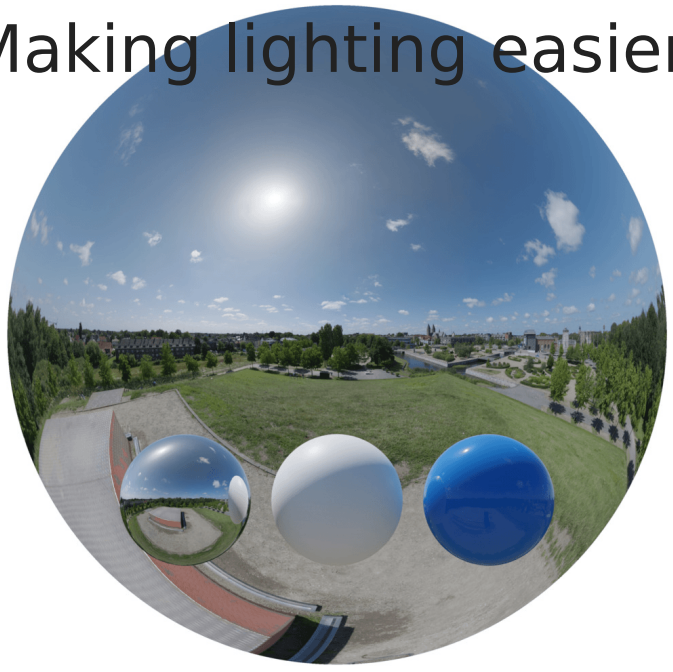
What is an 'HDRI environment'?

Lighting is hard

When lighting a 3D scene for rendering (be it complex path tracing or much simpler shading in a realtime game) it needs a light definition for any shadows or interesting reflections to appear.

A scene *can* be lit using simple light sources like point- or sun lamps but that's not how light in real scenes behaves. Even though the sun in the sky might be the only obvious light source in an outdoor scene it is usually not enough to just add a single virtual sun because in reality the light bounces off of all parts of the environment until it hits the subject. Replicating this with actual scene geometry is extremely laborious and computationally intensive, especially if the final render is only supposed to contain a few reflections on - for example - a metallic object without any focus on the background.

Making lighting easier



This is where **H**igh **D**ynamic **R**ange **I**mages (or just 'HDRIs') come into play**.** They are created by capturing a special 360° panorama image of an environment that includes all the light arriving at one point without the clipping and tonemapping

usually done by digital cameras.

The HDRI can then be applied as a backdrop to a scene where it now serves to create ambient lighting. This saves a lot of time and allows for extremely realistic lighting setups to be created (and switched between) within seconds.

As you can see in the sample animation the light being applied to the three spheres in the bottom half of the image always perfectly matches the surrounding scene. They change their color and their shadows along with the light sources and atmosphere of the rest of the image.

Revision #4
Created 24 May 2022 19:35:22 by ambientCG
Updated 21 September 2022 18:24:00 by ambientCG