

**“Video Production/Streaming
Video”**

SMAD 404
Advanced Multimedia

Streaming Video

Shooting Interviews

- **Use the tripod**
- **Camera should be at same height as person's face**
- **Don't do 2-shot interviews**
- **Don't shoot in profile**
 - Place reporter near the lens of the camera
- **Don't let the interview subject look into the camera**
- **Never let the interview subject hold the mic**
- **Shoot tight, but without the mic in the screen**
 - The mic should be just outside the shot
- **Never use the camera's built-in mic for the audio**
- **If using a lapel mic, hide the mic and cable**
- **Pay attention to the background**
 - No "open sky" backgrounds
 - Avoid converging vectors
 - Use neutral subject backgrounds
 - Manipulate depth-of-field to "fuzz out" the background
 - May need to adjust shutter speed
- **When editing, don't use the reporter's question that was asked during the interview. Lead into sound bites with narration you record later.**

Streaming Video

Shooting B-Roll

- **Steady Video (Use the tripods)**
- **Good Lighting**
 - Portable light kits (If they are available)
- **Natural Sound**
 - Record it always. Use it with narration segments.
- **Break up narration with nat. Sound-Up Full**
- **“Involve” the camera (Get closer)**
- **Do not use zooms, pans or tilts in your piece**
 - Let motion occur within the frame, not with the camera
- **Composition/Aesthetics**
 - Bring back your SMAD 202 knowledge
- **Think of Editing when you Shoot**
 - What will you need when you edit
- **Referential video vs. wallpaper video**
- **Sequential video**

Streaming Video

- **Delivered via Internet**
- **Begins playing almost immediately**
- **Buffering (Downloads a portion to get a "jump start")**
- **Attempts to continue playing without stopping until the end of the piece.**
- **Live (real time) or On-Demand (using files archived a server).**

Streaming Video

Benefits of Streaming vs. Downloads

- **Long download times eliminated**
- **Nearly-Instant gratification**
- **Files don't need to be stored on a users hard drive**

Streaming Video

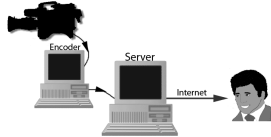
Variables

- 1. On-Demand vs. Live**
- 2. Screen Size**
- 3. Frame Rate**
- 4. Data-Rate (Bit-Rate)**
- 5. HTTP vs. Progressive vs. Real-Time**
- 6. Codec**
- 7. Architecture/Format**

Streaming Video

1. On-Demand vs. Live

- **On-Demand**
 - Creating a video file that can be accessed at any time
- **Live**
 - Encoding and Streaming in near Real-Time
 - Watch it nearly "live"
 - There is always a slight delay
 - Requires an "Encoder" and a "Server" where the encoding happens in "real-time" and gets sent to the "Server" for streaming in "real-time."



Streaming Video

2. Screen Size

- **Usually, 4 X 3 aspect ratios....**
- **Common streaming video screen sizes**
 - 160 X 120 (Sometimes 176 X 132)
 - 240 X 180
 - 320 X 240
 - 640 X 480 (less common)
 - Called "full screen", but it's not full screen on any computer today.
- **The larger the screen size, the greater the required data-rate**

Streaming Video

3. Frame Rate

- **Common streaming video frame rates**
 - 30 fps (same as NTSC video)
 - 24 fps (same as film)
 - 15 fps (maybe the most common)
 - ** Recall that one needs at least 18 fps to create a good illusion of motion
 - 10 fps (looks "jerky")
 - 7 fps (looks very "jerky")
 - 3 fps (more like a fast "slide show")

Streaming Video

4. Data Rate (Bit-Rate)

- **High data-rates are required when you have...**
 - Large screen sizes
 - High frame rates
 - Uncompressed or lightly compressed video

Streaming Video

Sample Data-Rate Requirements

| Application | Data-Rate | |
|----------------------------------------------------|----------------------|-------------|
| | Uncompressed | Compressed |
| Slow-Motion Video - 10 fps - 170 x 120 | 5 Mb/s | 8-16 Kb/s |
| Video Conferencing - 15 fps - 352x240 | 30 Mb/s | 64-768 Kb/s |
| CD-ROM - 30fps - 352x240 | 60 Mb/s | 1.5-4 Mb/s |
| Broadcast Video - 30fps - 720 x 480 | 248 Mb/s | 3-8 Mb/s |
| HDTV - 30fps - 1280 x 720 - 1,920 x 1,080 | .66 Gb/s 1.5 Gb/s | 20 Mb/s |

Streaming Video

Streaming: Target Bit-Rates

- **What type of connection does your user have?**

| Connection Name | Data-Rate | | | | | | | | |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|----------|---------------------|---------|-----------------------|-----------|---------------------|
| 56 K Modem | 38 Kb/s - 46 Kb/s | | | | | | | | |
| ISDN (Single-Channel) | 64 Kb/s | | | | | | | | |
| ISDN (Dual-Channel) | 128 Kb/s | | | | | | | | |
| xDSL (Digital Subscriber Line) | 384 Kb/s - 3 Mb/s | | | | | | | | |
| | Commonly restricted via price paid: 768 Kb/s downstream and 128 Kb/s upstream) | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Sample Packages</th> <th>Downstream - Upstream</th> </tr> </thead> <tbody> <tr> <td>Standard</td> <td>512 Kb/s - 128 Kb/s</td> </tr> <tr> <td>Premium</td> <td>1.544 Mb/s - 380 Kb/s</td> </tr> <tr> <td>Executive</td> <td>640 Kb/s - 640 Kb/s</td> </tr> </tbody> </table> | Sample Packages | Downstream - Upstream | Standard | 512 Kb/s - 128 Kb/s | Premium | 1.544 Mb/s - 380 Kb/s | Executive | 640 Kb/s - 640 Kb/s |
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| Executive | 640 Kb/s - 640 Kb/s | | | | | | | | |
| | | | | | | | | | |
| Cable Modem | 1 - 5 Mb/s Commonly 1.5 Mb/s (shared bandwidth) Also offered in varying "packages" | | | | | | | | |
| Network Connection/ Corporate LAN | 10 - 100 Mb/s or faster | | | | | | | | |

Streaming Video

Bandwidth Scalability

“The ability of the video streaming server to adapt to fluctuating network conditions.”

- Viewers with *low bandwidth* conditions get a more heavily compressed and/or lower frame-rate portion of the file.
- Viewers with *high bandwidth* conditions get a less heavily compressed and/or higher frame-rate portion of the file.

**** Some streaming video architectures may also vary the screen size.

Streaming Video

Single, Multiple and Variable Bit-Rates

- **Single Bit-Rate (“Constant” Bit-Rate)**
 - A video file that is encoded to send bits at one, constant speed. For example, a video file can be encoded to be delivered at 128 Kb/s.
- **Variable Bit-Rate (VBR)**
 - A file where more bits are assigned for highly-detailed parts of the video (i.e. during an explosion). The bit-rate constantly changes depending on the complexity in the scene. You may see this with “VBR” MP3 files where the data-rate constantly changes depending on how much “detail” there is in the music.
- **Multiple Bit-Rate (MBR) – For “Bandwidth Scalability”**
 - A file that is encoded for more than one connection speed. The video is delivered at a constant bit-rate as long as the connection throughput does not change. However, delivery of the file can change “on-the-fly” to a lower or higher bandwidth encoded portion of the file if network conditions change while the video is being streamed. For example, a streaming video file can be encoded for people who connect at 128 Kb/s, 256 Kb/s and 768 Kb/s. If a user’s connection starts at 256 Kb/s, the video will use the 256 Kb/s portion. But if the connection gets slower, the file can “drop back” to deliver at 128 Kb/s. This determined through a “back-channel” communication between the video server and the user’s player software.

Streaming Video

Relationship Between Bit-Rate, Compression and Quality

- High bit-rate = less compression = large file size = high quality
- Low bit-rate = higher compression = small file size = low quality

“When connection speeds are slow (i.e. 56 Kb/s), you need to deliver the video at a low-bit rate. To get a low bit-rate, you need to more heavily compress the video file. Compressing the video gives you a small file size”, but it also gives you a lower quality video.”

Streaming Video

5. HTTP vs. Progressive vs. Real-Time

- HTTP is for web pages, but you can “stream” video this way
- Progressive is a download you can watch before it fully downloads (usually done via HTTP)
- Real-Time is the only “true” streaming

Streaming Video

HTTP Streaming

- **HTTP: Hypertext Transfer Protocol**
 - This is the protocol used to serve web pages
 - HTTP sends data in bursts (not constant) and if packets get lost, it attempts to have them re-sent.
 - This is a problem for streaming where the “real-time” nature of streaming video dictates that it must send data in a more “constant” manner. Re-sending packets cannot happen.
 - HTTP can send video, but the result is lots of stopping and starting of the video.
 - Sometimes called “Pseudo-Streaming” or “Web Streaming”
 - There is no communication between server and player and no ability to send MBR files.
 - Can be done for “live” streaming, only “on-demand”

Streaming Video

Progressive Streaming

- This is usually done via HTTP server (web server)
- AKA: Progressive Download | Fast-Start
 - Video files one can watch as they download
 - There is a delay before the video starts to play
 - Attempts to “buffer” (download) enough so that once the video starts to play, it won’t stop before the rest of the file has downloaded
 - The user sees the part of the file that has downloaded
 - The user can’t jump ahead to a portion that has not yet downloaded
 - Can’t adjust to changing network conditions
 - Works best for short duration clips (less than 3 minutes)
 - The quality of the clip can be very good because it allows higher data rates than a connection may be able to stream in real-time
 - Users can save the file on their computers
 - Can be done for “live” streaming, only “on-demand”

Streaming Video

Real-Time Streaming

- **Two Protocols in Use (Not HTTP)**
 - RTSP (“Real-Time Streaming Protocol”)
 - MMS (“Microsoft Media Server”)
- Attempts “Real-Time” Delivery without pauses
- Requires a special server
- Attempts to send data at a more constant bit-rate and doesn't ask to have packets re-sent
- Allows random access of material
- Ability for communication between the server and the user's player to compensate for fluctuating network conditions
- The video must match the bandwidth of the user's connection, which can mean poor video quality for those with low-bandwidth connections
- Some “buffering” is still required
- Users can't save the file on their own computers
- The only option for “live” streaming

Streaming Video

6. Codecs

- Short for compressor/decompressor
- Can be implemented in software, hardware, or a combination of both (usually software)
- Compression is used for two reasons
 - Storage Space: The video doesn't have to take up huge amounts of disk space
 - Bandwidth: Limiting the amount of data means less needs to be sent to keep the video moving
- Files are *compressed* with a certain codec when they are saved and then *decompressed* by the codec when they are played back
- The codec used to *compress* the file, must be on the computer *decompressing* the file
- Particular codecs have strengths and weaknesses with certain types of video

Streaming Video

Recompression Loss

(*Compression Cascades*)

- **Each time a video file is re-saved and re-compressed, there is loss in quality (much like “generational loss” in analog formats)**
 - JPEG still images have this problem too
- Using one codec on the first save, and using a different codec when re-saving creates even greater loss

Streaming Video

Symmetrical vs. Asymmetrical Codecs

- **Symmetrical: Same amount of time required to compress and decompress**
 - If you have a 5 minute video, it will take 5 minutes to compress
- **Asymmetrical: More time required to compress than decompress**
 - If you have a 5 minutes video, it might take 20 minutes (or more) to compress



Streaming Video

Codecs

- **H.261 and H.263**
 - A standard video conferencing codec
 - Windows and Mac platform
 - Optimized for low data rates (Can work as low as 64K bit/sec)
 - Works best for low motion video (talking heads)

Streaming Video

Codecs

- **Cinepak**
 - Designed to run on low end computer systems and single speed CD-ROM drives.
 - The image size of Cinepak movies was originally very small (120x90)
 - While many people still use Cinepak for compression, there are many newer codecs that can out perform it.

Streaming Video

Codecs

- **Intel Indeo 4 and 5**
 - Very good image quality
 - Processor intensive: Required "high end" PC's or Macs
 - Better picture quality than Cinepak, the quality is not as good as the Sorenson Video Codec.

Streaming Video

Codecs

- **Sorenson**
 - High quality video
 - Low bandwidth needs
 - Asymmetrical: Takes a long time to encode media
 - Areas of highly saturated color tend to look blocky

Streaming Video

Codecs

- **MPEG 1 (Motion Picture Experts Group)**
 - Primarily used for CD-ROM and VCD (Video CD) video and audio.
 - Was invented for Single-Speed (1X) CD-ROMS which required video to playback on a CD at no more than 15 KB/s
 - (Upper -case "B" means BYTES)

Streaming Video

Codecs

- **MPEG 2 (Motion Picture Experts Group)**
 - High data rate, broadcast quality video
 - Used in DVD-Video.
 - Supports full-motion (30fps) and full-screen resolution (720x480).

Streaming Video

Codecs

- **DivX**
 - Based on an extracted .wmv (Windows Media Video) codec, using the Microsoft MPEG-4 derivative
 - It is combined with an MP3 audio stream instead of .wma (Windows Media Audio) (which is usually used inside WMV files) and with the file format changed from .asf to .avi

Streaming Video

Compression Rates/Ratios

- A Ratio of "How Much" You can Compress Data (File Size)

$$\frac{\text{Original File Size}}{\text{Compressed File Size}} = \frac{? \text{ MegaBytes}}{? \text{ MegaBytes}} = \frac{25 \text{ Mb}}{1 \text{ Mb}}$$

Compression Rate = 25:1

Compression Rates Can Go from
2:1-200:1

Streaming Video

7. Architectures/Formats

- **Video file formats involve the particular three letter extension**

Streaming Video

Architectures/Formats

Audio Formats

- **Audio file formats involve the particular two to four letter extension of a file**
 - **.au (Sun MuLaw)**
 - Primarily Unix and Mac
 - **.aiff (Audio Interchange File Format)**
 - The standard format for uncompressed audio on the Mac
 - Primarily Unix and Mac
 - **.wav (Windows Audio Format)**
 - The standard format for uncompressed audio on the PC
 - Large file sizes – good quality
 - **.mp3 (MPEG 1 Audio Layer 3. NOT MPEG3)**
 - Invented for video professionals
 - Highly compressed – excellent quality
 - This made it very popular on the Internet
 - Variable Compression/Variable Bitrates/Variable Quality
 - Compression from 2:1 – 200:1 (Often 10:1)

Streaming Video

Architectures/Formats

Audio Formats (continued)

- **.mov/.qt (QuickTime)**
 - Originally for Mac, now both Mac & PC
 - Downloadable and streaming
 - This extension is used for both audio and video files
- **.rm/.ra (Real Media/Real Audio)**
 - Both audio and video use .rm today
 - Commonly used for streaming, not downloads
- **.wma (Windows Media Audio)**
 - Microsoft proprietary format, primarily for streaming

Streaming Video

Architectures/Formats Video Formats

- Video file formats involve the particular two to four letter extension of a file
 - .avi (Audio Video Interleave Format)
 - One of the oldest video formats
 - Developed by Microsoft.
 - High quality, high bitrate
 - Not for streaming
 - .asf (Active Streaming Format)
 - Developed by Microsoft for streaming, around 1995.
 - The .asf extension was changed to .wmv or .wma to distinguish between video and audio file formats, but you still see .asf
 - .mov/.qt (QuickTime)
 - Developed by Apple.
 - .mpg/mpeg (Motion Picture Experts Group)
 - Can be MPEG-1 or MPEG-2
 - MPEG-1 was invented for the first generation of CD-ROMs which ran at 1X speed or single speed (150 KB/s)

Streaming Video

Architectures/Formats Video Formats (continued)

- .mp4 (MPEG-4 Movie)
 - Introduced in 1998
 - Designed for low-bitrates
 - Allows for much more than just video (i.e. data streams, subtitles, images)
 - The standard for the delivery of video etc. to mobile devices, such as cell phones
 - Can also be .avi or .mov
- .rm (Real Media)
 - Primarily PC Windows
- .wmv (Audio Interchange Format)
 - Primarily Mac
- .dv (Digital Video)
 - Not commonly used, since most DV streams use an .avi or .mov extension

Streaming Video

Architectures/Formats for Streaming QuickTime

- Not really format. It's a method for storing sound, graphics & movies
- Three Kinds
 1. Downloadable
 2. Downloadable (Fast-Start – Progressive)
 3. Streaming
- Uses the RTSP protocol (Realtime Streaming Protocol) Sorenson is the best supported codec
- File Format: .mov

Streaming Video

Architectures/Formats for Streaming

QuickTime

- **Bandwidth Scalability Support:**
 - Via "alternate movies" (different files, each encoded for a different data-rate)
 - A file is chosen based on the settings the viewer has configured in their QuickTime control panel
 - Edit > Preferences > Quick Time Preferences...



Streaming Video

Architectures/Formats for Streaming

QuickTime

- **Bandwidth Scalability Support:**
 - If the viewer has not properly configured the player, this won't work well
 - QuickTime has no "back-channel" communication, so it can't adjust for fluctuating network conditions.
 - It can't change between "alternates" during playback
 - It can compensate when the user doesn't have enough bandwidth for the movie being played by:
 - 1st: Dropping frames
 - 2nd: Dropping keyframes
 - 3rd: Going to "audio only"

Streaming Video

Architectures/Formats for Streaming

QuickTime

- **Meta Files**
 - .mov (reference movie)
 - Uses something called "MakeRefMovie"

**** MORE ON META FILES TO COME

Streaming Video

Architectures/Formats for Streaming

Real Media

- One of the first companies to do streaming
- Uses the RTSP protocol (Realtime Streaming Protocol)
- Has it's own proprietary codecs
 - i.e. Real Video G2, Real Video 8, Real Video 9 etc.
- Bandwidth Scalability Support:
 - Via "Surestream"
- File Format: .rm

Streaming Video

Architectures/Formats for Streaming

Real Media

- Bandwidth Scalability Support:
 - Offers excellent scalability via "SureStream"
 - Can create up to 8 differentially encoded audio & video tracks
 - "Back-channel" communication between the player and server can repeatedly switch between different versions "on-the-fly"

Streaming Video

Architectures/Formats for Streaming

Real Media

- Meta Files
 - .ram (old, but still in use)
 - .smi (recommended)

**** MORE ON META FILES TO COME

Streaming Video

Architectures/Formats for Streaming

Windows Media

- **.asf (Active Streaming Format)**
 - Designed for “streaming”
 - Replaced by **.wma (audio)** and **.wmv (video)**
- Uses the **MMS protocol (Microsoft Media Server)**
- Has its own proprietary codec
 - i.e. **Windows Media ???**
- **Bandwidth Scalability Support:**
 - Via “**Intelligent Streaming**”
- **File Format**
 - **.wmv (video)**
 - **.wma (audio)**

Streaming Video

Architectures/Formats for Streaming

Windows Media

- **Bandwidth Scalability Support:**
 - Offers very good scalability via “**Intelligent Streaming**”
 - Allows up to **30 differentially encoded audio & video tracks**
 - “**Back-channel**” communication between the player and server can repeatedly switch between different versions “**on-the-fly**”

Streaming Video

Architectures/Formats for Streaming

Windows Media

- **Meta Files**
 - **.wvx (for video)**
 - **.wax (for audio)**

**** MORE ON META FILES TO COME

Streaming Video

The Production Process

1. Recording
2. Capturing (if digital)
 - Digitizing (if analog)
3. Editing
4. Encoding/Converting
5. Posting/Uploading
6. Linking

Streaming Video

1. Recording

- **Video Production Basics**
 - Studio vs. Field Production
 - Good quality tape stock
 - Steady video
 - Portable lights
 - Good audio (Mics close to people speaking)
 - Content & Production aesthetics RULE

Video Production Basics

Shooting Video for "Streaming"

- **Avoid "intraframe" change**
(Change within the frame)
 - Use a tripod (or steady camera)
 - If handheld, use image stabilization
 - Avoid fast motion in the frame
 - Avoid zooms
- **Use lights**
- **Pay attention to proper exposure**
 - Underexposure is worse than overexposure for streaming
- **Avoid high-contrast scenes**
 - Most codecs work best with moderate contrast scenes

Video Production Basics

Shooting Video for "Streaming"

- **Keep detail to a minimum**
 - Talking heads work best on "green screen"
 - Have "talent" avoid high-contrast patterns with lots of detail
- **Use "shallow" depth-of-field to make background out of focus.**
- **High-quality camera (i.e. 3-chip)**
- **Get good audio**
 - Mics close
 - Avoid background noise

Streaming Video

2. Capturing/Digitizing

- **The transfer of your video from your tape to the computer**
- **Analog Tape: Requires a "digitizing" card to convert it from analog to digital and store it on your computer. (Sometimes also called "capturing").**
- **Digital Tape: This is called "capturing."**
 - This is usually done via an IEEE-1394 card

Streaming Video

IEEE-1394

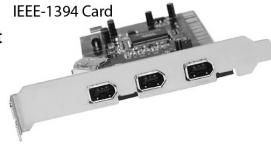
- **An interface that allows connection of digital video devices to a personal computer and offers high-speed communication at a steady rate**
 - A six wire cable that also carries power
 - Up to 400 Mb/s
 - Faster than USB
 - "Guaranteed Bandwidth"
 - Data transfer will be steady, so there will be no dropping of frames
- **Apple calls IEEE-1394 "Firewire"**
 - Apple was the primary developer
 - All Macs have a Firewire card
- **Sony calls IEEE-1394 "i.Link"**
 - Usually uses a four wire cable without power
 - Not all PCs have Firewire cards, but they can be purchased for very little money

Streaming Video

IEEE-1394

IEEE-1394 Card

- IEEE-1394 Card that goes in a computer



- Almost all digital camcorders have an IEEE-1394 connection
 - This is the 4-pin end of a Sony camcorder



Streaming Video

IEEE-1394

- Video can go both ways
 - Camcorder (VCR) to Computer
 - Computer to Camcorder or (VCR)
- Allows control of the Camcorder (or VCR) for play, stop, rewind, fast-forward etc... via software on the computer

Streaming Video

IEEE-1394b

- Aka Firewire 800
 - A new standard
 - A nine wire cable
 - Allows up to 786 Mb/s
 - Substantially faster than USB 2.0

Video Production Basics

3. Editing Video for "Streaming"

- **Avoid "interframe" change**
(Change over time)
- **Avoid frequent cuts**
- **Avoid quick scene changes**
- **Avoid certain types of transitions**
 - Slow dissolves, fancy wipes, page curls etc.
 - "Cuts" and "simple wipes" work best
- **Fades are difficult to encode, but are inevitable**
 - Make short duration fades

Streaming Video

4. Encoding/Converting

- **Once editing is completed, you have a high-quality file not intended for streaming**
 - i.e. QuickTime
- **Encoding is the compressing of files into a particular streaming format.**
- **Software**
 - Media Cleaner XL (PC) Media Cleaner 6 (Mac)
 - Will do all three streaming formats
 - Real Encoder
 - Windows Media Encoder
 - Non-Linear Editing Applications Plug-ins
 - Adobe Premiere

Streaming Video

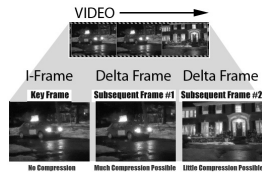
Keyframes

- **Uncompressed frames used as a reference for subsequent frames in "interframe" compression**
- **Sometimes called an I-Frame**
- **Using more keyframes means...**
 - Better looking video
 - Larger files that require higher data rates

Streaming Video

Keyframes

- **Keyframes** are often called **I-Frames**
- **Subsequent frames** that store data only about the “interframe” differences are called **Difference Frames** or **Delta Frames**



Streaming Video

5. Posting/Uploading

Two Options

- **Option 1: Pay for a Streaming Hosting Service**
 - <http://www.core.com.au/webhosting/streaming-media-hosting.htm>
 - <http://www.website-source.com/hosting/streaming.shtml>
 - **Hosting Company Issues...**
 - They may claim to have Real support
 - You need to ask what this means?
 - Do they have a dedicated Real streaming server or is it going to deliver your content via HTTP?
- **Option 2: Do it Yourself**
 - Operate your own servers

Streaming Video

Posting/Uploading

- **Downloadable and Progressive Streaming files**
 - i.e. QuickTime “non-streaming” files
 - **UPLOAD** to a HTTP server (web server)
- **QuickTime Streaming Files**
 - **UPLOAD** to a “QuickTime Streaming Server”
 - <http://www.apple.com/quicktime/products/qtss/>
 - **Windows/Linux** calls it “Darwin Streaming Server” (Open-source)
 - <http://developer.apple.com/darwin/>
 - <http://www.opensource.apple.com/darwinsource/index.html>

Streaming Video

Posting/Uploading

- Real Media files
 - UPLOAD to a "Helix Server" (formerly "Real Server")
 - http://www.realnworks.com/products/media_delivery.html
- Windows Media files
 - UPLOAD to a "Microsoft Media Server"
 - This is actually called "Windows Media Services" and is part of "Microsoft Windows Server"
 - <http://www.microsoft.com/windows/windowsmedia/9series/server.aspx>

Streaming Video

6. Linking

- **Option 1: External Media Player**
 - Link to a file that plays in the file's native media player
 - QuickTime Player
 - Real Player
 - Windows Media Player

External Media Players



Streaming Video

Linking

- **Option 2: Embedded in a Web Page**
 - Link to a file that plays in the file's native media player
 - QuickTime Player
 - Real Player
 - Windows Media Player

Embedded in a Web Page



Streaming Video

Web Interface

- Don't stream the video on "page-load"
 - Give users a choice. Allow them to click to view
- Give users a "Control Panel" or "Controller"
- Use video only when necessary

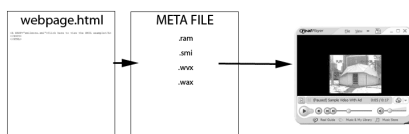
Streaming Video

Meta Files

- "Meta-Information" means *information about information*
- Small Text files
- In streaming, it's a separate file that contains information about the actual media such as:
 - Where the file is located (path)
 - Where into the video to start
 - How many times to play
 - Playlists
 - Author, Title, Copyright
 - Etc...

Streaming Video

Meta Files



Streaming Video

Meta Files – QuickTime: Progressive Download

- **No meta files required**
- **Insert into HTML file:**

For Progressive Streaming

```
<OBJECT CLASSID="clsid:02BF25D5-8C17-4B23-BC80-D3488ABDDC6B" WIDTH="160"
HEIGHT="136"
CODEBASE="http://www.apple.com/qtactivex/qtplugin.cab">
<PARAM name="SRC" VALUE="http://server.name.com/path/filename.mov">
<PARAM name="AUTOPLAY" VALUE="true">
<PARAM name="CONTROLLER" VALUE="true">

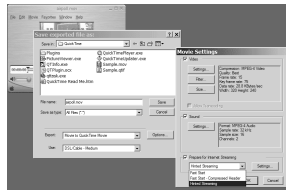
<EMBED SRC="http://server.name.com/path/filename.mov" autostart=true
width=160 height=136>
</EMBED>

</OBJECT>
```

Streaming Video

Meta Files – QuickTime: Realtime Streaming

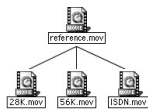
- **Files intended for streaming need to be hinted – that is, given “hint tracks” that contain information about transmission packet size and protocol so that QuickTime Streaming Server delivers your movie smoothly and reliably.**
 - File > Export > Move to Quick Time Movie
 - Options (Use the settings below)



Streaming Video

Meta Files – QuickTime: Realtime Streaming

- **Requires something called a “Reference Movie” that does the following:**
 - Launches the QT plug-in
 - Tells the plug-in where to find the movie
 - Notifies the QT Plug-in of alternate data rate movies, if you use that feature



Streaming Video

Meta Files – Real Media

- **.smi or .smil (Synchronized Multimedia Integration Language)**

.smi File Example

```
<smil>
<head>
<meta name="title" content="A Message from John Doe"/>
<meta name="copyright" content="©2005"/>
</head>
<body>
<video src="rtsp://server.name.com/path/filename.rm" clip-
begin="0.0s" clip-end="3:13.0s"/>
</body>
</smil>
```

*** MORE ON SMIL TO COME

Streaming Video

Meta Files – Windows Media

- **.asx (streams only .asf files)**
- **.wax (streams only .wma files)**
- **.wvx (streams .asf, wma and .wmv)**
 - Exclusively used for .wmv files

Streaming Video

Meta Files – Windows Media

Sample File (This could be be an .asx or .wvx file)

```
<ASX VERSION="3.0">
<title>Basic Example</title>
<copyright>Copyright 2002</copyright>
<entry>
<author>The Author's name</author>
<title>Video clip title</title>
<ref href="mms://server.name.com/path/filename.wmv" />
</entry>
</asx>
```

All about Windows Media Meta Files
<http://www.stats.kpnqwest.no/docs/asx.html>

Streaming Video

SMIL

- **Synchronized Multimedia Integration Language**
 - A text markup language (similar to HTML) that establishes a spatial framework (regions of the screen) for displaying media
 - Allows media to playback sequentially (one after the other) or in parallel (same time) in a synchronized manner
 - Can include video, audio, images and text

Streaming Video

SMIL

- Allows non-bandwidth intensive elements (i.e. text & images) to be maintained without being encoded as video
- Real Networks was the driving force behind SMIL 1.0
- Apple QuickTime supported SMIL in QuickTime 4.1
- Microsoft Windows Media supported their own called HTML + Time
- Real Networks and Microsoft got together to support SMIL 2.0
- SMIL: Supported by World Wide Web Consortium (W3C) as SMIL 2.0

Streaming Video

SMIL

- **Real and Apple support their own proprietary extensions**
 - Real: .rt (real text), .rp (real pix)

Streaming Video

SMIL

- Suppose you want to make this layout

Plays in Parallel
Image: ad.gif
Audio: audio.rm



Next in Sequence
Video: video1.rm



Streaming Video

SMIL Example

- This will start with a .gif image and audio (in parallel), followed by a video (in sequence) in different regions of the screen.

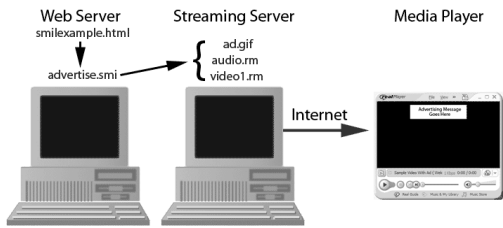
advertise.smi

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre> <smil> <head> <meta name="author" content="Steve Anderson"/> <meta name="title" content="Sample Video With Ad"/> </head> <layout> <root-layout width="160" height="180"/> <region id="advertisement" top="10" left="10" width="160" height="40"/> <region id="video" top="60" left="10" width="160" height="120"/> </layout> </head> <body> <seq> <par> <audio region="advertisement" src="rtsp://server.name.com/path/audio.rm"/> </par> <video region="video" src="rtsp://server.name.com/path/video1.rm"/> </seq> </body> </smil> </pre> | <ul style="list-style-type: none"> ⌘ Specifies The Whole Layout ⌘ First Region Layed Out ⌘ Second Region Layed Out ⌘ Play in sequence ⌘ Play in parallel ⌘ First Region: ad.gif ⌘ First Region: audio.rm ⌘ Second Region: video1.rm |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Streaming Video

SMIL

- View the SMIL Presentation at: <http://streaming.smad.jmu.edu/smilexample.html>
- Where the files go:



Streaming Video

SMIL smilexample.html

```
<HTML>
<HEAD>
<TITLE>SMIL Example</TITLE>
</HEAD>
<BODY>
<A HREF="advertise.smi">Click here to view the SMIL example</A>
</BODY>
</HTML>
```
