Technology is Revolutionizing the "Business of Show Business" with Digital Visual Effects and Distributed Networked Post Production

By Blake L. White

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No Longer the Odd Couple

So, let me start with the obvious -- Although filmmaking and distribution are still overwhelmingly analog, sequential, guild-based processes, Silicon Valley and Hollywood are no longer the "Odd Couple." For most of the past 17 years, computer companies, such as SGI, and software companies, such as Avid, Discreet Logic, Alias|Wavefront, Softimage, etc., have developed and supplied technology for the most innovative box-office blockbuster films. For the past seven years, EVERY academy award nominee (not just those that won) for visual effects used computer-based visual effects technology on the project. This year's winners – *Gladiator* and *Crouching Tiger, Hidden Dragon*, plus last year awesome *The Matrix* are the best-known examples of this combination of art and technology.

Technology has changed the economic model for filmmaking in the way it enables artists to depict people, places, and things that you couldn't visualize before. This technology for storytelling has enabled characters, such as the "Metal Man" in *Terminator 2*, all the characters in *Toy Story*, *A Bug's Life*, and *Antz*, the aliens in *Men in Black*, and the depiction of the central characters of *Godzilla*, *Dragonheart*, and *Twister*. It even enabled Sylvester Stallone's image to do some of his own stunts in *Judge Dred* and it allowed the producers of *The Crow* to finish the movie after Brandon Lee's tragic death. It enabled places of the imagination to be visualized and places where a camera isn't practical to become accessible, such as Gotham City, underwater in *Crimson Tide*, the takeoff of *Apollo 13*, trains passing each other in a tunnel in *Mission Impossible*, and the planetary civilizations in the *Star Wars* prequels. It has enabled us to visualize things, such as the ship in *Titanic* and sandstorms in *The Mummy*. In all of these examples, technology is a tool - a digital palette - for some very creative and brilliant artists in their attempt to tell better stories.

It's Not Just for Films Anymore

But it's not just for films anymore. Digital visual effects technology is used in TV commercials, broadcast graphics, games, and real-time immersive theme park experiences. TV networks are using compelling 3D graphics to distinguish their look and feel from competitors. Advertisers are trying to capture that 4-second attention span of the average US viewer with eyeball-grabbing visual effects, as we have seen in the First Union Bank, Pepsi Man, and other innovative commercials.

The very same 3D technology that was used to create compelling characters in *Toy Soldiers* is used to create a new generation of 3D animation (cartoons in my generation) characters found in *ReBoot*. Developed and produced by BLT/Alliance (now Mainframe Entertainment) of Vancouver Canada, *ReBoot's* 3D models that were used to create the 3D characters, such as "Megabyte," were used to shorten their product development cycle for the "Megabyte" action figure toy. From September's weekly release on Saturday morning TV to late-October availability on the shelves of Toys R Us, technology is changing the way we merchandise and the cost of doing it.

News and sports production is undergoing a radical change in workflow and availability of raw material for editing and repurposing, based on the power of high-bandwidth networks and powerful servers. This technology even enables the on-air talent to call the shots and control what we see on TV. Real-time graphics technology is changing the economic model by melding the lines between editor/directors and talent.

Digital Media Management

But creation of characters, episodics, news, and sports programming is only the start. Computer-based media servers are the foundation of future digital studio infrastructures. Servers are tying previously separate departmental operations together. They are allowing movement from rigid linear operations to a collaborative work style.

Servers are changing the economics and power base of small multi-skilled crews and studios so they can develop content in a non-linear fashion. This lets them both compete and collaborate with the major studios (Pixar and its relationship with Disney is a good example). It also lets them find the single clip or animation sequence needed by the director among the 3-5 million digital files common among a fully digital feature.

Servers also change the economic model for news operations and enable simultaneous access to editable media. The Cable News Network (CNN), one of the largest and most profitable electronic

news and information companies and the world's most extensively syndicated news service streamlined its business and sharpened its competitive edge by implementing an Informix®-based media asset management solution on an SGI Origin video server.

This innovative application allows approximately 300 editors, writers, and producers to search and browse video from up to 40 simultaneous satellite feeds in real time and from their desktops. This application also analyzes more than 25 live video programs an hour, 24 hours a day. Each video program is designed to be viewable and its key frames searchable, which allows CNN staff to meet their stringent news deadlines. On a week-by-week basis, the system processes and indexes more than 12,000 video clips, key frames, and timecode-indexed textual information.

Following the implementation, CNN reported significant cost savings. The widespread accessibility of video assets allows employees to focus instead on critical tasks, such as research and consultation. In addition, stories benefit from more robust content, which has been assembled from diverse information sources.

CNN's media asset management application was awarded the Advanced Imaging Magazine Award. The developers -- Informix, Virage and SGI -- received the award in the Interactive Imaging and Communication category. In addition, the solution was nominated for a Computerworld Smithsonian Award.

From Local Workgroups to Global Networked Production and Commerce

So, where are these technology developments leading the industry? We believe that the power of networks and servers, when applied to digital media, will radically change the production workflow and economic model.

We at the intersection of the computer, communications, and media industries have seen this trend before. Twenty years ago, automotive and aerospace companies moved in this direction to allow teams of designers, engineers, plant operations personnel, and marketing staff to work together. Ten years ago, the software industry did the same, using CASE tools. Now, it's entertainment's turn to adopt a digital infrastructure and a non-linear development approach.

To that end, WAM!NET *(Wide Area Media Network)* partners with SGI, Sony, Alias|Wavefront, Informix, and other key technology leaders, and leverages the relationship with its major investment partner, MCI WorldCom, to offer an alternative network production infrastructure with a project-based economic and operations model for the media industry.

WAM!NET, Connecting an Industry

WAM!NET offers a turnkey, managed service, featuring high-bandwidth dedicated access, offered at fractional T1, T1, dual T1, and DS3 speeds. Even if users have different service levels they can transfer files to each other over WAM!NET. Compressed video (MPEG 1-2, DVCpro) encoding, transport, decoding, and desktop review are options that complement the service.

Production studios, broadcast networks, and their trading partners are connected to a WAM!NET hub via SGI-based customer premise equipment on WAM!NET's global backbone. In order to enable global collaboration and commerce, the company has over 20 hubs in North America. There are also hubs in the United Kingdom, the Netherlands, Germany, Sweden, Belgium and France. It has regional network operations centers in Minneapolis, Las Vega sand Brussels, Belgium.

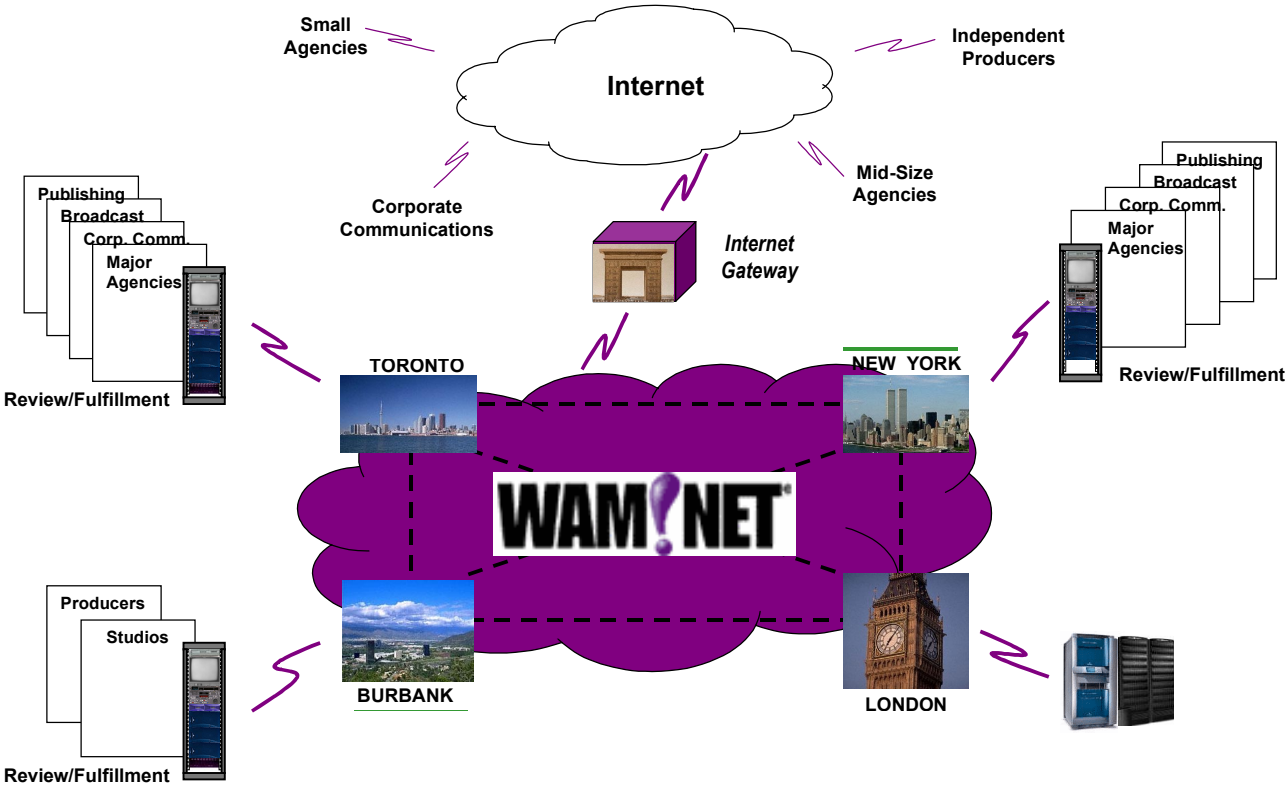
The WAM!NET service includes all the hardware, software, telecommunications connections to the network, installation, training and ongoing support. Studios and their trading partners don't have to deal with setting up and maintaining FTP sites.

WAM!NET is designed for mission critical work in the media industry. All transfers are guaranteed to arrive. Further, jobs are delivered at a guaranteed data transfer rate, important for tight deadlines, which are impossible to guarantee over the Internet. WAM!NET's private network has actively managed security systems that include firewalls between WAM!NET and studio's LAN.

WAM!NET also offers value-added services to help studios track and manage its transport of valuable content to partners. Electronic job tickets allow users to specify job data and all notes directly within a WAM!NET digital package. Its Customer Information System allows studios to track up to 90 days of transactions (sends & receives) and export this data to internal studio IT accounting software. CIS also allows customers to electronically set up their trading partners by requesting and approving addresses on-line.

Graphic courtesy WAM!NET

Network Production and Media Commerce with Affordable Connectivity



WAM!NET's Digital Media Management Platform

As the industry increasingly needs to create, manipulate, and distribute content in multiple formats based on multiple standards, re-working the original content will become prohibitively expensive, time consuming, and risky. A scalable, flexible, multi-purpose digital media transport and storage platform becomes essential to the studio's ability to develop once and distribute many times.

WAM!NET's digital media management platform provide various levels of WAM!NET services (on a statement-of-work basis) to content producers, managers, and distributors and their trading partners. It was designed and built in collaboration with SGI's Custom Engineering organization.

The platform is internally referred to as the MTD (Media Transfer Device) and provides various levels of service including:

- Connectivity from the customer's LAN to the WAM!NET network at T1 to DS3/OC3 and above speeds.
- Support for native file transfer between nodes
- Support for compressed video encoding, decoding, and review.
- Support for uncompressed video transfer between remote servers and review/playout from local servers
- Support for local media asset storage, management, browsing, and playout using third-party workflow applications integrated over the WAM!NET network to other servers and centralized storage and archive services.
- Support for local processor services, such as rendering, integrated over WAM!NET to centralized processor services.
- Support platform for customized workflow system deployment and application hosting.
- Centralized support of digital media asset servers over the secure managed network, while enabling access to the Internet via hosted gateway software.

Network Production Resources Provide Projects with Flexible and Scalable Capacity

With private, secure, managed global network capacity and with multi-user direct access (regardless of location) to digital media managed centrally and locally, most production studios will be able to work with the best creative and technical resources in the world. The advantages studios experienced from local area networks and local media servers can now be taken to the world at large. The animation suite or edit suite down the hall in a LA studio can be the animation house or post facility in London, as we recently saw with Ridley Scott's use of networking to allow "follow-the-sun" post production work on *Gladiator*.

However, there remains the issue of scale. Shops, small and large, bid on projects based on their production capacity. Production capacity is a function of capital budgets, payback, and sub-contract partner capacity. But what if studios could bid on jobs, not based on internal capacity, but assume they have almost unlimited capacity?

Networks enable central production capacity, with capital costs spread across the entire industry instead of being allocated to a single shop, to bring scalable resources seemingly in-house.

One example of project-oriented, expensed-based, flexible capacity is WAM!NET's Render-on-Demand service (ROD!). ROD is a distributed rendering global job controller that provides access

to hundreds of SGI processors and massive amounts of storage over WAM!NET's high speed privately managed secure network. The central ROD! system is housed in WAM!NET's Eagan, Minnesota headquarters data center, formerly the Cray Supercomputer Center, a facility no stranger to highly secure government projects. MAYA 2.x, Softimage Mental Ray, and Pixar Renderman services are available. The center uses an ASP (Application Services Provider) model, similar to those found in the Internet services industry, and stands ready to work with large and small studios for production spikes or ongoing production needs.

Photo courtesy of WAM!NET

Redefining Value Based on Results

Server-based solutions are not "off the shelf." They inevitably require customized software development according to the unique needs of a studio's company's workflow. This requires highly skilled, industry-experienced, and committed human resources to understand studios' needs, analyze the business case for change, suggest new business processes, design and build the solution, train the system users, support and service the solution, and take responsibility for managing the entire effort. To this end, savvy technology vendors have developed working relationships with globally capable "Industry Smart" system integration and consulting partners such as SGI Consulting, Sony Data Products, Informix Professional Services, BBC Resources, Ltd., and Booz-Allen & Hamilton to provide high-value intellectual capital and services to the industry to complement the power of the technology.

The important point about this is that professional services consultants listen to the customers' needs and focus on enabling their core business -- creating and making money from content -- instead of technology for technology's sake or the minutia of implementation details.

Technology; Revolutionizing the "Business of Show Business"

Production studios and broadcast networks are in the business of making money by evoking human emotions from entertaining images. We in the technology industry better focus on allowing the media industry to do that by enabling them to maximize their companies' creative talents with minimal attention to the technology itself. Increasingly, as technology permeates our world and our workplace, the technology companies that will make a difference and reap the reward for it will share the knowledge, have the customers' interests at heart, and take responsibility for the result.

These are the elements that will make the dreams of global "follow the sun" continuous collaborative production, re-use and extended exploitation of content in multiple formats, digital distribution, and digital exhibition a reality.

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