Choosing a Software-Based Streaming Encoder

Jan Ozer
Doceo Publishing
jozer@doceo.com
276-238-9135

Agenda

- What we cover
  - Quality, speed and features of desktop encoders (Adobe Premiere Pro, Apple Compressor, Grass Valley ProCoder, On2 Flix Pro,Sorenson Squeeze, Telestream Episode Pro)
- What we don't cover
  - Hardware encoders, server-based encoding, server farms

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Meet the Contestants

Product	Version/Price
Adobe Media Encoder	Suite
Apple Compressor	Suite
ProCoder	• ProCoder, $499 • Carbon Coder, $4,995
On2 Flix Pro	• Flix Pro ($249), Flix Exporter ($199), Flix Engine
Sorenson Squeeze	• Suite ($499), PowerPack ($649/$799), Flash ($249)
Telestream Episode	• Episode ($395), Episode Pro ($895), Engine ($3,500), Engine Pro ($7,950)

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

OS Support

Product	Supported OS
Adobe Media Encoder	Windows/Mac*
Apple Compressor	Mac
ProCoder	Windows
On2 Flix Pro	Windows/Mac
Sorenson Squeeze	Windows/Mac
Telestream Episode	Mac

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Output Format Support

Product	Supported OS
Adobe Media Encoder	H.264*, Windows Media*, Flash*
Apple Compressor	H.264, Windows Media*, Flash*
Grass Valley ProCoder	H.264, Windows Media, Flash*
On2 Flix Pro	Flash only
Sorenson Squeeze	H.264, Windows Media, Flash*
Telestream Episode	H.264, Windows Media, Flash

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Automation Definitions

- Batch - queue multiple files for encoding
- Watch folders
  - Set up process that automatically starts encoding a file copied to a watch folder
  - Great network sharing feature
- Droplets
  - Create desktop icon that triggers drag and drop encoding
- Profiles - (ProCoder)
  - One profile that contains multiple presets

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Automation

Product	Features
Adobe Media Encoder	None
Apple Compressor	Batch, Droplet
Grass Valley ProCoder	Batch, droplet, watch folders, profiles
On2 Flix Pro	Batch*
Sorenson Squeeze	Batch, watch folder
Telestream Episode	Batch, watch folder (with Engine

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Scalability

Product	Features
Adobe Media Encoder	None
Apple Compressor	Cluster encoding
Grass Valley ProCoder	Rhozet Carbon Coder
On2 Flix Pro	Server-based products
Sorenson Squeeze	Squeeze Excel (MPEG-2/H.264 hardware), $6,499
Telestream Episode	Engine ($3,500), Engine Pro ($7,950)

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Deinterlacing Quality

Product	Features
Adobe Media Encoder	Good
Apple Compressor	Best - very, very good, glacial Better - good, fast
Grass Valley ProCoder	Good
On2 Flix Pro	Fair
Sorenson Squeeze	Fair - watch for aliasing
Telestream Episode	Very good
Notable others	Avoid - WME, Flash 8

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Deinterlacing Comparisons

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Deinterlacing Summary

- Recognize aliasing artifacts as signs of suboptimal deinterlacing, not codec
- Don't deinterlace in QT Pro, WME, Flash 8
  - Scale and deinterlace in your video editor, producing an "intermediate" file to import into your compression program
- Squeeze is on the bubble quality-wise; aliasing can get noticeable
  - Ditto

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Performance - Mac

All times min:sec	Episode	Squeeze	Compressor
H.264 multi-pass	2:57	3:57	3:56
Windows Media	1:19	10:45	N.A.
Flash	2:40	4:41	N.A.
H.264 – Single Pass	1:48	1:19	1:25

- Encode 60 second 640x480@30fps file (pre-scaled, pre deinterlaced) in Apple Animation codec
- This isolates scaling/deinterlacing time which is very slow with Compressor
- Computer is 3 GHz, Dual Processor, Core 2 Duo Mac Pro

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Mac Analysis

- Squeeze very slow with Windows Media Video files, but quality better than Episode
- Episode faster with Flash, and delivers equivalent quality

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Performance - Windows

DP/DC HPxw4600 3.0 GHz Core 2 Duo	ProCoder	Squeeze	Flix Pro
Long Flash file	24:36	14:34	25:42
Long WMV file	4:23	5:27	NA
1 minute file to Flash, WMV, Real, H.264	11:30	12:53	NA

- ProCoder - produces in parallel
  - Uses On2 Plug-in for Flash, slowing Flash encodes considerably
  - With 4X encode, all three other files were finished in 3:43
- Squeeze - produces serially

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Quality Results

- H.264
- Flash
- Windows Media

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Quality Tests

- Same standard file
- Produced to standard parameters
  - 500 kbps@30 fps
  - 640x480 resolution
  - 468 kbps 2-pass CBR/32 kbps audio WMV/H264
  - Flash - VP6 - 2-Pass VBR (when available)
  - File sizes within 5%

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

H.264 Encoding Features

Tool	Codec	Hint for Streaming	Fast Start	2 Pass CBR
Adobe Media Encoder	Main Concept	Yes	No	No
Apple Compressor	Apple	Yes	Yes	Yes
Grass Valley ProCoder	Apple	Yes	?	Yes
Sorenson Squeeze	Sorenson, Apple	Yes	Yes	Yes
Telestream Episode	Proprietary	Yes	?	Yes

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

H.264 Quality Comparisons

- Low motion
- Moderate motion
- High motion
- Ditto - very clear quality differences, especially with more challenging clips

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

H.264 Summary

Encoder	Quality	Comments
Adobe Media Encoder	*Lacks features, quality fair*	• *No Fast Start option; No data rate control for audio on streaming file; No 2-pass CBR* • *Very good low motion quality, blocky with high motion*
Compressor	Very Good	• The standard by which all others are judged
ProCoder	Good	•Image got soft and blocky with motion
Squeeze	Good	• Soft appearance in low motion, some fading, very crisp in high motion
Episode Pro	*Fair to Poor*	• *Good in low motion* • *Falls apart in high motion* • *Some fading*

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Flash Encoding Features

Tool	Batch	De-int	VP6	2 Pass	Price
Flash 8/9 Video Encoder	Yes (F only)	No/ Yes	Yes	*No*	free
CS3 Flash Video Encoder	Yes (F only)	Yes	Yes	*No*	free
Premiere Pro/After Effects	No	Yes	Yes	*No*	free
Sorenson Squeeze	Yes	Yes	Yes	Yes	$249
On2 Flix Pro	Yes (F only)	Yes	Yes	Yes	$249
Episode Pro	Yes	Yes	Yes	Yes	$995
Flix Exporter (apps below)	Yes	Yes	Yes	Yes	$199
Rhozet Carbon Coder	Yes	Yes	Yes	Yes	$4,995

Discreet Media Cleaner, **Canopus Pro Coder** (VP6 for Flash video only), **QuickTime Pro**, **Adobe After Effects**, **Apple Final Cut**, and **Apple Compressor**

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Flash Quality Comparisons

Encoder	Rating	Comments
Adobe Media Encoder	Fair	• 1-Pass CBR only, OK for draft and low motion files
Compressor	Very good	• Need Flix Exporter, • Quality identical to Flix Pro output
ProCoder	Very Good	• Needs On2 Flix Exporter, Quality very good
Flix Pro	The Best	• The standard by which all others are judged
Squeeze	Good	• Noisy backgrounds
Episode Pro	Very Good	• Almost identical to Flix Pro

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

WMV Encoding Features

Tool	Multiple Bitrate	SDK 11 Tweaks
Adobe Media Encoder	Yes	No
Apple Compressor	No	No
Grass Valley ProCoder	Yes	No
Sorenson Squeeze	Yes	No
Telestream Episode	Yes	No

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Windows Media Comparisons

- Very low motion
- Low motion
- Moderate motion
- High motion
- Very real quality differences as clips get more challenging

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Which WMV Encoder is Best?

Encoder	Rating	Comments
Compressor	Very good	• Need Telestream Plug-in, quality very good
Adobe Media Encoder	Very Good	• Very close to Windows Media Encoder
Episode Pro	*Poor*	• *Fair quality low motion, drops lots of frames in high motion and poor quality*
Squeeze	Very Good	• On par with WME
ProCoder	Very Good	• On par with WME

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Encoder Specific Analysis

- Adobe Media Encoder
- Apple Compressor
- Grass Valley ProCoder
- On2 Flix Pro
- Sorenson Squeeze
- Telestream Episode

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Adobe Media Encoder

Feature	Rating	Comments
Deinterlacing	Good	
Flash	*Fair*	• *1-Pass CBR only, which is sufficient for low motion or high bit rate high motion*
Windows Media	Very Good	• Very close to Windows Media Encoder
H.264	*Poor*	• *No Fast Start option; No data rate control for audio on streaming file; No 2-pass CBR* • *Very good low motion quality, sometimes blocky with high motion*
Performance	Good	Very good on 2 processor (98%)
Automation	*Poor*	*Nada, zip, zilch,*

Doceo Publishing, Inc.

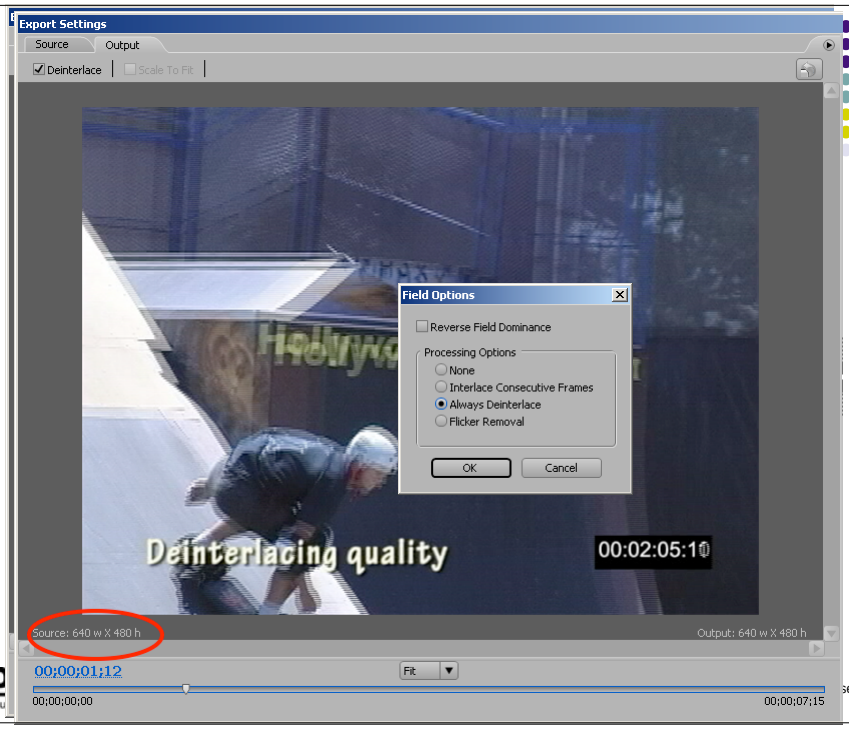
Copyright © 2007 Doceo Publishing, All Rights Reserved

Premiere Pro Concerns

- Project preset determines deinterlacing strategy
  - Interlaced preset - AME control works
  - Progressive preset - it doesn't
    - Deinterlace on the timeline

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved



Compressor

Feature	Rating	Comments
Deinterlacing	Good	• Optical Flow is very good (but glacial) • "Better" option is good
Flash	Very good	• *Need Flix Exporter,* • Quality identical to Flix Pro output
Windows Media	Very good	• *Need Telestream Plug-in (very slow)* • Quality very good
H.264	Great	• The standard by which all others are judged
Performance	Good	Scales well with additional processors, and can access multiple computers, but encoding is generally very slow
Automation	Good	Batch, droplet

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Compressor Factoids

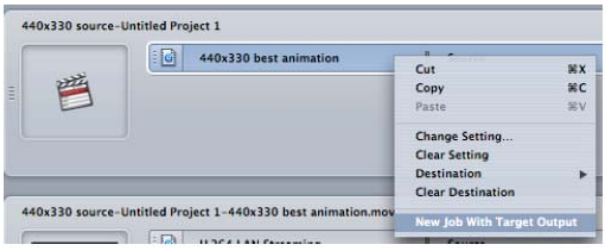
- Can't access "Best" deinterlacing when:
  - Producing from a progressive preset
    - FCP "hands off" a progressive file that's already deinterlaced
  - Using a QuickTime Export Component
    - Compressor defaults to deinterlacing in Export Component
  - Work Arounds:
    - Job Chaining - good for one-offs
    - Create an intermediate file, re-import that into Compressor and start batch

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Job Chaining

- Create preset for intermediate file using “best” deinterlacing



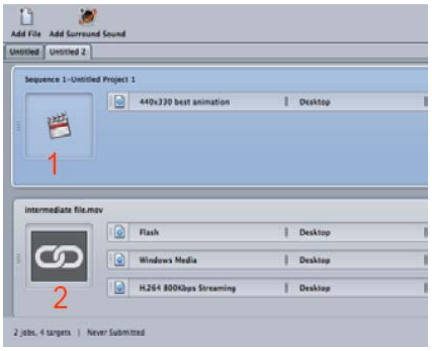
- Encode that file to final target

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Job Chaining

- First encode is to intermediate file
  - Second is to final
  - Cut encoding time to one minute H.264 file from 75 minutes to 25
  - Can’t produce multiple files from first, so
- You can import files into Compressor, so produce intermediate file, import into Compressor, set up batch



Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

ProCoder

	Rating	Comments
Deinterlacing	Good	• Efficient
Flash	*Good*	• *Need On2 Flix Exporter (extra expense and funky workflow)* • *Quality very good, but SLOW*
Windows Media	Very Good	• At or near the top
H.264	Fair	• Image got soft, still fair. • Funky batch issues with multi-pass encoding
Performance	Very Good	• Fast and scales very well with multiple processor systems
Automation	Very Good	• Batch, Watch folders, droplets, profiles

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

About ProCoder

- Developed by Rhozet; Carbon Coder is a visual twin that supports many high end formats and post production operations
- Preview needs work
  - Poor for aspect ratio conversions, since some inadvertent letterboxing in virtually all previews
    - Tricky for aspect ratio conversions and other non-standard production
  - Audio preview very limited

Doceo Publishing, Inc.

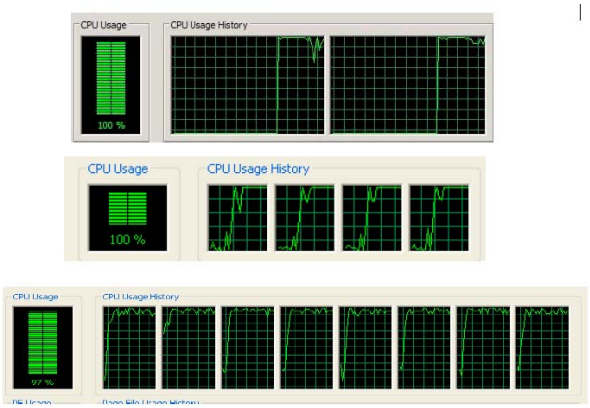
Copyright © 2007 Doceo Publishing, All Rights Reserved

About ProCoder

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

ProCoder MP Efficiency



Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

ProCoder MP Efficiency

- Encodes multiple files in parallel
  - More efficient when producing a batch than in sequential single encodes
- Efficiency is excellent, typically uses up to 100% of however many processors you throw at it

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

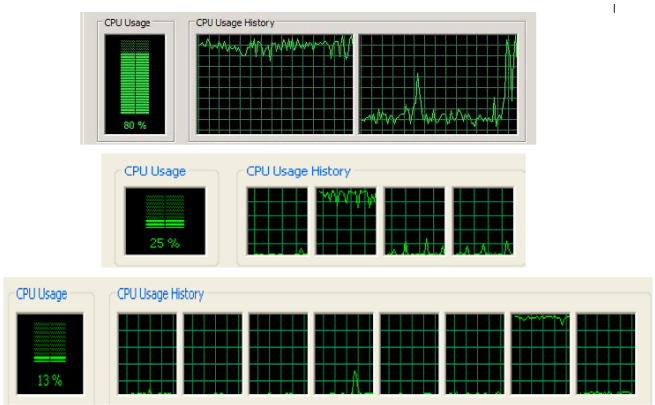
On2 Flix Pro

- Mac and Windows available
- Very good quality Flash video
- Usability
  - Doesn't automatically deinterlace interlaced source
  - Good Flash SWF options
  - *Very slow*
- *MP Efficiency*
  - *Very poor - see following page*
  - *Buy fastest processor available*
  - *Multiple cores don't help*

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Flix Pro MP Efficiency



Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Squeeze (4.5.6)

Feature	Rating	Comments
Deinterlacing	*Fair*	• *Deinterlace in editor if aliasing is evident*
Flash	Fair	• Noisy backgrounds, very fast
Windows Media	*Very Good*	• *Very slow*
H.264	Good	• Soft appearance • A touch faded • Very crisp in high motion
Performance	Good	• Doesn't scale well beyond 2 processors
Automation	Good	Batch, watch folder

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Squeeze Factoids

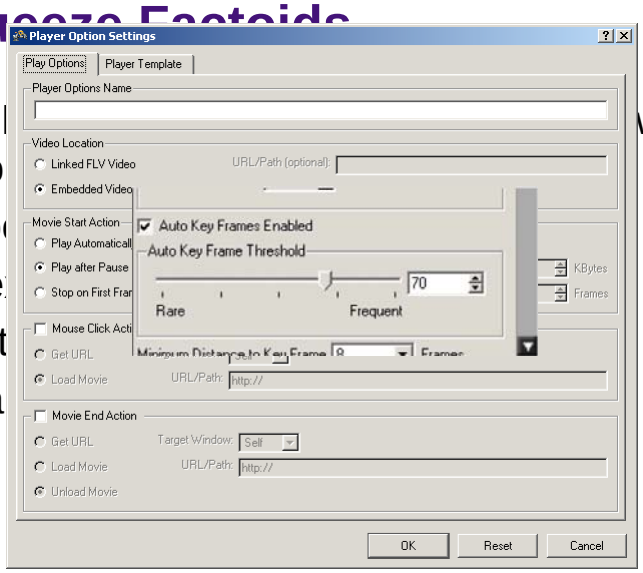
- Only full featured encoding tool with identical Mac and Windows tools
- Good Flash export capabilities (SWF)
- Flexible post encoding options
- Automatic deinterlacing
- Manually set “auto-key frame”

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Squeeze Factoids

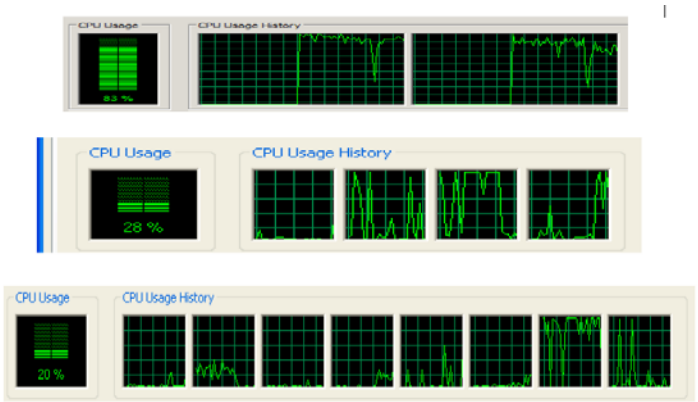
- Onl ws too
- Go
- Fle
- Aut
- Ma



Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Squeeze MP Efficiency



Doceo Publishing, Inc.
Copyright © 2007 Doceo Publishing, All Rights Reserved

When Buying For Squeeze

- Serial encoding approach lessens MP utilization
- Buy speed, not additional processors
  - Spend extra to get fastest CPU
  - Not more cores

Doceo Publishing, Inc.
Copyright © 2007 Doceo Publishing, All Rights Reserved

Episode Pro (4.4)

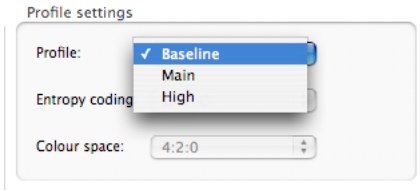
	Rating	Comments
Deinterlacing	Very Good	• As good as Optical Flow in a fraction of the time
Flash	Very Good	• Almost identical to Flix Pro
Windows Media	*Poor*	• *Fair quality low motion* • *Drops lots of frames in high motion and poor quality*
H.264	*Poor*	• *Good in low motion* • *Falls apart in high motion* • *Some fading*
Performance	Good	
Automation	Fair	Batch, droplet, no watch folder without Engine

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Episode Concerns

- H.264 presets use baseline profile
  - Should be main
- All presets "cut" to convert from DV to square pixel
  - Should be distort



Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved

Questions?

- The end!

Doceo Publishing, Inc.

Copyright © 2007 Doceo Publishing, All Rights Reserved