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Digital Video Work Flow and Standards updated 2022

If possible, it's good to know how your video will ultimately be presented- how it's being delivered to an audience, before you start, so you can tailor your parameters- resolution/size, frame rate, container and codec etc., to be compatible with the native specs of the delivery device & environment. In lieu of that, or if you expect to be screening across different delivery platforms, it's best to make a 'master' hi-res/hi-def, lossless version of your video that anticipates different delivery/environments settings, and you can always make other versions from the 'master' using different settings.

Back up your work often, especially all project files, on a separate drive (project files are the documents you've created using After Effects or Premiere/Final Cut, etc., and your source media). I highly recommend also using a cloud-based back up for double back-up.

Resolution
The pixel dimension of the frame; higher means larger files and better resolution for devices able to deliver them. For digital cinema purposes, high definition (HD) resolutions are- full HD is 1920x1080, 1280x720 small HD. UHD (ultra high-def) is 3840x2160. Digital cinema standard is 4K at 4096x2160 (2K is 2048x1556) as well as 6K, 8K and up, used by film industry pros. For SD (standard def), your average SD older data/video projector's native resolution is 1024x768.

Aspect Ratio
The ratio of width to height of the frame, usually represented as two numbers separated by a colon, such as 4:3 or 16:9 (wide screen)

Frame Rate and Standards
The number of frames that are shown per second (fps). The digital video standard is 30fps or 25 fps, animation standard is 30fps. Newer production and cameras use higher rates for supper smooth action & to facilitate slow motion. Traditional film standard is 24fps.

The frame rate for SD video is often standardized depending on country/continent, though this is becoming less important due to advances in video streaming technologies. In North America, Central America and parts of South America the standard NTSC (standard definition) frame rate is 30 fps. Technically, NTSC runs at 29.97 fps. In much of Europe, Eastern Europe, Asia, Australia and much of Africa, the standard for regular (standard def-SD) definition video is PAL and uses 25 fps.

NTSC and PAL also have common standard 'resolution' or frame sizes.
NTSC 720x486 also known as 'D1' (720x480)
PAL 720x576 (there is also a high def PAL format)

NTSC and PAL are size/ratio + frame rate standards that come into play mostly when you send off videos to festivals and the like, often on dvd. If you are streaming/playing video through a computer or display that uses (for example) VLC or a media player, the NTSC & PAL standards are not applicable.

Formats- Containers (also known as Wrappers)
A container for video files packages the various parts of the file. They are expressed as file extensions. This includes the visual footage/imagery as well as the audio tracks and graphics. Containers are also referred to as the format of that file. By definition, a container format could wrap any kind of data. The most popular video + audio containers are Quicktime's .mov, Windows .avi, and .mp4 which works well on both pc and mac. The most popular audio only containers are .aiff (used mostly on macs), and .wav (used mostly on windows). Containers are NOT codecs.

Codecs
A video codec is a device or software that enables video compression and/or decompression for digital video (and audio). The process usually employs lossy data compression. It's best to choose common in-use codecs such as H.264 (the codec of choice for many applications where you need a smaller file), DivX (older popular codec, fading from use), mp4 video, MPEG-2, JPG 2000, DV stream, etc. New codecs come out from time to time, but don't use them unless you know that your video presentation device can support it.

More info on the classifications of codecs, containers, etc. :
https://www.promax.com/blog/video-codecs-file-formats-containers-extensions-explained

Codecs and Rendering (See also "Rendering in AE, settings" below)
When you are editing digital video for a final product, or for use in another application (such as premiere or final cut > after effects) it's best if you can to work with lossless or hi-res files, then you can export lossy versions from there that give you smaller file sizes. However, unless you're working on a set up that allows for very large files, that may be difficult. If your computer is not equipped to deal with super large files, then you can output through AME* or Premiere for smaller file sizes/mp4's. For a lossless codec when rendering from After Effects- in the Render Queue use Best Settings & Lossless or Animation settings OR a ProRes codec which will be smaller file size but still very good resolution. After Effects is primarily designed to create full size files, that you would then render/convert down for smaller more portable files (such as mp4/H264).

Bit rate
(Files that are too big are often the result of an unnecessarily large bit rate)
Bit rate controls both the visual quality of the video and its data file size. It is the number of bits (data) that the video will process in a given period of time (usually seconds). Bit rate is commonly measured in kilobits per second (kbits), or megabits per second (mbits). For example, an old DSL connection may be able to download data at 768 kbits, while a Firewire 800 connection can

transfer data up to 800 mbits. Bit rate can also describe the quality of an audio file. For example, an MP3 audio file that is compressed at 192 kbits will have a greater dynamic range and may sound slightly more clear than the same audio file compressed at 128 kbits. This is because more bits are used to represent the audio data for each second of playback. Similarly, a video file that is compressed at 3000 kbits will look better than the same file compressed at 1000 kbits. More bits per second means more information, more resolution, a better looking and sounding video. It also means bigger file size. For HD video use 20,000-30,000 kbits (for vimeo uploads 10,000). Use an audio rate of 320+ when possible.

Audio
Audio files are best saved in format AIFF or WAV to ensure they import well into editing programs (mp3's don't work as well but do work). If you are using a sound-editing program, like Garageband or Audition, Audacity, etc., import (just drag it in) the .aif file to manipulate or add to other tracks. To output your audio from Garageband use the 'Share' menu > 'Export Song to Disk', but do not compress it unless you really have to. The export will make an .aif file that reads well in editing programs. Audio bit rates: If your source material is from mixed sources, then you should probably encode your audio at the bit rate of the source that has the lowest audio bit rate; generally though, 320+ is best.

Square Pixels vs not square
Square pixel ratios are used on computers and HD (high definition) video. The pixel aspect ratio for square pixels is 1:1. Non-square pixel ratios are typically used in SD (standard definition) video. If you are working with SD or mixed SD and HD footage, you may have some tweaking to do in order to bring all ratios in line (the same) for the final project.

Progressive and Interlaced
Video can be interlaced or progressive. If your video has jagged lines, or a "stairstep" effect, particularly when your subject is moving, this is typically due to an interlace problem. Computer screens handle video differently than televisions do. Playing an obviously interlaced video on a computer will look terrible, but output that same video to a standard DVD and play it on your old TV, it will look great. 1080i- stands for 1080 interlaced, 1080p- stands for 1080 progressive. Generally, you want progressive.

Interlaced - analog cameras and videotape
Interlaced scan-based images use techniques developed for old Cathode Ray Tube (CRT) TV monitor displays, made up of 576 visible horizontal lines across a standard TV screen. Interlacing divides these into odd and even lines and then alternately refreshes them at 30 frames per second. The slight delay between odd and even line refreshes creates some distortion or 'jaggedness'. This is because only half the lines keeps up with the moving image while the other half waits to be refreshed.

Progressive – computer and LCD displays, projectors, digital cameras

Progressive scanning, as opposed to interlaced, scans the entire picture line by line every sixteenth of a second. In other words, captured images are not split into separate fields like in interlaced scanning. Computer monitors do not need interlace to show the picture on the screen. It puts them on one line at a time in perfect order i.e. 1, 2, 3, 4, 5, 6, 7 etc. so there is virtually no "flickering" effect. As such, in a surveillance application, it can be critical in viewing detail within a moving image such as a person running away. However, a high quality monitor is required to get the best out of this type of scan. 'Deinterlace' your files to convert interlaced files for computer, projector, and LCD displays.

Importing Camera footage
When you connect your camera or memory card to your computer sometimes the video footage is not directly accessible. If the camera/card does not mount as a drive, or as, for example, raw or Pro Res files, but rather as a series of folders with 'strange' names/numbers, then you'll need to get to your footage by importing it. Most camera capture video will open directly through Premiere or FCP –File>Log and Transfer on older versions to get your footage, or file>import>media, or simply drag and drop, on newer versions.

SUGGESTED WORK FLOW

After Effects (AE)

You need at least 16GB of Ram on your computer to use AE even a little bit; 32GB of Ram to use effectively, more, like 64 or above, is MUCH better.

Before beginning your project, set up your folder/s with a main project Folder ('Wally' below). Inside that have folders for your After Effects files, your source media (video, audio, image) files. Try not to move files around. When you move files already in use in a project, you have to update by selecting missing file in AE project tab and File Menu>Replace File to locate and replace.
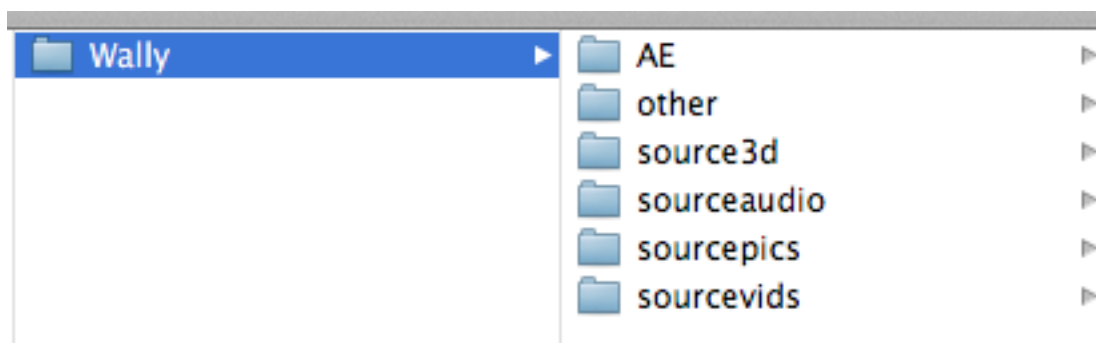
- Suggested settings/specs:
- FPS: 30, Progressive (not interlaced)

- Shoot original footage in HD, 16:9 for widescreen, or SD 4:3 ratio
- Audio codec: AAC, 48kHz (cd's use 44, but 48 is standard in digital video),
- 320+kbps for audio if you have the option
- Faster

Faster working in AE:

1. In AE Preferences>Memory >configure Installed Ram to allot most to AE and Adobe suite
2. While working in AE, set the working resolution on the bottom of the composition window to 'auto' or half or quarter size instead of full (you change that in render module before rendering); and, set the Fast Previews (the lightning bolt icon on the bottom of the composition window) to "Adaptive Resolution".
3. Use separate drives (ssd drives are best) for your applications + OS, and to read and write files.
Don't forget to back up often. Have at least 2 copies of all your project files- one on an external ssd (or your computer if need be), and one the cloud (apple, dropbox, google, etc). I use a separate standard hard drive (not a ssd drive) to regularly back up my computer, which would make 3 copies of your project. These older technology hard drives are much cheaper and good for regular backups. Note: when buying ssd drives, make sure the connection/cables match your computer and get the fastest one that does; they get better all the time.

A set-up with 3 drives – **Recommended**
>your applications (including AE) and OS (the computer's operating system) on the 'main' hard drive of your computer.
>all your project & media files on another drive (external ssd!)
>your AE disk cache on another drive (ssd!-faster is better).
A set-up with 2 drives –
>use your computers hard drive for applications and the OS,
> use an external fast ssd drive for all project files, and, use the fastest drive of the two for the cache.

Note- a related option is to get an external 1+TB SSD drive that has the ability to partition (or used as a RAID) into 2 virtual drives. This means you can use the one SSD device for 2 drives.

4. If you are getting a lot of buffering (spinning ball) then Purge all memory: first in the AE menu>Edit>Purge both options, and then purge the cache in AE menu>Preferences>Media and Disk Cache>Empty Disk Cache, and disable layer cache. This is not great for previewing while working, but for render time and stuck previewing only.

Always back up your work (project files and renders) every time you make a change you want to keep; remember you have the option to 'save as' to keep multiple versions. You can use 'auto-save', set in Preferences, though this will slow you down a bit and can be frustrating.

Rendering in AE, settings:
1. Put caps lock ON (on the keyboard) when rendering.
2. Have already set up multiprocessing if that benefits your computer (see #1 in Faster Working in AE).
3. Close all other programs especially if memory/processing power is an issue.
4. 'Render' (do not use the 'Export' function) video to Quicktime the lossless Animation codec, or use a ProRes codec, for outputting a 'master'/original copy, set size and use 'best setting'. This produces large files, so may not be practical for some uses.
5. Quit and restart AE if you get an error.
6. If you are having trouble with the Animation codec, try format>Quicktime>options>ProRes+, another option is to use a jpg/png sequence there with your pre-set up folder for the gazillion files that it will make); or render directly in *AME.

After Effects allows you to render out using its sister program- *Adobe Media Encoder (AME) where you can directly output a smaller .mp4 or H264. file (double pass is best). In Adobe CC this is the primary option for all exports. But AME can be *very* slow, depending. A better 2-step option is to render a high-res version (Quicktime>Prores or Animation codecs) in After Effects, and then use Compressor (a stand-alone companion to Final Cut) to convert to .mp4 or whatever. Compressor is very fast, a 4.5GB ProRes file converts to an .mp4 in under 2 minutes! After market video converter programs are also an option, programs like the free Handbrake, or $ programs. Some reviews of these at https://www.comparitech.com/utilities/best-video-converter-mac/. An important part of your decision of which converter to use is the quality of the actual video & audio output. Read up on options, download trial versions and do tests. I've tried many, and find Compressor to be best for my needs, fast and good quality.