



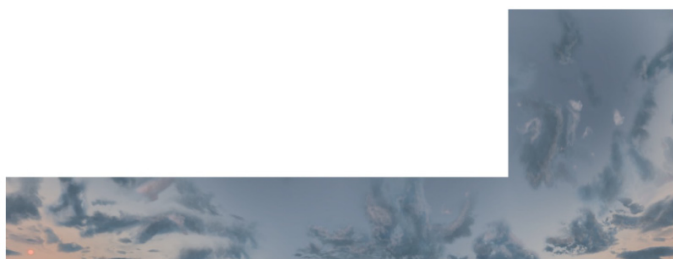
## WHAT YOU NEED:

- Maya
- A sky scene (for example check out my „skybox tutorial“ on [www.thomashess.net](http://www.thomashess.net))

## 1. WHAT'S A SPHERE MAP?

If you are working with realtime graphics you may hit the problem of projecting stuff around the camera or on a certain surface to get a reflection like effect. Current technologies support various methods, such as cubic reflection. In this case a cube is textured with 6 individual textures and a projection is calculated on the 12 polygons of this cube. This saves performance in comparison to projecting against all thousands polygons you might have in your scene.

Sphere maps are prerendered textures such as cube maps, but they use a different projection matrix and work with only one texture which may save a couple of render batches.



upper half of a cube map

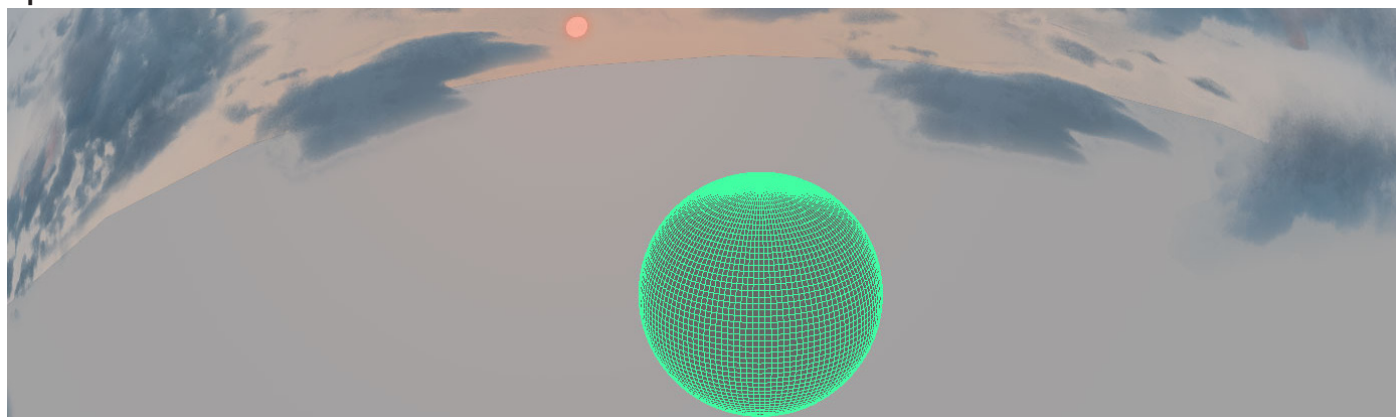
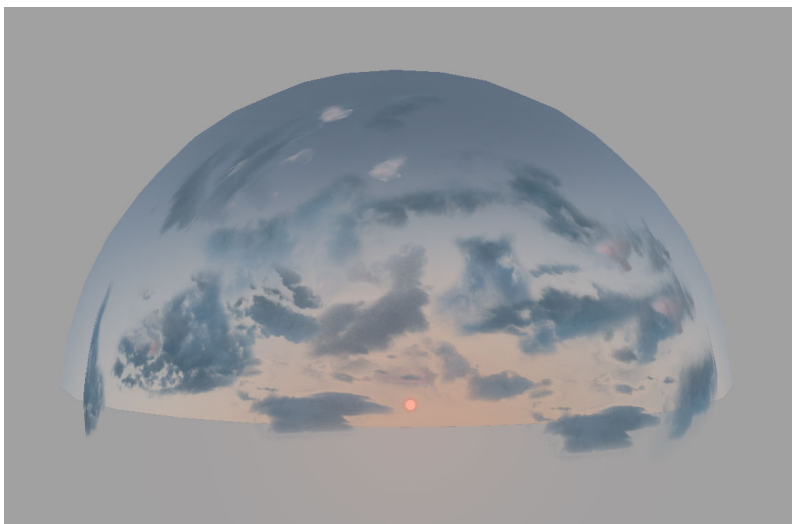


sphere map of the same sky

## 2. PREPARING THE SCENE

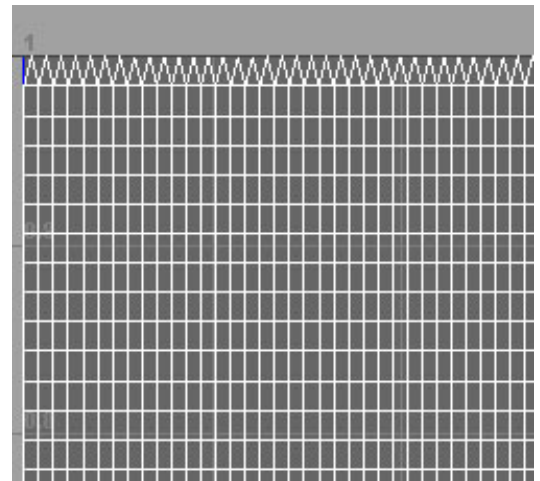
Before you can render the sphere map you have to set up your scene for the baking process. As a first step you may construct the sky itself. I was just lazy and pick an old one from another tutorial.

After this step you need to create a sphere with high subdivision levels. For example pick 128 in vertical and 64 in horizontal dimension. The sphere should be right in the center of the sky and the poles should be aligned on the up/down axis.

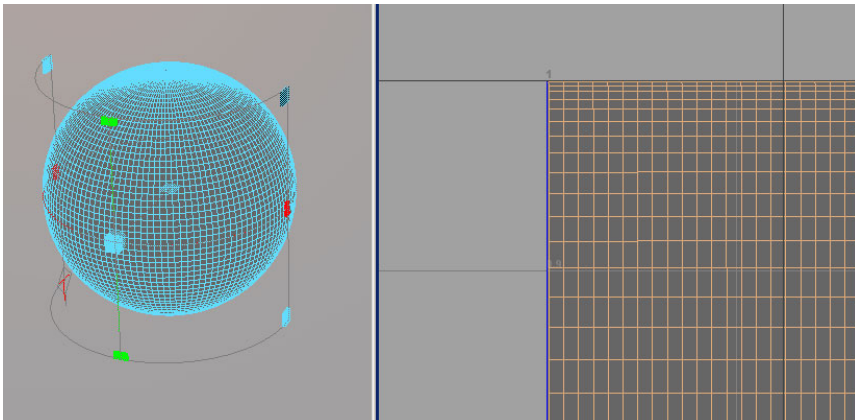




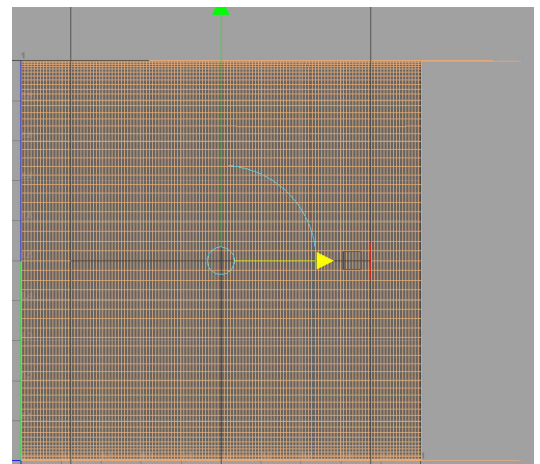
As you open the UV editor now, you will see Mayas default sphere UV map. The poles are perfectly laid out, which is NOT what we want in a spherical projection. A sphere map has strong distortions on the poles. So apply a cylindrical projection on the sphere while the projection axis is again the up/down axis. The created UV shell should be matched into the UV range of 0-1 as perfect as possible.



default UV layout



cylindrical projection in the perspective viewport



cylindrical projection

### 3. MATERIAL SETUP

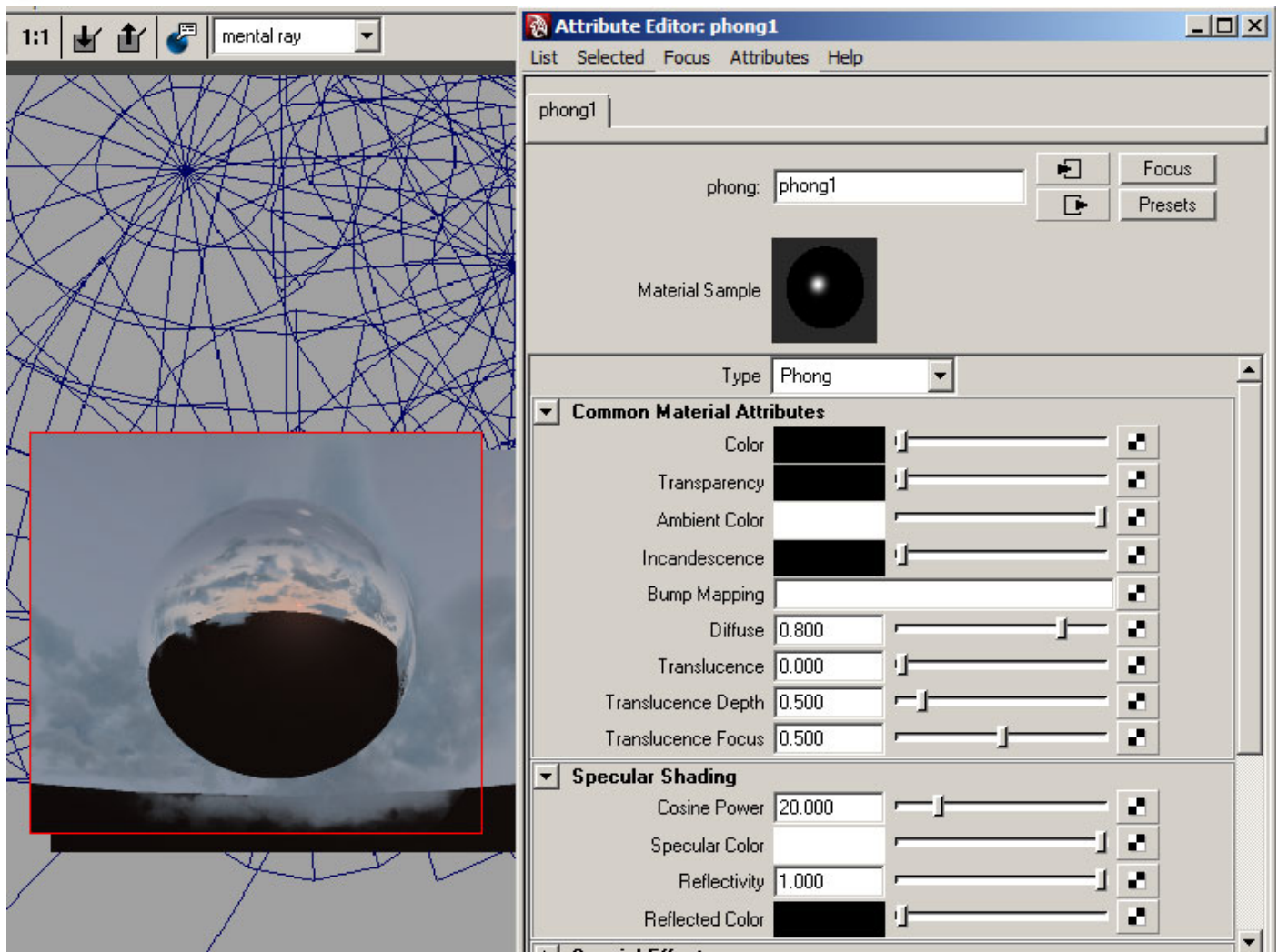
To render the sphere map we will project the environment onto the sphere and write that information into a texture. Hence the sphere needs a material that is 100% reflecting and has no own color. Create a phong material that has:

- black color
- white ambient (as there are NO lights in the scene)
- white specular
- maximum reflectivity

This leads to an important note: To get this thing to work there are no lights allowed in the scene. Otherwise the sphere will receive specular from those lights. If you turn down/off the specular, there will be no reflection! So specularity HAS TO BE white!

Don't forget to apply the phong onto the sphere.

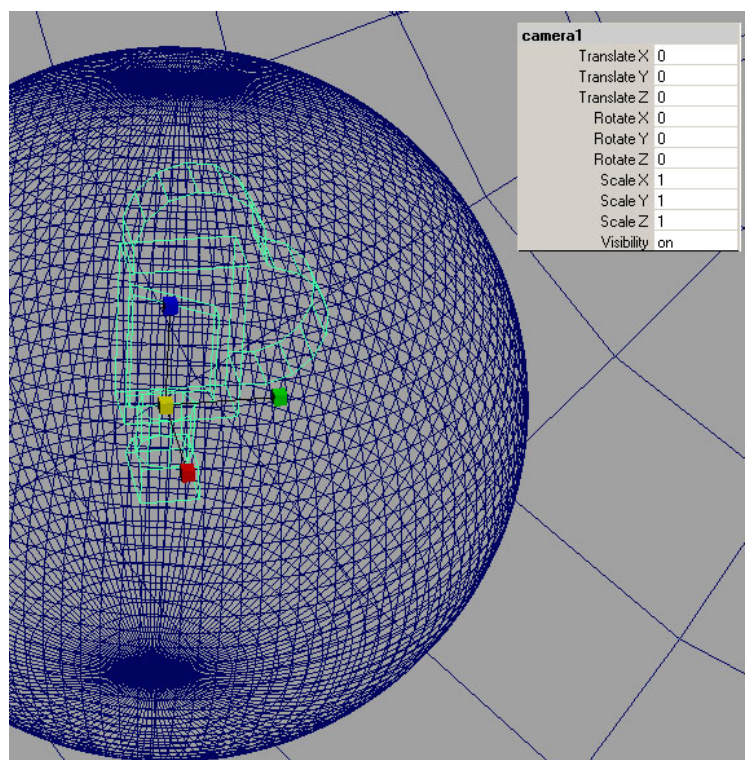


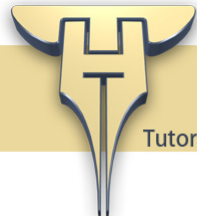


## 3. BAKING

As the scene is set up now, the actual baking can start. Create a new camera that should be placed right in the center of the sphere. The camera will be used to calculate the reflection on the surface of the sphere. If the camera is not in the center, you will get weird distorted results. Now switch to the rendering menu and pick „Mental Ray Batch Bake“. A window will pop up. Configure it as follows:

- bake selected object
- camera has to be the created one (might be camera1, if you haven't created any cameras before)
- color mode should be „light and color“
- enable „Orthogonal reflection“
- set up output name (== prefix) and resolutions





## Rendering sphere maps with Maya

Tutorial by Thomas Heß

[www.thomashess.net](http://www.thomashess.net)

Select the sphere while leaving this window opened and click on „convert“. There you go! The rendered sphere map can be retrieved in your current project folder: `maya/projects/YOUR_PROJECT/renderData/mentalray/lightMap/prefix.tga`

