

## Dare to Stream

A Presentation in Quiz Format

Everything You Need to Know about  
Compression, Transcoding and Codecs

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## Agenda:

- Production
- Encoding
- Distribution

## The DV Format and HDV

- The DV Format is:
  - A. Raw, uncompressed video?
  - B. Higher quality than HDV?
  - C. Same as MPEG-2?
  - D. Lower quality than HDV?

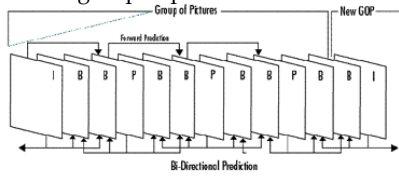
Correct answers?: B and D

## Encoding Basics - Interframe/Intraframe

- Intraframe - self contained - like JPEG
  - DV is Motion-MPEG, series of sequential JPEG Files, all self-contained
    - High quality
    - Easy to edit

## Picture of a GOP

- Key/Delta/GOP
  - Key (I) - intraframe only
  - Delta (B and P)
    - Changes between frame
  - GOP - group of pictures



## Encoding Basics - Interframe/Intraframe

- Inter-frame:
  - Also high quality
  - Harder to edit
    - Seek to frame 4 in GOP - have to decode 4 frames

## DV/HDV Both Higher Quality

- DV as higher quality
  - Less compression
- HDV as higher quality
  - Higher resolution
  - Incredible quality in most instances

## The DV Format and HDV

- You can't edit MPEG-2 video
  - A. True
  - B. False
  - C. Not sure

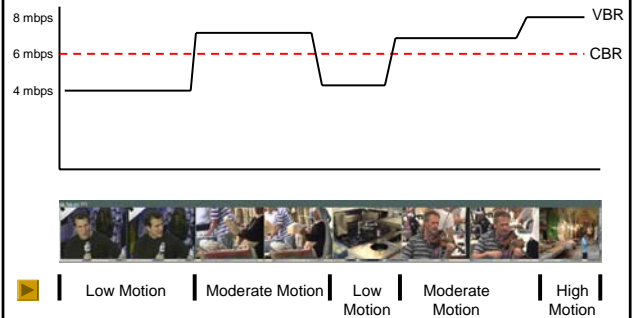
Correct answer?: B, false, of course you can edit MPEG-2, it's the format in HDV

## MPEG-2 Production

- Variable bit rate encoding (VBR) is better than constant bit rate encoding (CBR)
  - A. True
  - B. False
  - C. What's VBR and CBR?
  - D. It depends

Correct answer?: D - footage and usage dependent

## Constant vs Variable Bit Rate



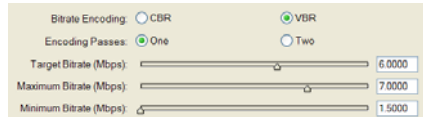
## Constant vs Variable Bit Rate

- Constant Bit Rate (CBR)
  - One bit rate applied to entire video irrespective of motion
  - Pros: Easy and fast
  - Cons: Doesn't optimize quality
- Variable Bit Rate (VBR)
  - Dynamic bit rate matches motion in video
  - Pros: Best quality/bit rate optimization
  - Cons: slow, produces inconsistent stream

## Constant vs Variable Bit Rate

- CBR Better
  - Low motion video (interviews)
  - Streaming video
  - When you're in a hurry
- VBR Better
  - High and low motion footage
  - Disk based video
  - When you're not in a hurry

## Variable Bit Rate Parameters



- Number of passes
  - Two is optimal
  - Unavailable for real time
- Bit rate - choose target
  - Maximum Rate - Useful for streaming or DVDs
  - Minimum - Useful when low motion portions degrade

## Progressive vs. Interlaced

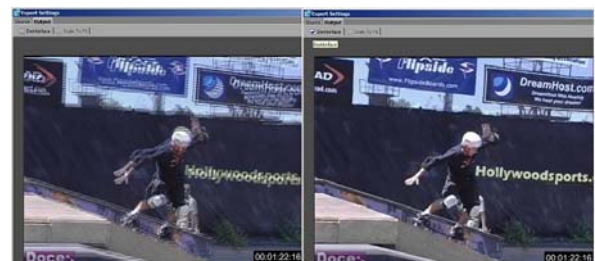
- You can only produce streaming video with progressive video
  - A. True
  - B. False
  - C. What's progressive video?
  - C. Trick question

Correct answers?: D - you can only produce streaming video with progressive video, but you can convert interlaced to progressive

## Deinterlacing

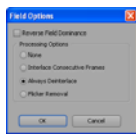
- Most SD cameras capture interlaced video
  - 60 fields per second, not 30 frames
  - Fields are captured 1/60th of a second apart
- All streaming codecs are frame based
- Converting from fields to frames can cause a stair step or Venetian blind artifacts which deinterlacing can resolve

## deinterlacing - Why it's Important



## Deinterlacing - Rules of the Game

- Always deinterlace when producing streaming files
- Encoders all have different controls, but typically, you may need to (shown for Premiere Pro):
  - Select deinterlacing, AND
  - Output a progressive frame



Right click control



In Adobe Media Encoder

## Deinterlacing - Rules of the Game

- Deinterlacing artifacts are easy to spot; once seen and recognized, you can resolve
- When all else fails, output DV and let a third party encoding tool like Sorenson Squeeze or Flix Pro deinterlace

## All That Said - Is Progressive Better?

- Probably, but not earth shaking because deinterlacing routines are very effective



## Codec choice

- The highest quality codec is:
  - A. Apple's MPEG-4 or H.264?
  - B. Microsoft's Windows Media Video?
  - C. Flash Video?
  - D. RealVideo?
  - E. All of the above

Correct answers?: E

## Which Codec is Best?

- Sources and conclusions:
  - Streamingmedia (me) - RealVideo
  - Network Computing Magazine - Flash
  - Montana and DL.TV - QuickTime
- Key point to remember:
  - As data rates get higher, qualitative differences get smaller
  - At 600 kbps and higher, they're very similar

## About Flash Video

- Flash Video is "the bomb" because
  - A. It's quality is equivalent
  - B. It's easier to integrate into web graphics
  - C. It's easier to customize a player
  - D. All of the above

Correct answers?: D, but you probably don't care

## Consumer Net Only Video Newbies

Publishers	Real	WMV	Flash	QT
BusinessWeek Online			1	
Sports Illustrated			1	
NY Times			1	
Forbes			1	
WSJ			1	
CNET			1	
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>0</b>

## Networks Repurposing TV

Stations	Real	WMV	Flash	QT
CNN			1	
ESPN			1	
Fox			1	
CBS	1	1		
ABC			1	
Golf Channel			1	
Bloomberg		1		
MSNBC		1		
MTV			1	
Weather Channel	1			
<b>Totals</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>0</b>

## Networks Repurposing TV - Analysis

- Recent technology decisions, Flash prevails
- Windows Media - old guard
- Real - very old guard
- QT - not relevant for broadcast

## Why You Don't Care

- You're not going to build custom player
- Flash doesn't scale well
- It's harder to use without programming knowledge
- Can't easily time shift
  - No iPod like player
  - Can't easily save to disk

## Apple's iPod

- Video on the iPod is:
  - A. A trend that will soon disappear?
  - B. A commercial necessity?
  - C. Trendy, but necessary

Correct answers?: B

## DL.TV: Codec Usage

- Offers six different streams
  - 40% - video iPod
  - 20% - Flash - from site
  - 15% - Windows Media
  - 15% - MPEG4 in MOV format
  - 10% - DivX and MP4
- Point:
  - Technical viewers, when given a choice, choose MOV
  - Viewers have clear preferences - multiple codecs are a good thin

## That Square Pixel Thingie

- When producing streaming video from DV video, which resolution is wrong?
  - A. 320x240?
  - B. 352x240?
  - C. 400x300?
  - D. 440x330?

Correct answer?: B

## That Square Pixel Thingie : 16:9

- When producing streaming video from 16:9 DV video, which resolution is wrong?
  - A. 480x270?
  - B. 640x360?
  - C. 320x180?
  - D. 320x240?

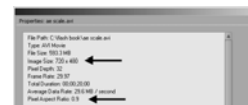
Correct answers?: D

## NTSC Pixel Aspect Ratio



- DV frame on the left, displayed on a computer
  - square pixels look fatter b/c not squeezed during display
- Same frame displayed on a television set
  - Squeezed to .9 PAR, so looks normal

## NTSC Pixel Aspect Ratio (PAR)



- 4:3 DV has a pixel aspect ratio of .9
  - Display .9 horizontal pixels for each vertical
- Problem: Streaming files played on computer are played with PAR of 1.0
- So: Scale to 4:3 resolution (640x480/400x300)

## NTSC Pixel Aspect Ratio (PAR)



- 196:3 DV has a pixel aspect ratio of 1.2
  - Display 1.2 horizontal pixels for each vertical
- Problem: Streaming files played on computer are played with PAR of 1.0 (the whole square pixel thing)
- So: Scale to 16:9 resolution (640x360 / 480x270)

## Data Rate

- You'd have to be crazy to stream at over:
  - A. 250 kbps:
  - B. 500 kbps:
  - C. 600+ kbps:
  - D. 700+ kbps:

## Data Rate

- You'd have to be crazy to stream at over:
  - A. 250 kbps: Golf Channel (440x330)
  - B. 500 kbps: Blip.TV (up to 640x480)
  - C. 600+ kbps: ESPN /DL.TV (up to 640x480)
  - D. 700+ kbps: CBS (480x360)

## Key Point

- This is not your father's Internet
  - If you're not getting bigger, you're getting smaller
  - Broadband really is the norm
  - Mitigate risk with multiple bit rate streams

## Encoding

- It's expensive and time consuming to support multiple file sizes and multiple formats
  - A. No and Yes?
  - B. Yes and No?
  - C. What?

Correct answers?: A / B

## encoding

- No and yes
  - Premiere Pro can output all formats
  - Set them all up manually
- Yes/No
  - Sorenson Squeeze costs \$500, but you can batch multiple files to multiple codecs and parameters
  - Can setup up multiple file encodes in seconds

## Encoding

- You really have to know what you're doing to encode streaming video
  - A. No, you can pay me.
  - B. Not really, but you can't follow most presets
  - C. Yes, you do

Correct answers?: B -

## Some simple rules

- Windows Media
  - Go up to 400x300 and tell viewer to zoom
  - Audio - about 64 kbps
  - Video - as high as you need to eliminate artifacts (usually about 400 kbps or so)
- iPod
  - Follow the preset
- Flash
  - Doesn't zoom well (so need big screen, like 480x360)
  - Audio is MP3, so need 96 for good audio
  - As high as needed to eliminate artifacts

## You Just Need to Know the Basics



## Streaming Delivery

- You need a streaming server to deliver top quality video
  - A. What's a streaming server?
  - B. True
  - C. False
  - D. It depends

Correct answers?: C

## Streaming delivery

- Servers: What They Do:
  - Separate web application
  - What does it do?
    - detects bandwidth and sends right video
    - meters out videos as needed
- You Don't NEED a server
  - High volume sites do to preserve bandwidth
  - Corp sites do so network not swamped
  - Low volume web sites don't need server

## Streaming Delivery

- QuickTime movie trailers are streamed
    - True
    - False
- Correct answer?: Generally false

## Progressive vs. Streaming

- Progressive
  - Can encode at higher data rates
  - May take awhile to play, but caches on disk so ultimately will play well
  - Post a video to your site w/no server - generally progressive
- Streaming
  - Plays immediately, and supposed to match connection speed and play through
  - Generally, lower quality

## Streaming Strategy

- The best strategy is to:
  - A. Pick one codec
  - B. Pick two codecs
  - C. Pick any three codecs
  - D. One streaming and one iPod

Correct answers?: D