

3D animations rendering using MentalRay

Challenge: Mental Ray is a high performance, photorealistic rendering software which produces images of unsurpassed realism from computer-aided design and digital content creation data, by relying on patented and proprietary ray tracing algorithms. Mental Ray combines full programmability for the creation of any imaginable visual phenomenon, with setup-free interactive photorealistic rendering in one single solution.

The application is used as the primary rendering engine of the AutoDesk Maya application.

Autodesk Maya is a 3D animation software that delivers an end-to-end creative workflow with comprehensive tools for animation, modelling, simulation, visual effects, rendering, matchmoving, and compositing on a highly extensible production platform. Whether you work in film, games, television, advertising, publishing, or graphic design, Maya offers state-of-the-art toolsets, combined into a single affordable offering designed to help meet today's demanding production requirements. Maya 2012 delivers new toolsets for pre-visualization and game prototyping, extended simulation capabilities, and improved pipeline integration.

Rendering of Maya 3D contents is a computationally very expensive process, solving it with a simple PC can last weeks and months in a more complex project. As the rendering of individual frames is independent from each other, porting the application to the EDGI platform can shorten this time significantly.

The primary user community of the application are the students and researchers of the University of Westminster. Mental Ray is actively used in teaching students on Computer Animation and Computer Games courses. Students typically create large end of year projects where significant amount of animations need to be rendered. Offering tools that allow image processing and rendering jobs to be completed quickly could help students in achieving more effectively their learning objectives. Taking rendering results faster would give the opportunity to researchers, academics and students to experiment with more parameters that may allow better quality end result and thus better understanding of the content under investigation.

The primary user community aimed utilising the software on the University of Westminster Local Desktop Grid. As Mental Ray requires licences, the desktop grid application was targeted to run only on laboratory computers that are fully licensed for the software (this means two 20 seater labs at the moment). The user community also requires a high level user interface that hides the complexity of the underlying infrastructure and middleware from them.

The University of Portsmouth, where an institutional level local desktop grid is currently being set up, also expressed its interest for deploying the desktop grid enabled Mental Ray renderer.

The Mental Ray and AutoDesk Maya applications are widely used by media professionals and artists from all over the world. The potential user community is very large. The EDGI enabled version of the application can be potentially interesting for smaller companies and individuals who cannot afford setting up and running their own rendering farms. These institutes could create local desktop grid installations and run rendering tasks on multiple desktop PCs.

MentalRay was ported to BOINC-based desktop grids by the EDGI project. The work inside IDGF-SP (in collaboration with the SCI-BUS European project) concentrates on setting up rendering facilities that could be used as teaching tools in higher educational institutions. The portal interfaces are developed by SCI-BUS, while the desktop grid applications are further developed in IDGF-SP.

Solution: The original porting of the application has been carried out in the EDGI project. During IDGF-SP, required further developments were made in the application to make it suitable to be executed in complex scenarios from a custom made GUI for teaching purposes.