

Choosing Frame Resolution

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This page covers the issues one should keep in mind when selecting a pixel resolution for movie frames.

Table of Common Display Resolutions.

You probably want to keep your movie at some multiple of a common display resolution. Aside from fitting displays nicely, and preventing the performance hit or wasted space, these resolutions are usually what movie encoders like, so the odds of encoding artifacts or errors or poor performance are reduced.

Here is (will be) a table of common movie frame resolutions, their aspect ratios, antialias settings, and what a good preview resolution would be for use in ParaView. A discussion of these issues follows the table.

Final Display Resolution	Preview Resolution	Aspect Ratio	2x Antialias	3x Antialias	Usual Use
640x480	640x480	4:3	1280x960	1920x1440	Small area on a PowerPoint slide
800x600	800x600	4:3	1600x1200	2400x1800	Reasonable area on a PowerPoint Slide
1024x768	800x600	4:3	2048x1536	3072x2304	Large area on a PowerPoint Slide
1280x960	800x600	4:3	2560x1920	3840x2880	High resolution PowerPoint
1400x1050	800x600	4:3	2800x2100	4200x3150	Possible Full-Screen Conference Display
1600x1200	800x600	4:3	3200x2400	4800x3600	Full Screen Desktop
1280x720	800x450	16:9	2560x1440	3840x2160	Small HD (High Definition)
1920x1080 *	800x450	16:9	3840x2160	5760x3240	Full HD (preferred Conference Display)

* Probably best to use this for your master frames, then crop/resize as needed for movies of other resolutions/aspect ratios.

If you have to choose something less usual, there is a nice diagram showing other options here: http://en.wikipedia.org/wiki/File:Vector_Video_Standards.png.

Preview Resolution:

In ParaView, the aspect ratio of what you see in the GUI may not match the aspect ratio of the display where your final movie will be displayed. If these don't match, then the image you see in ParaView won't match the image you see in your movie frames. To avoid this problem, you can lock the 3d window's resolution via "Tools -> Lock View Size Custom...". Now, what you see (except for overall size) is pretty much what you get. Even if you save movie frames at another resolution, if they have the same aspect ratio, you will get an accurate sense of the final appearance by looking at the locked 3d view in ParaView.

Choosing an Aspect Ratio:

It's good to think about what your movie will look like in other common aspect ratios. If you've got an HD movie, but have to present it on a square monitor, will it look good with the sides chopped off? Or would it look better shrunk down with empty space above/below the movie on the display? I prefer to make it look good in HD (1920x1080), with an eye to possibly chopping off the left/right sides for more square displays (so preview what that would look like, and if that's good too, you're golden).

Antialiasing

Often lines or edges appear to have "jaggies" or stair stepping when they are nearly vertical or horizontal. To get nice lines, we need anti-aliasing. To do this, we render our images at somewhere between double and triple normal resolution, and then use a separate tool to average them down to the desired size. For example, I want a nice HD frame at 1920x1080. For an image with jaggies, I'd just save that. But to anti-alias at 2x, I save it as 3840x2106 pixels, and then run:

```
convert -geometry 1920x1080 bigframe.png antialiasedframe.png
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Where convert is a command line utility from the free ImageMagick package.

Keep in mind that when ParaView saves an oversized frame, it still draws single pixel lines only one pixel thick. So drawing oversized at 2x and then averaging down by 1/2 to get 1x, you see final lines that appear to be 1/2 a pixel thick (they appear partially transparent to cause the illusion of subpixel thickness). So you probably don't want your antialias scale to be more than 3x because your lines will disappear, because you get diminishing returns on improved image quality, and because frames saved at 3x the desired resolution could have up to 9x the file size and 9x the processing time. (In practice, file size scales less than linearly with resolution because the scaling often does not introduce extra detail). If you do need 3x or more antialiasing, you can adjust line thickness in paraview to be more than 1 pixel thick, so that you can control your final line thickness. Still, in practice, roughly 2x is usually perfect in terms of image quality, disk space, and processing speed.