

Live Internet Broadcasting

Not Just For Entertainment

By Rich Mavrogeanes & Mike Savic

It is no secret that the public Internet is rapidly becoming the dominant source of media consumption, especially for the younger generation who view TV on computer screens, cell phones, PDAs, and personal Set Top Boxes. Netflix, Hulu, Google, TiVio, and others are rapidly replacing physical media (DVDs) distribution of movies with online downloads and streaming service.

But you should not confuse the viewing of recorded video programs with the viewing of live video channels. They are related, but very different.

A live video channel is immediate and interactive. You can broadcast news, special events, and company updates. You can simulcast your conventional TV broadcast over the public Internet, already done by many TV stations today. Popular live broadcasting applications include:

- Conference events at hotels, conference centers, meeting rooms
- Public, Education, and Government (PEG) TV channels
- Sporting events

- Enabling remote family members to view memorial services from funeral homes
- Government town hall meetings
- Charity events and fund raising activities

Happily, putting a live broadcast on the public Internet is very, very easy and you don't even need to know how to spell "IP" to do it.

Quality Broadcasting

Video on the public Internet can certainly deliver broadcast quality, including HD. However, don't be confused by *file* download and *file* streaming with *live* video.

Most consumers don't understand the difference between live and stored video, but with a file there is ample opportunity for a player to buffer and do various tricks to achieve a good result.

A 10-minute video file that is encoded at a very high rate will almost certainly take more than 10-minutes to buffer and play when accessed over consumer-grade Internet connections. A *live* video has no such opportunity so its encoding rate has to be within the range of the target audience.

Experience shows that most DSL/cable modem broadband users are successful with video in the 300 Kbps range, and success rates fall rapidly above 700 Kbps. So, even if you could send video at 2 Mbps (which you likely cannot do on a conventional DSL line), most of your viewers would be unable to receive it.

You should also not confuse “webcam” and desktop videoconference applications with true Internet broadcasting. Beyond reliability issues and scaling to support thousands of live viewers, these tools are intended for small “talking head” use with you sitting at your computer, and they do not attempt to deliver full motion, high quality video broadcasting.

To provide a quality broadcast result, you need a dedicated encoder, and today they come in two popular flavors: windows media and H.264 (because Flash player only supports file playback for standard H.264, but not live video, it is not considered here).

A high quality live broadcast therefore requires an audio/video source, a dedicated encoder, a streaming service, a web page with the player, and a web server to deliver the web page. With this, you can broadcast 7 x 24, or broadcast only for the duration of your event.

Purchase or Rent

If you are simulcasting your TV station, PEG channel, or if you broadcast an event monthly, weekly, or daily, chances are you will want to simply purchase the needed equipment. The Discover Video kit includes the encoder appliance, a year of streaming service, hosted web viewing pages, and remote automatic configuration.

If you are conducting an event, such as a trade show, conference, charity or fund raising program, annual company sales meeting, or other occasional event, renting the equipment may be in order. The Discover Video kit can be rented on a monthly basis, and it includes the encoder appliance, monthly allocation of streaming service, hosted web viewing pages, and remote automatic configuration. The monthly rate is approximately 1/12th of the purchase price.

Choice

You may select H.264 or Windows Media for your streaming video. H.264 has a slight quality advantage over the Windows Media appliance at the Internet streaming rates of interest, and Windows Media has an advantage for simplicity and viewing options.

The Discover Video web viewing pages use both Windows Media Player and Silverlight to display live Windows Media video and QuickTime player to display live H.264.

Simplicity

The Discover Video solution benefits from fewer firewall issues and is a true plug-and-play” streaming solution from virtually anywhere.

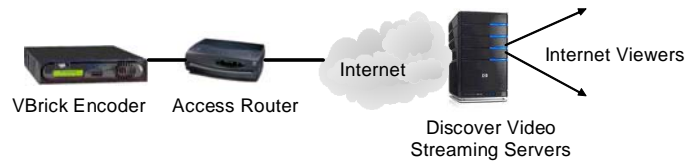
For Internet broadcasting, an encoder sends IP packets that contain compressed video to a special hosted server that is also connected to the public Internet. This server, also known as a “reflector” or “CDN”, then delivers your video to viewers. The encoder accepts audio/video via standard and familiar input connectors, and it connects to the public Internet via Ethernet. You must have an Internet connection that can support the upload speed. Happily, gaining Internet access today is usually quite simple, and a consumer-grade cable modem service or DSL connection is all that is needed.

Care should be taken if you elect to use existing Internet access (for example, a municipal, corporate, or school LAN) because you must have sufficient full time uplink speed of approximately 300 to 700 Kbps. In most cases there is ample bandwidth, but you need to ensure that there is (see FAQ, below).

With two connections made (audio/video + Internet via standard Ethernet), you are instantly “on the air” and you and your viewers can watch your new Internet TV channel from anywhere in the world.

Cookbook

To send your video channel to the Internet only, you need a VBrick appliance, an optional Access Router (cable or DSL modem), and an Internet connection.



Audio/Video

Your audio/video source may be a camera, VCR/DVD player, TV Tuner, or anything that delivers a standard composite or SVideo output (e.g. the “yellow” RCA type connector from consumer A/V gear). Simply plug it in and your video source is “on the air”. Higher quality video sources produce a higher quality video image for your viewers. For a conference venue that has an A/V team to display camera feeds via projectors, simply have the A/V team feed the encoder with the same signal; for a sales meeting, just hook up an inexpensive “camcorder”.

Your audio/video choices range from the most simple to very complex, but the connection of your final audio/video feed to the encoder is simplicity itself.

Automatic Configuration

The technology has many possible settings, and some can be difficult to understand. Thankfully, the Discover Video PEG kit includes automatic configuration. The on-site technology automatically “phones home” to obtain configuration information, allowing for automatic optimum performance and vastly reducing complexity for PEG operators. Even though the technology may be behind your firewall, Discover Video can make adjustments for you, virtually eliminating your technical participation in the setup and operation of you live video broadcast.

Discover Video Internet Broadcasting Frequently Asked Questions

- How much Internet bandwidth do I need?
 - For Internet streaming, you need at least 300 Kbps for reasonable quality. Don't assume that the bandwidth you have for email and general browser uses is sufficient. A good guide is available at www.speedtest.net -- pay special attention to uplink bandwidth.
 - A conventional DSL Internet access connection with uplink rates over 1 Mbps are easily installed, and costs are in the \$25 to \$50 / month range.
- How much Internet streaming service is included in the Discover Video kit?
 - 10 GB/month, 120 GB per year. This is more than enough for the average PEG channel. This is over 900 viewing hours at the 300 Kbps rate. Bandwidth usage is measured on viewer consumption, so you can stream 7 x 24 and incur *no* usage when no one is watching, and you use about 0.12 GB if someone views for one hour.
- Is there a cost for going over 120 GB in a year?
 - Yes. If you go over the allocation service does not stop, but you will be invoiced for bandwidth used in excess of your allocation. The bandwidth rates are low, and tend to go down over time. Online usage reports are provided.
- What happens at the end of the first year?
 - You may renew your service to continue broadcasting on the public Internet. Generally, you can budget approximately \$120/month depending on usage.
- Can I get a higher initial Internet bandwidth allocation for broadcasting on the web?
 - Yes. Contact Discover Video for rates
- I understand that the service allows me to "simulcast" the PEG channel on the public Internet. Can I record programs and make them available for video-on-demand too?
 - Yes, with a small additional cost. While you can certainly record video and upload it to popular video sites such as YouTube, these free sites do not generally support long-form content (i.e. 1-hour programs).

- Does the public Internet live video web page include my information, logo, etc.
 - Yes. You can customize the provided viewing page with your title/name and logo. The web page includes both Windows Media player version and Silverlight version, thus assuring compatibility with Windows, MAC, and IE, Firefox, and Safari browsers. The H.264 viewing page uses QuickTime player.
 - Simple “cut and paste” code to display the live video on your own web page is provided.
- How reliable is the Discover Video kit?
 - Extremely reliable. The VBrick appliance is designed for 7 x 24 operation and is not a “PC with a video capture card”. Its operating system is the same one NASA chose for the Mars pathfinder mission. Coupled with Discover Video’s exclusive remote configuration management, and world-class CDN partners, your PEG station will be on the air continuously.
- Can I use my existing Internet connection?
 - Yes, probably. Most Internet access connections in corporate, municipal, education, and home networks are underutilized for uplink bandwidth and 300 Kbps is not a lot of bandwidth.
- Can I deliver my live content to every desktop in my enterprise without using Internet access bandwidth?
 - Yes! The technology includes built-in multicast. A virtually unlimited number of local viewers may view the live video without bandwidth concerns.
- Can I just purchase the VBrick encoder from Discover Video without Internet service and “roll my own”?
 - Yes. If you are technically sophisticated, you can negotiate bandwidth with a CDN supplier, build your own video web page, and manage the technology yourself.
- What is the audio/video input to the encoder?
 - Video is standard composite via BNC, or S-Video (cables/adapters provided)
 - Audio is standard line-level via audio jacks (cables/adapters provided)
- Where do I put the encoder?
 - The device is small and can be located virtually anywhere, but commonly it is located with the audio/video equipment at the event venue or co-located with existing RF modulators. A 19” rack adapter is included.

- What support is provided?
 - The VBrick includes “Gold” service plan that provides hardware and software extended warranty, software updates, and telephone support. Discover Video extends this to include streaming services, remote configuration and monitoring, and web services.
- What are the rental terms?
 - Rental terms are 1/12 of the published purchase price per month. You are charged for any month or part of the month that you have the product whether you use it or not. For example, if you rent on the last day of the month, you are charged for that whole month and if you return it a week later you are charged for the second month. Rentals require credit card deposit for a minimum of three months, and any unused portion is refunded to your credit card. Rentals include 10 GB of streaming service per month, with overage billed directly to your credit card.
- Is it possible to digitally record all or some of my broadcast?
 - Yes. Discover Video has software solutions that allow you to record your content and to digitally archive it.
- What does the web viewing page look like?
 - See the illustration for one simple example. You control the title and can insert your own logo. There are two viewing pages, allowing your viewers to select Windows Media Player or Silverlight. Silverlight provides a more sophisticated interface and supports PC and MAC, Internet Explorer, Firefox, and Safari browsers.



- Should I engage the IT staff?
 - It is a good idea to engage your IT staff if you are going to use the network that they manage. Otherwise, no. Your IT staff will want to be assured that there are not security issues, and that operation will not affect other systems. You can assure them that encoder is safe, is immune to virus and worms, and is used by the highest levels of government in classified network applications.

About Discover Video

Discover Video is a private corporation located in Connecticut. The company is an independent supplier of world-class software and hardware solutions for better human communications and is focused on video streaming, personal videoconferences, digital signage, and related media. www.discovervideo.com

About Rich Mavrogeanes

Rich Mavrogeanes founded VBrick Systems in 1997 and served as the CEO, President, or Chief Technology Officer for more than a decades. He serves on the board of the MPEG Industry Forum, was selected as one of "the most influential person in Streaming Media", received the "Innovator of the year award", the Computer World's "Hero" medal, and serves on the board of several industry, government, and non-profit boards and councils. He has published many articles on streaming media and technology, many are available online via web search and at www.discovervideo.com.