
When reviewing hardware specs needed for most GPU renderers it becomes obvious, the user needs a special hardware, and many times the hardware should be created by a specific manufacturer, while CPU renderers can reliably run on any hardware. We wanted to create software that runs on our user's machines, instead of forcing them to buy new machines with specialized hardware that can be many times more expensive than the advanced software they are using.

Hardware choice:
User experience team examined different types of machines used by our users, and found a large percentage of our users using notebooks, Mac machines, all in one machines, and windows tablets, were it is almost impossible to upgrade hardware to accommodate new video cards needed to run GPU based renderers, so in many cases even if the user was willing to upgrade the machine, this was unfortunately not a feasible option.

Video card life cycle:
The fast GPU life cycle, were a top video card becomes old in 1 or 2 years, and not capable of supporting the latest GPGPU code, made this option less appealing, as we do not want to ask users to change hardware each year or two.

In addition, lack of backward compatibility in GPU world means that a user will have to wait for some time before getting his latest and greatest video card supported in SimLab composer (or any GPU-based renderer), since that in itself would require a considerable development time.

Multiple machines:

We found that many SimLab Composer users utilize 2 separate machines: a notebook and a desktop. This means that even if the user decided to buy a specialized workstation for rendering, he also needs a technology that can run efficiently on his notebook.

CPU rendering enables the user to start and test using a notebook while on the run, and to generate even faster renderings on the workstation once available.

Points from software development

Streamlined development: Using same tools, IDE, and widely used syntax, development of new features is mainly an R&D problem with minimum programming overhead. GPGPU code, on the contrary, would take considerable effort to be optimized on GPU, and might fail to run as efficiently on a different GPU generation, let alone a different GPU manufacturer.

Add to the above the fact that in many cases, adding a simple feature to a GPU based code would slow down its overall performance due to thread divergence issues.

Benchmarking: SimLab Soft was able to achieve real time results, while keeping complex models responsive even on common notebooks.

Since SimLab revealed the new rendering engine, we did not receive a single complaint about lack of performance compared to GPU rendering, the claim of GPU performance superiority is proven to be wrong.

Handling large models :
With 8 GB of memory, users can easily use CPU rendering for rendering models with millions of polygons and large rendered image resolutions. If you need more, all you need is to simply install more memory to your machine.

Conclusion

SimLab Soft introduced CPU based real time rendering in SimLab Composer 2014, which was released in June 2013, we are happy with this direction, and we are confident that we made the right choice to serve our users. With our current research on even further enhanced CPU\SIMD utilization, building on Intel's Embree technology at its core, and including specially compiled code for latest CPUs; we are aiming to deliver a single solution that gives our users unparalleled real time experience and top quality renders of complex scenes on both low end machines and powerful workstations.