

perspective, if you give this tool to a person who can just move the camera around all our assets, they can make 'machinema' that is close to what you get if you have ILM (Industrial Light & Magic, George Lucas' special effects company) at your disposal."

This newest wave of cinematic entertainment has been dubbed Cinema 2.0 — where users can have fully self-determined entertainment experiences in wildly realistic 3D environments.

"The Cinema 2.0 milestone is comparable to other major evolutions of film: sound, color, cinemascope, 70mm, THX, stereoscopic 3D, IMAX," says Urbach.

"Cinema 2.0 means truly interactive cinema, where the experience of watching a film is bridged perfectly with real-time rendering for a dynamic and engaging experience. The cornerstone of this is not limiting the artistic process, and AMD innovation now helps make that possible."

The combination of OTOY's real-time rendering capabilities along with LightStage, a revolutionary 3D capture technology (another soon-to-be-released project of Urbach) offers computer-based artists and consumers

major advances in character realism — skin and hair that reflect and absorb detailed subtleties in lighting. "You'll have a whole city street with people walking by and they'll all just look completely real. It's a quantum leap really over what you see in films today," says Urbach.

Richard Huddy (Worldwide Developer Relations Manager with AMD's Graphics Product Group) adds, "Imagine going to the opening of a movie and upon getting home being able to play a game that looks and feels absolutely identical — right down to the character models and sets."

Hollywood has already taken notice. Urbach has a number of projects in the works, including an upcoming CG feature with Warner Brothers that will breathe life into the superheroes painted by comic book legend Alex Ross.

According to Gilder, Urbach's influence on home entertainment will make a profound cultural impact. "There will be increasing migrations between the various media. Television as we know it will die and be displaced by some convergence of Cinema 2.0, 3D games, and Internet 2.0."

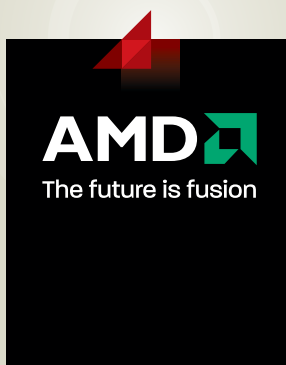
For more information about OTOY, visit: www.otoy.com

About AMD

Advanced Micro Devices (NYSE: AMD) is a leading global provider of innovative processing solutions in the computing and graphics market. AMD is dedicated to driving open innovation, choice, and industry growth by delivering superior customer-centric solutions that empower consumers and businesses worldwide.

For more information, visit <http://www.amd.com>

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It's just like reality only
sharper.

Jules Urbach and OTOY are leading
a graphics revolution, in real-time.

Jules Urbach was designing video games while still in high school in Los Angeles, back in the early 90s. After graduation, he passed up a spot at Harvard to work full time developing new gaming and online technologies.

Today, he's known as a pioneer in the gaming industry — a visionary with a reputation for finding groundbreaking solutions to seemingly impossible problems.

The AMD logo is displayed on a black rectangular background. It features the letters "AMD" in white, followed by a green square icon containing a white stylized "A" shape. Below the logo, the tagline "The future is fusion" is written in white.

AMD
The future is fusion

“The hardware solution that AMD’s providing us right now is the only one that we can see that’s able to do this. The GPUs with the CPUs with the bus, all together, enable us to make this thing work.”

—Jules Urbach, Founder, JulesWorld LLC

The Rise of OTOY

After years of developing tools and content for the likes of Microsoft®, Macromedia, Disney, Time Warner, and Cisco Systems, Urbach launched his own venture in 2004, based on a simple but revolutionary idea. What if you could take all types of graphics-rich content — like 3D games and video — and serve it up in real-time to just about anyone, anywhere?

To many, this might sound impossible. Previously, only high-end PCs with fast processors, maxed-out RAM memory, large hard drives, and expensive graphics cards could handle the demands of full-resolution media. But Urbach found a way around this.

He called his solution OTOY — an 800k engine that works as a virtual machine within a Web browser. OTOY can scale to instantly render and display graphics-rich content like 3D games, interactive landscapes, and full-resolution video on pretty much any device running a current Web browser — from desktop and notebook PCs, to cell phones and handhelds, to gaming consoles and set top boxes. Users don’t even need to download a plug-in. The graphics rendering all happens in real-time on OTOY’s servers.

This server-side rendering supplements a high-end graphics card (also known as a Graphics Processing Unit or GPU) by providing a formidable compute engine to compress/decompress high-res images and create a richer, more cinematic experience for viewers.

OTOY does real-time rendering at 30 frames per second or better on the server side. Because of its unique optimizations, the graphics rendering process can happen about 10,000 times faster than the rendering at top 3D animation and special effects studios using CPUs for offline rendering, and can cut the cost of animating a CG film by between 40 and 70 percent.

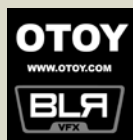
It might take up to 40 hours and a server farm to render a richly detailed, layered frame at Pixar or Industrial Light & Magic. That same asset can be produced by Urbach’s team on a single server in what amounts to real-time.

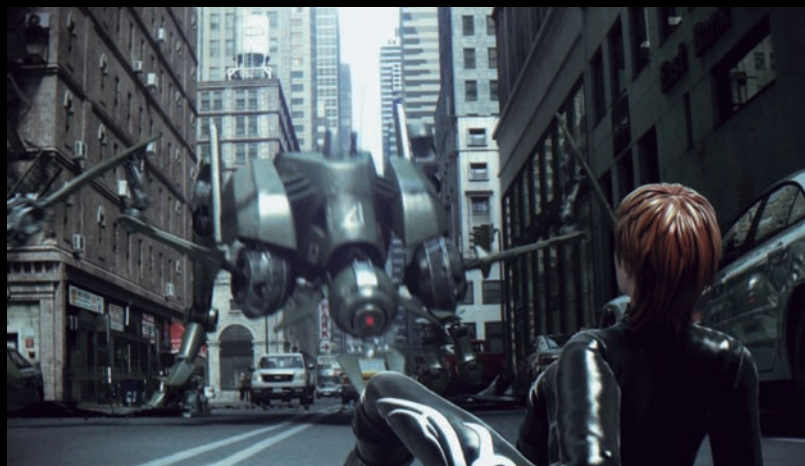
And the server that Urbach relies on to deliver OTOY’s unbelievably realistic, real-time content is built on AMD’s desktop gaming platform, codenamed *Spider*.

A Platform Designed for The Ultimate Visual Experience™

The initial tests Urbach has been running have all been on AMD systems starting from the *Spider* launch in November of 2007. The machines currently running OTOY include an AMD Phenom™ X4 Quad-Core processor, a set of four ATI Radeon™ HD 4800 Series GPUs, and an AMD 790FX chipset.

“While the GPUs are obviously critical for the rendering part, I’d say that the fact that the system as a whole works so well is really important,” Urbach says. “The bus speed on the *Spider* platform





was fast enough for us to really get all four video cards working at a speed for us to use the CPUs to compress all these different streams and send them out to the client.”

“All the pieces — the motherboard, the CPU, and the GPU — all together, really deliver something that we didn’t have before. It’s really cool.”

Graphics Power to the Next Level

In the same way that digital video cameras, computer-based video editing software, and online distribution tools like *YouTube* have changed our cultural landscape by making video content creation accessible to the masses, OTOY effectively democratizes a baseline of high-performance graphics for basic PC users and handheld devices that may lack a discrete graphics card.

As Urbach puts it, “Not everyone has cards like that. So we’re giving that experience to people who don’t have that hardware yet.”

“We’re also working pretty heavily toward having a tandem rendering solution where people with an AMD GPU can get even higher quality than those without it.” For PCs with a discreet GPU card, OTOY becomes a key to unlocking realms of cinematic graphics wonder that have never been seen before.

George Gilder (technology analyst, writer, and former Editor in Chief of the *Gilder Technology Report*) says “From the very beginning

Jules has had the advantage of writing software that directly addresses the instruction sets of graphics processors and that hugely accelerates all these graphics functions that increasingly dominate the Internet.”

Urbach thinks the graphics horsepower behind OTOY can even change the current norm of buying and loading media. “If you think about the way that games are delivered today, you have to buy a DVD or you have to download something, and that’s a really different experience from just opening up a Web page and within a split second playing the game. So, there are a lot of possibilities in terms of how content’s delivered, using a server-side system like this.”

OTOY makes a cinematic user experience affordable and accessible to just about anyone, anywhere. Plus it opens up worlds of possibilities for unbelievably realistic interactive entertainment and user-created 3D content.

The Newest Wave: Cinema 2.0

But by far the most compelling aspect of this technology is that OTOY applications and media can be layered and mixed together by developers and users, in ways that defy the current limitations set by either Web content or traditional media.

“It’s meant to be a technology that can be used by developers and consumer end users alike,” says Urbach. “From the simplest