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# Webcasting Comes of Age

*Technology advances mean that taking the plunge into Webcasting no longer means jumping into the deep end.*

There's no hotter topic in the field of streaming media right now than Webcasting, and with good reason. What was once a high-risk, low-return proposition is now entering the mainstream of organizational communications, thanks to all-in-one service providers, turnkey solutions, and even desktop, DIY tools.

Until recently, many organizations were wary of Webcasting, for the simple reason that the technology was new and unfamiliar, says Tim Napoleon, vice president for

or print document, and more timely than other video-based delivery formats, like DVD.

Getting to the point where you're ready to Webcast can be a challenge, Napoleon admits, as you need to get all of your video and presentation assets organized and then prepare and shoot the event itself. And when the event's over, it can be immediately archived for on-demand viewing.

"The era of the big corporate meeting, where everyone drops what they're doing and goes into the conference room, is over,"

Napoleon says. For tips on the production stage, we've included a case study on how Webcasting has helped the state of Washington train foster parents (p. 18), and "Video Production for Streaming" (p. 21), a best-practices primer with advice from some of the top names in the Webcasting business. To the suggestions you'll find there, Napoleon adds this reminder: "Make sure your content is nonlinear, searchable, and accessible. Put an index on the side that lets people jump to the key points of interest to them."

In addition to making sure your production values are top-notch (and that means something very different for streaming video than it does for traditional broadcast or DVD), Napoleon offers this bit of advice: Take a screenwriting class from your local college or university. "You have to know your audience, and a screenwriting class will help you do that," Napoleon says. "You know the information you want to get out, but you need to figure out how viewers will want to watch it."

We hope you'll find this *Webcast Essentials* White Paper full of such useful advice and information on everything from setting up your first Webcast and choosing an audio format to picking a service provider and finding the tools to do it yourself. Please don't hesitate to contact Streaming Media, Inc. ([www.streamingmedia.com](http://www.streamingmedia.com)), your one-stop resource for everything streaming.

*"Doing a Webcast used to be a little bit like driving a dynamite truck; it was too easy for something to go wrong. Now, there are simple and reliable solutions that get the job done." —Tim Napoleon, VitalStream*

business development of VitalStream, one of the industry's leading service providers. The technology was cutting-edge, and so putting on a successful Webcast was a way to wow your customers—if it all worked, that is.

"Doing a Webcast used to be a little bit like driving a dynamite truck," says Napoleon. "It was too easy for something to go wrong, and having a CEO talking to customers was a visible stage for failure."

A self-professed technology fanatic, Napoleon says that, ironically, it's exactly when technology becomes "kind of boring" that it can really take off, and that's what's happened with Webcasting. "The excitement might be gone, but it's been replaced by reliable and simple solutions that get the job done."

In fact, Napoleon sees Webcasting as, if not a magic bullet, then at least an absolutely crucial weapon in organizational arsenals from internal communications to sales. It allows for dynamic, immediate delivery of information in a format that's accessible and more engaging than a PowerPoint presentation

Napoleon says, suggesting that those in-person gatherings be reserved for activities that still require face-to-face contact. "A better use that time would be to send out a Webcast presentation a week before, and then at the company-wide event to do team-building, brainstorming, or corporate strategy planning."

Of course, Webcasting's value goes far beyond B2B communications, as witnessed by its applications in government, education, and the medical field. But enterprises are just beginning to tap its potential for customer relations and sales, where it offers instant-on streaming video that can accompany sales calls. Again, that lets you maximize the value of the in-person visit or phone call, rather than spend that time going over information that could have been previously conveyed via the Web.

So what makes a successful Webcast? The old saw "garbage in, garbage out" still applies. "There's no magic filter, unfortunately, that transforms a poorly produced Webcast into something golden at the end,"



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# Hands-On:

## How to Deliver a Successful Webcast

With recent technological improvements, Webcasts have become a familiar part of the online experience. The rapid adoption of high-speed connectivity, combined with ever increasing computer processing power, has created a mainstream media delivery platform for marketing communications and online training. In addition, media formats like Flash Video and Windows Media have seen near-universal adoption in the marketplace. With the right planning and preparation, adding Webcasts to your marketing and communications mix can be a turnkey process.

### Why Webcast?

Let's touch upon some of the reasons why Webcasting is such an engaging communications tool for corporations, educators and content owners. As companies continue to

focus on the ROI of their lead-generation tactics, Webcasts have become a standard element in the marketing mix. Webcasts meet the needs of many of the ROI demands. Webcasting allows you to:

- *Expand Your Reach*—Simultaneously communicate your messaging to a global audience and go beyond the logistical challenges of face-to-face presentations.
- *Increase Comprehension and Retention*—An interactive, television-like experience provides a powerful communications vehicle and ensures that a consistent message is delivered to your audience.
- *Increase Productivity*—Provide the information-sharing benefits of conferences and onsite meetings without the travel. Webcasts are a convenient way to offer training or sales presentations that

allow the viewer to control the interaction. Prospects can move more quickly to a purchase decision due to the ease of obtaining information.

- *Increase Traffic to Your Site*—A compelling audio and video experience helps to differentiate your site from your competitors and helps to make a great first impression that will have an immediate and lasting effect on your customers.
- *Foster Trust with Your Audience*—Personalize your message with integrated audio and video to help build relationships with prospects, customers, and staff.

### Planning For Your Webcast

#### ■ PROJECT MANAGEMENT

The key to successfully delivering any Webcast is detailed planning and thorough

### The Anatomy of a Webcast

This chart illustrates the technical process of producing and broadcasting a webcast.



# Webcasting Questionnaire

Use this questionnaire as a guide to plan for your webcast.

If you have any questions, a VitalStream representative is just a phone call away at (800) 254-7554.

## What type of media do you want to use for your event?

- Audio Only  
 Video (and Audio)

## What streaming media format(s) do you plan to use?

- Flash Video  
 Windows Media  
 Both Flash Video and Windows Media  
 Other: \_\_\_\_\_

## How many speakers will be presenting at your event?

- 1 Speaker  
 2 Speakers  
 3 Speakers  
 Other: \_\_\_\_\_

## Are each of the speakers presenting from the same location?

- Yes  
 No

## Do you need VitalStream to provide video production services?

- Yes  
 No

## How many cameras do you intend to use at your event?

- 1 Camera  
 2 Cameras  
 3 Cameras  
 Other: \_\_\_\_\_

## What is the size of the audience expected to attend your event?

- 1 - 50  
 50 - 100  
 100 - 250  
 250 - 500  
 500 - 1000  
 1000+  
 Don't Know

## What type of connection(s) does your audience have? (check all that apply)

- Modem Connection  
 Broadband (Cable Modem or DSL)  
 T1 or Greater  
 LAN (Local Area Network)  
 Don't know

## How long do you expect the event to last?

- 15 - 30 Minutes  
 30 Minutes - 1 Hour  
 1 - 2 Hours  
 > 2 Hours  
 24 x 7

## Would you like to archive your event for future on-demand playback?

- Yes  
 No

## Would you like information on publicity packages to promote your event?

- Yes  
 No

## Do you need VitalStream to provide graphic services?

- Yes  
 No

## What other services do you need for your Webcast? (check all that apply)

- User Registration  
 E-mail Invitation  
 Pay-Per-View  
 Audience Polling  
 Ask a Question Form  
 Presenter Controlled Slides  
 Audience Controlled Slides  
 Audience Testing  
 Interface Design  
 Other: \_\_\_\_\_

## What is your budget for each of your live events?

Enter Budget: \$ \_\_\_\_\_

## What is the address/location where the event will take place?

Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_

Country: \_\_\_\_\_

Date of Event: \_\_\_\_\_

## Does this location have Internet connectivity?

- Yes  
 No - Please supply  
 Don't know

preparation. You must develop a plan, identify deliverables, and determine the success metrics for your live broadcast. VitalStream developed a questionnaire (at left) to help you plan for your Webcast.

### PROMOTE THE EVENT

Use all available resources and communications to build awareness of your event. Feature the details of the Webcast on your Web site and in other appropriate marketing materials. One of the most effective ways to grow your online audience is to email invitations (text, HTML, or video) to those who might be interested in participating in your Webcast. In any communications, include relevant information such as the event title, a brief description, a date and time, and a link to where the audience can view the event. And sending out reminder emails is always a good idea.

### END USER INTERFACE

The Web interface and graphic elements surrounding your event broadcast need to be completed in advance of the event date. VitalStream is partnered with a number of companies, such as Multicast ([www.multicastmedia.com](http://www.multicastmedia.com)), that can build custom interfaces that match your corporate identity and existing Web site. While some organizations require rich features and functionality such as pay-per-view, most companies want broadcast-quality video with basic features such as custom-branded presentation layer, registration, slide integration, moderated Q&A, capture/record, polling, and auto-detection.

### PREPARATION

Prepare for your Webcasting event by practicing presenting your content. Give the camera crew access to the event location at least one day in advance so that the crew can set up and test the lighting as well as the audio and video feeds. If you have any slides in your presentation, prepare them well in advance of the event.

### The Day of the Webcast

#### EVENT PRODUCTION: AUDIO AND VIDEO CAPTURE

Our event production partners can provide an experienced production crew that has the know-how to make your event a Webcasting success. Our crews deliver expert camera work, lighting, and event staging, and they capture broadcast-quality footage. The footage is then transmitted to the VitalStream Content Delivery

Table 1

**Project Management**

*Planning, coordination, and budgeting*

**Event Production**

*Experienced production crew; may include satellite delivery*

**Studio-Grade Encoding**

*Convert content into a format suitable for streaming online*

# The Webcasting PROCESSES

**Digital Broadcasting**

*Broadcast using VitalStream's content delivery network*

**Audience Reports**

*Measurable results accelerate planning for your next event*

The VitalStream MediaConsole® allows you to control the access to your media and receive real-time reporting. In addition, we can integrate Webcasting capabilities into your existing IT infrastructure to deliver events over your Intranet.

■ NETWORK FEATURES

- **Global Infrastructure**—The modular structure and global diversity of the VitalStream content delivery network provides a scalable digital broadcasting platform to distribute your media around the world.
- **Multi-Networked**—The VitalStream content delivery network is connected to the Internet with high-speed fiber optic connectivity to multiple tier-one service providers.
- **Intelligent Routing**—Intelligent routing protocols bypass any congested areas of the Internet and selects the fastest route to deliver your content to each audience member.
- **24x7 Monitoring and Support**—With real-time network monitoring and live support, we proactively identify and correct any issues before they become a problem.

**After the Event**

■ POST-EVENT PRODUCTION

After the event is over, content can be repurposed in a variety of ways. Our post-production facilities offer a complete suite of digital postproduction tools to enhance and edit your event. The event can be made available for on-demand viewing over VitalStream's content delivery network and even authored onto DVD.

Network in one of two ways. The captured video can be encoded onsite and sent over the Internet to the VitalStream Network. Or, if you do not have onsite broadband connectivity, the captured video can be transmitted through a satellite uplink to a digital production facility with direct, fiber-optic connectivity to the VitalStream Network.

Through its partners, VitalStream's production services include:

- Camera and VTR recording
- Local audience PA and playback
- PowerPoint projection
- Event producer
- Show directing with multiple cameras
- Lighting and staging
- Conference call with call center support

■ SATELLITE DELIVERY

If your event does not have onsite broadband connectivity, then satellite delivery is a requirement. To meet this need, VitalStream has partnered with production houses that are industry leaders in satellite signal acquisition and delivery. Our experienced production partners provide you with the ability to transmit events as complicated as a multi-camera live broadcast or events as simple as a single presenter at a podium. Our partners' satellite trucks act as professional digital video command centers for your event.

Satellite services include:

- Cband uplink
- Satellite time rental
- Generator power
- Truck and equipment rental
- Production crew and technicians
- Lighting and staging

*Webcasts—both live and on-demand—can be integrated seamlessly into your branded Web site. (Image: Cystic Fibrosis Foundation Live Webcast, powered by Multicast)*

■ STUDIO-GRADE ENCODING

VitalStream has partnered with leading encoding houses, like Multicast ([www.multicastmedia.com](http://www.multicastmedia.com)), that specialize in converting your audio or video into any media format suitable for streaming over the Internet. Using state-of-the-art encoding systems, trained audio and video engineers convert your media into the smallest file size while maintaining the highest level of quality. Whether onsite or via satellite, our encoding specialists convert your media into one or all of the industry-standard streaming formats at a variety of connection speeds ranging from 28Kbps (audio only) to 600Kbps and more.

■ DIGITAL BROADCASTING: STREAMING MEDIA DELIVERY

VitalStream provides a content delivery network to broadcast your event live or on-demand around the globe. Our network can broadcast in any streaming format including Flash Video, Windows Media, QuickTime and RealMedia. Also,





Use the detailed reporting in the VitalStream MediaConsole® to analyze the effectiveness of your event including who attended, for how long and what streaming format they used.

your unique audience and presentation objectives.

■ PRESENTATION INTEGRATION

- Streaming video and audio
- Branded media player or presentation window
- Choice of Windows Media or Flash Video
- Capture/record
- Real-time attendance and statistical reports
- Choice of 3 to 4 bitrates (100K, 300k to 600K or more)

■ OPTIONAL FEATURES

- Custom media window:
- Slides
- Animation
- Web pages
- Documents
- Spreadsheets
- Agenda window
- Sponsorship window
- Registration
- Forms (e.g., feedback, questionnaire)
- Live Q&A
- Document attachments
- Discussion/chat window
- Polls
- Surveys
- Biography window with optional photo
- Ecommerce integration
- Pay-per-view
- Live event staging
- Language translation
- Closed captioning

■ ON DEMAND/CONTENT ARCHIVING

The same team that encoded your live event can record the event for future on-demand playback. Archiving your events further enhances your ability to deliver your message to your target audience. It also improves efficiency by eliminating the need for someone to give the same presentation over and over again.

■ REAL-TIME REPORTING

Use the detailed reporting in the VitalStream MediaConsole® to analyze the effectiveness of your event including who

attended, for how long and what streaming format they used. Reporting gives you an instant assessment of your audience. Use this information to track return on investment, marketing effectiveness and other audience trends.

Customizing Your Webcast

VitalStream, along with its partners like Multicast (www.multicastmedia.com), delivers a full feature set of options and always includes usage statistics with every Webcast. In addition, you can combine options to make your Webcast fit



Whatever your Webcasting needs, VitalStream and its partners have you covered. Our Webcasting solutions are truly unique. Your Webcast is always branded to you with features that can be customized with any combination of audio, video, slides, images, Q&A, polls, surveys, attachments, Web pages, animations, and annotation tools. Our system is entirely Web-based and has two parts. The user joins you via a Web browser and you, or we, control every aspect of the Webcast through rich, but easy-to-use administrator tools. Webcast with VitalStream and you can deliver your message to anywhere in the world.

VitalStream can integrate both live and on-demand video into your site. This mockup shows a live stream in the main window, with thumbnails of archived video running across the lower third. (Image: Child Nett TV, powered by Multicast.)

  
 Readers can obtain more information about VitalStream:  
 VitalStream  
 800.254.7554  
 www.vitalstream.com

contact info

# Streamtheworld

*Playerless live radio streaming*

**S**treamtheworld is a plugin-free, live radio streaming solution designed to facilitate audio streaming for listeners and broadcasters alike. In addition to being playerless, the Streamtheworld technology offers better audio quality in all possible bitrates.

## No plugins

The major challenge to delivering streaming radio, according to most radio directors, was that radio streaming could only be accessed via plugins like Windows Media Player, Real Audio and Winamp. The user accessing the broadcast through a Web site that streams with Streamtheworld won't have to download any software or upgrade the ones already installed.

Also, most companies that use a network could configure their firewalls to block the streams coming in and prevent their employees from listening to their favorite radio station on their computer at work. The Streamtheworld solution is firewall-proof, so users will be able to listen to the radio wherever they are.

## Stream for as low as \$199 per month

Streamtheworld's goal is to provide a single point of accountability for all streaming needs while adding value, not cost. Partnerships with best-of-breed technology providers allow the company to employ proven industry-standards technologies reliably and on time.

The Streamtheworld technology has been created in order to facilitate and encourage live audio broadcasting over the Internet. While providing better quality audio streaming to more users than any other solution, Streamtheworld costs less. It can provide a stream for an unlimited number of simultaneous listeners for as low as \$199 per month. Since they already stream 45 major radio stations, they are able to offer the best prices in the industry.

The Streamtheworld server purchases its data transit from multiple Tier 1 backbone

*Canada's largest radio station, CKOI, uses Streamtheworld's technology to deliver broadcasts to listeners around the globe.*

providers—including Verio, Sprint, UUNET (WorldCom), Peer1, GT (360 Networks), and T lus—and has multiple gigabytes of provisioned and expandable capacity. Utilizing a unique, fail-safe, intelligent network infrastructure and proprietary routing technology, it delivers unsurpassed speed, reliability, and virtually unlimited scalability.

With its turnkey solution, Streamtheworld saves the headaches of installation, handling every setup step, including installation, signal conversion, scaling, and maintenance.

## Available for everyone

The solution allows clients to have a personalized player that can host publicity banners and information about the radio station. The player also can show images from webcams installed in the studio to increase the feeling of proximity between the listener and the host.

Unlike other streaming solutions, Streamtheworld requires the user to go through the station's Web site to be able to access the stream, which is favorable for the site's traffic. Also, audio ads can be inserted when the streaming starts or within the stream itself. This is good for advertisers that want to make sure their ads are heard. We also offer the possibility to stream specialized Webradios that will enchant the most critical music lovers.

Finally, Streamtheworld comes equipped with unique measurement software so that clients can keep track of how well their stream is performing.

## Advantages

Built on technical stability, a rock-solid network, and immediate live customer support, Streamtheworld is a trusted and efficient streaming company. Every interaction with

Streamtheworld is handled by a real person. You always deal with real people who care for the success of your business. Clients can rely upon experienced and certified support professionals to provide outstanding service and support 24 hours a day, 365 days a year.

Streamtheworld also can provide streaming in conventional formats such as Windows Media Player, Real Audio, Quicktime and Shoutcast.

## Increasing revenues

Over the last few years, the Internet has become the most important communication tool for businesses to promote their products. It is now almost mandatory for a radio station to broadcast its content on the Web in order to reach the most listeners possible. Streamtheworld has made it easy for broadcasters to get the most out of their station and for listeners to tune in easily without having to install any plugins in their system.

Radio stations benefit from this technology because it will increase the number of visitors to their Web site, increasing the revenue generated by the site. Also, more people will get to hear the ads that are broadcast on the air and the streaming will increase the station's visibility on the web.

Because they are listening from their computers, the listeners can instantly react to an advertising message, get more information or make a purchase online. Internet radio combines the better of two proven media—the effectiveness of audio advertising and the efficiency of the Internet—to offer advertisers a powerful way to get the most from a marketing budget.

Streamtheworld has created an efficient, plugin-free streaming solution and is currently developing the video version of its technology . . . stay tuned!



**STREAM E WORLD**

contact  
info

Readers can obtain  
more information about  
Streamtheworld at:

866.448.4037 or  
www.streamtheworld.com

# Don't Fear Video

*Don't let outdated myths get in the way of implementing video communications*

It's easy for any IT manager to kill their boss's interest in deploying video in their enterprise network: just whisper, "It will kill the mission-critical data applications."

Of course, that need not be true. But it is a response sometimes given due to fear that it might be true, or as a means to avoid what appears to be an additional or uncertain workload. Video in a network is in reality just a special form of data, and just like voice-over-IP, one that requires real-time, reliable delivery.

## Dispelling the Myths

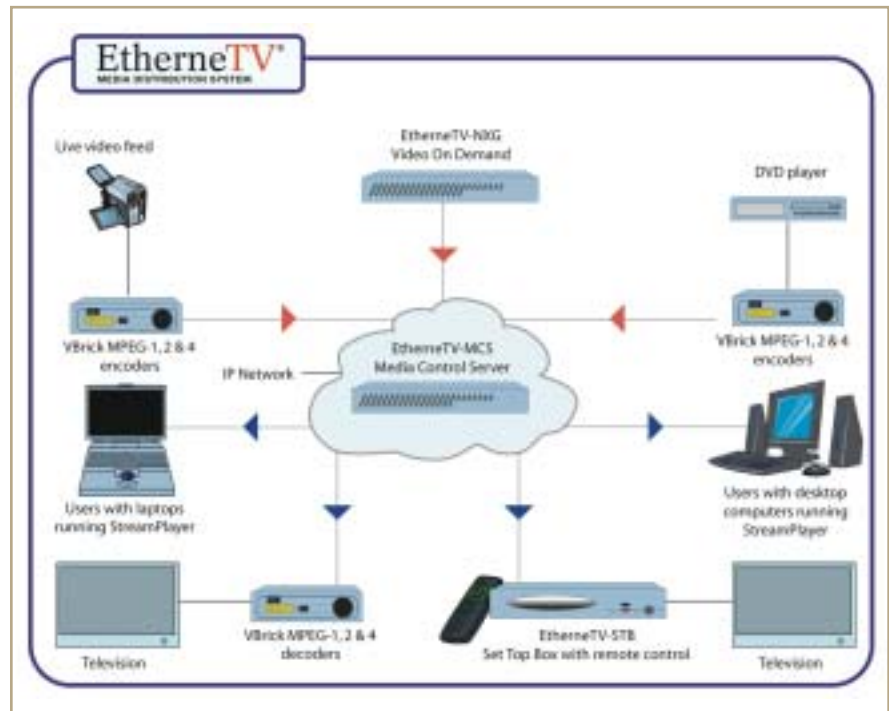
Happily, modern enterprise networks are completely up to the task. Let's start by dismissing several myths about video:

### ■ VIDEO IS A BANDWIDTH HOG

If your network consists of analog modems, shared Ethernet hubs, and 100MHz desktop computers, you may be right. If this is your network, you probably also believe that a 100KB email file-attachment is a bandwidth hog!

In a switched Ethernet network, every host has their own private 10/100Mbps connection. Modern switches cannot even be oversubscribed (the sum of the many switch ports is equal to the capacity of the switch), so at least at the local level most network managers agree there is no problem.

The perception of bandwidth being a problem typically comes from the over-subscription of Wide Area Network (WAN) connections. If you have a T1 connection to the public Internet, then it takes only six people in your building to tune in to a 250Kbps public Webcast



before your entire T1 is consumed by inbound unicast video streams. Indeed, mission-critical applications that depend on access to external servers will grind to a halt. For this reason, it is not uncommon for IT managers to deny users access to public webcasts. Thus, "video is a bandwidth hog" becomes the conventional wisdom, and like most conventional wisdom, it is misleading.

Video is almost never a bandwidth hog when it is used wholly within a building or campus. Even a 5Mbps broadcast-quality MPEG-2 live video stream sent over your LAN uses exactly 5% of the capacity of

one Ethernet switch port—a number that is "barely felt" by today's standards. Within your network, use of multicast means that this single 5Mbps video can be viewed on all desktops and TV monitors without bandwidth worries.

### ■ VIDEO STANDARDS HAVE NOT MATURED

Every DVD is in reality an MPEG-2 file. Virtually all satellite broadcasting is MPEG-2. "Digital Cable TV" delivers MPEG-2 video streams to millions of homes. MPEG-4 is a well-established standard, implemented by multiple vendors and, like MPEG-2, facilitates a multiple-vendor solution for video.

Unlike H.323 and H.320 "videoconferencing" systems, modern video standards such as those developed by the Internet Streaming Media Alliance (ISMA) were developed for IP networks, while legacy systems were primarily developed for "telecom" and were well suited for ISDN delivery systems.

*"Video is no more exotic than any other application"*

Common MPEG Quality Parameters

Table 1

MPEG-1	1Mbps to 3Mbps VHS-tape quality
MPEG-2	1.5Mbps to 17Mbps DVD-quality
MPEG-4	56Kbps to 2Mbps VHS-tape quality

It may be reasonable to resist a major video deployment when such deployment depends on a single-vendor, proprietary solution. Today there is wide interoperability between vendors, thanks to adherence to standards.

#### ■ NETWORK VIDEO QUALITY IS POOR

If you are referring to thumbnail-sized, proprietary video in the public Internet from several years ago, this might be a true statement.

Today, you have full-screen, 30 frame-per-second, stunning DVD-quality live and stored video with a quality that often surpasses what you get at home.

Modern video appliances and systems provide two-way, low-delay, DVD-quality television with CD-quality audio. If hearing the word “video” makes you think of legacy talking head “videoconference” systems, or to “webcasting,” you’ve not seen modern network video.

#### ■ NETWORK VIDEO IS EXOTIC

Video is no more exotic than any other application. Gone are the days when you must understand, install, and support unusual PC video drivers, capture cards, decoders, and special video servers. Most new users are shocked to discover they can have live DVD-quality video running in their network in about 15 minutes, including reading the instructions.

#### ■ NETWORK VIDEO APPLICATIONS ARE LIMITED

We forget that the initial “killer application” for our digital networks was not email, surfing the web, file exchange, e-commerce, or any of the current “mission-critical” uses of our networks. Modern LANs were inspired simply to share printers.

So it is with network video. The initial deployment may be to broadcast the CEO’s weekly address to all employees; to monitor critical areas; to provide both live and archived training and education; or to conduct face-to-face meetings with broadcast-quality television. Quickly, the natural human instinct to see and hear makes

video the most compelling form of human communications.

#### But What Is “Video”?

Few people alive today are not already familiar with television, or literally, “remote vision.” But what is video?

Video is simply a series of still images displayed fast enough that the human eye does not detect flicker. To send video on a network, however, each still image must be compressed.

#### ■ FRAMING THE ISSUE

A TV image consists of a continuous series of frames presented at a rate of 30 per second (actually 29.97 per second). To convert one frame into digital format, it must be broken into individual pixels. Each pixel uses 2 bytes of storage to describe its location, color, and intensity. If the industry standard sampling rate is used, 13.5 million pixels result (CCIR-601 standard). This number of pixels requires exactly 699,840 bytes (720 pixels x 486

*Today there is wide interoperability between vendors, thanks to adherence to standards.*

lines x 2 bytes per pixel) to digitize one frame. With a rate of 29.97 frames per second, the data rate required to display TV-quality images with full motion is 20,974,204.8 bytes per second. One CD could only hold about 30 seconds of video, and serial transmission of this data would require more than 167Mbps in each direction. In fact, Rec-601 Component Video Serial Data Interface operates at 270Mbps! This certainly shows the vast data-carrying capacity of broadcast television.

In order to make it practical to transport video over modern digital networks, it must be compressed. To achieve high quality, video compression must balance various options in reducing the vast amount of data present in traditional video signals, without sacrificing the image quality or its motion, and several methods to do this are possible. By far the most interoperable video compression technology in use today is MPEG, the Moving Pictures Experts Group. MPEG has produced MPEG-1, MPEG-2 and MPEG-4 (MPEG-3 was absorbed into the MPEG-2 standard). Your choice will depend on what you want to do.

Using MPEG, full-motion video with stereo audio can be transmitted using as little as 100Kbps or much as 15Mbps or more. MPEG-2 is well-suited for live broadcasting of very high quality video to desktops, set top boxes, projectors, etc., over true broadband networks. MPEG-4 is well-suited for both LANs and for virtually any IP network, including the public Internet.

#### Network Fear, Uncertainty, and Doubt

Video will not break your network, but it may reveal weaknesses in your network infrastructure that you will want to fix anyway. For example, network video is normally sent via UDP, and that means there is no TCP retransmission to recover any lost packets. If your network is dropping half of all data transmitted before you deploy video, users may not notice because their email still gets through. But dropped packets will disrupt video, hence video tends to reveal network issues, not cause them. For

this reason, network video sometimes falls prey to a “kill the messenger” syndrome.

#### How To Overcome Fear

As an old TV commercial once proclaimed, “Try it, you’ll like it!” Watching live news or stored educational content on your desktop, monitoring remote locations, or Webcasting on a daily basis to customers and remote employees alike is compelling and contributes to the bottom line by vastly increasing efficiency. With the good network citizenship, low cost, and ease of use features that modern video network appliances deliver, once you try it you may never look back (or if you do, it will be via network video).



Readers can obtain more information about VBrick Systems at:

203.265.0044 or  
www.vbrick.com

contact  
info

# New England Cable News

New England Cable News (NECN) is the largest regional cable news network in the country, serving 2.8 million households in 820 communities throughout New England.

In 1996, NECN introduced its Web site and became the pioneer in streaming video for news coverage. The Web site provides 24/7 access to broadcast streaming videos and delivers over 1,000 news-related clips per month to its online viewing audience of 150,000 people. There's no doubt that the growing popularity of the Internet as a news source, especially during the workday, has contributed to NECN's success as the premiere Web destination for New England video news coverage.

## Problem

NECN realized that, in order to strengthen its reputation as a dependable New England news source, its Web site needed to deliver the same uninterrupted, high-quality video that reflected the integrity of the news station. The NECN site needed to utilize streaming media to extend its traditional TV broadcast to users on the Web and needed a solution that would be able to handle unexpected traffic spikes, which have been known to triple the number of visits and videos streamed as a result of major breaking news. It also was necessary for the station to find a cost-effective technology solution that could reliably handle traffic surges and deliver high-quality streams around-the-clock, thereby providing the same quality experience its TV viewers had come to expect.

## Solution: Mirror Image Video On-Demand and Live Webcasting

NECN selected Mirror Image's Video On-Demand and Live Webcasting solutions to handle its streaming media needs based on the service's scalability, reliability, and ability to support industry-leading multimedia formats, including RealNetworks, Windows

Media, and QuickTime. In addition, the services offered NECN the ability to upload content and immediately gave them greater management intelligence on viewership patterns and bandwidth usage. By removing the "heavy lifting" from NECN's origin server, Mirror Image's solution also empowered the station to focus on its core business of extending its television broadcasts to the Web without additional infrastructure overhead.

To ensure a seamless integration of the solution, the Mirror Image team worked directly with NECN to automate the upload, publishing, and distribution of files. The moment NECN transfers files to Mirror Image, they are automatically distributed to Mirror Image's network and available for immediate streaming delivery to users, enabling NECN to re-purpose its TV broadcast footage the same day.

The timing for the implementation could not have been better. The new Mirror Image-powered site prepared NECN to handle easily the overwhelming traffic due to the catastrophic events of September 11, 2001. NECN surpassed most news broadcasting performance abilities that day, and provided their audience with the immediate insight others could not. Mirror Image's worth was proven the second day on the job.

"Without Mirror Image's streaming solution, we would have not been able to perform," commented Steve Safran, Executive

Producer at NECN. "Mirror Image allowed us to provide our audience with uninterrupted, high-quality streams without worry. We received an equivalent of six months of traffic in two days that never would have been delivered without Mirror Image."

## The Results

By working with Mirror Image for the last two years, NECN has risen in the ranks as a top-notch news site, with an incredible performance track record of delivering over 150,000 news-related video clips per month. The high quality of Mirror Image's Video On-Demand and Live Webcasting solution has enabled NECN to extend its broadcast channel to the online market. In fact, frequent NECN visitors have commented on NECN.com's enhanced site performance and better overall experience.

"With Mirror Image's Video-On-Demand solution, we offer viewers streaming news feeds that are as reliable and as enjoyable as watching TV. And, it is because of Mirror Image's innovative technology that we were able to partner with Boston.com and continue on the path to reach our goal as the leader in streaming video for news coverage," concluded Safran.

Today, in conjunction with Mirror Image, NECN is now able to focus on developing profitable partnerships with other top New England news sites such as Boston.com, the city's online version of the major daily newspaper, *The Boston Globe*. NECN is currently in the process of adding a video component to Boston.com to create an evolutionary video-integrated site with streaming audio and video. This "next-generation site" utilizing the Internet as an extension to broadcast is expected to increase customer activity, viewer growth and traffic while helping to set the stage for future revenue opportunities.



When NECN transfers files to Mirror Image's network, they are available for immediate streaming delivery to users.

contact info



Readers can obtain more information about Mirror Image Internet at:

800.353.2923 or  
www.mirror-image.com

# Audio Quality and Netcasting

After a five-year hiatus, netcasting is once again making headlines in business publications. Thanks in part to streaming-enabled 3GPP devices, some analysts see netcasting as supplanting broadcasting, because netcasting offers a virtually limitless number of programming formats. Meanwhile, the local FM broadcasters in a given market, out of economic necessity, have to broadcast mass-appeal formats that don't fully satisfy anyone.

Netcasters have much to learn from broadcasters, however, about what is commonly called "broadcast-quality" audio. Without such understanding, netcasters cannot fully compete with traditional broadcast media. The topic of broadcast-quality audio can be divided into two main technology threads: audio processing and codecs.

## Audio Processing

Broadcasters have been accustomed to processing audio for AM and FM transmission with transmission audio processors like Orban's Optimod series. These processors compress dynamic range to make the signal comfortably listenable in noisy environments, and also to make the best use of the dynamic range limitations of the channel itself. In analog services (like FM radio), this dynamic range varies as a function of reception conditions, which are poorest in the fringes of the signal. Audio processing therefore also increases the potential coverage area of analog transmissions.

Digital transmissions behave differently. The technical specifications of the transmission system determine the signal-to-noise ratio. This does not change with the signal strength in wireless transmission (and is even more irrelevant in a wired environment). Internet reception anomalies are typically audio drop-outs rather than added noise.

What role does audio processing play in a system with a very low noise floor? It can still have several vital functions:

- First is dynamic range compression to accommodate the signal into typical listening environments like autos and homes. In

*autos, the acoustic dynamic range is severely limited by wind and road noise. In most apartments and multi-family dwellings, the available dynamic range is limited by the need to avoid disturbing family and neighbors with excessive sound levels. In public spaces like buses, subways, and airports, there is a wide variety of acoustic noise sources. There are relatively few environments where the full, uncompressed dynamic range of the original program material is useable or desirable.*

- Second is to ensure a consistent presentation. In radio, program material from different producers is constantly juxtaposed. Yet most successful broadcasters agree that achieving a "major market" sonic image requires an overall consistency of sound texture and

*shown that a combination of multiband compression and sophisticated peak limiting is the most effective way to do this.*

- The final function is to help improve the intelligibility of standard program material, particularly news actualities and incoming telephone calls. Properly designed multiband compression like that used in Optimods can make startling improvements in this material without need for preprocessing in a production studio.

Preprocessing each program element before it is stored on a playout system is not as effective as preprocessing the mixed audio on the program line immediately before it is streamed. The latter technique maximizes the smoothness of transition

**Experience has shown**  
*that a combination of multiband compression and sophisticated peak limiting is the most effective way to broadcast a louder and punchier audio signal.*

*spectral balance from source to source. Multiband compression can achieve this. By setting a target spectral balance and automatically re-equalizing program material that does not have this balance, the multiband compression helps the radio station achieve a "big-time," highly produced sound that sounds authoritative to listeners.*

- Third is to reduce the peak-to-average ratio of the signal to increase its relative loudness by comparison to an unprocessed signal normalized to the same peak level. In netcasting, all signals share the same "pipe." Each signal has exactly the same reach. So the only thing that netcaster can do to stand out from his neighbors (and possible competitors) is to broadcast a louder and punchier audio signal. Experience has

between program elements and makes voice from announcers or presenters merge smoothly into the program flow, even if the announcer is talking over music.

It is important to understand that AM, FM, or TV audio processors that employ pre-emphasis/de-emphasis and/or clipping peak limiters are highly inappropriate for use with the perceptual audio coders used in netcasting. The pre-emphasis/de-emphasis limiting in these devices unnecessarily limits high frequency headroom. Further, their clipping limiters create high frequency components—distortion—that the perceptual audio coders would otherwise not encode.

An audio processor like Orban's Optimod-PC 1100 Professional PCI Sound Card consists of several cascaded stages. These include Input Conditioning, including defeatable highpass

filtering and defeatable phase rotation; Stereo Enhancement; Two-Band Gated Automatic Gain Control (AGC), with target-zone window gating and silence gating; Equalization, including high-frequency enhancement; Multiband Compression in either two or five bands, depending on the processing structure; and Look-Ahead Limiting.

A highpass filter removes low frequency noise that can contaminate some recordings and microphone chains. This noise can otherwise cause problems with the rest of the audio processing and with the codec, which should never waste its bit budget by encoding noise. The phase rotator makes speech more symmetrical, reducing its peak-to-average ratio by as much as six decibels without adding nonlinear distortion. Hence, phase rotation can be very useful for loudness processing of speech.

There are a number of stereo enhancement technologies available. Orban prefers one based on its patented algorithm that increases the energy in the stereo difference signal (L-R) whenever a transient is detected in the stereo sum signal (L+R). By operating only on transients, this algorithm increases width, brightness, and punch without unnaturally increasing reverb (which is usually predominantly in the L-R channel). Gating circuitry detects “mono” material

allows the user to adjust the tonal balance in a much more detailed way. EQ has two purposes in a broadcast processor. The first is to establish a signature for a given station that brands the station, creating a “house sound” by subtly emphasizing the bass, midrange, or high frequencies. The second purpose is to compensate for the frequency contouring caused by the subsequent multiband compression and limiting. These may create an overall spectral coloration that can be corrected or augmented by carefully chosen fixed EQ before these multiband dynamics stages.

Multiband compression and limiting may occur in one or two stages, depending on the developer. If it occurs in two stages, the multiband compressor and limiter can have different crossovers and even different numbers of bands. If it occurs in one stage, the compressor and limiter functions can “talk” to each other, optimizing their interaction. Both design approaches can yield good sound, and each has its own set of tradeoffs.

Usually using anywhere between four and six bands, the multiband compressor/limiter reduces dynamic range and increases audio density to achieve competitive loudness and impact. It’s common for each band to be gated at low levels to prevent noise rush-up, and developers often have proprietary algorithms

and thus introduces sidebands that are far removed in frequency from their associated Fourier “carriers.” The “carriers” hence have little ability to psychoacoustically mask the resulting sidebands when compared with the sidebands that a look-ahead limiter introduces because the look-ahead limiter’s gain control signal has a much lower bandwidth. Therefore, compared to a hard clipper, a look-ahead limiter produces considerably less audible modulation distortion. This is particularly important when one is driving a low bitrate codec because one does not want to waste precious bits encoding this distortion.

Simple wideband look-ahead limiting can still produce audible intermodulation distortion between heavy bass and midrange material. Advanced-technology look-ahead limiters use sophisticated techniques to reduce such IM distortion without compromising loudness capability.

### Codecs

The basic principle of perceptual coding is to divide the audio into frequency bands and then to code each frequency band with the minimum number of bits that will yield no audible change in that band. Reducing the number of bits used to encode a given frequency band raises the quantization noise floor in that band. If the noise floor is raised too far, it can become audible and cause artifacts.

A second major source of artifacts in codecs is pre- and post-echo caused by ringing of the narrow bandpass filters used to divide the signal into frequency bands. This ringing worsens as the number of bands increases, so some codecs may adaptively switch the number of bands in use, depending on whether the sound has significant transient content. This ringing manifests itself as a smearing of sharp transient sounds in music, such as those produced by claves and wood blocks.

### Psychoacoustic Models

Perceptual coders exploit complex models of the human auditory system to estimate whether a given amount of added noise can be heard. They then adjust the number of bits used to code each frequency band such that the added noise is undetectable by the ear if the total “bit budget” is sufficiently high. Because the psychoacoustic model in a perceptual coder is an approximation that never exactly matches the behavior of the ear, it is desirable to leave some safety factor when choosing the number of bits to use for each frequency band. This safety factor is often called the “mask-to-noise ratio,”

*Netcasters have much to learn from broadcasters,* however, about what is commonly called “broadcast-quality” audio.

with slight channel or phase imbalances and suppresses enhancement so this built-in imbalance is not exaggerated.

AGC compensates for varying input levels. This is particularly important nowadays because many CDs are aggressively processed for loudness when they are mastered. Older CDs with the same peak levels can have average levels (which correspond approximately to loudness) more than 10dB below the average levels of current product. This means that the common technique of normalizing audio files for the same peak level causes huge problems with source-to-source loudness consistency, particularly when old and new material is juxtaposed. AGC can go a long way toward smoothing out such inconsistencies.

Equalization applies processing similar to “tone controls” to the signal but typically

for doing this while minimizing the audible side effects of the gating.

A look-ahead limiter controls the peak level at the output of the processor to prevent clipping the codec. The limiter prevents overshoots by examining a few milli-seconds of the unprocessed sound before it is limited. This way the limiter can anticipate peaks that are coming up.

One can model any peak limiter as multiplying its input signal by a gain control signal. This is a form of amplitude modulation. Amplitude modulation produces sidebands around the “carrier” signal. In the case of a peak limiter, each Fourier component of the input signal is a separate “carrier” and the peak limiting process produces modulation sidebands around each Fourier component.

Considered from this point of view, a hard clipper has a wideband gain control signal

measured in dB. For example, a mask-to-noise ratio of 12dB in a given band would mean that the quantization noise in that band could be raised by 12dB before it would be heard. (That is, there is a safety margin of two bits in that band's coding.) For the most efficient coding, the mask-to-noise ratio should be the same in all bands, ensuring that the sound elements equitably share the available bits in the transmission channel.

### Coding Efficiency

Different sounds will vary greatly in the efficiency with which a perceptual coding system can encode them. Therefore, for a constant transmission bitrate, the mask-to-noise ratio will constantly change. Pure sounds having an extended harmonic structure (such as a pitch pipe) are particularly difficult to encode because each harmonic must be encoded, the harmonics occupy many different frequency bands, and the overall spectrum has many "holes" that are not well-masked, so that added noise can be easily heard. The output of a multiband audio processor that uses clipping is another sound that is difficult to encode, because the clipper creates added distortion spectrum that does not mask quantization noise well, yet may cause the encoder to waste bits when trying to encode the distortion.

### The AAC and aacPlus Codecs

AAC is intended for very high-quality coding with compression up to 12:1. The AAC codec is about 30% more efficient than MP3 and about twice as efficient as MP2.

The AAC codec can achieve "transparency" (that is, listeners cannot audibly distinguish the codec's output from its input in a statistically significant way) at a stereo bitrate of 128Kbps, while MP2 requires about 256Kbps for the same quality. The MP3 codec cannot achieve transparency at any bitrate, although its performance at 192Kbps and higher is still very good.

AAC stands for Advanced Audio Coding. Intended to replace Layer 3, AAC was developed by the MPEG group that includes Dolby, Fraunhofer (FhG), AT&T, Sony, and Nokia—companies that have also been involved in the development of audio codecs such as MP3 and AC3 (also known as Dolby Digital™). (AAC does not stand for Apple Audio Codec, although Apple was one of the first to implement this technology with the introduction of Apple iTunes, the most successful downloadable music source, and QuickTime 6.)

Coding Technologies' "Spectral Band Replication" (SBR) process can be added to

almost any codec. This system transmits only lower frequencies (for example, below 8kHz) via the codec. The decoder at the receiver creates higher frequencies from the lower frequencies by a process similar to that used by "psychoacoustic exciters." A low-bandwidth signal in the compressed bitstream provides "clues" to modulate these created high frequencies so that they will match the original high frequencies as closely

provide the absolute best possible sound per bit that the current state-of-the-art will allow, without the typical resonant, phasey, watery character of older-technology codecs, like the Windows Media Audio. WMA has become a de facto "lowest common denominator" codec in netcasting, mostly because Microsoft ships a player with every copy of Windows. However, all third-party bias-controlled tests known to us

*There's little reason not to consider using aacPlus to deliver quality audio to the increasingly sophisticated Internet streaming audio audience.*

as possible. Adding SBR to the basic AAC codec creates aacPlus, which offers the best subjective quality currently available at bitrates below 128kbps. At bitrates below 128kbps, full subjective transparency cannot be achieved at the current state-of-the-art, yet the sound can still be very satisfying. (In the phraseology of the ITU 1 to 5 subjective quality scale, this means that audible differences introduced by the codec are judged by expert listeners to be "detectable, but not annoying.")

Coding Technologies' aacPlus v2, the latest in MPEG-4 Audio and previously known as "Enhanced aacPlus," is aacPlus coupled with the new MPEG Parametric Stereo technique created by Coding Technologies and Philips. Where SBR enables audio codecs to deliver the same quality at half the bitrate, Parametric Stereo enhances the codec efficiency a second time for low-bitrate stereo signals. Both SBR and Parametric Stereo are backward- and forward-compatible methods to enhance the efficiency of any audio codec. As a result, aacPlus v2 delivers streaming and downloadable 5.1 multichannel audio at 128Kbps, near CD-quality stereo at 32Kbps, excellent quality stereo at 24Kbps, and great quality for mixed content down to 16 Kbps and below. MPEG standardized Coding Technologies' aacPlus as MPEG-4 HE-AAC (MPEG ISO/IEC 14496-3:2001/AMD-1: Bandwidth Extension).

With the addition of MPEG Parametric Stereo (MPEG ISO/IEC 14496-3:2001/AMD-2: Parametric coding for high quality audio), aacPlus v2 is the state-of-the-art in low-bitrate standards-based audio codecs. The Coding Technologies codecs

that compared aacPlus to WMA at the same bit rate always rated WMA lower when subjective audio quality is the performance metric. Because WMA has never been passed through formal MPEG testing procedures, it is unclear what bitrate one must use with WMA to achieve parity with any given aacPlus bitrate, if even possible.

Orban's OpticoDec-PC family of Streaming and File Audio Encoders uses the genuine Coding Technologies aacPlus codec. Because OpticoDec-PC supports both RTSP/RTP (Real and QuickTime) and HTTP/ICY (SHOUTcast and Icecast2) standards-based streaming servers, and because free player clients are available from Real, Winamp, and many mobile phones, there is little reason not to consider using aacPlus to deliver quality audio to the increasingly sophisticated Internet streaming audio audience while saving on bandwidth costs thanks to aacPlus's higher efficiency than MP3 and WMA.

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# No-Frills Web Conferencing

Guarantee success with a simple approach—  
with specific suggestions for sales professionals

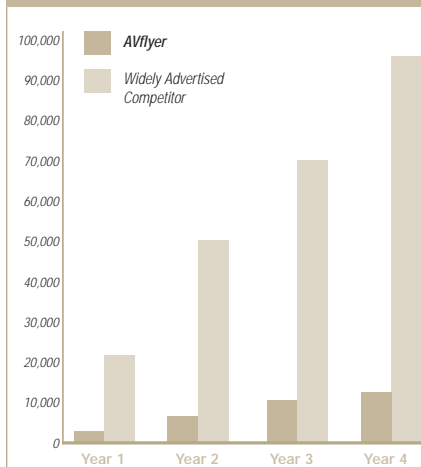
Today's business environment mandates doing more with less money, and utilizing the virtual workplace to orchestrate all manner of sales activities and interactions with customers and prospects—whether local or global. Leading sales organizations across a wide variety of verticals have increasingly embraced Web conferencing and online presentation and collaboration technology to accelerate the sales cycle, close more sales, train customers, and deepen customer relationships.

However, most sales professionals experience the following four problems with their Web conferencing and online communication initiatives:

- *Too much training required* to use system
- *Too costly* to expand or roll out additional usage
- *Limited reach*, with certain prospects and customers unable to participate
- *Lack of consistent message*, based on difficulty in sharing and centrally managing presentation content across the organization

The typical root of these problems is the selection of an overly complicated Web conferencing system.

## VALUE PROPOSITION Estimated Cumulative Cost Comparison - capacity for up to 10 persons



This article provides an overview of how to guarantee success by solving these four common problems with a simple, no-frills approach. While specific suggestions are made for sales professionals, similar benefits are available to other types of professionals, including consultants, marketing professionals and communications/public relations professionals.

### Deciding When to Use Online Communications in the Selling Process

In certain specific instances, such as initial prospecting and closing of smaller sales, online interactions achieve superior results than their traditional counterparts. In other instances, such as closing large and complex sales, the in-person meeting retains its superiority. However, leading companies are adopting creative hybrid approaches (see sidebar, "Hybrid Communications," p. 15), combining the benefits of personal interactions with the benefits of online interactions.

When deciding what applications to switch to online communication methods, consider the soft costs as well as the more obvious hard costs of in-person meetings. *The primary soft cost of in person meetings is typically the unproductive or lost time of your employees and other meeting attendees.*

Likewise, along with the tangible benefits of meeting in person (such as closed sales, qualified leads, and the like), consider the intangible benefits. *The primary intangible benefits of in-person meetings are the ability to develop rapport and trust, and the ability to gain information from body language and the physical environment.*

Consider using an online format or a hybrid approach for all activities where the estimated benefits of meeting in person do not exceed the estimated costs.

### First Steps: Getting Started

Select one or two possible applications for online meetings and collaboration, and then get started with a simple pilot (test). Select a project that is not too large, but that will still yield significant cost or time savings. Typical tests include:

- *Initial pitches or product demonstrations for prospects*
- *Weekly sales conference calls or internal training sessions*
- *Training sessions for small customers, where currently an in-person visit would occur*

### Criteria for Selection of the Appropriate Tool

After identifying particular applications for conversion to online communication and collaboration, the next step requires you to evaluate and select the technology tool most appropriate to your situation. For sales professionals, that means finding a tool that addresses these criteria:

- *Minimal Training Requirements*—Will people actually use the tool, or does it require too much training?
- *Pricing*—Is the tool priced for everyday use? Does it have hidden costs?
- *Universal Reach*—Will the technology requirements of the tool (such as downloads and high bandwidth) impede your activity?
- *Organizing and Sharing Content*—Does the tool easily allow you and your colleagues to organize and share a variety of content?

By design, the simple, no-frills AVflyer™ system fulfills each of these criteria, as detailed in the next section. Its design is optimized to serve as an everyday tool for external communications with prospects and customers, as well as internal communications with colleagues.

However, AVflyer™ is not optimized for certain specialized sales applications, such as:

- *Serving as the technical platform for very large events (over 1,000 simultaneous participants)*
- *Authoring high-end, movie style content for canned product demonstrations*
- *Event production services (consulting services) related to Webinars or special events*

AVflyer™ makes recommendations of other technologies and service providers that specialize in these niches. Typically,



Interactive features, such as instant polling, make excellent prospecting tools.

companies will employ a number of technology tools to cover a variety of specific needs. For example, a company may use AVflyer™ for everyday use for sales prospecting and customer training, and use another company specializing in SEC reporting activities to handle their online quarterly and annual shareholder calls.

#### AVflyer™ Uniquely Achieves the Four Criteria

AVflyer™ uniquely solves the Web conferencing problems common to sales professionals by achieving all four of the criteria.

- **Minimal Training Requirements**—AVflyer™ solves the training problem by keeping the system simple and by purposefully avoiding “feature bloat.” This means a typical user (comfortable with Web surfing and preparation of PowerPoint® slides) can self-learn the Standard Mode features in ten minutes or less. Even the additional Advanced Mode features can be mastered in one 45-minute training session.
- **Pricing**—AVflyer™ is priced for everyday use, while most systems are priced for occasional and special use. Many systems charge more for features never used by most customers—features that create training problems, and also create technical barriers to reaching a variety of prospects and customers with differing computer resources.

AVflyer™ never charges overage fees, while many purchasers of other services have experienced large, unexpected overage fees.

A company that uses AVflyer™ does not need to spend management time and effort allocating and limiting the use of their Web conferencing and collaboration tool.

AVflyer™ offers subscription pricing based on the total number of users (presenters and participants) using the system at any one

time. The license is flexible to allow for a number of presenters, rather than only one named presenter.

For example, a subscription license for capacity of ten would allow five separate simultaneous meetings, each consisting of a presenter and one participant, or it would allow one larger meeting consisting of nine participants and one presenter. If a customer’s usage bursts over their licensed capacity for more than a certain amount of time each month, AVflyer™ will contact the customer to request they increase the license (or agree to a hard limit on their number of simultaneous users). But overage charges will NOT accrue.

AVflyer™ also offers pre-paid minutes for customers conducting larger, infrequent meetings. For example, a customer holding a monthly meeting for 100 people would purchase pre-paid minutes, rather than a subscription for 100 users. This provides the best value for customers with spikes in their usage patterns.

- **Universal Reach**—AVflyer™ does not impede your prospecting activities with technology limitations. Unlike most competitors, AVflyer™’s Standard Mode operates with no downloads of any kind—not even Java applets or ActiveX® components. And because it reaches Apple computer users and operates at extremely low bandwidth (3-5Kbps), it reaches as wide an audience as possible. This provides an advantage over more complicated systems, especially during the early stages of the sales cycle, because inconveniencing the prospect or wasting time on technical troubleshooting jeopardizes the sale.
- **Organizing and Sharing Content**—AVflyer™ easily allows management and colleagues to organize and share a variety of content. Imagine if management could establish online sales presentation templates, complete with slides, surveys and Web tours. Centralized control over presentation content would eliminate the worry and hassle of updating the presentations on the computer desktop of each individual. This strategy drives consistency of message—and focus—throughout your sales process.

# Hybrid Communications:

## Integrating Traditional and Online Methods

*Conversion to online communication/collaboration is not an all-or-nothing proposition. Typically, innovative companies deploy a hybrid approach.*

*Examples include:*

**Tactic:** Switch to online presentations to qualify prospects. If criteria are met in the online screening process, then spend the time and resources for an in-person meeting.

**Idea:** Better qualify prospects with the aid of a Web conferencing tool, and save valuable time for prospects that are a better fit and more likely to close.

**Tactic:** Rather than sending two or three team members to call on an important prospect, send one colleague in person to read body language and develop the relationship. The other team members participate online.

**Idea:** Use Web conferencing to leverage your sales team and save “wear and tear” on key personnel.

**Tactic:** Switch to online customer training and support for the bulk of smaller customers, thereby freeing management to focus their in-person attention on the top 20% of customers that generate the most profit for the company.

**Idea:** Focus your personal attention on your most profitable customers.

**Tactic:** Reduce the frequency of in-person sales meetings—rather than abolishing them—and switch to online meetings for the interim periods. Example: rather than meeting weekly in person, meet monthly in person, and meet online 3 times a month.

**Idea:** Reduce, don’t eliminate, periodic in-person meetings. Use online communications to build momentum for in-person meetings.

## Conclusion

AVflyer™’s simple, no-frills approach ensures online communication success for the typical sales professional—solving all of the common problems they face. Most importantly, the combination of everyday pricing and ease of use ensures broad acceptance and widespread usage of the tool. That means AVflyer™ positions you to achieve or exceed your sales objectives while utilizing fewer resources.



Readers can obtain more information about AVflyer at:

888.AVFLYER (888.283.5937) or  
www.avflyer.com

contact  
info

# Presenting Engaging Media Experiences

In today's fast-paced market, companies are challenged to present information on the Web in new and compelling ways. One of the most reliable ways to present engaging experiences is via Flash-based technologies. Unfortunately, the technical learning curve of authoring and generating interactive content using Macromedia Flash is steep.

Xtivity™ is a new, professional Macromedia® Flash® (SWF) authoring software program that generates the engaging Flash experiences but does it through a different type of authoring environment. Xtivity allows Web designers, graphic artists, and new media designers to visually design interactive Flash Web projects in a layout-style workflow. There is no coding involved, and the user operates without being locked into a timeline, working with symbols and movie clips, or any of the traditional methods used to author interactive Flash projects.

The Xtivity workflow is designed around a simple premise: allow the user to assign actions to objects, and then trigger the actions using events. The user can draw boxes, add content to the boxes, assign actions to the boxes, and then tell the actions when to start.

Xtivity exports the final project to the Macromedia ShockWave Flash (SWF) file format, which plays in the Flash Player on 98.3% of the world's Internet browsers. SWFs generated with Xtivity have the same look, feel, and compatibility as any other type of SWF file.

## Productivity Is Key

Edits, updates, and new additions to interactive Web sites and to sites deploying streaming media take time; invaluable time when you look at the pace of business updates in many companies.

Xtivity uses a drag-drop-deploy workflow that enables rapid creation, updating, and editing of project content. This means more work can be done in a shorter time, allowing users

to focus on the design of a project instead of the coding, scripting, logic, and structural aspects traditionally associated with a code-based authoring environment.

Xtivity's interface should come as a familiar sight to users who have experience with other professional design programs such as Photoshop, Dreamweaver, and Quark Xpress. Xtivity uses a layer-based content architecture with a logic-based workflow. The user can add actions and edit properties of individual content layers providing a visual environment, not a coding environment. Xtivity can directly import entire Photoshop documents. Users can create entire Web sites in a multi-layered Photoshop document, and then import the PSD into Xtivity and apply actions and properties to each individual layer. Updating is effortless, as changes you make to the PSD in Photoshop can be sent to the imported PSD in Xtivity with the click of a button.

Xtivity not only will stream multimedia from the Web, but also will import and compress raw media in the form of .mov, .avi, .mp3, and .wav files with variable compression settings that rival major media editing programs for quality and file size. Once implemented into a project, Xtivity will export video files as separate SWFs that can be streamed from an Internet location into any type of application that calls upon it.

## Creativity is Fundamental

Xtivity includes a content library that consists of thousands of pre-made graphics, sounds, transitions, and SWFs. With such a time-saving treasury of content at the user's disposal, the scope of the creative project is

limited only by the user's imagination. Tivity Software regularly offers new downloadable content from its Web site. This content ranges from simple buttons and masks to entire projects featuring newly discovered techniques and tips that can be edited or can be substituted with the user's own content for exportation.

Xtivity's graphic library includes dynamic graphic content that can be scaled and tiled at both run time and author time. Xtivity also includes pre-made objects called Elements and Components that allow the user to plug-and-deploy projects by dragging over their own content into the proper placeholders. For example, there are Previewer components that allow users to plug in their own images to create professional, interactive slideshows driven by a topic list.

## Who We Are

The diverse work force at Tivity Software understands the mind of the professional Web designer, graphic artist, and new media designer. Our goal is to provide a way for users to build enriching Internet experiences through interactive media for their site visitors.

Tivity Software is focused on offering professional authoring tools that can be used to create interactive Web sites and offer streaming video, Web communication systems, and other solutions currently in development.

## Free Trial

Whether you're a top-end graphic Web designer or a computer-savvy rookie wanting to add interactive content to your first webpage, Xtivity has something for you. Visit our Web site at [www.tivity.com](http://www.tivity.com) to download the free 30 day trial.

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# The X PRIZE

*Launching a historic event via Webcasting*

The Ansari X PRIZE, a \$10 million reward offered to jumpstart the space tourism industry through competition among the most talented entrepreneurs and rocket experts in the world, was designed to recognize the first team able to privately finance and successfully build a spaceship that launches three people 62.5 miles high and return safely to Earth. Teams from all over the world raced to see who could be the first to reach this milestone and win the Ansari X PRIZE.

## Problem

Knowing the huge interest this would have for those in the space and aviation community and public citizens interested in space travel, the X PRIZE Foundation wanted to allow users worldwide to witness the historic first-ever civilian launch by the first team's craft SpaceShipOne on September 29, 2004.

Since this once-in-a-lifetime event was not available via any television broadcast, the X PRIZE foundation needed a way to leverage the Internet to deliver this historic event to the masses. The Foundation sought a solution with the capacity to seamlessly deliver video for the entire event to users worldwide. And since the X PRIZE Foundation operates entirely on donations, they also needed to use the launch as a means of outreach to further their cause of working towards making private space travel a reality.

## Solution: Mirror Image Live Webcasting

To ensure online visitors a high-quality experience, the Foundation selected Mirror Image to Webcast SpaceShipOne's private

space flights for the \$10 million Ansari X PRIZE. The first X PRIZE launch on September 29, 2004 experienced 1,200 hits in the first minute, and at its busiest points as many as 19,270 concurrent users, all of whom Mirror Image's Webcasting solution handled impeccably. From its onsite airport location in the Mojave Desert, Mirror Image provided live encoding and signal transmission services back to its global Windows Media 9 Certified network to successfully deliver the event.

By combining live event management, onsite production and global live video delivery, Mirror Image provided the X PRIZE Foundation with all the resources involved in the entire Webcast chain to make the event a success. "For more than 30 years, the general public waited for an opportunity to enjoy the space frontier on a first-hand basis, and with the help of Mirror Image we delivered it to them on September 29," said Peter Diamandis, X PRIZE Chairman and President of The Ansari X PRIZE Foundation. "The Ansari X PRIZE Foundation has made witnessing space travel possible for all, and by partnering with Mirror Image, we were able to guarantee that online visitors would not miss history in the making due to performance or capacity issues."

## The Results

Drawing online spectators from all over the world—including North America, Europe and Asia,—Mirror Image made it possible for viewers to successfully watch the historic X PRIZE launch. In fact, according to traffic statistics of the first launch, 41 percent of the visitors viewed the Webcast for more than an hour, which indicates that they did not experience any glitches that disrupted the quality of the Webcast.

After SpaceShipOne's first achievement, a second flight needed to successfully be

completed before the \$10 million X PRIZE could be claimed. The second launch, which occurred on October 4, 2004, was also Webcast by Mirror Image. This time, the traffic skyrocketed beyond the first launch's numbers with 621,901 total hits, which were comprised of 75,159 unique visitors and 24,421 repeat visitors, and peaked at over 20,000 simultaneous users at any one time. For this event, the large numbers were also partly attributed to the fact that CNN.com, Space.com, Yahoo.com, WindowsMedia.com and other websites were pointing their traffic directly to the live streams that Mirror Image delivered on [www.xprize.org](http://www.xprize.org).

"We are thrilled with both the interest and attention the X PRIZE event generated and thank Mirror Image for enabling us to deliver the launches to thousands of viewers without a hitch. As companies like ours continue to innovate, it is good to know that we can depend on Mirror Image to provide the capacity and technology necessary to handle events of this size," concluded Diamandis.

Mirror Image Webcasting service allowed the X PRIZE foundation to gain mainstream exposure to their Web site, got people excited in what they are working to accomplish, and helped them accept donations to help further their cause of bringing affordable private space travel to the public. In fact, due to the Webcast, online donations to the X PRIZE Foundation for the year were doubled during the two-week event thanks to the exposure.

Watch out for a whole series of Webcasts when the foundation launches the X PRIZE CUP, ([www.xprize.org](http://www.xprize.org)) a 10-day event where the average person can come and watch the next generations of space vehicles fly, where they can talk to the astronauts, see the vehicles up close, learn about the technology, and begin to dissolve the myth that they will never travel to space in their lifetime.



*The XPRIZE Webcast peaked at more than 20,000 simultaneous users.*

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Readers can obtain more information about Mirror Image Internet at:

800.353.2923 or  
[www.mirror-image.com](http://www.mirror-image.com)

# Webcasting Fosters Better Parents in Washington

*The state's Foster Parent Training Institute is using Webcast-based training to provide continuing education to foster families all over the state.*

Government bureaucracies are snail-paced and behind the times, right? Well, that's certainly not the case in the state of Washington, where government agencies have long used video for training and for disseminating information and now are embracing the Internet as an important platform for delivering that video.

One particular government program stands out as an example of the strategic use of Webcasting for training, though it is certainly not the only such project currently under way in Washington. It is a foster parent workshop that's been developed by the Foster Parent Training Institute (FPTI), a unit of the state's Department of Social and Health Services that is responsible for providing continuing education to the state's 6,200 foster families. Improved care for foster children through better-educated and more aware foster parents is the goal, training is the method, streaming video is the medium, and the Internet is the delivery mechanism for this ongoing project.

The FPTI supplies the content and the instructors/presenters, while the actual production of the Webcast training events (and the Web site hosting) is handled by the state's Department of Information Services (DIS). The DIS is a service agency for other state agencies; when an agency wants to reach out to the public or improve its internal or external communications, it contacts DIS.

The DIS offers state agencies a "Technology Mall," from which they

can choose among such services as video production, Webcasting and video streaming, satellite broadcasting, downlink coordination, interactive system design, and/or Web site design.

## From Satellite to Webcasting

With the help of the DIS, the Foster Parent Training Institute has been using video to educate foster parents since around 1996, when they began broadcasting video training workshops via satellite. This type of video distribution, though expensive, was appropriate for Washington, a big state with a large rural population spread throughout varied and often rugged terrain. Add the challenge of winter weather, and you can understand why an educational organization like the FPTI might want to limit the number of

teachers it has on the road at a given time. Travel for learners also is a safety and cost concern.

Broadcasting training events via satellite required that learners gather at about 15 downlink sites scattered around the state, in places such as community centers, colleges, hospitals, and 4-H Club extension offices. This approach of doing a one-time broadcast event from a single central location provided a big cost and time savings over the alternative of holding multiple scheduled classroom-style, small-group workshops in virtually every community in Washington and having to pay-per diem travel costs for thousands of parents.

Since the FPTI has switched to Webcasting, the savings have been even greater. Renée Klosterman, multimedia production manager for Interactive

**Department of Information Services**  
**Technology Mall**

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*Video production and Webcasting are just a few of the services offered at Washington's online Technology Mall.*

*Renée Klosterman estimates that the cost of doing a Webcast for 450 participants is about one-half the cost of sending the same presenter out to conduct live workshops throughout the state in 18 locations.*

Technologies at the DIS, isn't sure how much the former satellite approach had saved the FPTI, but she estimates that the cost of doing a Webcast for 450 participants is about one-half the cost of sending the same presenter out to conduct live workshops throughout the state in 18 locations.

While satellite broadcasting was an improvement over multiple onsite sessions, it still had many drawbacks. One disadvantage of satellite broadcasting was its inflexibility. If the workshop leaders wanted to run overtime, they couldn't, because when their time was up, they'd get "kicked off the bird," says Klosterman. "But with Webcasting, if the session goes overtime, you can just let it continue to run," she says. "You can be more flexible with the timing of your program." And then, of course, there was the cost of buying "bird time."

And even though the instructors didn't have to travel from site to site (they just had to show up at the one broadcasting site), the learners/parents still had to do some traveling. "It was still a hassle for parents to travel 30 miles to a downlink site," says Klosterman, "and it also meant time spent away from the kids they were supposed to be caring for."

In contrast, when video instruction is delivered over the Internet, parents don't have to leave their homes at all. They can participate in live workshops from their desktop PCs and even can ask questions via either email or a toll-free phone number. Or they can opt for the even greater convenience of accessing the workshop content non-real time "on demand" from an archive on the DIS server. Of course, archive users who forego the live Webcast gain convenience but lose the



ability to interact live with the presenters. Klosterman is surprised at how many people are willing to make this tradeoff. Among users, the on-demand option is far more popular than the live option, she says.

The DIS began experimenting with Webcasting internally within its offices in 1998 and initiated the Web workshop approach in June 2001. Then, in October 2001, they "really kicked off" their Webcasting services, says Klosterman, with a special Webcast event live from the Central Washington State Fair. There a panel of experts convened to discuss how foster parents could help their kids cope with the trauma September 11 caused. A live audience of local foster parents and community members was allowed to ask questions, and the program was Webcast live for remote foster parents.

That event was a sort of trial run for Webcast foster parent training, and its success made it a model for future sessions. Since then the Institute has conducted seven Webcast training workshops, with more planned for the future.

### The Horsepower Under the Hood

For its streaming services, the state of Washington Department of Information Services uses a Helix server from Real Networks. Why do they use Real? Well, it's tradition. When DIS first started streaming back in the late 1990s, "Real was the top dog in the running at that time," says DIS multimedia developer Dan Steeby. In the interim, Real has updated the Helix server to stream Windows Media as well as the RealVideo format. That simplifies Steeby's job and provides cost savings because, he says, "Now we can offer more than just Real, and we don't have to own multiple servers to do it."

Steeby says the main drawback to being a Real shop is "security issues at the client end with agencies that don't have permission to use Real." He goes on to explain that security fears have caused many state agencies to "lock down their desktops" so staff users can't download or install unapproved software. Consequently, many Washington government PCs don't have RealPlayer installed on them. They have only the Windows Media Player that came with the PC when it was purchased.

*Video professionals  
who switch to video streaming  
need to fight their natural inclinations to want  
to do more to make things look sophisticated.*

## Eight Webcast Essentials

- Frame subjects tightly.
- Skip the flashy effects.
- Avoid “busy” backgrounds and unnecessary motion (like complex transitions).
- Don’t use too many graphics.
- Avoid using too much text with audio narration; i.e., “PowerPoint-style” presentations.
- When possible, give your presenter a live audience for in-person feedback.
- Break up long speeches with Q&A.
- “Plant” email queries and audience questions to jumpstart feedback sessions.

The DIS Interactive Technologies unit encodes in all three formats and in multiple bitrates from 28Kbps to 256Kbps, according to Steeby. They realize that many of the state’s foster parents are limited to dial-up connections, and so they do what they can to optimize the video streams for “the dial-up crowd,” he says.

### Production Lessons and Best Practices

Washington’s DIS has been offering video services for years and so is well-versed in the art of video production for broadcast and recording. But when they began to do streaming video, they needed to shift their mindsets a bit to adjust to the idiosyncrasies of this new medium.

Klosterman says that video professionals who switch to video streaming need to fight their natural inclinations to want to do more to make things look sophisticated. She believes that instead, they need to discipline themselves to do less. “Our motto is ‘simple pictures are best,’” she says.

To that end, DIS producers of streaming video avoid flashy opening montages,

effects, dissolves, and other transitions. They frame subjects tighter with the camera and avoid visually “busy” backgrounds and unnecessary motion.

Klosterman believes that if you use a lot of graphics you often give the viewer too much information. “You might get away with that if you were doing a PowerPoint presentation, but it doesn’t work for a Webcast,” she says. You have to keep the limitations of your medium in mind and adjust your presentation to play to its strengths and weakness. “It makes more sense to make the presentation fit the medium,” says Klosterman.

Klosterman frowns on PowerPoint-style Web sites and calls them “talking newspapers,” because they are mostly text with audio narration. “Listening to someone just talk for an hour can get boring,” she notes. Klosterman recommends that

### Good Work Breeds More Work

Renée Klosterman is satisfied with the success of the foster parent Webcasts, even though that success has increased her workload. It has motivated other state agencies to demand her services. Still, not everyone in Washington is yet onboard the streaming video bandwagon, and so she has been working to rectify that.

“Webcasting is still science fiction for some people,” she says. “So we spend a lot of time just educating people at the state agencies. But once they’ve tried streaming video, they are thrilled with it.”

Klosterman regards the foster parent training program as a sort of proof-of-concept project that has laid the groundwork for even more exciting and effective streaming video training projects in the future. “Webcasting is going to be a huge training mechanism,” she predicts.

“Webcasting is still science fiction for some people. *But once they’ve tried streaming video, they are thrilled with it.*” —RENEE KLOSTERMAN

Web sites use streaming video to create user experiences that are more like watching a TV news program, with short, bullet-point comments and pre-produced video clips/segments.

Klosterman also has some tips for improving the effectiveness of the Webcast events themselves. There at the DIS, producers always try to make sure there is a live audience for the Webcast presenter who is being recorded, even if it’s only four people. This gives the presenter someone to get visual cues and feedback from, and it makes the presentation seem more natural to the remote Internet viewer.

Also, don’t let the speaker just drone on, warns Klosterman. “Throw in some Q&A early on” to break up the monotony, she says. She also suggests planting a few questions in the audience. Sometimes a reticent audience needs to be urged to ask questions. They just need someone to start it off, someone to break the ice. Take some of your FAQs and feed them to your audience “plants,” Klosterman recommends. Likewise, plant some email questions to jump start your email interaction.

So far, streaming video has been a very effective communications tool for her service agency, says Klosterman. The Internet provides her with a conduit to “get out the information” that she’s been asked to disseminate, and to do it in new and unique ways. “We can get out information to the public that we simply just would not have been able to get out before,” she says.

And she points out that streaming video is helping to extend the reach of the Foster Parents Training Institute’s efforts beyond the state limits. The FPTI and DIS frequently get requests for their streamed video content from other states and other countries. And so Klosterman is not just “getting information out” to the state of Washington—she’s getting information out to the world.

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# Video Production for Streaming

*From lighting to camera work to video resolution, there's plenty you can do to make sure that your encoding team has the best possible footage to work with.*

When discussing the best ways to ensure a high-quality streaming broadcast, most of the attention centers on the encoding. But there's only so much encoding can do when the video itself isn't quite ready for primetime. Here's a look into what can be done prior to encoding to set the stage for a successful Webcast event.

## Stay Lit

Eric Manchester, senior live events producer for AOL, has acted as operations lead on more than 1,000 live Webcasts for AOL, "ranging from small internal Webcasts to some of the largest live events on the 'Net," he says. Through this experience, he's come to recognize the primary differentiating factor when it comes to producing video for streaming: "You need a lot more light for streaming than you do for almost anything else."

Steve Mack, author of the *Streaming Media Bible* and founder of LUX Media, echoes this sentiment. "While you can do some things in post to fix it up, you really have to get the light right to begin with," he says. This is especially true during a live event, Mack notes; spending time in post is a luxury that Webcast producers don't have.

"I would highly advise anyone in a live broadcast situation to bring in external lighting," Mack continues. "If you're broadcasting a simple talking head, you can accomplish this with a simple three-point lighting system. If you're broadcasting a much larger presentation, obviously the lighting becomes a little more complex. You need to light the entire stage in a wash. At that point, it's probably best to consider bringing in an outside lighting consultant."

## Steady As It Goes

Video codecs use motion as the primary determinant for deciphering what's most important in a scene, meaning excess motion during a video production will result in a lower-quality streaming video. "Any unnecessary motion should be avoided," says Mack. "Spending money on a tripod is a very good investment. If you have your camera locked

down, you'll get a higher-quality encode."

Both Mack and Manchester recommend avoiding the trap of adding too much visual flourish to a streaming event. "I have done a number of events where they put a background up with a number of very small logos all over the backdrop, or [someone] wore an outfit with sequins and sparkles all over it," says Manchester. "This is very hard to encode, and when you only have approximately 300k to play with it's not likely to look very good."

## The Higher the Better

Despite the fact that streaming video can't match broadcast when it comes to resolution and picture clarity, that doesn't mean video shot for streaming should be produced at a lower quality. "I really think that one should always capture in the best possible quality," advises Manchester. "You can never improve it later on."

And while this higher-quality video may not directly impact the quality of streaming experiences today, it could go a long way to ensuring that video content maintains its relevancy as consumers begin to expect higher-quality video. "You're going to want to archive in a format that will be at the highest possible resolution," says Mack.

"But you also need to look at how you are processing your content," Manchester says. "When you're encoding live you do not have the luxury of time. Your system must be able to get the video in and out in near-real time. Your CPU cycles are a key to this." When CPU resources run low and encoding quality suffers, Manchester warns, "you are affecting every single viewer out there."

## Testing Saves

As is the case with any streaming broadcast, testing prior to the event is essential to see what effects your production choices are having on the end product. "You need to understand what your production choices do to your end product," says Manchester.

"When I encoded the Concert for New York City after 9/11," he recalls, "we spent 30 minutes trying to optimize the feeds we

were getting from the concert site, as we were unable to get bars prior to test feeds. We thought we caught everything we could. When we looked at the high-bitrate encodes, we looked great. Then David Bowie walked on stage in an all-white outfit with a very bright key lighting package on him," Manchester continues. "We found he was a bit too white and tried to compensate. The high-bitrate feeds looked OK, but when we finally checked the low-bitrate encodes we found that Bowie looked like a giant white blob."

## Digital Delights

"The biggest thing we've done in the last year to improve our Webcasts is our new broadcast operations center," says Manchester. "While we have spent time working on optimizing our encoding profiles for better quality and efficiency, the move to an all-digital space has had the greatest impact."

By staying digital, Manchester's team is able to avoid the noise and artifacts typically generated through analog-to-digital conversion. "The encoders on the market today are not able to differentiate between the noise and the actual content," he continues. "Each artifact would then be encoded into the stream and eat up valuable bits that I would have preferred to see spent on other areas."

Not only that, but moving between analog and digital introduces additional problems to streaming's already sensitive light levels. "Each conversion in the process darkened our feeds," says Manchester. "Encoding in general prefers brighter feeds. This darkening caused a lot of time and resources to be spent improving the feed. We are finding that staying digital continues to streamline our process."

bio

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# First Things First:

*Audience Experience Matters Most*

## Limelight Networks

- Live and on-demand broadband streaming to large audiences
- Massively provisioned to broadband Internet providers
- High-capacity media backbone
- Massive and highly-scalable storage & delivery
- High-bandwidth media delivery Architecture

- *The success of a particular song, video clip, or game that becomes popular can overwhelm the Webcaster's infrastructure, causing users to be frustrated at exactly the moment of greatest popularity and demand.*
- *Delivering content to users one at a time means that costs increase in lockstep with audience size.*
- *Internet users have learned to expect "what I want, when I want it," which means that every media file (song, video, or whatever) may have to be instantly available on demand.*
- *Users increasingly connect to the Internet not just from PCs, but also from cell phones, music players, game consoles, TiVo video recorders, set-top boxes, and other devices.*

Each of these special Internet challenges, if not recognized and dealt with effectively, increases the risk that an otherwise compelling media experience will in the end be nothing more than an unsatisfactory, frustrating, low-fidelity experience for its intended audience. And that guarantees failure: message not communicated, and no return visits.

All of these problems can be addressed, however, by using a content delivery network (CDN) to get rich media content to Internet audiences, especially if the CDN is designed specifically for media delivery rather than text and graphics. CDNs are specialized networks designed to provide high-performance delivery of content objects across the Internet to users located around the world, generally by locating large numbers of servers at many locations and then servicing content requests from these "forward" positions.

As broadband Internet connections—residential, workplace, and wireless—continue to grow at breakneck speed, more and more of the Internet user population is able to get, and increasingly demands, rich media content. This transition from the text-and-graphics Web to the audio-and-video Web creates new opportunities for media companies and enterprises to capture user interest and exploit the power of rich media to emotionally connect with, and powerfully communicate to, audiences, users, customers, employees, and communities.

Making the most of these opportunities usually means implementing an Internet streaming media strategy, and that raises many issues involving technologies, platforms, media players, and other important building blocks. It is important to think through these technical complexities, but it is essential not to lose sight of the single most important success factor of all: audience experience matters more than anything else.

Based on years of media experiences—radio, CDs, television, and movies—consumers naturally expect that media will continue to look and sound like, well,

Internet streaming media has now crossed this quality threshold and rapid consumer adoption has begun. But that doesn't guarantee acceptance of poorly-executed streaming content. In fact, it means exactly the opposite: the bar is high and moving higher, and anyone seeking to exploit Internet streaming media must be cognizant of the audience's demand for a media-quality experience.

Audience experience begins with story and storytelling. Regardless of the nature of the content—whether it is fact or fiction, whether the duration is 30 seconds or 30 minutes, whether the goal is to entertain, amuse, inform, instruct, or persuade—the heart of connecting with an audience is storytelling. Effective storytelling demands at a minimum a basic set of communication skills coupled with a decent grasp of the tools of the medium. Far too often, especially in early attempts at a new medium, would-be communicators lack that grasp of the medium's tools. Just as telling a story well in text means knowing how to write, spell, and punctuate, telling a story well in audio and/or video means knowing how to compose, produce, and edit. It is important not to assume that pointing a camera at some-

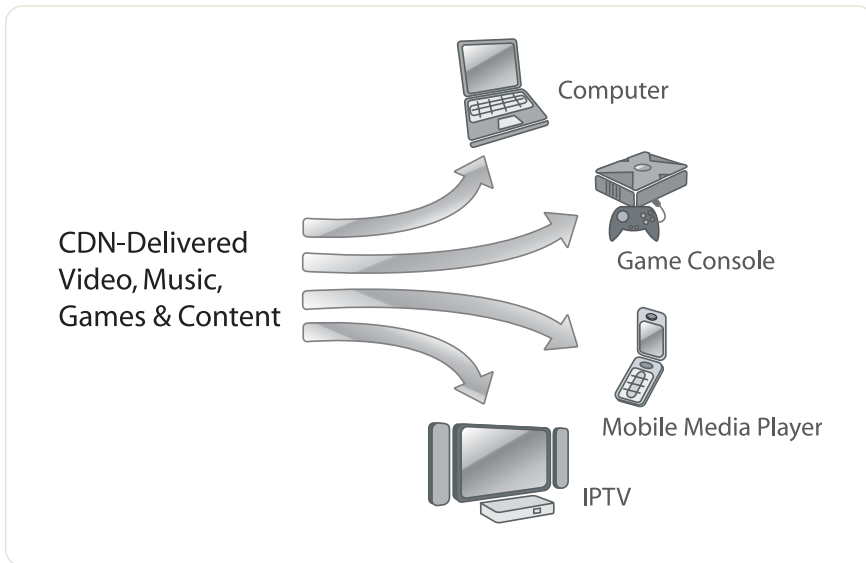
**A well-built CDN will include the ability to store a Webcaster's entire content library in the network and move any object to a forward server for delivery within milliseconds of a user's request.**

media. While consumers will accept some compromises in quality in exchange for expanded content and/or flexible choice of time, place, and setting (similar to the trade-off a cell phone represents between voice quality and mobility), history establishes that consumer acceptance does not take off until quality of experience reaches a minimum acceptable threshold, at which point acceptance skyrockets.

thing is the same as visually communicating an idea. Poorly produced audio and video content will not be widely accepted by audiences and will fail to achieve its objectives.

But beyond the storytelling challenge, the Internet presents additional unique problems in delivering a quality audience experience:

- *Internet congestion can cause media playback to stop, start and skip.*



*To maximize the opportunity* it is important to address delivery to other devices, including mobile phones, music players, TiVo-type digital video recorders, and game consoles.

CDNs differ from one to the next in the details of their architectures and the industries and content types they are designed to address, but they share the common characteristic that they can get media content to an audience fast, without the stop/start/skip problems associated with the “plain old” Internet. Simply put, they bypass or “leap across” most or all of the congestion that causes the stop/start/skip problem in the first place. This high performance media delivery creates a “high-fidelity” experience for audiences.

CDNs are also, for the most part, adept at handling surges in demand, because when such a surge occurs, the CDN can spread that demand across many servers. A well-designed, well-equipped CDN accelerates smoothly as users flock to a particular content object or broadcast, so that all users, across almost any size of audience, receive the same high-quality, high-fidelity experience. For example, in the spring of 2005, when the new Pope Benedict XVI was elected and spoke to crowds in St. Peter’s Square, the audience viewing this historic event live via MSNBC’s Internet video coverage surged to more than 100,000 simultaneous viewers, and the total traffic jumped to over

21 gigabits per second—more traffic than most ISPs’ entire networks ever see at one time. MSNBC handled this audience surge without a glitch because it delivered the event via the Limelight Networks CDN.

At the same time, however, the Internet’s one-by-one delivery of content to each individual user means that delivery costs increase in direct proportion to audience size, unlike other media. This can mean that larger audiences are a mixed blessing bringing greater reach, but at higher cost. These kinds of cost concerns often cause Web sites to compromise fidelity and audience experience by reducing the bitrate at which media is encoded, in an attempt to keep costs down. Encoding at a lower bitrate means fewer bits/bytes, and therefore lower cost, per user, but it also means lower quality. In the case of video, for example, lower bitrates mean smaller viewing size and fewer frames per second.

In such a scenario, a CDN’s performance should be evaluated in economic terms—that is, in terms of cost of delivery. A well-built CDN designed for media delivery will have a significant cost advantage over one designed for the text-and-graphics era of the Web. By selecting a lower cost, media-

focused CDN, a Webcaster can deliver more bits, higher fidelity, and a truer media experience to the same size audience without increasing the budget.

Another important factor is the “get what I want, when I want it” nature of Internet user expectations. The audience experience challenge isn’t well met if the 80/20 rule applies—if 80% of the media content is delivered less frequently, and therefore is not available in the CDN’s forward servers when it is requested by a user. Techies call this situation a “cache miss” by which they mean that the CDN has missed the opportunity to serve the object from its servers, and so must first request the object from the Webcaster’s site itself—an extra step that effectively defeats the whole point of having a CDN for media delivery.

A well-architected media-delivery CDN, on the other hand, will include the ability to store a Webcaster’s entire content library in the CDN network, and to move any object to a forward server for delivery within milliseconds of a user’s request.

Finally, the advent of the new digital lifestyle means not just an explosion of digital content, but also a proliferation of digital devices. Delivering media content to PCs is clearly fundamental, but to maximize the opportunity it is equally important to address delivery to other digital devices, including mobile phones, music players, TiVo-type digital video recorders, and game consoles. Audience experience is not just about high fidelity, but also about user choice of time, place, and device.

Thoughtfully addressing the key issues that drive audience experience—storytelling, high fidelity, demand surges, instant availability for large media libraries, delivery to the full range of digital devices, and cost efficiency—will enable any Webcaster, large or small, to leverage the reach and power of the broadband Internet to communicate effectively to, and connect powerfully with, audiences and users at home, at work, and on the move, whenever and wherever users want it, need it, or demand it.

The Limelight Networks logo features a stylized green eye shape above the text 'LIMELIGHT NETWORKS'. To the left of the logo, the words 'contact' and 'info' are stacked vertically in a light grey font. Below the logo, the text reads: 'Readers can obtain more information about Limelight Networks, visit: 866.200.LIME or www.limelightnetworks.com'.

For more information on any of the companies who contributed to this white paper, visit their Web site or contact them directly:



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