

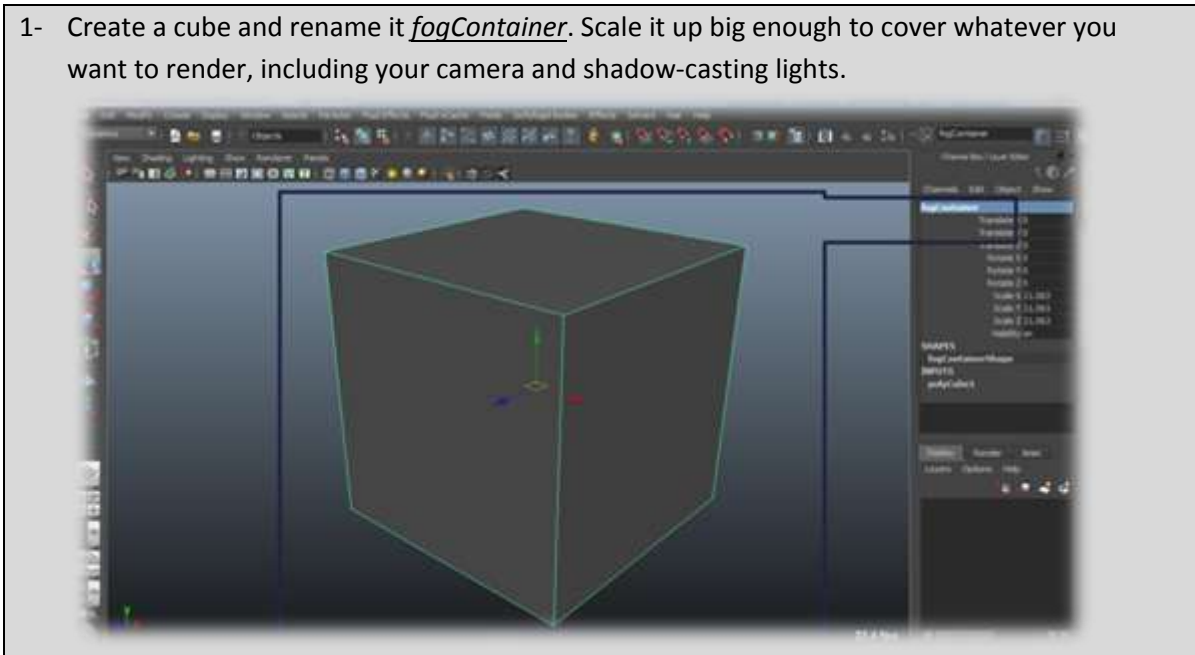
Volumetric shadows in Maya, rendered with Mental Ray.

This tutorial will cover the setup and rendering of volumetric shadows in Maya. For this tutorial all you need is Autodesk Maya with Mental Ray installed and you're good to go. I used Maya 2011 while creating this tutorial, be aware that there might be slight variations on how to achieve this effect in older versions of Maya – however, the basic setup is still the same.

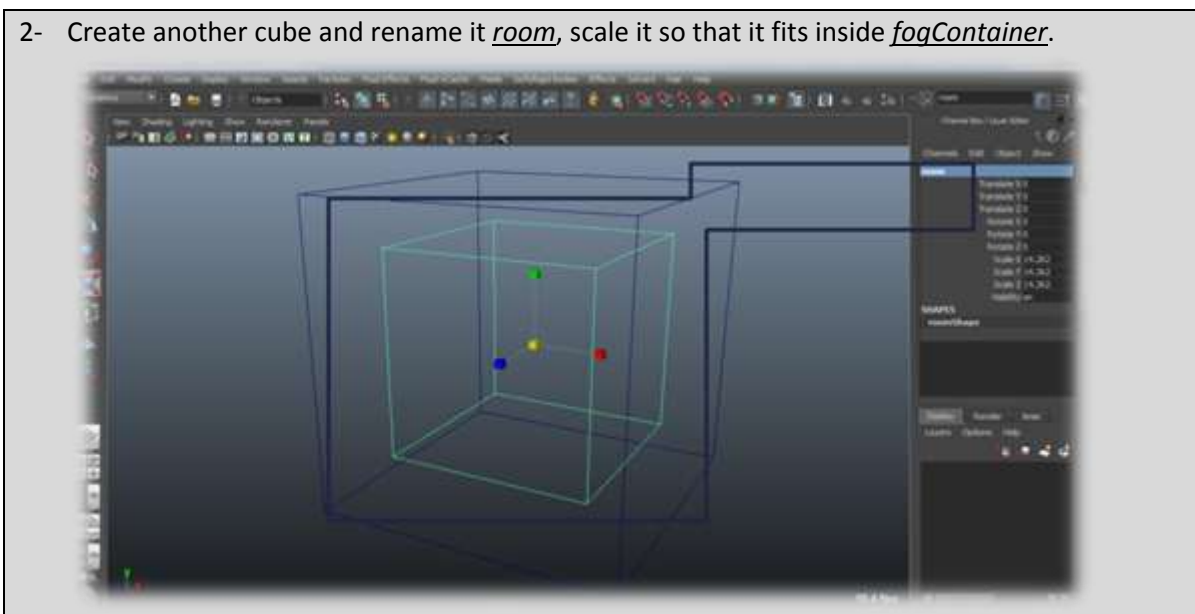
How to create volumetric shadows in Maya/Mental Ray

Basically all that we are going to do is create some geometry that will contain the fog, and build the rest of the scene inside this geometry.

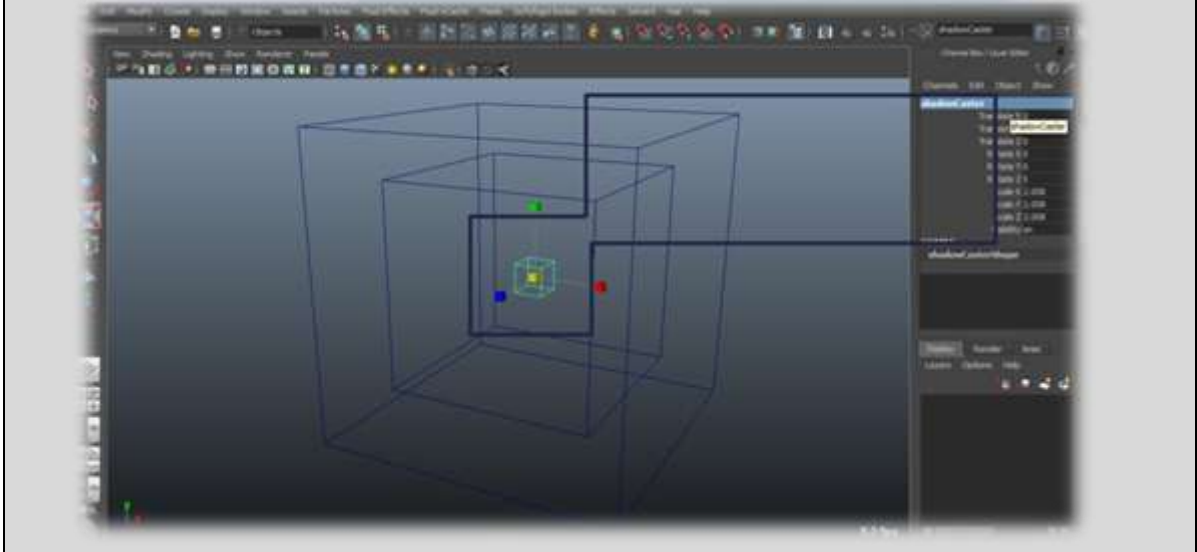
- 1- Create a cube and rename it *fogContainer*. Scale it up big enough to cover whatever you want to render, including your camera and shadow-casting lights.



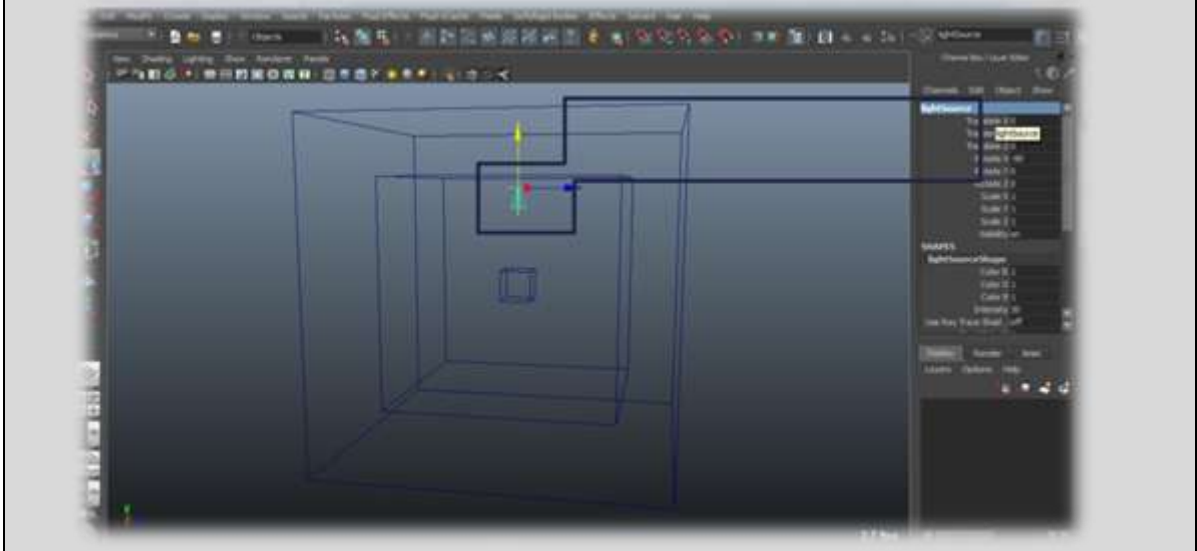
- 2- Create another cube and rename it *room*, scale it so that it fits inside *fogContainer*.



- 3- Create a third cube and rename it shadowCaster. Place it in the middle of the room.

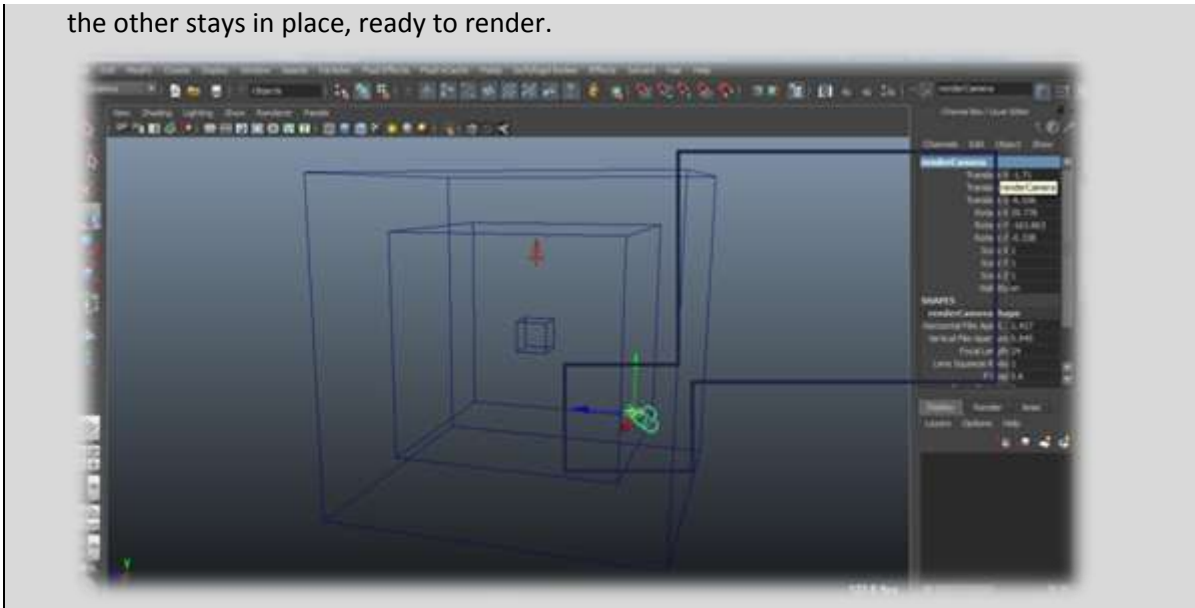


- 4- Create a spotlight and rename it lightSource. You can use any light you want, but the spotlight is very fast, and great for testing purposes. Give it a quadratic decay rate and as much intensity as you need, 30 might be a good initial value. Also enable depth-map-shadows, for example with a 1024px resolution map. Generating shadowmaps is generally quite fast, so a 1024px map won't take more than a few seconds to build.



- 5- Create a camera and rename it renderCamera. Place it so that you are looking toward the shadowCaster and the lightSource. You don't have to create a new camera, I just always tend to have the renderview set up, so that I always have one camera to look around with, and

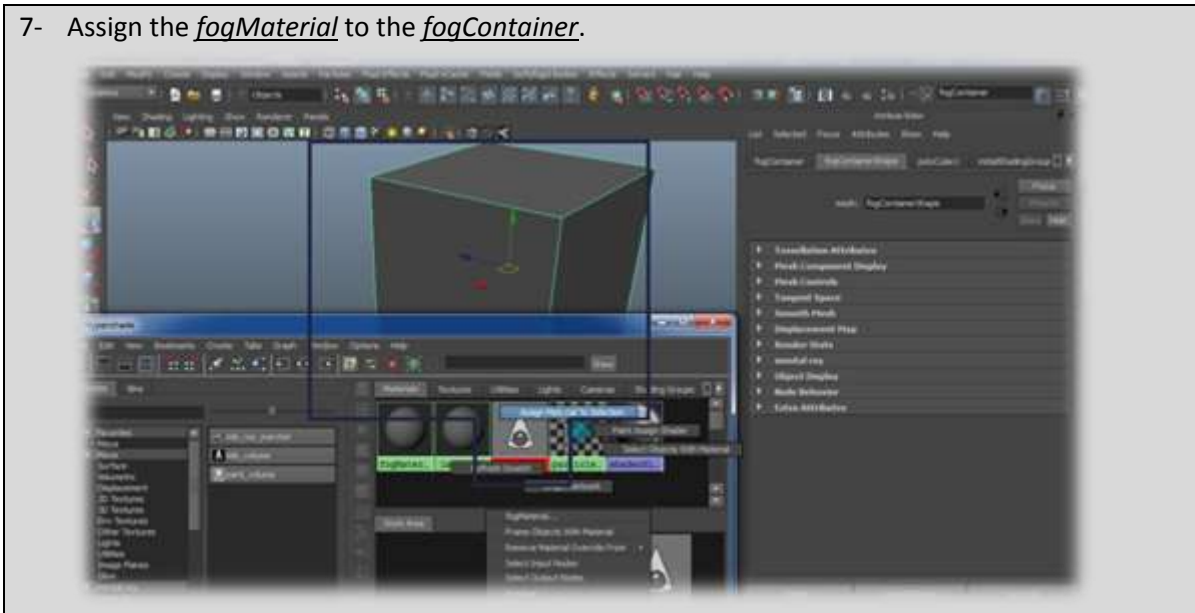
the other stays in place, ready to render.



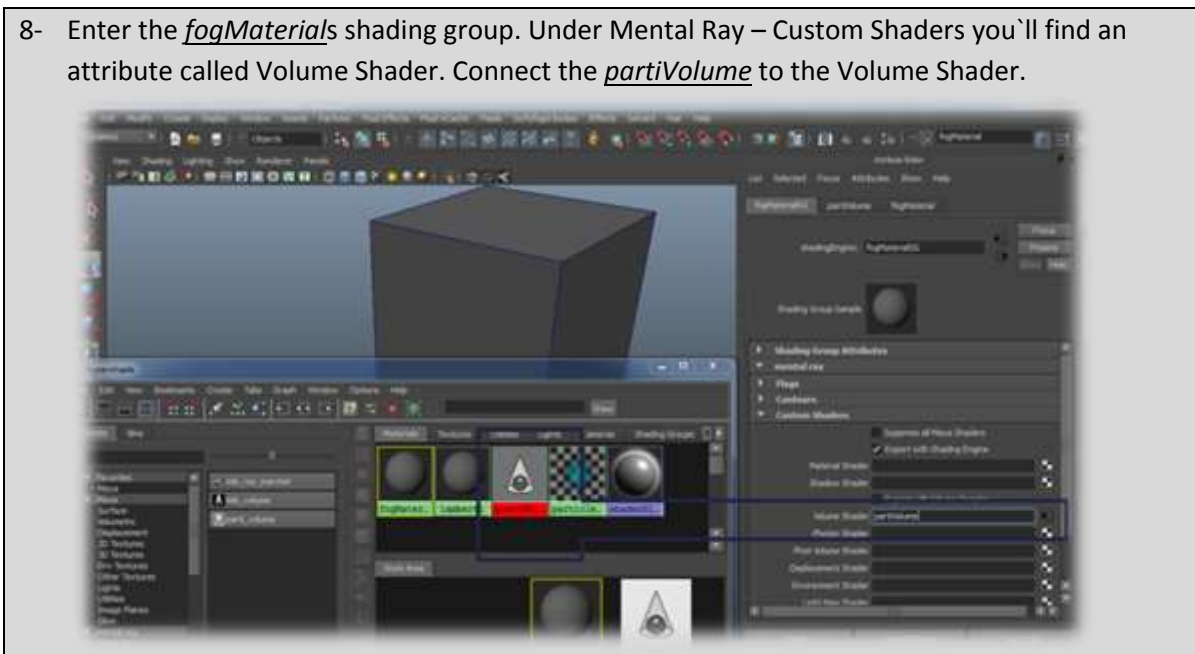
- 6- In the Hypershader, create a Lambert (or whatever Maya material, we are just interested in the shading group) and rename it *fogMaterial*. Also create a *parti_volum* node from the Mental Ray – Volumetric Materials tab. Rename it *partiVolume*. In the *partiVolume*, set the Scatter slider all the way to the right, making it white.



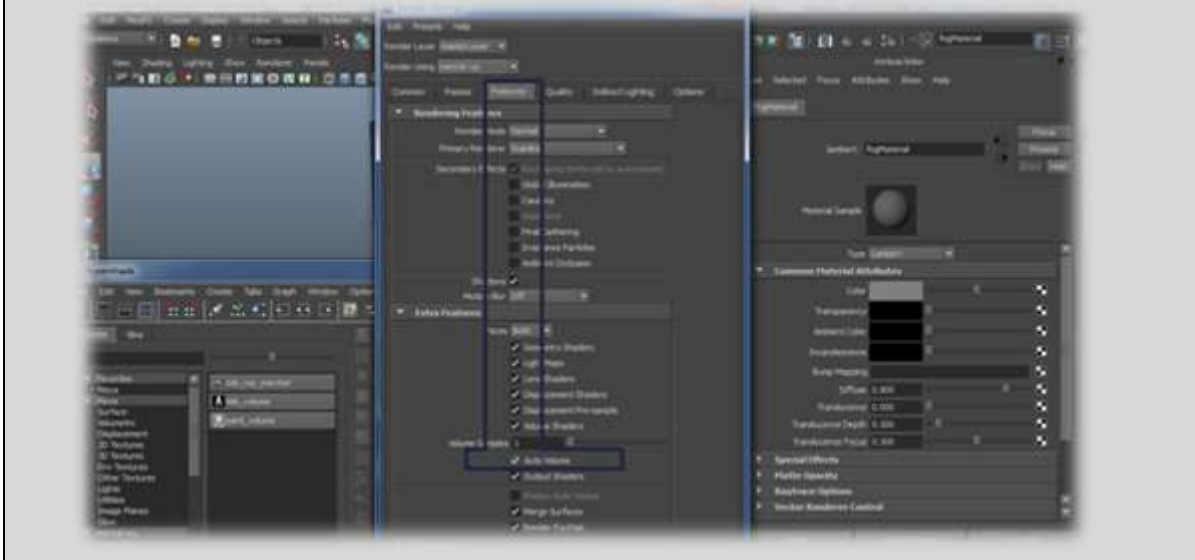
7- Assign the fogMaterial to the fogContainer.



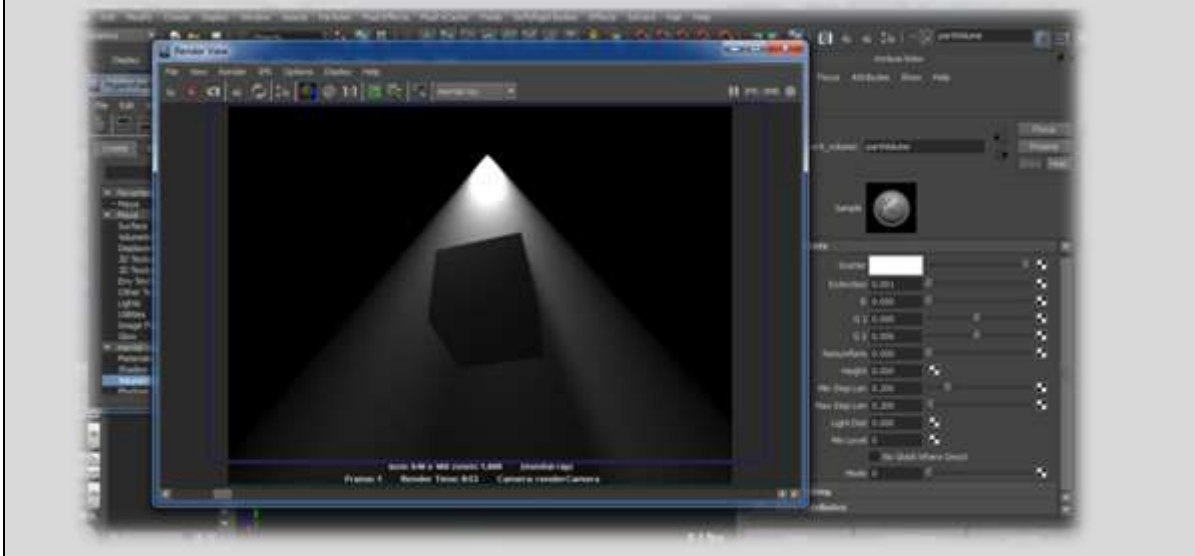
8- Enter the fogMaterials shading group. Under Mental Ray – Custom Shaders you'll find an attribute called Volume Shader. Connect the partiVolume to the Volume Shader.



- 9- Open the render settings to make sure Mental Ray is set as the current renderer. In the features tab check the Auto Volume box.



- 10- Render. (Remember to render through the renderCamera and not the default pers.) The effect should be clear now, but the default settings are not good enough for production. We enter the *partiVolume* again and adjust the step-length (both min and max). A value of 0.2 instead of the default 0.5 should increase the quality quite a bit. You might also want to adjust the filtering on the shadow map. A value of 2 will soften most jaggy edges with a 1024px shadow map.



That was the basic walkthrough, and (as you probably figured out by now) the only difference from a normal scene is that we use the *parti_volume* node to create a fog-medium surrounding the scene. Now, with the volumetric shadows in effect, it's just a matter of tweaking the lights and the fog to create the desired look. A few interesting attributes in the *partiVolume* might be:

Scatter: The color and overall intensity of the fog. If this value is set to black, the fog has no effect – however it still affects render time.

Extinction: Gives the scatter-value a falloff effect. Higher values scatter the light more, simulating a thicker fog.

R, G1 and G2: Combinations of these controls the scattering, simulating different types of particles in the air. Examples (from the Mental Ray manual):

Rayleigh (Cigarette smoke, dust):	R = 0.50 G1 = -0.46 G2 = 0.46
Hazy Mie (water droplets, fog – sparse):	R = 0.12 G1 = -0.50 G2 = 0.70
Murky Mie (water droplets, fog – dense):	R = 0.19 G1 = -0.65 G2 = 0.91

Nonuniform: Controls the uniformity of the fog. A value of 0 creates a perfectly even fog, moving towards a value of 1 gradually creates a more cloud-like fog.

This tutorial only covers volumetric shadows, but you can also create more advanced volumetrics, for example using `parti_volume_photon` node, scattering caustics. I might also write a tutorial using these techniques if I find the time. If I do, you will find them on my site as soon as they are finished.

If you've got any questions or comments, please feel free to send me an e-mail at severin@3dartist.no.