

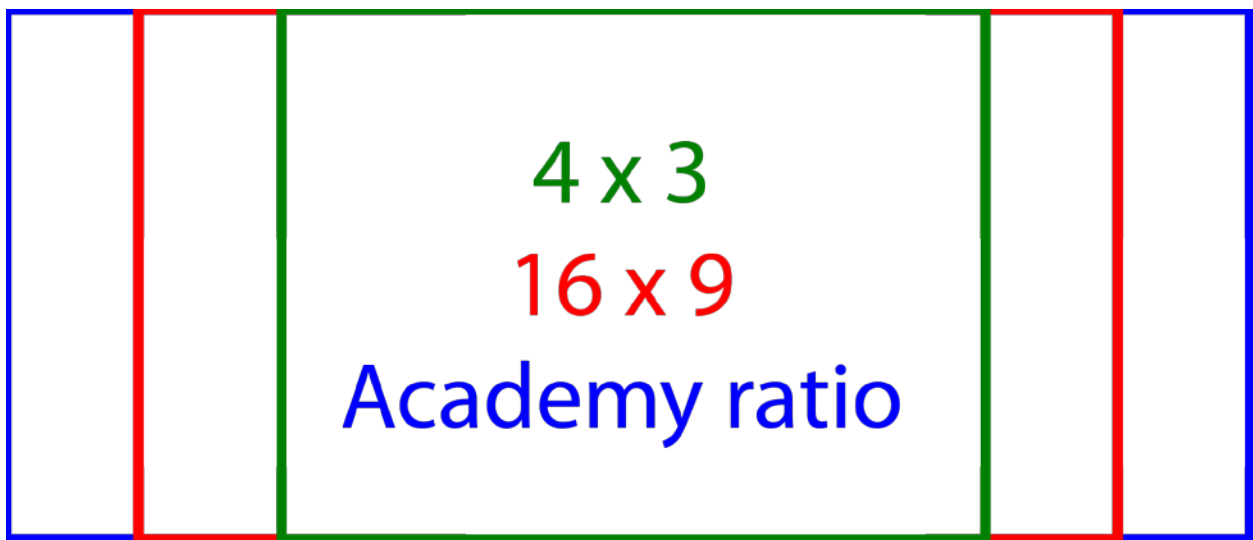
Why Video?

"Online video continues its break-neck growth rate with video views hitting 119% Year over Year growth in 2009 according to [comScore](#)."

"With proper optimization, video increases the chance of a front-page Google result by 53x"
([Forrester, January 2010](#))

Video Formats

Aspect Ratios:



Aspect ratio describes the dimensions of video screens and video picture elements.

Sometimes commonly expressed in Pixel form.

4 x 3

320 x 240 or 240

640 x 480 or 480

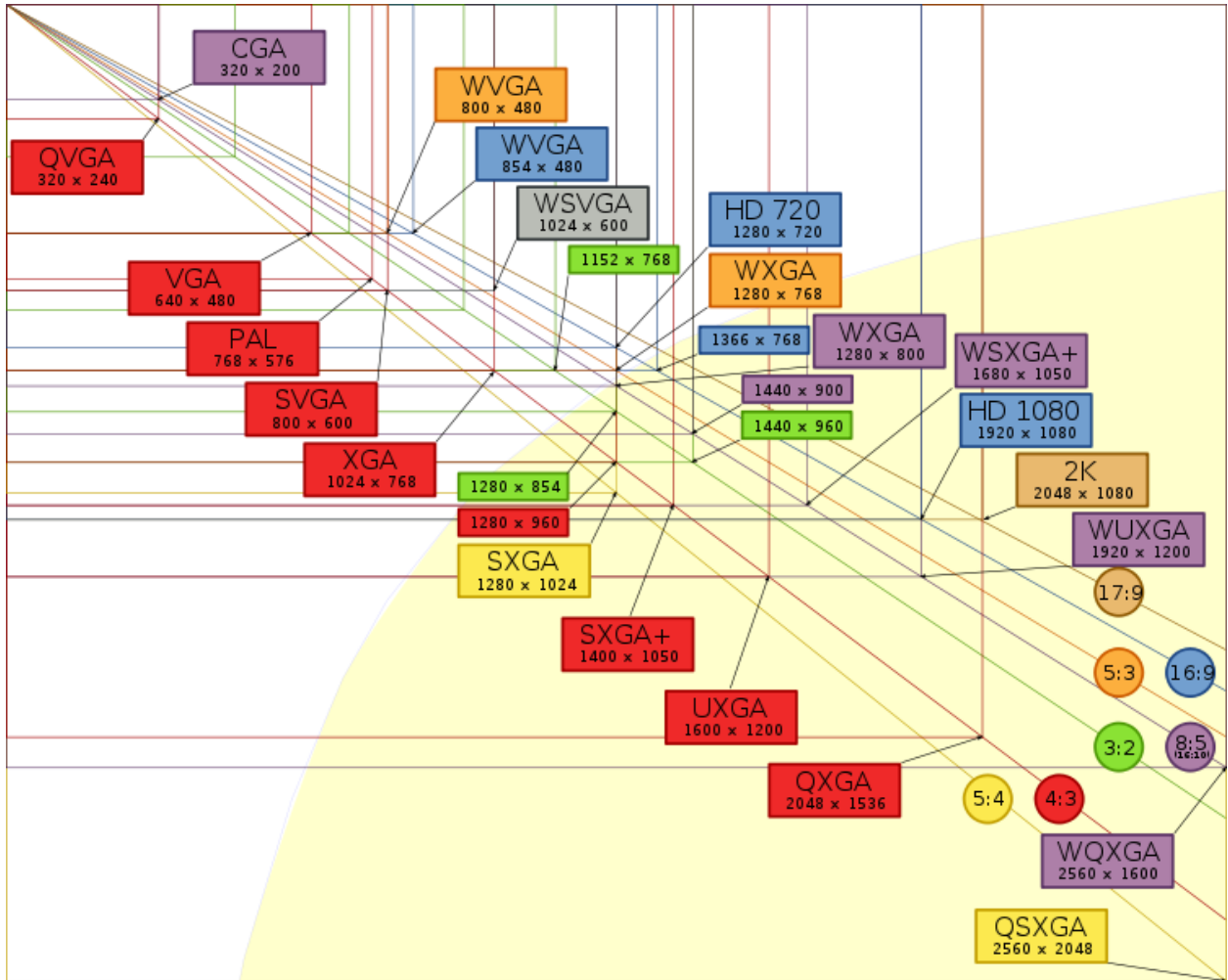
800 x 768 or 768

16 x 9

854 x 480 or 480

1280 x 720 or 720

1920 X 1080 or 1080



Average Video Size for Web

640 x 480

If so why shoot at a higher resolution? Why not use consumer end cameras



Because although they say HD they use interpolation to get to that size.

Interpolation is an algorithmic method of constructing additional pixels based sample pixels to enlarge the frame. The sharpness and detail are compromised.

Sensor size comparison



You want to shoot in the highest resolution possible for the most detail.

Common Cameras Video Types

SD Video can come in 4x3 and 16x9 aspect ratios and normally record up to 480px on mini DVD tape. The video and audio are encoded in digital form, using [lossy compression](#). Video is encoded with the [MPEG-2](#) codec, using 8-bit chroma and luma samples with 4:2:0 [chroma subsampling](#).

HDV Video and audio are encoded in digital form, using [lossy compression](#). Video is encoded with the [MPEG-2](#) codec, using 8-bit chroma and luma samples with 4:2:0 [chroma subsampling](#). Stereo audio is encoded with the [MPEG-1 Layer 2](#) codec. The compressed audio and video are [multiplexed](#) into a [MPEG transport stream](#), which is typically recorded onto magnetic tape, but can also be stored in a computer file.

HD Video refers to any video system of higher resolution than standard-definition (SD) video, and most commonly involves display resolutions of 1,280×720 pixels (720p) or 1,920×1,080 pixels (1080i/1080p).

video recording formats ([HDCAM](#), [HDCAM-SR](#), [DVCPRO HD](#), [D5 HD](#), [AVC-Intra](#), [XDCAM HD](#), [HDV](#) and [AVCHD](#)), the optical disc delivery system [Blu-ray Disc](#) and the video tape format [D-VHS](#).

Common high-definition video modes

Video mode	Frame size in pixels (W×H)	Pixels per image ¹	Scanning type	Frame rate (Hz)
720p	1,280×720	921,600	Progressive	23.976, 24, 25, 29.97, 30, 50, 59.94, 60, 72
1080i	1,920×1,080	2,073,600	Interlaced	25 (50 fields/s), 29.97 (59.94 fields/s), 30 (60 fields/s)
1080p	1,920×1,080	2,073,600	Progressive	23.976, 24, 25, 29.97, 30, 50, 59.94, 60

Extra high-definition video modes

Video mode	Frame size in pixels (W×H)	Pixels per image ¹	Scanning type	Frame rate (Hz)
2K	2,048×1,536	3,145,728	Progressive	
2160p	3,840×2,160	8,294,400	Progressive	
4K	4,096×3,072	12,582,912	Progressive	
2540p	4,520×2,540	11,480,800	Progressive	
4320p	7,680×4,320	33,177,600	Progressive	50, 60

Note: ¹ Image is either a frame or, in case of interlaced scanning, two fields. (EVEN and ODD)

Interlaced and Progressive Scanning

Interlace is a technique of doubling the perceived frame rate of a [video](#) signal without consuming extra [bandwidth](#).



Zipper effect of odd and even fields to for image. It's most noticeable during movement.

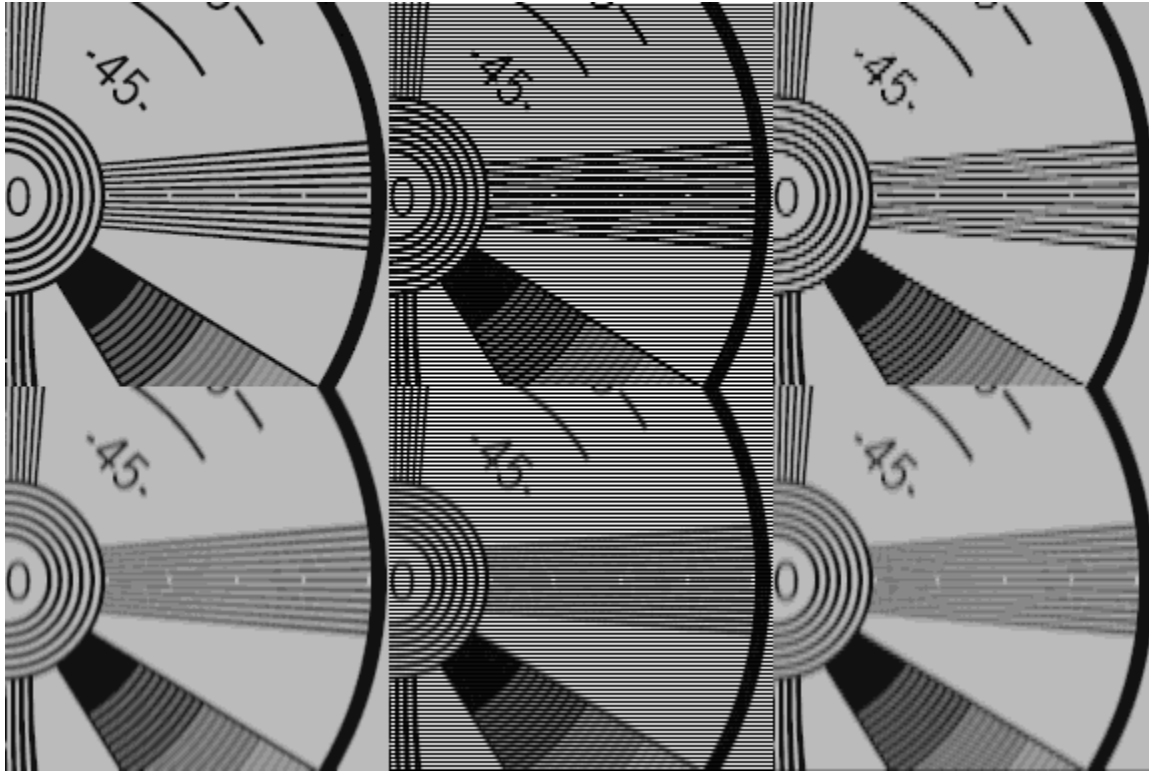
With [progressive scan](#), an image is captured, transmitted and displayed in a path similar to text on a page: line by line, from top to bottom. The interlaced scan pattern in a CRT ([cathode ray tube](#)) display completes such a scan too, but only for every second line. This is carried out from the top left corner to the bottom right corner of a CRT display. This process is repeated again, only this time starting at the second row, in order to fill in those particular gaps left behind while performing the first progressive scan on alternate rows only.

Interlaced video is designed to be captured, transmitted or stored, and displayed in the same interlaced format. Because each frame of interlaced video is composed of two fields that are captured at different moments in time, interlaced video frames will exhibit motion artifacts known as "interlacing effects", or "combing", if the recorded objects are moving fast enough to be in different positions when each individual field is captured. These artifacts may be more visible when interlaced video is displayed at a slower speed than it was captured or when still frames are presented.

Televisions are equipped with de-interlacing engines that correct for this.

Interline twitter

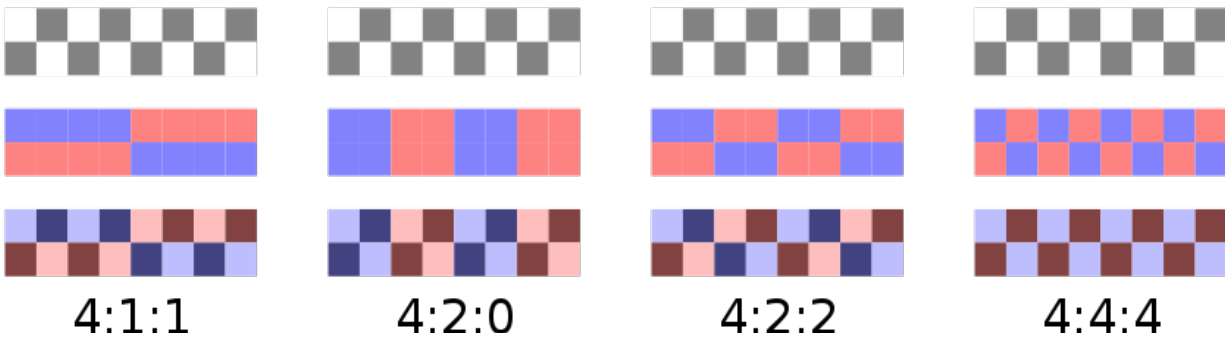
Interlacing introduces a potential problem called **interline twitter**. This aliasing effect only shows up under certain circumstances, when the subject being shot contains vertical detail that approaches the horizontal resolution of the video format.



On the left are two progressive scan images. Center are two interlaced images. Right are two images with [line doublers](#)

Chroma subsampling

Chroma subsampling is the practice of encoding images by implementing less resolution for [chroma information](#) than for [luma](#) information. It is used in many video encoding schemes—both analog and digital—and also in [JPEG](#) encoding.



Codec is a portmanteau of 'COmpressor-DECompressor' or, more commonly, 'coder-decoder'. A codec encodes a data stream or signal for transmission, storage or encryption, or decodes it for playback or editing. Many of the CODECs are [lossy](#) but some archived are lossless.

Codec <input type="checkbox"/>	Creator/Maintainer <input type="checkbox"/>	First public release date <input type="checkbox"/>	Latest stable version <input type="checkbox"/>	License <input type="checkbox"/>	Patented compression formats <input type="checkbox"/>	Compression method <input type="checkbox"/>	OpenCL support <input type="checkbox"/>	nVidia CUDA support <input type="checkbox"/>	ATI Stream/AMD APP support <input type="checkbox"/>
libtheora (Theora)	Xiph.org	2002-09-25	1.1.1 (2009)	BSD-style	none	Lossy	Unknown	Unknown	Unknown
dirac-research (Dirac)	BBC Research Department	2008-09-17	1.0.2 (2009)	MPL 1.1, GNU GPL 2, GNU LGPL 2.1	none	Lossy/lossless	Unknown	Unknown	Unknown
Schrödinger (Dirac)	David Schleaf	2008-02-22	1.0.9 (2010)	MPL 1.1, GNU GPL 2, GNU LGPL 2, MIT License	none	Lossy/lossless	Unknown	Unknown	Unknown
x264	x264 team	2003	r1790 (2010)	GNU GPL	MPEG-4 AVC/H.264	Lossy/lossless	Unknown	Unknown	Unknown
Xvid	Xvid team	2001	1.2.2 (2009)	GNU GPL	MPEG-4 ASP	Lossy	Unknown	Unknown	Unknown
FFmpeg (libavcodec)	FFmpeg team	2000	0.5.1 (2010)	GNU LGPL	MPEG-1, MPEG-2, MPEG-4 ASP, H.261, H.263, VC-3, WMV7, WMV8, VP5, VP6, MJPEG etc.	Lossy/lossless	Unknown	Unknown	Unknown
FFavs (libavcodec)	FFavs team	2009	0.0.3	GNU LGPL	MPEG-1, MPEG-2, MPEG-4 ASP etc.	Lossy/lossless	Unknown	Unknown	Unknown
Blackbird	Forbidden Technologies plc	2006-01	2	Proprietary	Blackbird	Lossy	Unknown	Unknown	Unknown
DivX	DivX, Inc.	2001	7.0 (2009)	Proprietary	MPEG-4 ASP, H.264	Lossy	Unknown	Unknown	Unknown
DivX ; -)	a hack of Microsoft's MPEG-4v3 codec	1998	3.20 alpha (2000)	Proprietary	Microsoft's MPEG-4v3 (not MPEG-4 compliant)	Lossy	Unknown	Unknown	Unknown
3ivx	3ivx Technologies Pty. Ltd.	2001	5.0.2 (2007)	Proprietary	MPEG-4 ASP	Lossy	Unknown	Unknown	Unknown
Nero Digital	Nero AG	2003	Unknown	Proprietary	MPEG-4 ASP, H.264 ^[15]	Lossy	Unknown	Unknown	Unknown

A **container or wrapper format** is a [meta-file format](#) whose specification describes how data and [metadata](#) are stored (*not* coded). Common containers are:

- [3GP](#) (used by many mobile phones; based on the [ISO base media file format](#))
- [AVI](#) (the standard [Microsoft Windows](#) container, also based on [RIFF](#))
- [Flash Video](#) (FLV, F4V) (container for video and audio from [Adobe Systems](#))
- MJ2 - Motion [JPEG 2000](#) file format, based on the ISO base media file format which is defined in MPEG-4 Part 12 and JPEG 2000 Part 12
- [QuickTime File Format](#) (standard [QuickTime](#) video container from [Apple Inc.](#))
- [MPEG program stream](#) (standard container for MPEG-1 and MPEG-2 [elementary streams](#) on reasonably reliable media such as disks; used also on [DVD-Video](#) discs)
- [MPEG-2 transport stream](#) (a.k.a. MPEG-TS) (standard container for digital broadcasting and for transportation over unreliable media; used also on [Blu-ray Disc](#) video; typically contains multiple video and audio streams, and an [electronic program guide](#))
- [MP4](#) (standard audio and video container for the [MPEG-4](#) multimedia portfolio, based on the ISO base media file format defined in [MPEG-4 Part 12](#) and JPEG 2000 Part 12) which in turn was based on the QuickTime file format.
- [RM](#) (RealMedia; standard container for [RealVideo](#) and [RealAudio](#))

Compression

Video compression refers to reducing the quantity of [data](#) used to represent [digital video](#) images, and is a combination of spatial [image compression](#) and temporal [motion compensation](#).

There are two items that govern compression: Size and Bit rate.

Bit Rate is quantified using the [bits per second](#) (**bit/s** or **bps**) unit, often in conjunction with an [SI prefix](#) such as [kilo-](#) (kbit/s or kbps), [mega-](#) (Mbit/s or Mbps), [giga-](#) (Gbit/s or Gbps) or [tera-](#) (Tbit/s or Tbps). Note that, unlike many other computer-related units, 1 kbit/s is traditionally defined as 1,000 bit/s, not 1,024 bit/s, etc.

Bit rates can be variable or constant.

Video compression typically operates on square-shaped groups of neighboring [pixels](#), often called [macroblocks](#). These pixel groups or blocks of pixels are compared from one frame to the next and the [video compression codec](#) (encode/decode scheme) sends only the [differences](#) within those blocks.

1	1	1	1
1	2	2	1
1	2	2	1
3	3	3	1

The most common and considered the best compression right now is H.264.

There are three ways to present video on your site:

1. Self hosting with a called player
2. Hosting through a common/free service with embed code
3. Dedicated server companies –pay for play subscriptions

Self Hosting

Flash Video Player

Quicktime Player

Windows Media Player

Hosting through a common/free service with embed code

Youtube

Vimeo

Google Video

Yahoo Video

Daily Motion

World Wide Web HD resolutions

Source	Codec	Highest resolution (W×H)	Total bit rate/bandwidth	Video bit rate	Audio bit rate
Amazon Video On Demand (formerly "Unbox")	VC-1	1,280×720	2.5 Mbit/s		
BBC iPlayer ↗	H.264	1,280×720	3.2 Mbit/s	3 Mbit/s	192 kbit/s
Blockbuster Online					
CBS.com ↗ /TV.com (720p)		1,280×720	2.5 Mbit/s		
CBS.com ↗ /TV.com (1080p)		1,920×1,080	3.5 Mbit/s		
Hulu	On2 Flash VP6	1,280×720	2.5 Mbit/s		
iPlayerHD ↗	FLV, Quicktime H.264, MP4 H.264	1,920×1,080		5 Mbit/s	
iTunes/Apple TV	QuickTime H.264	1,280×720	4Mbps		
Netflix Watch Instantly	VC-1	1,280×720	5 Mbit/s	2.6 Mbit/s and 3.8 Mbit/s	
PlayStationStore Movies & TV Shows	H.264/MPEG-4 AVC	1,920×1,080		8 Mbit/s	256 kbit/s
Vimeo	H.264	1,920×1,080		4 Mbit/s	320 kbit/s
Vudu	H.264	1,920×1,080	4.5 Mbit/s		
Zune Video (formerly "Xbox Live Marketplace Video Store")		1,920×1,080	3 Mbit/s		
YouTube	H.264/MPEG-4 AVC	4,096×3,072		6.5 Mbit/s	max. 119 kbit/s

Online Video Platform options:[Brightcove](#)[Ooyala](#)[Fliqz](#)[Bitgravity](#)[Kaltura](#)

Sample videos “The Good, the Bad, the Ugly” *-reversed*

<http://vimeo.com/1538288> -Richard Goodwin

<http://vimeo.com/9037753> - Design Utopia

<http://vimeo.com/5497606> -Peter Eisenman

<http://vimeo.com/8754325> - Egozi-Architect

<http://vimeo.com/15886527> - The New Architect

<http://www.esimages.com/video/california-cool/>