MEDIA COMPRESSION OUTPUT

- SHANE FROGLEY

INTRODUCTION

This study of rasterized image file type compression was done to understand the differences in formats and why they are relavant or irrelvant in today's society. This document will provide a visual evidence to the fact that image compression is an issue that we as Web designers, Software engineers, and Graphic designers have to take into consideration.

Through-out this document you will see examples of the image/video compressions and the visual fidelty that gets lost in the converting of images and video. There will also be an audio Evaluation

I used Adobe Photoshop to handle the different file conversion for the images. This helped me to determine the compression methods that certain file formats use and how they are impacting the fidelty of the images. I also used Apple's "Ibooks Author" program to compare the compression that it does to it's images.

With the video analysis I downloaded a minimally compressed video from the internet to determine the differences.

The outcomes were varied. I was surprised that certain results didn't vary as much as I thought they would, but through the long process I have come to a better knowledge of the issues with different programs and differing image formats.

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1.0
LIST OF IMAGES FORMAT

IMAGE FORMATS

.JPG (Joint Photographic Experts Group)

.PNG (Portable Network Graphics)

.GIF (Graphics Interchange Format)

.TIFF (Tagged Image File Format)

.HEIF (High Efficiency Image Format)

.RAW (Raw Footage)

.BMP (BitMap)

1.1
IMAGE FORMAT HISTORY

JPG

History

JPG is named after the group that created it called the Joint Photographic Experts Group. This group was organized in 1986. They publically released the format in 1992. JPG has gone through 6 revisions over the years to allow a better optimizations.

Technical Specs

- It produces a high quality image at a fraction of the size.
- Deals with harsh edges poorly and displays them as blocky.
- Not good for text or diagonal lines
- Supports a maximum image size of 65,535×65,535 pixels with 16 million colors.
- Doesn't do well with multiple edits of a photo it will end up looking blocky/pixelated.

PNG

History

Portable Network Graphics first released in 1996 as an effort to replace the GIF format. It has since been updated in 2004. It is the most widely used lossless image format used today.

Technical Specs

- The format includes a transparency layer.
- Supports 16 bit and 24 bit modes.
- The 16 and 24 bit modes allow more colors to be added to the file.
- Usually is smaller than a gif file.
- Doesn't carry an animation feature, and not all web browsers support it.
- Keeps image fidelty the same.

GIF

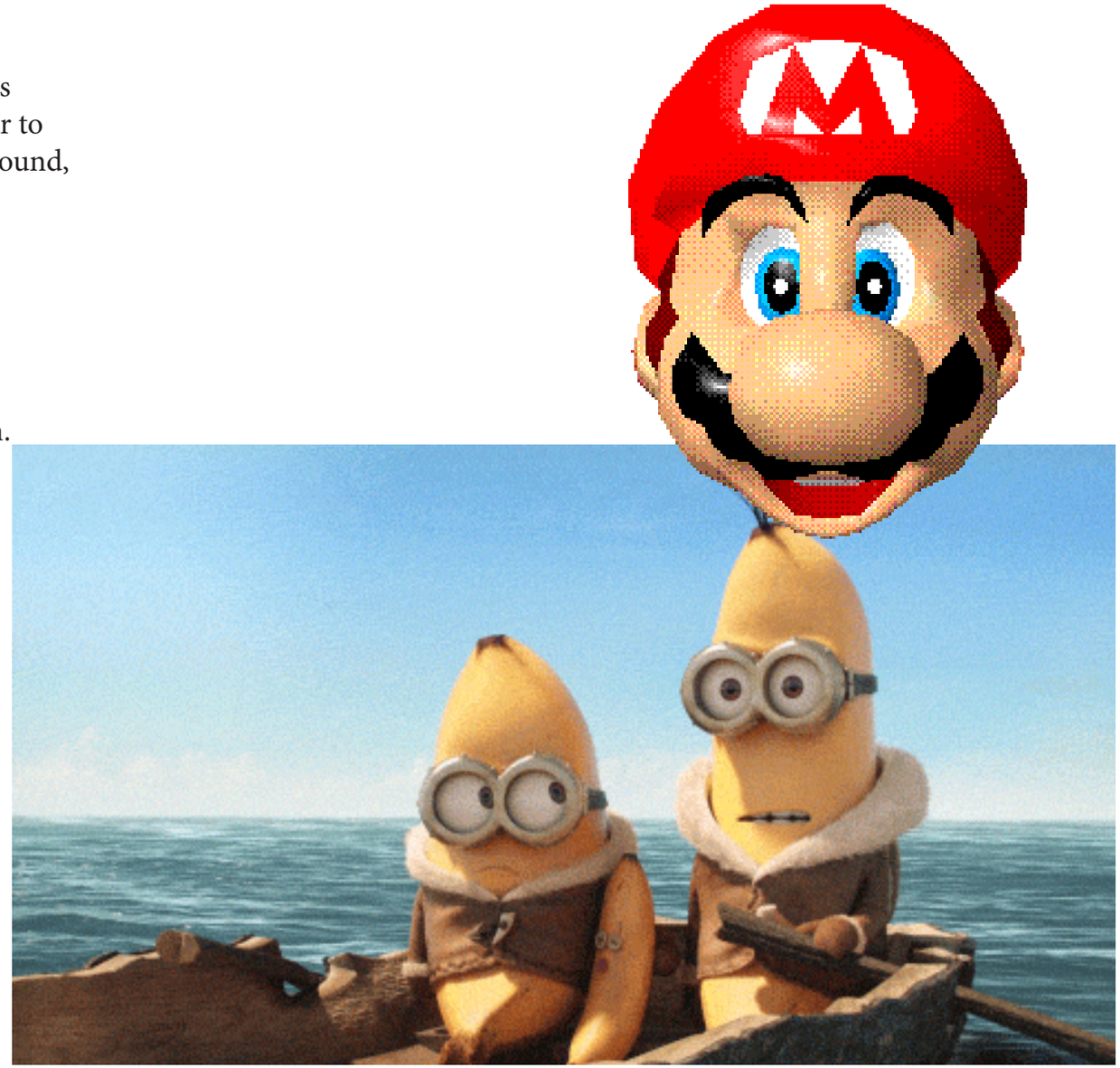
History

Graphics Interchange Format was made by Steve Wilhite in 1987 while he was working at CompuServe. He intended the pronunciation of such, to be similar to the peanut butter brand Jif. It is widely more accepted as Gif with a hard “g” sound, similar to the word “gift.”

Technical Specs

- It is a type of Bitmap image file that supports only 256 colors.
- It can be grainy due to the limited color palette.
- Supports small animations.
- Is outdated in almost every way simply because of file size and compression.

Animation is the only feature keeping it alive.



May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

TIFF

History

Tagged Image File Format was created by Aldus in 1986. Aldus was bought by Adobe in 1994. Adobe has since updated the format consistantly.

Technical Specs

- Supports several types of compression like JPEG, LZW, ZIP or no compression at all.
- It is a high quality image format, all color and data information are stored.
- Can be saved with layers.
- File sizes are normally big.

HEIF

History

High Efficiency Image Format is fairly new and was created in 2015. With Apple was the first company to adopt it in 2017 for use on their smart phones in IOS 11.0.

Technical Specs

- With image bursts it can create prediction options that can be used in order to exploit the temporal and spatial similarities between the images. This exploit can make the file sizes up to 40% smaller than a JPG.
- Less Artifacting due to it's smart prediction.
- Allows storage of multiple images into a single file.

HEIF - 38 KB

JPG - 49 KB

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

RAW

History

As I was doing the research I found that they don't have much detail on when Raw images came to be. It's likely to assume they were introduced by each manufacturer of cameras simply because there is no standard for a Raw image. This means they can be coded in many different ways.

Technical Specs

- Highly unprocessed files, that contain most of the information directly from the Camera.
- Files are very big in file size.
- Come in many different file extensions.
- Can easily edit the file without damaging the file permanently.
- Not all Raw files are the same in how they are processed.
- Raw images are a type of Bitmap.

JPG RAW

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

BMP

History

BitMap file was released with Windows 3.0 and was owned by Microsoft in 1990. This was one of the first image formats to come to market.

Technical Specs

- The file sizes are extremely big.
- They don't scale easily, meaning that they don't change size easily.
- They aren't compressed easily.
- The bitmap file format is basically worse in every way making it replaced by JPG.

BMP -3729 KB

JPG - 386 KB

1.2
IMAGE FILE NAMING CONVENTIONS

IMAGE FILE NAMING CONVENTIONS

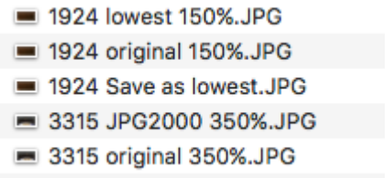
The importance of File naming conventions are critical in order to have people understand what the files actually are. File naming conventions help developers, coders and photoshop guru's alike in order to work on the same project at the same time, or work on a project later on long after the build is made. With turnover on jobs, different people have to know what a file is and what it is doing before they can revise it. This helps the workplace avoid redundancy.

For example if there is a program named "jump.exe" this is a terrible name convention simply because it doesn't describe it at all. It could be a program that is very useful and coded very well, but the person wouldn't be able to understand what it can do by just the name of the file. The workplace could then waste time on creating a program very similar that executes the same thing, Without another good file naming convention then the process could repeat, and you are left with wasted hard drive space, wasted time, and wasted money.

A good example is shown on the top right where we see that all have different names and there are details, but could use more details.

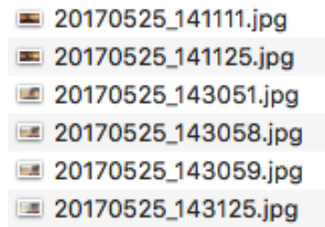
A better example is shown in the middle where they all have the highest amount of detail

A bad example is shown on the bottom right where all the pictures are numbered without a description of what they are, only a date at the beginning.



Good File naming

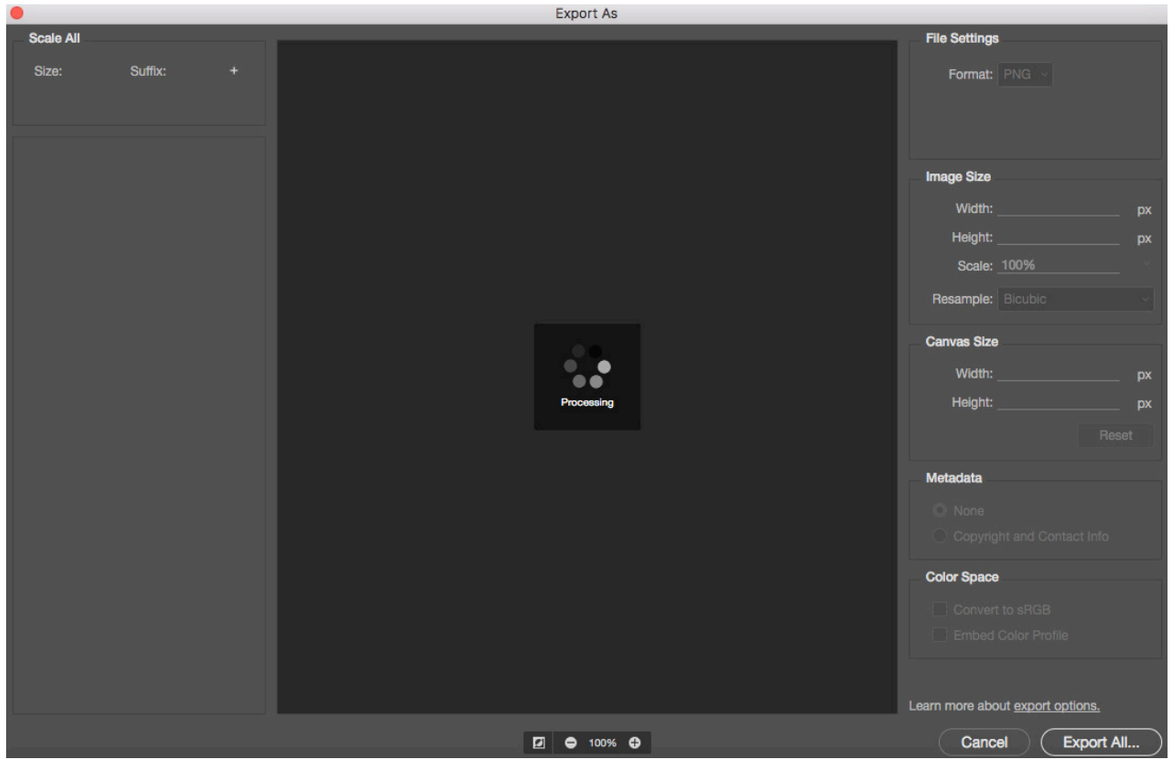
Better File naming



Bad File naming

1.3
JPG IMAGE EVALUATION

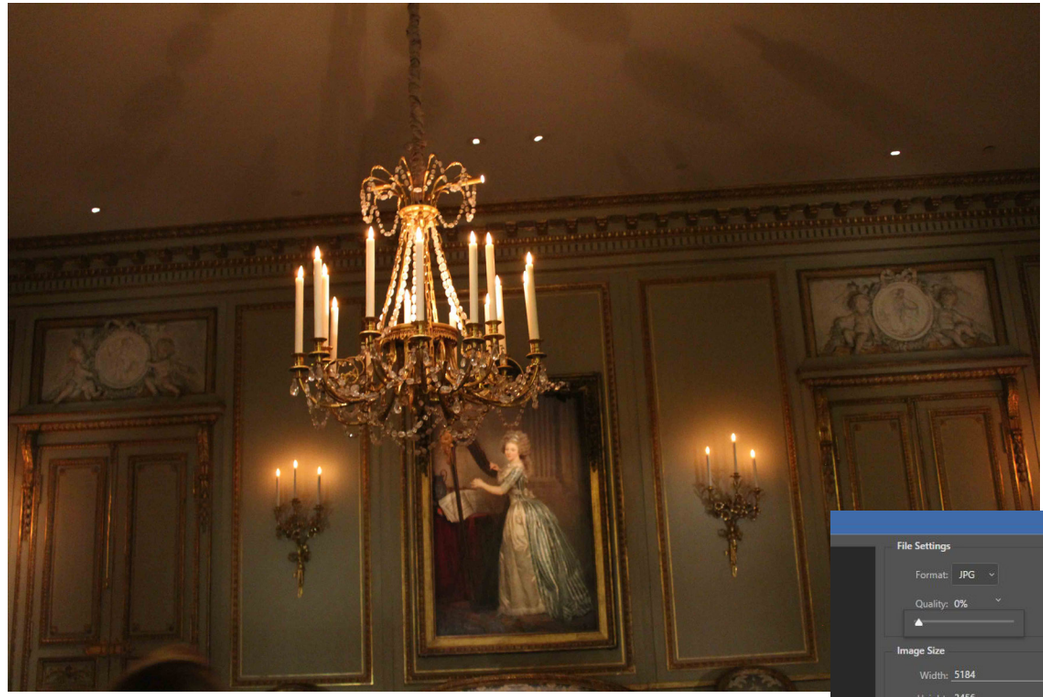
PROCESSING 'EXPORT AS' ON A OLD MAC



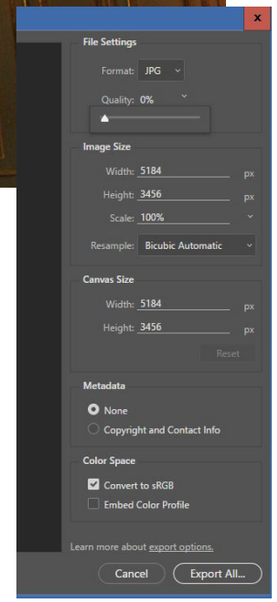
It became very apparent that the "Export as" feature is using a lot more processing power than that of the "Save as" Feature in Photohop. My Macbook Pro, which is a mid 2010 model, had this processing screen on for a solid eight minutes plus. I decided to not take the time to see how long it would actually take before it started working. Luckily I have a PC that can pickup my mac's slack.The difference in time was, no question, a saving grace. Instead of taking eight minutes, it took two seconds.

JPG - ORIGINAL VS. EXPORT AS

JPG Original



JPG Export As



settings used to export

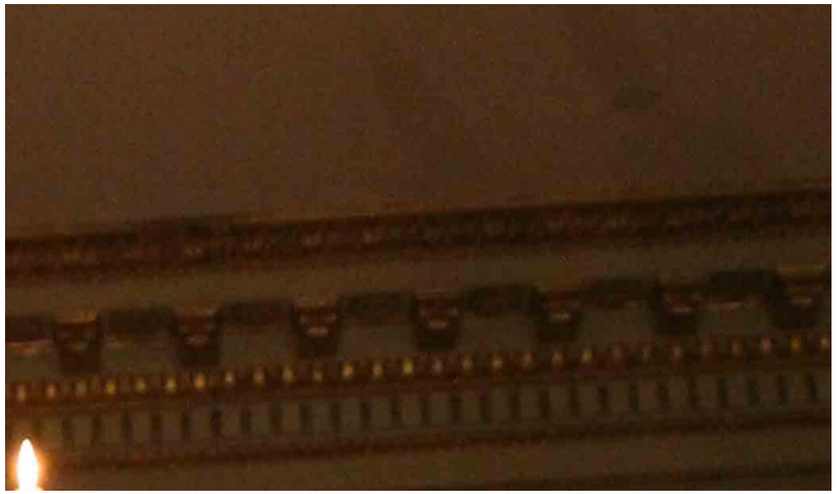
I used the “Export as” feature in Photoshop to export as a JPG at the lowest possible setting. The biggest and most obvious change was the color. The colors were more vibrant in the original file. There was a subtle graininess to the “Export as” photo, but as you zoom into the photo you can understand why. I chose this photo simply because I thought the intricacies of the photo would show off how bad the compression of jpg and the jpg artifcating really is.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

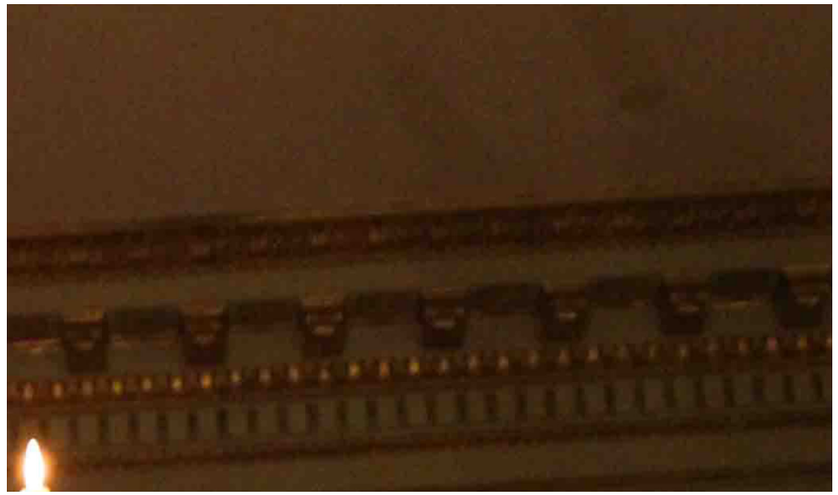
JPG - ORIGINAL VS. EXPORT AS ZOOMING

JPG Original 150% zoom

I zoomed into this particular spot to show the harsh edges. Once again there was an obvious color difference between the original and the others. I have noticed that between the 'Export as' and the 'Save as' feature in Adobe Photoshop the 'Export as' feature is much higher quality than the 'Save as' feature. This makes sense due to the fact that it takes up more processing power than the 'save as' feature.



'Export as' 150% Zoom



'Save as' 150% Zoom

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

JPG VS. PNG

JPG original

PNG

When I first started the comparison, I chose an image with highly detailed content because I thought that maybe it would end up similar to the results from the jpg compression. When comparing the original against the png version, I was hard pressed to find anything different. The only difference was file size. The strange thing was that the 'quick png' option made the file size 5mb larger, which I thought was strange, but it might be due to the fact that it isn't processing as much so it just quickly exports it out. The .PNG files as a whole are 3x the file size of a .JPG.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

JPG VS. GIF

GIF

[1] What is interesting is when the Freedom tower touches the clouds the format doesn't know what to do with it, so it just changes the colors dramatically.

[2] Clearly there is a huge difference between these two formats. The .GIF file format just doesn't cut it as far as color goes. It looks pixelated because of the color limitations.

Also GIF takes up twice as much storage of a .JPG file. GIF's are outdated in every way with the exception of the use of animation.

JPG original 450% zoom

GIF 450% zoom

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

JPG VS. JPG 2000

JPG original

JPG original 350% zoom

I chose this image simiply because it has a little bit of everything. It has a ton of detail, but a lot of that detail gets lost in the JPG2000 conversion process.

[1] This is made evident by the muddiness of the picture, it doesn't know how to handle the brick area so it creates a huge artifact that just makes it terrible looking.

[1]

JPG2000 350% zoom

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

JPG VS. JPG 2000 - ANOTHER LOOK

JPG original

JPG2000

Here's another look side by side to see the differences. The Jpg2000 clearly has some issues with the brick pattern up top and the bricks near the middle window. The colors are slightly off too. The whites seem to be more exposed in the JPG2000 image.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

1.4
FILE SIZE EVALUATION

FORMAT FILE SIZE COMPARISON

Exported using Adobe Photoshop CC 2017

Exported with lowest Settings possible and without a resolution change

IMG_3315.JPG original	-	7.32 MB
JPG2000	-	162 KB
‘Export as’ Jpg	-	626 KB
‘Save as’ Jpg	-	584 KB
‘Export as’PNG	-	21.5 MB
‘Save as’ PNG	-	21.5 MB
Quick Export PNG	-	24.6 MB
GIF	-	6.7 MB

IMG_3315.jpg Original

Exported with Highest Settings possible and without a resolution change

IMG_3315.JPG original	-	7.32 MB
JPG2000	-	12.2 MB
‘Export as’ JPG	-	9.34 MB
‘Save as’ JPG	-	9.5 MB
‘Export as’PNG	-	same as lowest
‘Save as’ PNG	-	same as lowest
Quick Export PNG	-	same as lowest
GIF	-	same as lowest

Lossless setting - JPG2000 - 17.1MB

1.5
SEAMLESS MEDIA OUTPUT

IBOOKS AUTHOR

I Started off building a book on Star Wars. My plan was to desgin it in Adobe Indesign and then export it to Ibooks Author. This was a challenge due to my lack of experience in Ibooks Author. I eventually figured it out though. Ibooks Author is really a finicky program. It just doesn't work as well as Indesign. The selection tool was a pain to deal with, it got mixed up a bunch of times. I had a lot of trouble with it grabbing and moving the background image of what I had Strategically placed two seconds before. Let's just say there were a lot of 'crlt + Z's.

Ibooks Author doesn't allow for arbitrary sizes of their Ibooks. I used an Iphone 6 for my testing, so I wasn't able to customize the size of the book to fit the whole screen.

Screenshot from IBooks Author

IBOOK SCREENSHOTS

Getting the images seemless was kind of tricky, but once I figured out that I had to split the images into their separate pages in Indesign and then export it, there wasn't much of an issue. It allowed for seemless transitions from page to page without issues.

The Screenshots shown below have a gray screen over to signify the difference between pages while you swipe right in the IBook App. This is a useful feature, but it makes the seamleasness of the book not very good.

Screenshot from Iphone 6 IOS 11.0.3

Screenshot from Iphone 6 IOS 11.0.3

1.6
SEAMLESS MEDIA COMPRESSION

IBOOK COMPRESSION - JPG

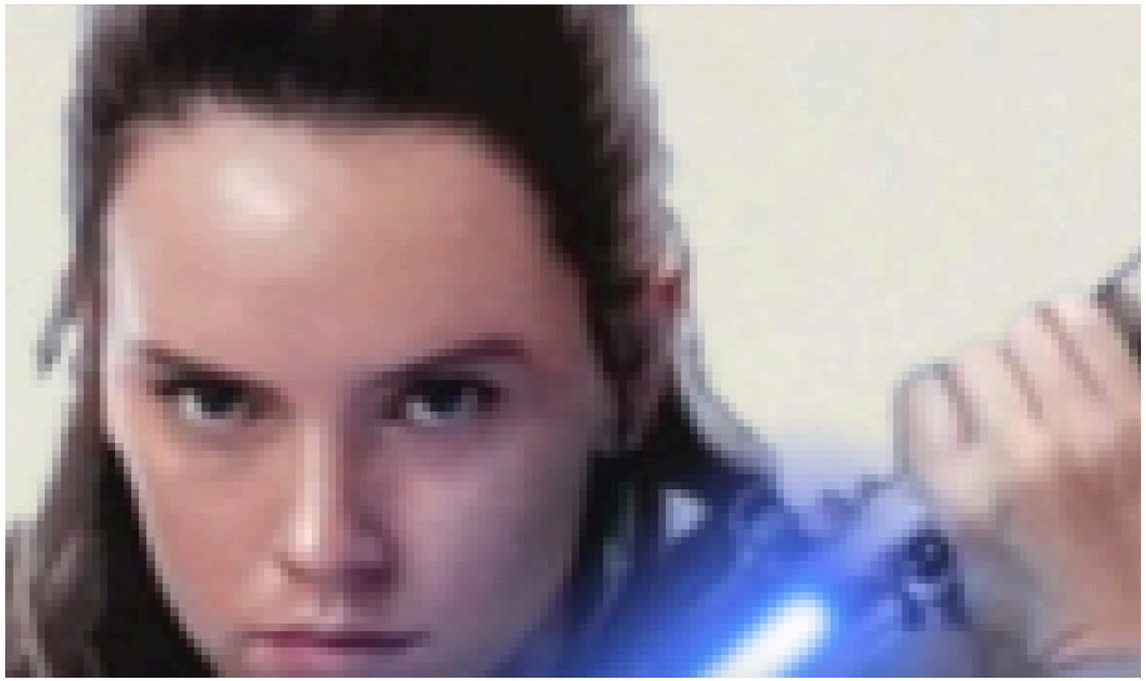
In this comparision, the difference is “day and night” where the stars look more defined on the right. The compression almost takes some of the stars out, it dampens the effect of them. The brightness is effected pretty badly. The color is changed too. The botoom right star clearly has some color changes to it.

Compressed Screenshot from Iphone 6 IOS 11.0.3

Original

IBOOK COMPRESSION PT 2 - PNG

In this comparision the difference is again vastly different from the original. It appears a form of Anti-Aliasing is being used to fade the png into the background of the IBook. The detail on the Lightsaber hilt is compressed heavily. The eyes and eyebrows aren't nearly as defined as in the original. The ear has a muddy look to it now.



Screenshot PNG - Iphone 6 - IOS 11.0.3

Original

2.0
LIST OF VIDEO FORMATS

LIST OF VIDEO FORMATS

.AVI (Audio Video Interleave)

.FLV (Flash Video Format) ...

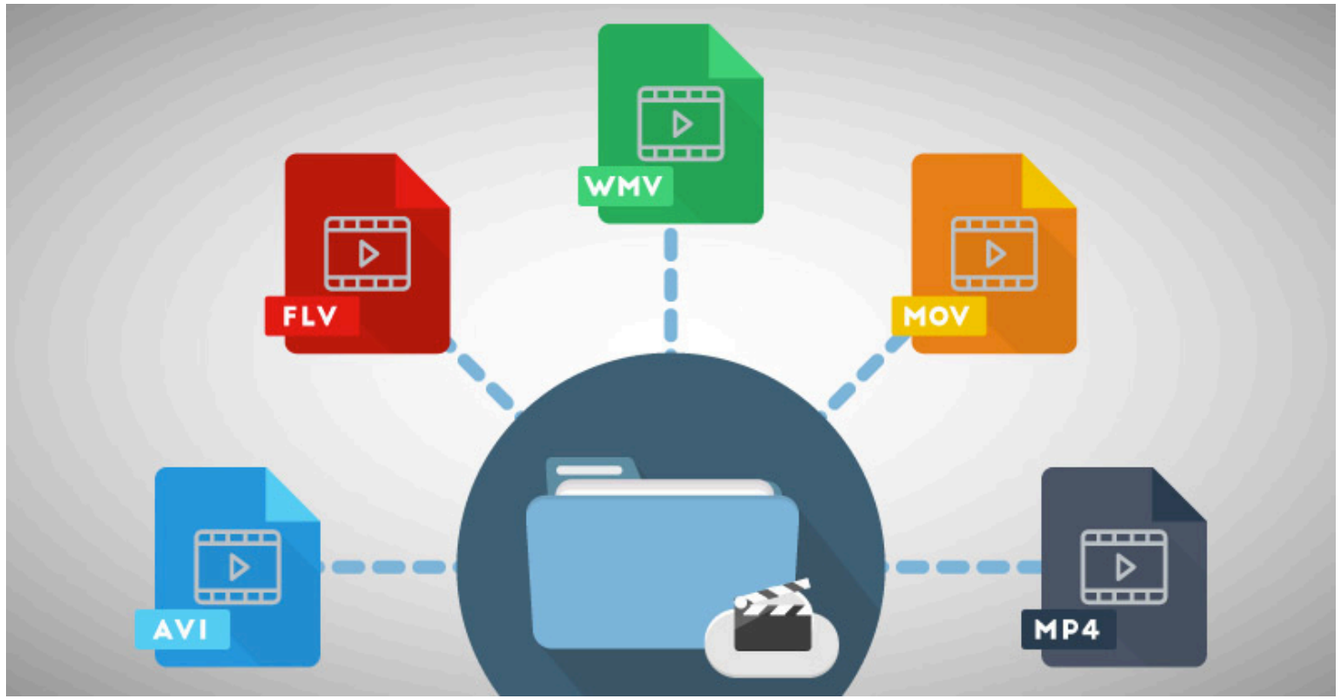
.WMV (Windows Media Video) ...

.MOV (Apple QuickTime Movie) ...

.MP4 (Moving Pictures Expert Group 4)
.M4V

.MKV (Matroska multimedia container)

.HEVC (High Efficiency Video Coding)



2.1
VIDEO FORMAT HISTORY

CODEC VS CONTAINER

Before we talk about file extensions for video we need to talk about the differences beteween Codecs and Containers.

Codecs are the way we encode the video. Which could be plethora of different codecs depending on the file container.

The Container contains various components of the video, Like the audio, the subtitles, and the video itself. Therefore the audio can have a different codec than that of the video.

This means that a “Star Wars EP 1 Trailer.mp4” and a “Star Wars EP 1 Trailer.mp4” could be entirely different files even though they have the same extension and same name.

AVI

History

Audio Video Interleave was introduced by Microsoft in November 1992. It supports multiple streaming methods for audio and video.

Technical Specs

- Doesn't encode aspect ratios
- Can't contain VBR (Variable Bit Rates)
- File sizes are usually high, because of the CBR (Constant Bit-Rate).
- An AVI file's data divided into blocks, each block is identified by a FourCC tag.

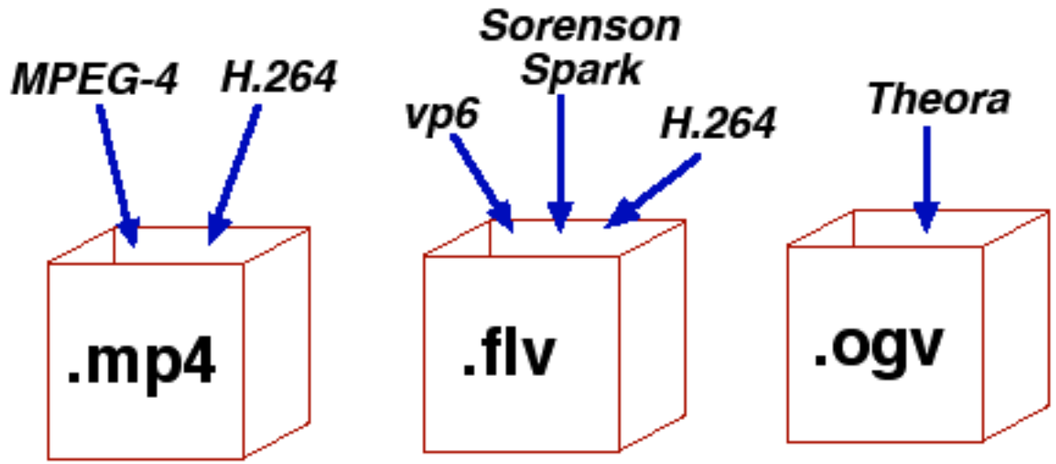
FLV

History

Flash Video Format was designed to deliver video content over the internet. FLV was developed by Macromedia in the 2003. The newer codecs of this file format are completely different from what it was originally.

Technical Specs

- The newer versions of this codec don't support old compression types.
- There are two different formats .F4V and .FLV.
- In playback, the old codec it didn't detect what the file extension was, it just went straight to play the video itself then determine what it was.



WMV

History

Windows Media Video started out in 2003 but was officially approved in March 2006. It was made to combat online video streaming.

Technical Specs

- There are three distinct codecs.
- One codec became the standard for HD-DVD's and Blu-Ray formats
- .WMV files are considered part of the Advanced Systems Format.

MOV

History

QuickTime Movie was developed by Apple and is based off of .MP4. Apple released it in 2001.

Technical Specs

- It can contain more than one track which stores audio, video, or subtitle information.
- Can contain virtually any codec inside of them.
- They typically contain footage that is not highly compressed.

MP4

History

Moving Pictures Expert Group version 4 was released in 2001 roughly the same time as .MOV file.

Technical Specs

- It's very close to the QuickTime file format.
- based off of .MOV
- MP4 formally specifies support for Initial Object Descriptors.
- In order to limit piracy M4V files were developed by apple to provide optional DRM (Digital Rights Management) copy protection.

MKV

History

Matroska multimedia container was developed by Russians in order to rip Blu-ray content at a fraction of the file size. Matroska branched off of the MCF format because there were disagreements with binary formats.

Technical Specs

- Has the capability of holding an unlimited number of video, audio, picture, or subtitle tracks in one file.
- It can hold many different codecs inside of it's container.

HEVC

History

High Efficiency Video Coding video codec will compress video files to half the size. It is currently the most-efficient encoding format. It was developed by a collaboration of the Moving Pictures Expert Group and the Video Coding Experts Group sometimes called the Visual Coding Experts Group.

Technical Specs

- It makes streaming in 4k resolution possible.
- HEVC is twice as efficient as MPEG-4/H.264
- Experiences only a minimal loss in quality

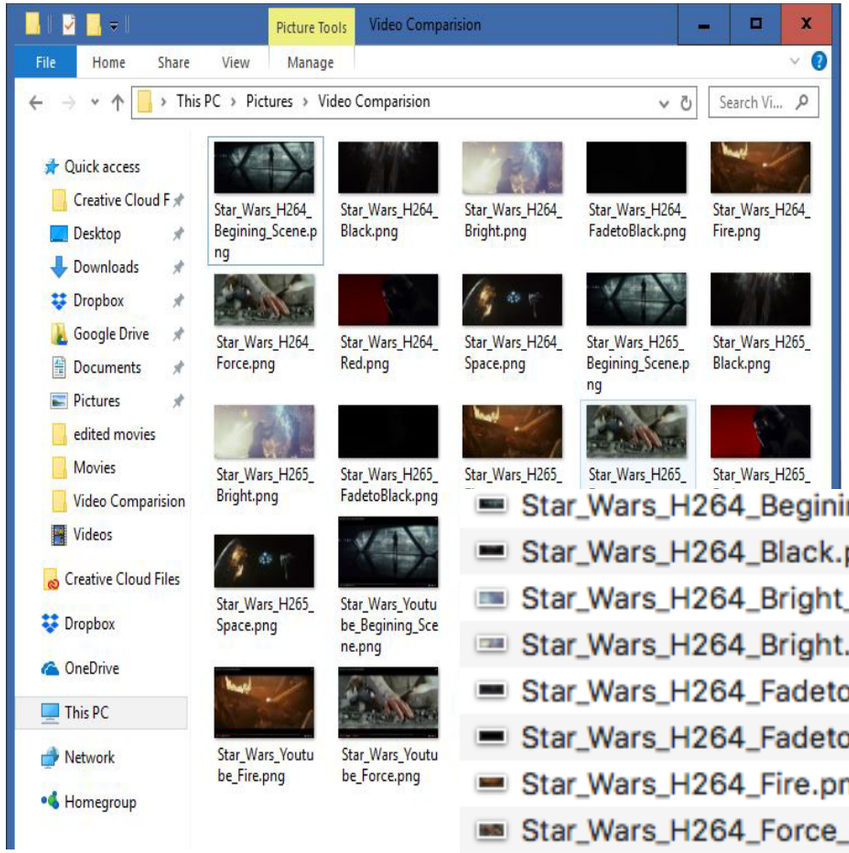
2.2
VIDEO FILE NAMING CONVENTIONS

VIDEO FILE NAMING CONVENTIONS

I chose to create a file naming convention for my video analysis. I formated it as shown on the right. Basically every single one followed this same format

Star_Wars_VersionType_SceneName_amountOfZoomIfApplicable.png

When I saved my screenshots I saved them as PNG files because I wanted to make sure there wasn't any loss in data when looking at the source material. This would insure that I was getting the most accurate representation of the actual video footage and not have something compressed twice. This helped me discover the actual compression of H.264, H.265, and Youtube.



2.3
VIDEO EVALUATION INTRO

INTRODUCTION TO VIDEO ANALYSIS

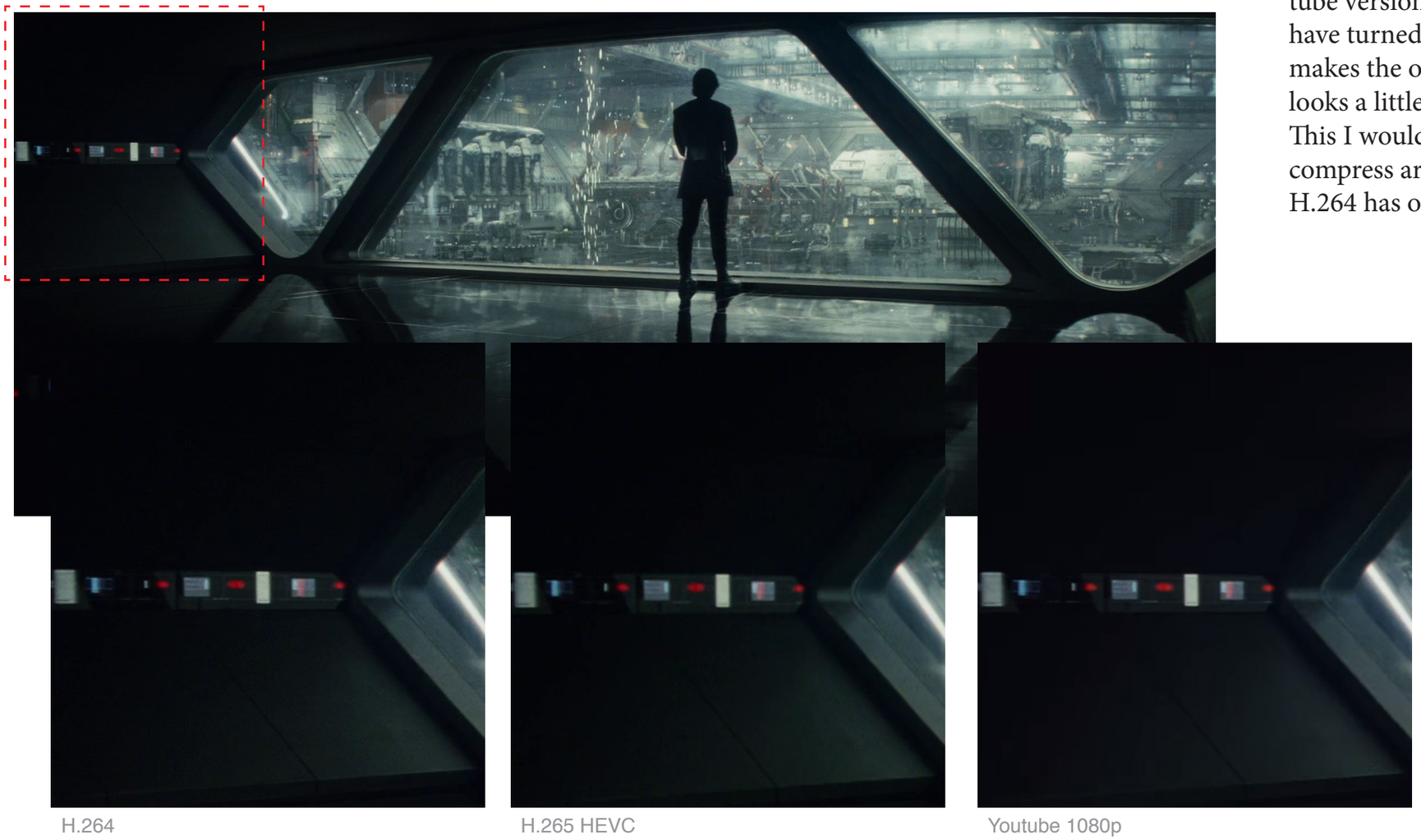
When deciding on what I would do for the video Analysis portion, I decided to take a look at the differences between Youtube's compression and the H.264/H.265 codecs. I chose these because I feel they are the most relevant to this period in time.

I found some files on the internet of "The Star Wars: The Last Jedi Trailer 2" so I will be using that as a comparison for the videos. I have seven still images that I will be comparing side-by-side to determine the differences between the three formats.

I ran into issues with doing this comparison simply because some of the Compression artifacts showed up really well on My PC but when I moved the files to my Old Mac with a Low Resolution and a worse brightness setting. It was hard to tell.

2.4
VIDEO EVALUATION

BEGINNING SCENE COMPARISION



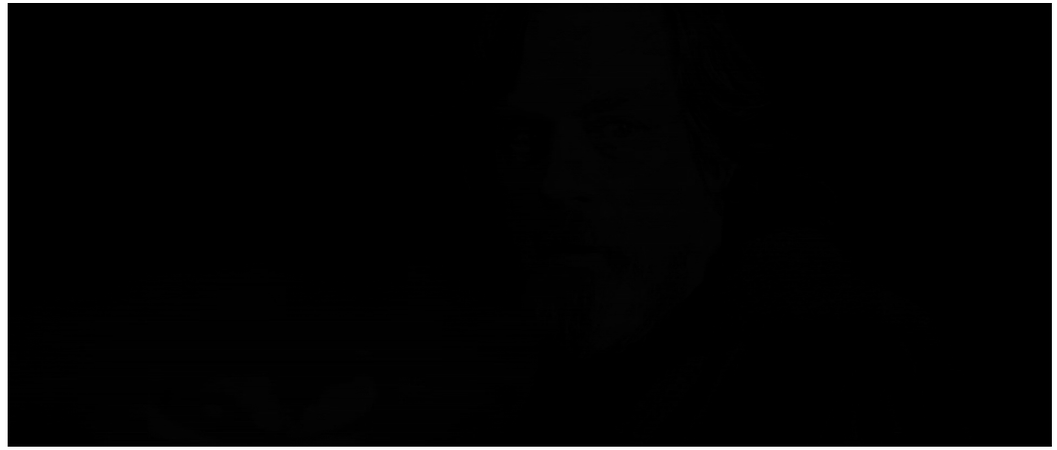
H.264 H.265 HEVC Youtube 1080p

As you can see with all the different video formats/ codecs they all have a different way to handle the different black hues in this beginning scene. The Youtube version looks the worst overall. The black pixels have turned into a blocky mess. The HEVC codec makes the overall picture look less grainy, but it still looks a little more muddy than the H.264 version. This I would think has to do with how HEVC can compress areas of the image differently whereas the H.264 has one compression done to the entire image.

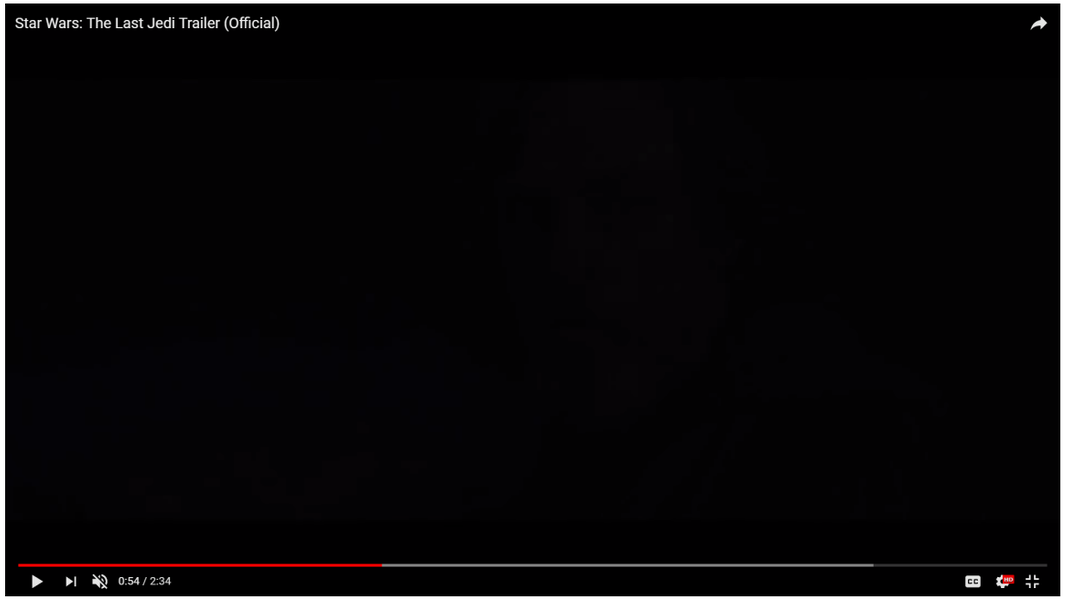
May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

FADE TO BLACK COMPARISON - UNALTERED

H.264



H.265 HEVC



Youtube 1080o

The fade to black scenario for each of these codecs are really bad with HEVC standing on top in my opinion. If we look at Youtube's way of doing things you can see there are obvious blocky elements and there are purple hues to the color that is supposed to be black. There is also a pretty big purpleish cloud in the bottom left of the image. H.264 is pretty good but it doesn't realize that the entire image is supposed to be black.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

FADE TO BLACK COMPARISON - ALTERED

H.264

H.265 HEVC

Youtube 1080p

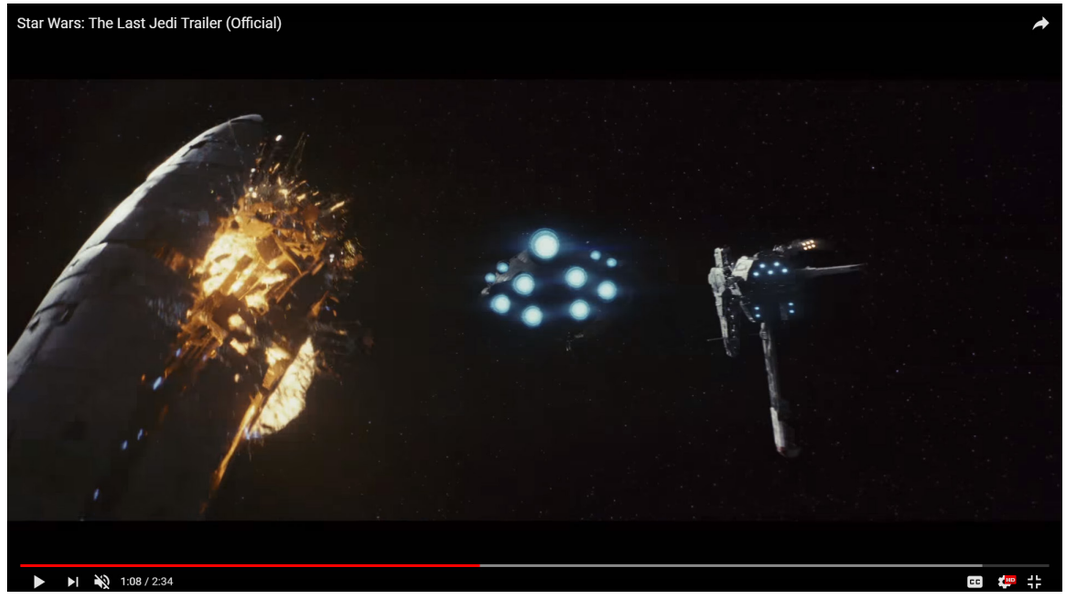
These were edited with an Brightness/Contrast adjustment layer in Photoshop with the exact same brightness change to each photo. This is to help reiterate what was shown in the previous page. HEVC definitely has the advantage when it comes to deciding what color a particular frame should be. Youtube has a blocky mess of pixels.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

EXPLOSION COMPARISION

H.264

H.265 HEVC



Youtube 1080p

There are many artifacts in the H.264 version specifically in the stars. HEVC has less artifacts in certain areas, but more in others.

1 There is a yellow glow around the HEVC version that isn't seen at all in the Youtube version, but in the H.264 version it is slightly visible. This I assume would be due to the color depth. HEVC has a better algorithm to handle the original color better.

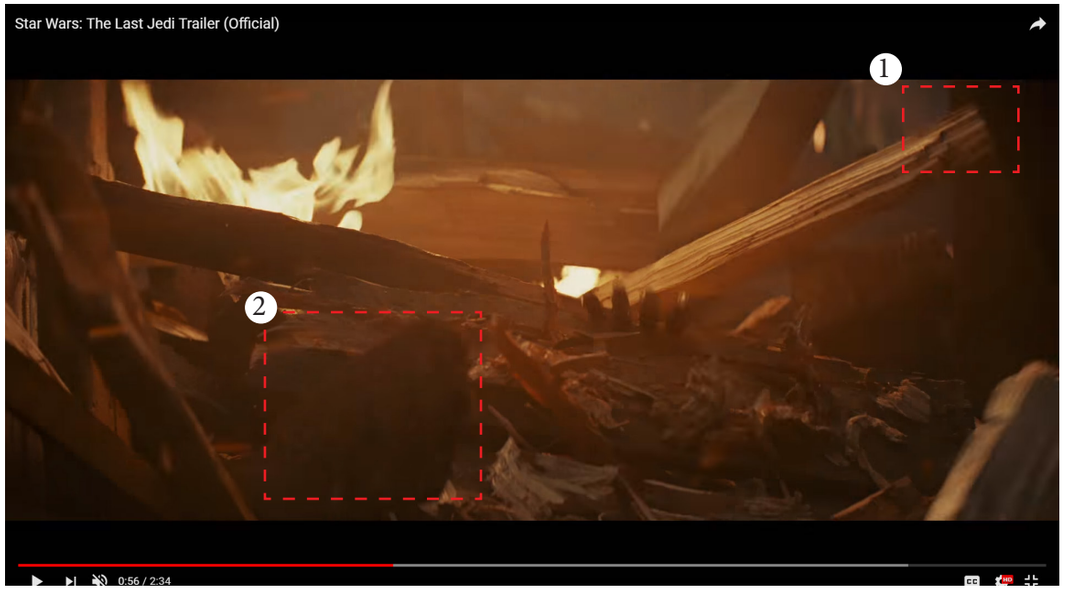
Youtube version we see the purple issue again where black appears more purple than normal

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

FIRE COMPARISION

H.264

H.265 HEVC



Youtube 1080p

At first glance, I didn't notice much of a difference between versions other than, the black portion of the scene in the top right. It is slightly different as far as artifacting goes. I thought I would include this image because there are a lot of details in the scene and I thought the algorithm would have problems with it. There are only a few at a distance, but if you zoom into the footage. You will see a lot more differences.

①When looking zoomed in on the top right part of the wood, I noticed that the Youtube version looked like part of the wood was missing. Like it's algorithm had trouble determining the black from the wood itself.

②I also noticed that the rock looks different across all versions lacking detail in the HEVC and Youtube versions

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

BRIGHT LIGHT COMPARISON

H.264 500% zoom

HEVC 500% zoom

Youtube 1080p 500% zoom

To grasp more of the concept on what each codec is doing, I zoomed in to the frame of the video to understand it better. You can notice that H.264 has more of a strict pattern to it. Whereas HEVC seems to be a randomized pattern. This makes sense because HEVC has an interesting way of handling different areas of the video footage. Instead of it compressing it all the same way, it can compress certain areas different than others. The loss of quality is pretty noticable when zoomed in, for example, the lightning bolt shown in HEVC image is hard to see. Overall, at a distance you would be hard pressed to see the difference between H.264 and HEVC. Youtube is completely different their algorithm is very harsh on the details. There are many noticable artifacts in the Youtube version.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

HAND COMPARISON

H.264 250% zoom

HEVC 250% zoom

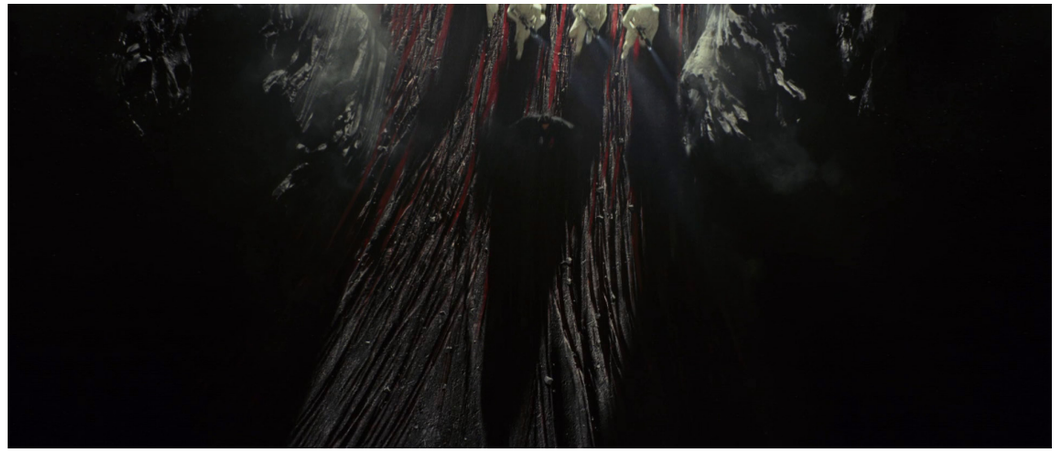
Youtube 1080p 250% zoom

H.264 as you can see has a bit more detail than HEVC. HEVC looks more blurry in places whereas H.264 doesn't. This makes sense simply because if the file size for an video goes down by 30-40% of the original size, the algorithm has to take away pixels from something. In conclusion my take away is that HEVC is good for file size constraints but if you want a higher quality image then you should output to H.264

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

WHITE LIGHT TO BLACK COMPARISION

H.264



H.265 HEVC

Youtube 1080p

Looking at the H.264 vs the HEVC they handle the white turning to black differently, but they are very similar. They both have what looks like three waves of a certain hue of black. These waves are all the same hue and it creates the illusion that the screen is black but it's not. Granted it gets the job done so it's good.

The Youtube version is handled poorly there are massive amounts of the black that aren't faded very well. They appear to have a purple hue to them again, just like we saw in the previous versions.

May have to increase brightness settings to see what is actually shown. Visuals may vary based on Display

3.0
LIST OF AUDIO FORMATS

LIST OF AUDIO FORMATS

.MP3 (Mpeg Audio Layer III)

.FLAC (Free Lossless Audio Codec)

.AAC (Advanced Audio Coding)

.WMA (Windows Media Audio)

.OGG (Vorbis)

. APE (Monkey's Audio)

. WAV(Waveform Audio File Format)

3.1
AUDIO FORMAT HISTORY

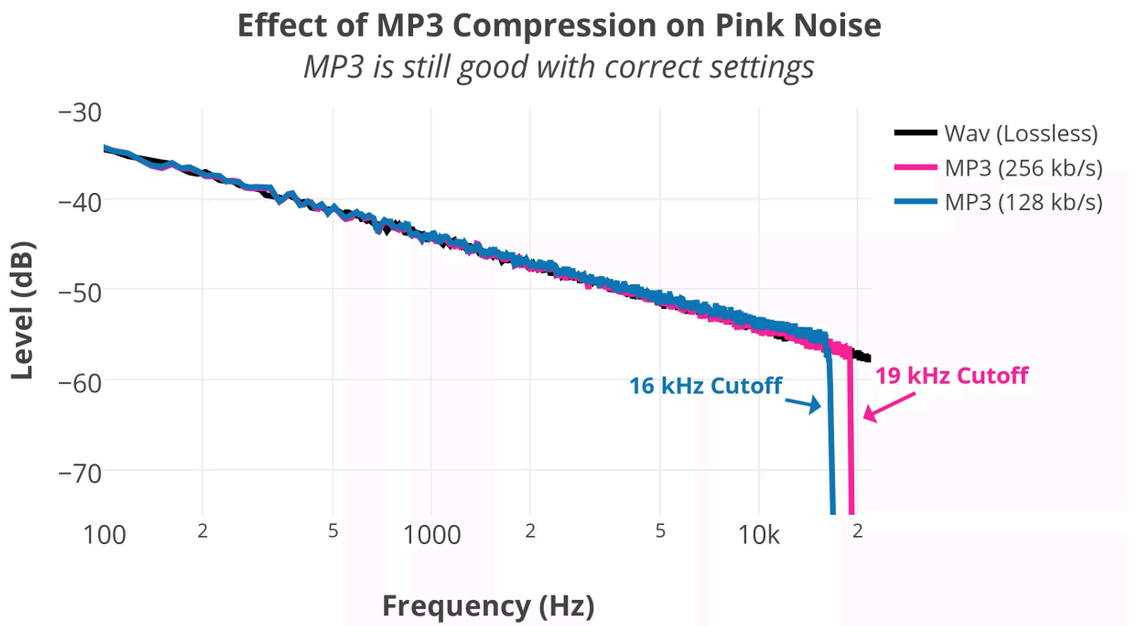
MP3

History

MPEG Audio Layer III was first introduced to the public in 1993. Developed by the Moving Pictures Expert Group

Technical Specs

- Has a lossy file format.
- Has a frequency cutoff at the high end frequencies
- The cutoff is at 16kHz or 20kHz. This is dependant on the kb/s that is encoded to.



FLAC/AIFF

History

File Lossless Audio Codec was released in 2001 and developed by Josh Coalson. It was later adopted by the Xiph.Org Foundation as an open source audio format.

AIFF is Audio interchange file format. It is very similar to FLAC basically the only change is that AIFF is used by Itunes. It is sometimes called ALAC.

Technical Specs

- It is a lossless format
- It contains all of the higher and lower frequencies.
- Minimal Compression
- Ususally 65-70% of the original source file size.
- Has higher bit-rates

AAC

History

Advanced Audio Codec was released in 1997 and developed by multiple different studios. Sony was one of those developers. It was designed as the successor to the MP3 format. It is now the standard for Youtube, Itunes, Sony and many others.

Technical Specs

- It has a lower file size at higher bit-rates.

WMA

History

Windows Media Audio was developed by Microsoft and released in 1999. At the time Microsoft claimed that WMA could produce files that were half the size of equivalent-quality MP3 files and that they were near CD quality. These claims didn't live up to their expectations though. Microsoft later developed Lossless, Pro, and Voice codecs. Pro was simply a enhanced Audio codec. The Voice codec targeted the Voice frequencies

Technical Specs

- Consists of four distinct codecs for specific tasks
- Was the competitor to MP3

OGG

History

Vorbis is an open source format maintained by the Xiph.Org Foundation. It was released in 2000.

Technical Specs

- It is a lossy format
- Doesn't have restrictive software patents.
- Designed specifically with streaming in mind.

APE

History
Monkey's Audio was developed by Matthew T. Ashland and released in 2000.

Technical Specs
- Lossless format
- File size reduced dramatically about half of the original size.
- Playback is highly CPU instensive because of the encoding process.
- Software support is minimal.

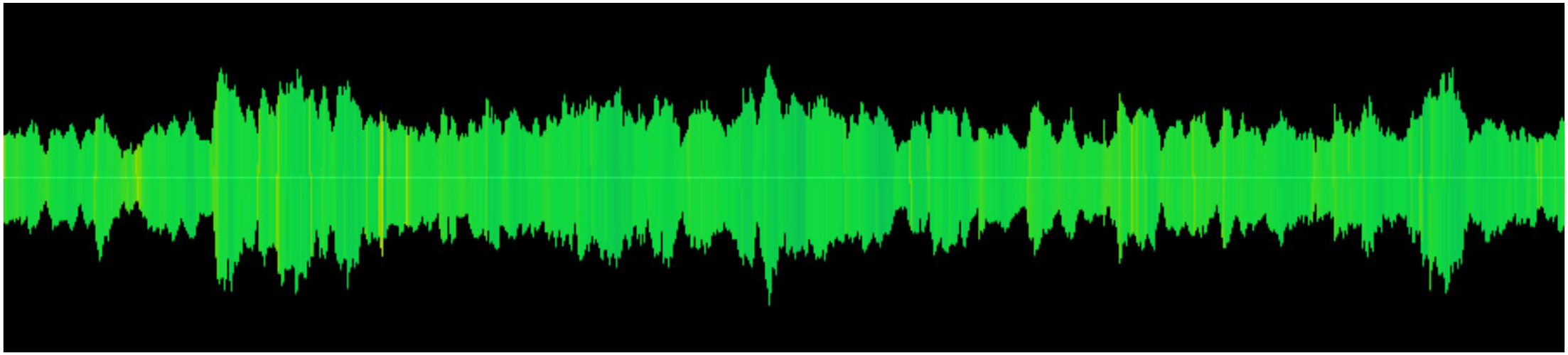
WAV

History

Waveform Audio File Format was released 1991 and developed by Windows and IBM.

Technical Specs

- Ability to be compressed or uncompressed.
- File sizes vary
- Easily editable due to simplistic structure
- More commonly used than APE



3.2
AUDIO FILE NAMING CONVENTIONS

AUDIO FILE NAMING CONVENTIONS

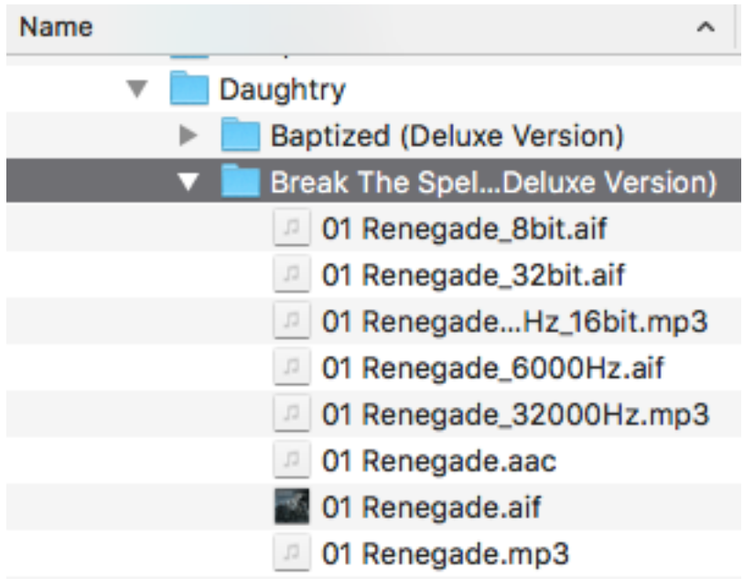
When working with the source footage at this specified sample rate and bits per sample

```
Audio channels: 2
   Sample rate: 44,100
Bits per sample: 16
```

There are only three different changes that can happen to the files so there it is much easier to determine a file naming convention.

My file name convention will be:

SongName_Hz_BitsPerSample.AudioFileEXT



3.3
AUDIO ANALYSIS

INTRODUCTION TO AUDIO ANALYSIS

Sony MDR-X10

Vizio SB3821

In this analysis of Audio I will be using some Sony MDR-X10 Headphones and a Vizio SB3821-C6 38” Soundbar for my Audio testing. I have a CD of Daughtry - Break the Spell Deluxe edition that I have ripped in Itunes in AIF format. I will then use Adobe Audition to convert them and then test the difference in MP3, AAC, and AIF formats. I will be using VLC version 2.2.6 Umbrella (Intel 64bit) to playback the audio. I will focus mainly on the song Renegade unless otherwise specified.

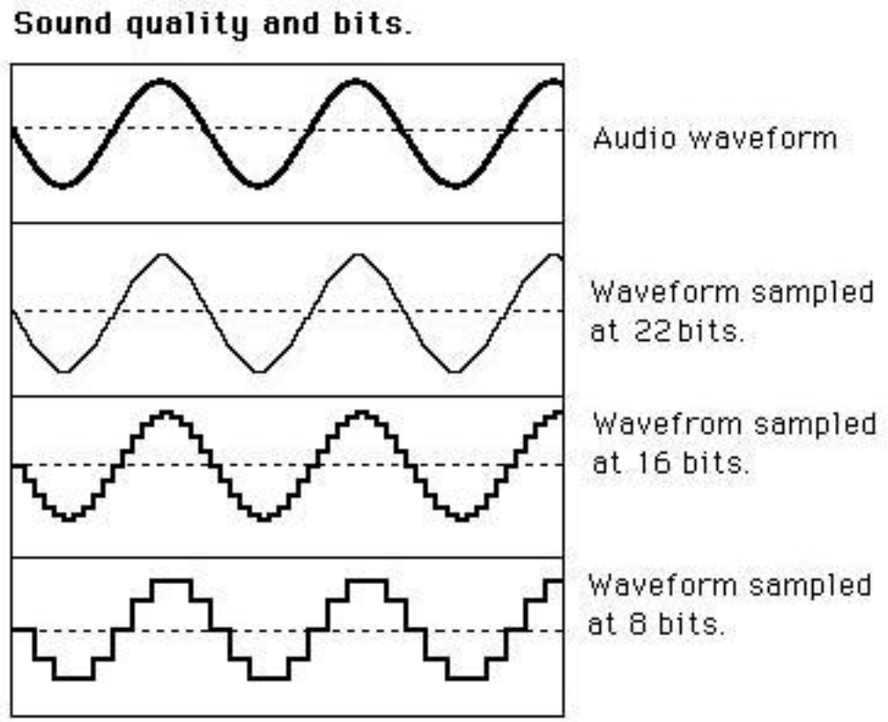
AIF - HERTZ/BIT-RATE CHANGE

44,100 HZ vs 6000 HZ
Makes the instruments sound very muffled and compressed. Almost as if it was on the radio, but its worse than what the radio sounds like. More like an AM station rather than a FM station.

44,100 HZ vs 192000 HZ
Just for fun I tried upping the HZ rate to see if it would do anything to the sound, but It really didn't do much at all. Which makes sense due to the source file being that of 44,100 HZ but, I suspected that it might change how fast the song went, but it didn't.

16 BIT vs 8 BIT
This adds a hiss sound to places where there are empty noise and it is really hard to listen to. The entire song is like this and it ruins the song for me.

16 BIT vs 32 BIT
I also tried upping the BIT rate but that didn't do anything either. My guess is that if I had a higher BIT rate on the source file then I would hear a subtle change.

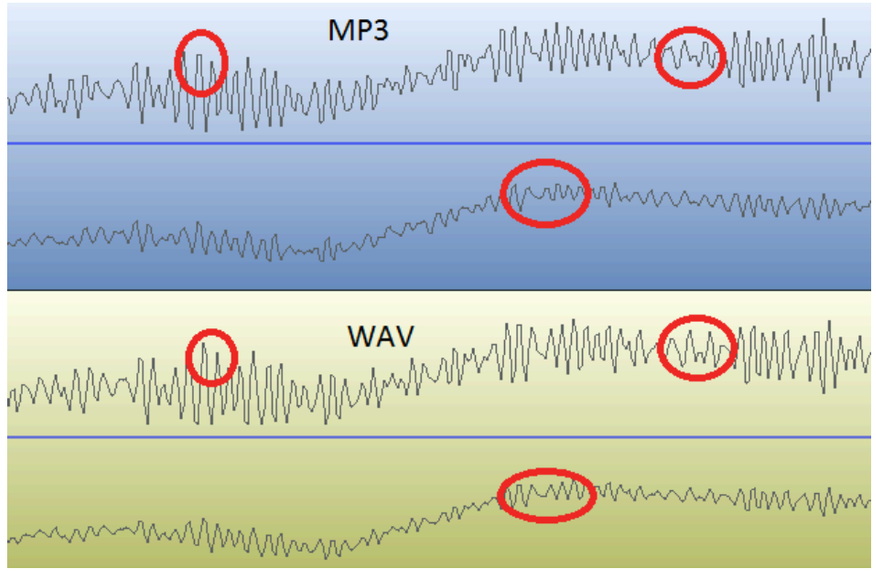


MP3 - ANALYSIS

AIF 44,100 HZ vs MP3 44,100 HZ
This is where I noticed a big difference in the amount of hiss that came out of my Vizio speakers. It was very high pitched sound almost like that of a TV being on with nothing playing, or like a lightbulb hiss.

MP3 44,100 HZ vs MP3 32,000 HZ
There wasn't a huge difference but I did notice some more noise than usual. Not as drastic as it could be though. I did notice there were lower fluctuations in the music, basically it was taking a peak of music lower to match it closer to the lyrics.

AIF 6000 HZ vs MP3 6000 HZ
These are just terrible and are very similar to each other. I had a hard time listening because it sounds so bad. The difference was more hiss sound, and less of a bass in the song.



AAC - ANALYSIS

AIF 44,100 HZ vs AAC 44,100 HZ
There wasn't a massive change however there are differences when the symbols are hit on the drums. Some are completely gone from the song The sound wasn't as good, almost like they took out some higher frequencies in the conversion. The good thing about it is that you can only hear the hiss when it hits those higher frequencies in the song. I heard a difference in the volume as well, its definitely muffled a bit. Also there is a part in the Song where the guitar makes an echo in the AIF version but It is very dampened I can hardly recongnize that it is there. There is a lot more popping when it comes to the "S" sounds in the lyrics. For example, when he says "cross" is sounds like "crossssssssss" in the AAC version. There is a lot more hiss to the "S"

AAC vs MP3
The biggest adavantage to AAC is the lower file size when you have a higher bit-rate. I found more issues with AAC than I did with MP3. I am very surprised to find that through my testing I found that MP3 sounded better to me than AAC. This might have because of the way Adobe Audition encodes the files. AAC is supposed to be more superior than MP3 at least that is what I have been told.