

CHEAT SHEET

SENDING RICH MEDIA OVER IP

New video compression standards and IP networking techniques have made it possible to deliver high-quality video and audio reliably over local area networks (LANs) or wide area networks (WANs). Here's how it's done.

MAIN QUALITY FACTORS

THE CODEC: the choice of compression technology that determines the frame size, frame rate, and bitrate at which the video is compressed.

AVAILABLE BANDWIDTH: the size of the pipe and the congestion points.

THREE STEPS

DEFINITIONS

IP Multicast - Single packets delivered over IP and copied to a specific subset of network addresses. Specified in the destination address field. In contrast, in a broadcast, packets are sent to all devices in a network.

MPEG - The Moving Pictures Experts Group establishes the standards used for coding audio and video information in a digital compressed format.

MPEG Network Appliance - A hybrid appliance that encodes the video and audio using two formats - MPEG-2 for the LAN and MPEG-4 for the Internet.

Reflector Service - A third-party service provider that relays the stream to multiple end-user recipients to create a multicast. Typically located within a CDN, reflectors are servers that facilitate multicasting.

Rich Media - Audio, video, data, and other content.

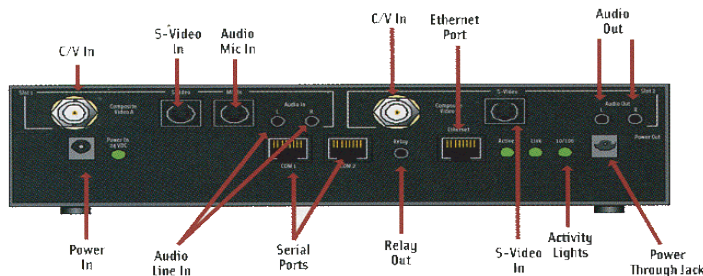
RTSP - Real-Time Streaming Protocol, a standard method of transferring audio and video and other time-based networks.

Streaming - The simultaneous transfer of digital media (video, voice, and data) received as a continuous real-time stream that can be stored and played on-demand or in real time.

- 1. Capture it** - A rich media recorder is the simplest and fastest way to capture multi-channel content: audio, video and VGA visuals.
- 2. Store it** - Unless it's real time, rich media (including compressed audio and video) is stored on servers as data files. A server application can be used to manage the repository of files and provide easy management and retrieval.
- 3. Deliver it** - Rich media can be delivered in two ways. In a "connected" mode, you require and must connect to the network to access and playback content. In a "disconnected" mode, a network isn't required, and playback can be made from a local file on a hard drive, CD, or portable memory device. Streaming media requires a network connection - the file is played back from the server and doesn't take residency at the local device.

MPEG VIDEO APPLIANCE

A typical MPEG video appliance has standard analog video inputs such as composite, S-video, and audio - microphone or stereo. A dual unit can hold both MPEG-4 and MPEG-2 encoder cards, providing a wide range of encoding rates and resolutions. In addition, the appliance has a network connection (Ethernet - 10/100 BaseT).



VIDEO QUALITY VS. COMPRESSION

MPEG-1: "VHS tape quality" scales from 1.5 Mb/s to 3 Mb/s.

MPEG-2: "DVD quality" scales from 3 Mb/s to 15 Mb/s.

MPEG-4: "VHS tape quality" scales from 8 Kb/s to 2 Mb/s.

COMMON MISCONCEPTIONS ABOUT STREAMING VIDEO

- 1. It's a bandwidth hog.** The bandwidth requirement for live video encoded at 250 Kb/s sent via the public Internet equals 250 Kb/s times the number of viewers.

If there are 10 viewers, you need 2.5 Mb/s of WAN bandwidth. On a LAN, no WAN bandwidth is required at all, and with multicast, there's virtually no bandwidth limitation.

STREAMING BENEFITS

- Faster communications
 - Global reach
- Reduced "time to market"
- More effective communications
 - Increased productivity

- 2. Many popular players don't support standards such as streaming MPEG.** Multi-vendor standards such as MPEG as supported with automatic plug-ins to Windows Media Player, QuickTime, etc.

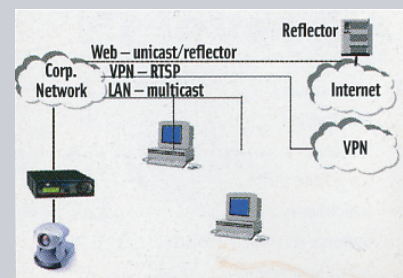
- 3. Audio and video quality isn't very good.** On LANs and using IP multicast, you can achieve much higher quality video and audio-full screen DVD-quality, including CD-quality stereo audio.

THE TRUTH ABOUT BANDWIDTH

1. Connect a source (camera, VCR, DVD player, etc.) to an MPEG appliance.
2. Configure it to stream to a particular IP multicast address.
3. The appliance will announce itself to all PCs that have viewing software as well as decoding appliances and set-top boxes connected to TVs.
4. Open the viewing software and click on the name of the video.

HOW TO SEND VIDEO OVER THE INTERNET

Because the Internet doesn't support IP multicast, each viewer must receive a separate stream from the video source (RTSP) or from a reflector service. To reach many viewers directly, there must be enough bandwidth between the source location and the Internet. If there isn't, use a reflector service to replicate the streams. This way, a school or business can reach thousands of viewers without having huge pipes to the Internet.



One network video appliance is used to provide live video on the LAN and Internet. An enterprise can provide DVD-quality video to the local employees while still reaching the remote employees with VHS-quality video via webcast.

THE TRUTH ABOUT BANDWIDTH

- IP multicast works on most LANs but isn't available on the Internet.
- Multicast is ideal for delivering live video to hundreds of viewers.
- A 4 Mb/s MPEG-2 video stream uses only 4 percent of a 100 Mb/s Ethernet port.