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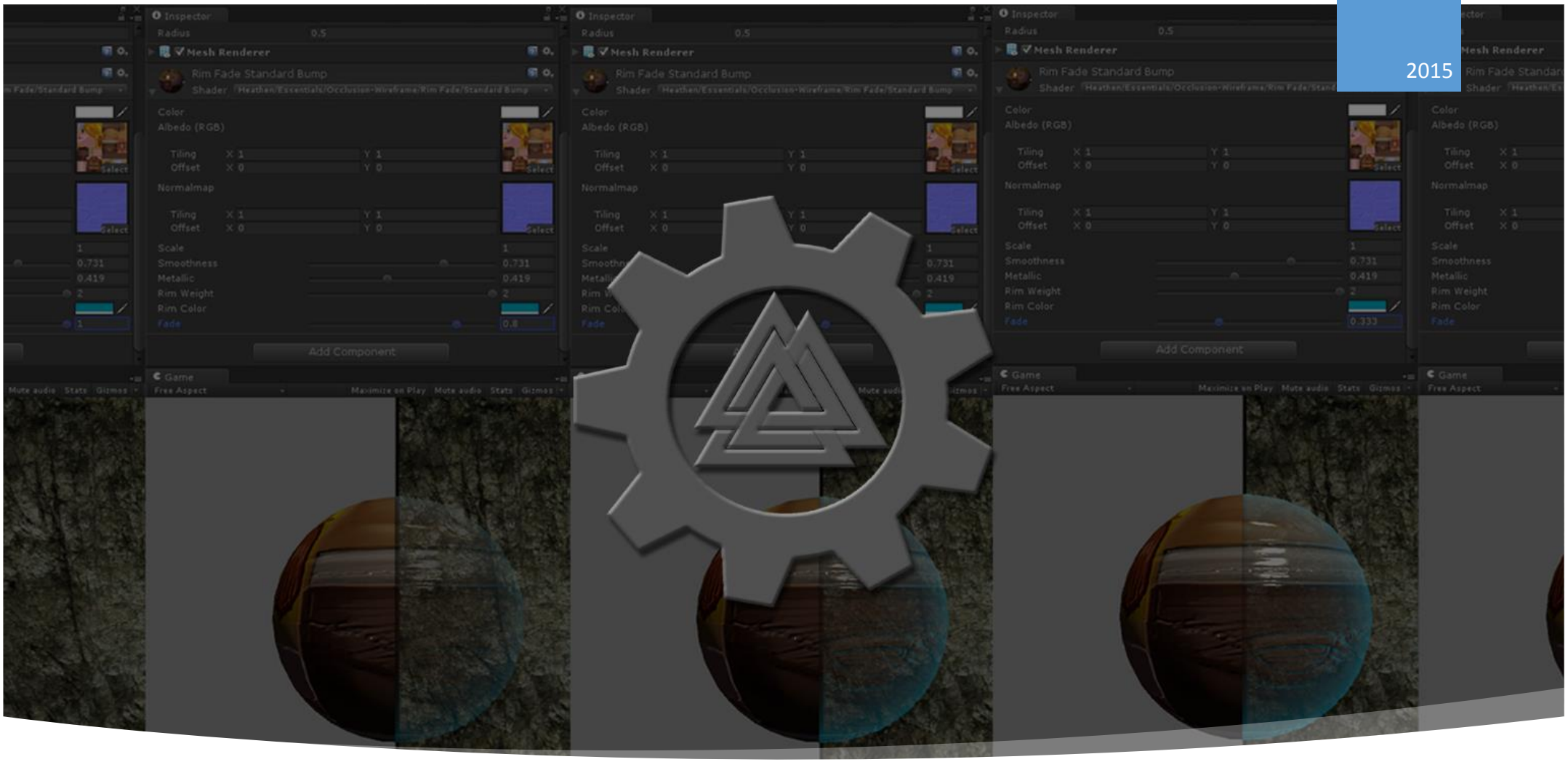

OCCLUDED RENDER GUIDE

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Description

Heathen Engineering's Occluded Render provides a simple fast and highly configurable solution for rendering special effects on the occluded portions of objects. The package includes full source code for all shaders and several extensions for special case needs such as Unity's Standard Asset: Toon style shaders and integration with Heathen Engineering's Selective Glow asset available separately on the Unity Asset Store @ (https://www.assetstore.unity3d.com/#!/content/15174)

Note Standard Occluded Render shaders may not appear to occlude when rendered in editor even when simulating this does not affect the build and appears due to editor camera.

Getting Started

Heathen Engineering's Occluded Render is a Material Shader solution meaning you only need to set the material of the objects you want to render on occlusion with the desired Heathen Occluded-Wireframe shader of your choice. To do this select the material of the object in question or create a new one for it.

On the Inspector window of the material located at the top of the panel you will find a 'drop down' also known as a 'combo box' labelled *__Shader__* click this and navigate to
'Heathen' > 'Essentials' > 'Occlusion-Wireframe'
and then the select the effect you wish to use

- Basic
  Renders a colour with opacity when occluded
- Pattern
  Renders a texture with tent colour when occluded
- Rim
  Renders a 'rim light' effect when occluded
- Wireframe
  Renders the mesh wireframe with optional fill and wire colour when occluded
  (Note) this is currently only available in Standard lighting models.

You will be presented with a list of the available material shaders for that effect, simply select the shader appropriate for you chosen look and feel.

Your material is now configured, you can assign the textures desired and apply it to your object.

Effect Styles

Basic

The basic style simply renders a colour when occluded, you can configure the colour and it does respect the alpha or ‘transparency’ of the colour selected. This is a popular choice when you’re looking for a strong effect suitable for small objects such as units in an RTS game or mobs in a Dungeon Crawler.

Pattern

The pattern style renders a texture over when occluded, you can configure the tent colour and it does respect the alpha or ‘transparency’ of the texture and tent. This is a popular choice when the occluded effect needs more detail such as FPS and RPG cases.

Rim

The rim style renders a rim light effect and when used with standard shaders the emission strength can be controlled in addition to the colour and weight values common to all rim Heathen rim effects. This is a popular choice for more detail without the need of a special or tiled texture such as Pattern requires. Rim is capable of giving a soft ghost like effect or even a bright (HDR) bloom (requires HDR camera and Bloom screen effect)

Wireframe

The wireframe style renders the models wireframe via geometry shaders when occluded. This effect may not be available on all systems and historically required DX11. It is however a common requested effect for many genre of game. Wireframe shaders are included that render the wireframe at all times as well as occluded render variants. Alternatives to wireframe is to use pattern and set the pattern texture to a baked wireframe map sometimes referred to as a UV shell map.

Note Wireframe is not currently support in Deferred rendering path.

For Shader Developers

Not only is the full source available but the solution is designed to be extended. This section assumes a basic understanding of shader programming in Unity.

Adding Occluded Render to Custom Material Shaders

Occluded Render can be applied to virtually any material shader assuming it renders with ZTest LEqual or ZTest Less; note the default setting for Unity shaders is ZTest LEqual so unless you explicitly code a different ZTest it will be ZTest LEqual.

Each of the effects Basic, Pattern, Rim and Wireframe are defined in Hidden shaders referred to as 'Effect Shaders'; these shaders render the desired effect on ZTest Greater and do not ZWrite e.g. ZWrite Off.
(Note) 'Hidden Shaders' simply means the shader will not show in the Inspector window's Shader 'drop down', the source of the Hidden shaders is available for you located under each effect's folder e.g. **_Heathen Engineer/Heathen Shaders/Shaders/Essentials/Occlusion-Wireframe/Pattern/Occlusion-Pattern-Effect_a.shader** is the default path for the Pattern type A effect shader. In general you will only need to use Type A effect shaders Type B are maintained for backward compatibility only.

The fastest way to add the effect to your shader is to add UsePass calls to the desired effect shaders. You will typically want to add a call for each rendering path for example

```
UsePass "Hidden/Heathen/Occlusion-Pattern-Effect_a/FORWARD"
UsePass "Hidden/Heathen/Occlusion-Pattern-Effect_a/PREPASS"
UsePass "Hidden/Heathen/Occlusion-Pattern-Effect_a/DEFERRED"
```

Would be added at the top of the SubShader body to apply the Pattern effect to the material. You will also need to apply that effects required properties to allow it to be configured in the editor; in the example below you see the 3 typical bump or normal mapped shader properties plus the 2 properties required by the Pattern effect

```
Properties {
    _Color ("Main Color", Color) = (1,1,1,1)
    _MainTex ("Base (RGB)", 2D) = "white" {}
    _BumpMap ("Normalmap", 2D) = "bump" {}
    _OcclusionColor ("Base (RGB)", Color) = (0.5,1,1,0.25)
    _OcclusionPattern ("Pattern (A)", 2D) = "white" {}
}
```

You can see the full source of this particular shader by examining the **_Heathen Engineering/Heathen Shaders/Shaders/Essentials/Occlusion-Wireframe/Pattern/Occlusion-Pattern-Bumped.shader** file.

Troubleshooting

If you have any issues feel free to contact Heathen Support by e-mail at Support@HeathenEngineering.com or on the web (live link available on main site) at www.HeathenEngineering.com

The occlusion effect don't show or flickers when I move the camera

When using standard shaders in the editor you may not see the occlusion effect or it may flick in and out this however should not be present in the main build and is caused by the editors unique camera settings in particular where occlusion is concerned for which this asset is particularly dependent on occlusion functioning in the expected way.

Note you may see this with non-standard materials as well; since 5.x.1 in editor occlusion has been the cause of several occlusion based questions, none of which are present in builds.

Also note that Wireframe does not support Unity 5+ Deferred Rendering Path though does support Unity 4 aka Legacy Deferred or PrePass.

The rim effect is solid

This is usually due to your Rim Power being set to high, the default value of 20 is useful when you are using HDR with other common screen shaders to render a bloom or over bright effect. To get the ghost like effect turn the Rim Power down to below 1 usually around .3 to .7 will look nice depending on the brightness of the scene.