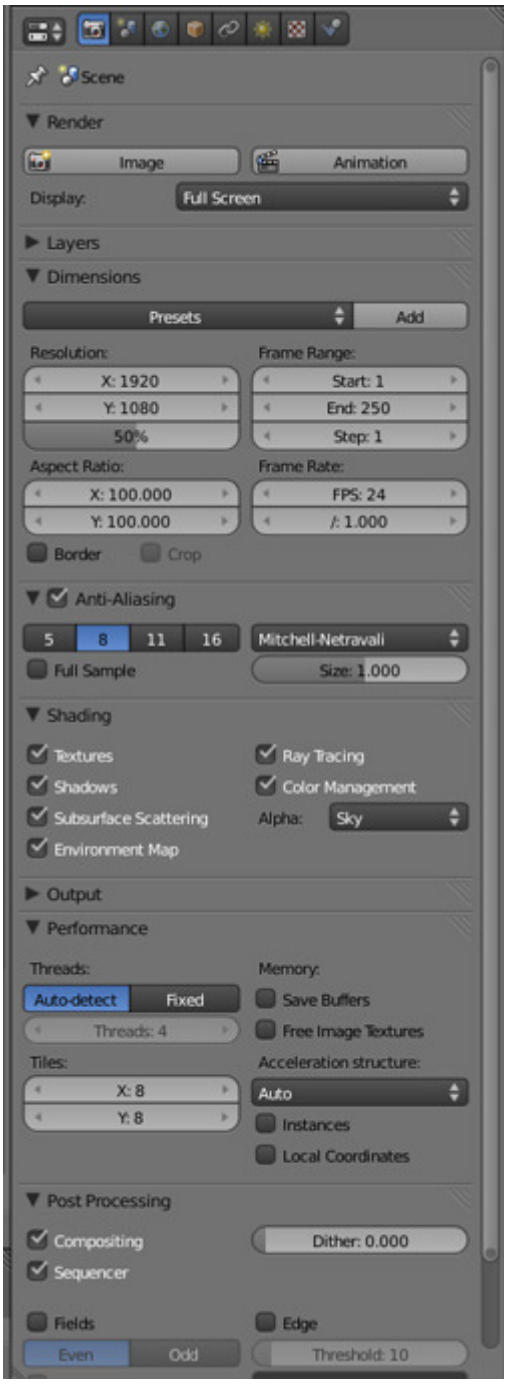
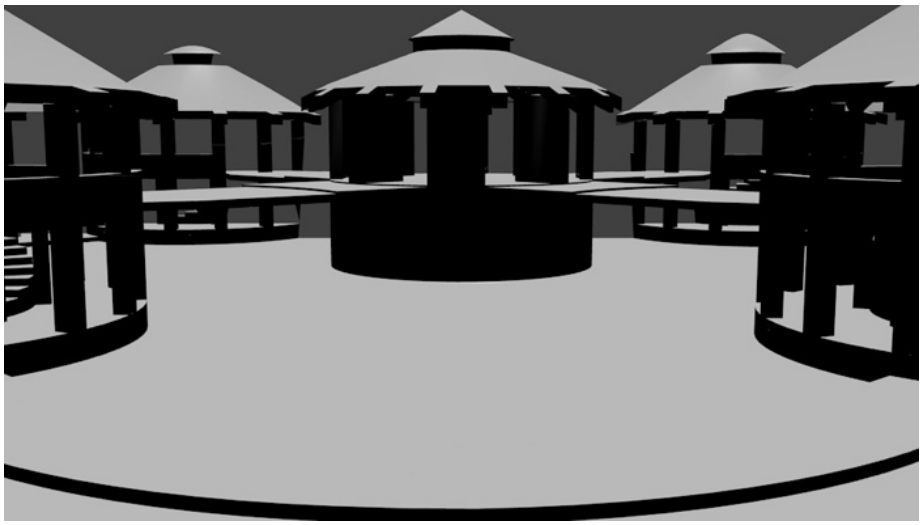
Rendering Reference

Dark Scarab Tutorials -- Blender 2.5



NOTE: Please keep in mind these times will not be the times you will get. It is also safe to say that the percentages will not be the same as yours. The point of this testing is to help determine which settings are the slowest and which ones are the fastest so you can have an idea as to how you can optimize the time you spend working on your projects.

Just so you know, my scene is the one in the image below. I removed all materials, textures, ambient occlusion, etc so that we have a good clean base to go off of. You can consider that image the default image. Also, each of the times consist of the average time of three renders.



I have also provided a screenshot of all of the settings that are default on my computer. I do not think I changed anything at the time of this writing, so I think it will be the same as yours if you haven't changed anything either. This image is directly to the left.

Format and Size

Let's start out with the most basic and most obvious factor for render time. Each of the following are one of the presets, the default being HDTV 1080p.

Size	Time	Percent of Default
TV PAL	1.88s	41.77%
TV PAL 16:9	1.89s	42%
TV NTSC	1.75s	38.89%
HDTV 720p	2.67s	59.33%
HDTV 1080p	4.50s	100% (Also the slowest)

OSA Settings

Be careful with this setting. This can change the render times drastically, but it will also change the quality of your render drastically as well.

Setting	Time	Percent of Default
Off	3.23s	71.94%
5	4.16s	92.65%
8	4.49s	100%
11	4.97s	110.69%
16	5.97s	132.96%

Fields and Anti-aliasing

No real difference was found until the Box setting and even that wasn't much. Theoretically, Mitch and/or CatRom should take the longest and it should go faster as you go down the list since they make the cleanest edge. Turning Fields off is considerably faster and I could not tell any difference between the render qualities. Filter Size seems to have no real effect on render times.

Fields On

Filter	Time	Percent of Default
Mitchell	5.34s	99.07%
Catmull-Rom	5.36s	99.44%
Gaussian	5.39s	100%
Cubic	5.42s	100.55%
Quadratic	5.30s	98.33%
Tent	5.31s	98.52%
Box	5.24s	97.22%

Fields Off (Default)

Filter	Time	Percent of Default
Mitchell	4.45s	100.22%
Catmull-Rom	4.53s	102.03%
Gaussian	4.44s	100%
Cubic	4.55s	102.48%
Quadratic	4.45s	100.22%
Tent	4.49s	101.13%
Box	4.42s	99.55%

Fields On/Off (Avg. from the above times)

Fields On	5.34s	119.20% (of Off)
Fields Off	4.48s	83.90% (of On)

Filter Size	Time	Percent of Default
0.50	4.45s	100.22%
0.75	4.37s	97.75%
1.00	4.44s	100%
1.25	4.50s	101.35%
1.50	4.62s	104.05%

Ambient Occlusion

Ambient Occlusion can make your scene look incredibly better or slightly better depending on the circumstances. The higher setting you give ambient occlusion the longer it will take. The following are the only settings that seem to change the render times drastically. As you can see below, this test showed a render that took over 25 times longer than the default, however with a setting that high there is no graininess.

Constant QMC: Samples

Samples	Time	Percent of Default
Off	4.45s	12.09% (Default)
2	16.74s	45.46%
4	25.71s	69.83%
5	36.82s	100% (Default when turned on)
8	1m 21.84s	222.27%
16	4m 59.74s	814.07%
32	19m 17.33s	3143.21%

Now I tested the three major AO settings. These are at their default values. Changing the values associated with these types can speed up or slow down your render.

Type	Time	Percent of Default
Constant QMC	36.82s	100%
Adaptive QMC	29.64s	80.50%
Constant Jittered	31.81s	86.39%

Adaptive QMC: Threshold

Basically the higher this you set this setting the faster the render is going to be. Threshold stops Blender from Rendering all of the areas that need AO, therefore less calculating and faster renders. The higher you set this, or the more you omit from calculations, the faster your render will be. With the use of this setting, it can be faster than Constant unlike the times above.

Setting	Time	Percent of Default
0	36.26s	100% (Slowest)
0.50	21.76s	60.01%
1	21.51s	59.32%

The other settings in Ambient Occlusion did not seem to create any change in the amount of time it took to render, so use them as you see fit.

Others

There are many other settings that will lengthen the rendering time. Here is a list of those that I know will effect your rending time:

- Textures

Using no textures will be the fastest. Once you begin adding textures to your models or scenes the rendering time will increase. The amount of increase depends on what texture you use. If you use one of the

built in settings this will render only a little slower than without it. If you use an image, it all depends on the resolution of the image you are using. The higher the resolution the slower your render is going to be.

- Materials

Just adding color to your scenes will hardly affect your render time at all. However a few settings can drastically change the length of time you are waiting. Using 'Ray Mirror', 'Ray Transp' or 'ZTransp', or Subsurface Scattering will all slow the rendering down. ZTransp is going to be faster than RayTransp but by using ZTransp you sacrifice the use of all the settings available with Ray Transp'.

Subsurface Scattering will slow your render down, however it calculates before the actual rendering begins. When using Subsurface Scattering it will 'render' the parts of the scene that uses it, then actually finishes your render.

- **Radiosity**

Radiosity is another setting that will calculate before your scene will actually begin to render. The time it takes mainly depends on the 'Max Iterations' setting. The higher this setting the longer it will take. Blender recommends a setting of at least 100. If you leave this at zero, it will take forever (I've never waited long enough to see how far it would go). I never leave it at zero.

- **Scene Complexity**

The more complex your scene is the longer it will take to render. One object will be much faster than 1000 objects. The same goes for one object with 8 vertices compared to an object that has 100,000 vertices. Also, the more of the world background you leave open the faster your render will be. The world background renders extremely quickly.

- **Animations**

This one is the most obvious. Instead of doing one render, you are doing hundreds so naturally it will take longer. However, if you are rendering for the Video Sequence Editor it will be very fast compared to a standard animation. The stuff in the video sequence editor is typically already rendered the standard way or is an imported video.

- **Tiles**

This is a setting that I did not test because from experience it seems to depend on the size of the image that you are rendering. The default had it at 8 (on both X and Y) and with and HD render I tried it with 4 for both and saw a significant increase in speed. This does not always mean less is more. I also went down to 3 tiles for each and it slowed back down. So, if you know you are doing a lot of test renders I would fiddle with it a bit until you find the fastest settings.

Do you know of other factors that I should include here? Let me know in the forums or send me a message.