



GreenLight Technical Report

2010

CineGrid

## **Tom DeFanti: CineGrid Multi-Media Activities**

### **Research Activities**

One of Project GreenLight's application drivers is the area of multi-media. Of particular interest is the energy efficiency of next generation high definition mixed media development and collaboration environments. Our instrumented servers, network switches, display clusters and display environments offer ways to measure the storage, transmission, duplication, rendering and display of mixed media data at very high resolutions and frame rates. In collaboration with the CineGrid project, we are measuring and optimizing techniques for the above with a goal of maximizing work per watt. Some examples and initial measurements were seen in preceding Section 2.A.8.

CineGrid [<http://www.cinegrid.org>] is a research community with the mission "To build an interdisciplinary community that is focused on the research, development, and demonstration of networked collaborative tools to enable the production, use, preservation and exchange of very-high-32quality digital media over photonic networks." Members of CineGrid are a mix of post-production facilities, media arts schools, research universities, scientific laboratories, and hardware/software developers around the world connected by one or more up to 10 Gbps networks. Since 2005, CineGrid members have conducted pioneering experiments in digital media production and post-production, network streaming delivery, exhibition, and remote collaboration. These experiments created media assets that CineGrid members wanted to access over time, which meant they had to be stored somewhere, managed to insure access and preservation, and transferred upon request among members scattered around the world. The first CineGrid Exchange storage nodes at UCSD/Calit2, University of Amsterdam and Keio/DMC were established to support this requirement. Over time, as the number and size of storage servers has increased, and the number and variety of digital media assets has grown, the Cinegrid Community has seen a need to systematically combine and integrate existing resources in order to provide a scalable solution for the storage of digital assets.

Just as distributed rendering architectures have been adopted by cinema post-production facilities to deliver visual effects shots on tight schedules, the trends in cloud computing (private and public) for virtualization of servers, storage and high-speed network infrastructure can be adopted for distributed digital content creation, distribution, library and archiving services. During Year 2, Project GreenLight has been providing an instrumented storage, delivery and display environment for CineGrid testing and prototyping. The current storage available to mixed media GreenLight projects is 66TB. In Year 3 we will be working on storage design techniques, mixed (magnetic and electronic) storage architectures and caching configurations to optimize throughput while maximizing mixed media processing efficiency. GreenLight instrumentation and tools are being used to provide the mechanisms to optimize work per watt in high definition video streaming and distance collaboration.

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