

# ReFlection Manager

Version 0.4

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## About

Reflection Manager is a plugin for unity, designed to allow for simple creation, and use, of high quality reflection probes. The plugin features a novel parallax correction shader, giving improved visuals over standard reflection probes.

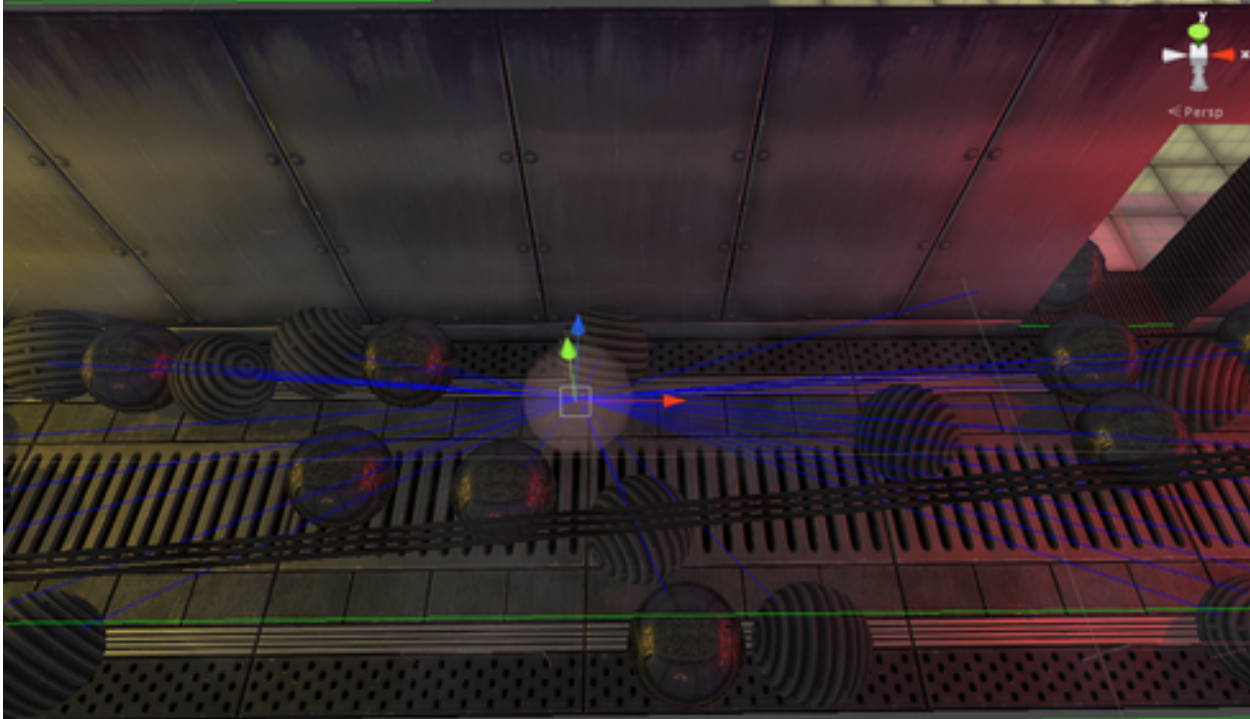
Contact [Sales@GameArt.me](mailto:Sales@GameArt.me) for support

## Placing Reflection Probes

To place a new reflection probe click *GameObject/Create Other/Reflection Probe*. This will create a blank reflection probe with the default reflection probe settings. Click on the probe, and then in the inspector you will be able to generate reflection data. You can apply the generated cubemap directly to materials, or you can set link bounds to have it automatically apply to materials at runtime. This runtime linking is incompatible with static batching. Runtime linking, and parallax correction can be disabled in the reflection settings object.



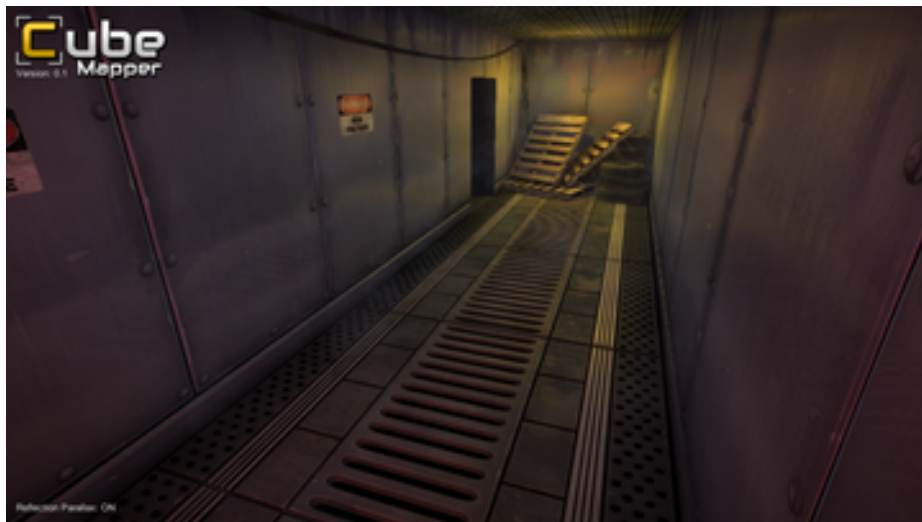
## Dynamic Probe Linking



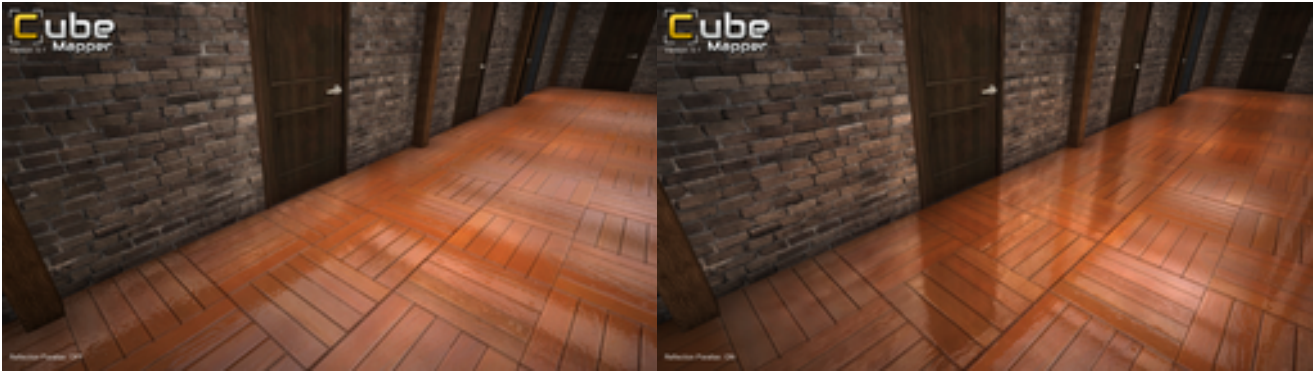
To dynamically link an object to reflection probes you need to attach the *Dynamic Reflection Linker* component. You can choose if you wish this object to receive parallax reflection correction or not. You can also set how long the object should spend blending between old and new reflection data. Your object will link to the corresponding probe to the parallax volume it's within, if it's not inside a parallax volume it will link to the closest probe.

## Gloss

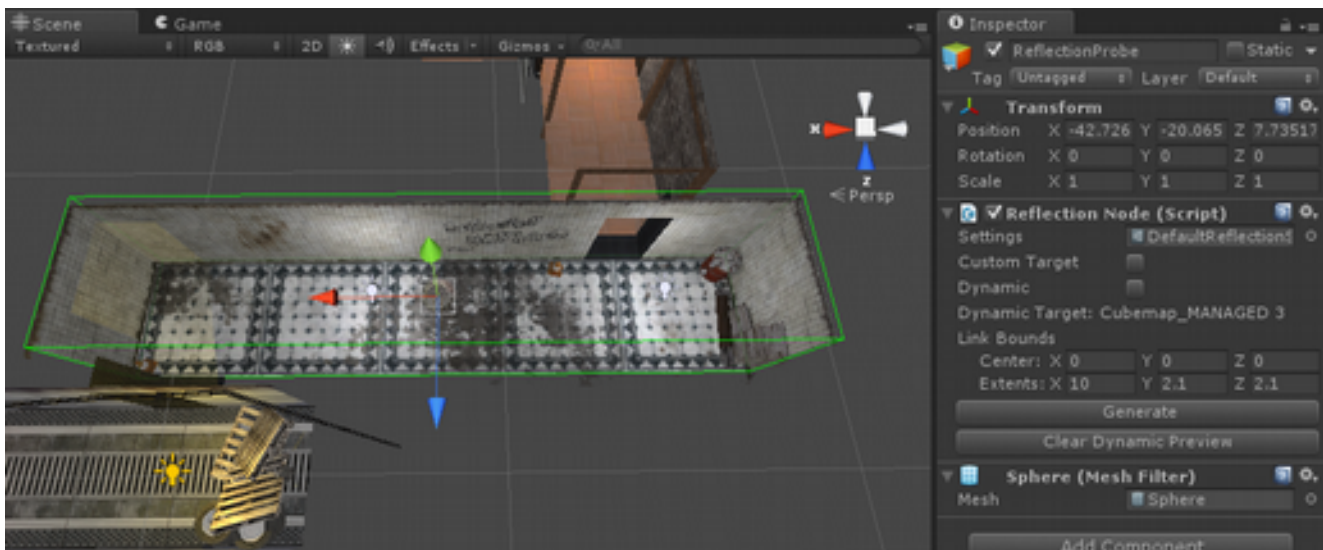
Gloss determines what mip level we sample the cubemap texture from. By using gloss we can recreate a wide range of realistic surfaces, both reflective and diffuse. In the Parallax Correction demo we can see how gloss is used to create a metallic looking surface on the boiler room walls.



## Parallax Correction



Parallax correction helps line up cubemap reflections to world geometry. Parallax correct can be enabled or disabled in reflection settings files. Parallax volumes determine how the effect looks, parallax volumes are defined per-reflection probe by modifying the *Link Bounds*. Additional parallax volume types are in development.



The parallax volume should be as large, or larger than the geometry linking to it. If you make the volume smaller, the areas on the outside of the volume will show incorrect reflections. Link bounds center allows you to offset the parallax volume, which is useful in cases where the reflection probe has not been placed in the center of the room.

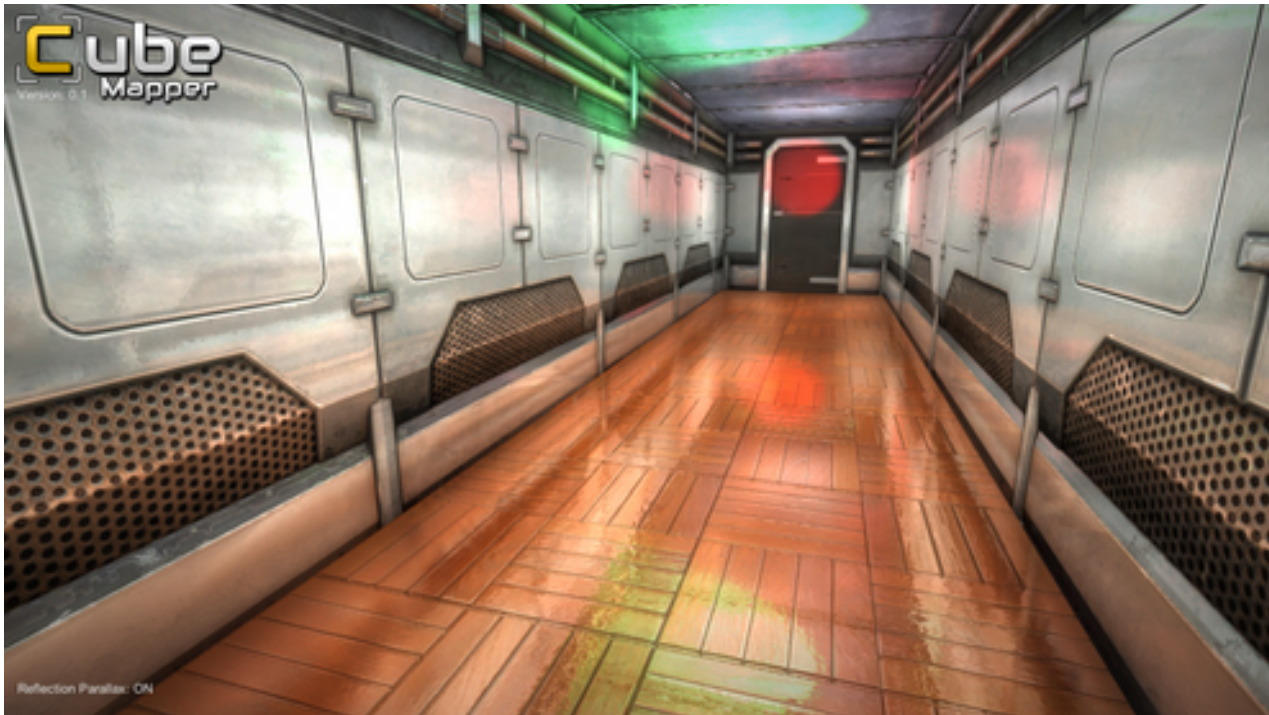
**NOTE:** *In the current version, you cannot rotate parallax volumes. This support will be added in the next release.*

## Dynamic Reflections

These can be really impressive, but are also very computationally expensive. The initial release of Reflection Manager uses naive dynamic reflections, as a result you will need to keep the dynamic target size low, and only use sparing. In the Parallax Reflection demo we disable rendering the



dynamic reflection when it cannot be seen, to prevent slow-down in the rest of the level.



## Custom Shaders

Although Reflection Manager ships with a wide range of compatible shaders, you can still easily integrate Reflection Manager functionality into your own shaders.

You will need to include the ReflectionManager helper library in your shader code.

```
#include "ReflectionManager.cginc"
```

And where you would normally sample your cubemap, replace that line with:

```
float3 reflection_colour = ReflectionManager( _Cubemap, _GlossMap, world_reflection_vector, world_position, uv );
```

Dynamic objects that can link to multiple probes (blending) requires additional setup:

```
float3 reflection_colour_primary    = ReflectionManager( _Cubemap, _GlossMap,
                                                         world_reflection_vector, world_position, uv );
float3 reflection_colour_secondary = ReflectionManagerAlternate( _CubemapAlternate, _GlossMap,
                                                                world_reflection_vector, world_position, uv );
float3 reflection_colour = lerp( reflection_colour_primary, reflection_colour_secondary, _CubemapAlternateMix );
```

ReflectionManagerAlternate considers the secondary reflection probes parallax correction volume.

And on mobile, use the mobile friendly command instead:

```
float3 reflection_colour = ReflectionManagerMobile( _Cubemap,_GlossMap,  
world_reflection_vector, IN.worldPos, IN.uv_DiffuseMap );
```

## **Mobile**

When developing for mobile, shader model 2.0 has one limitation you must be aware of. ReflectionManager() uses the *TexCubeLOD* instruction to sample the proper gloss level for a reflection probe. This instruction is not supported on most mobile devices, so we have provided an alternative interface ReflectionManagerMobile() which uses *TexCubeBias* under the hood. This bias logic needs some more work before it accurately resembles the standard shader. If you don't care about supporting gloss on your mobile device (highly possible) you can use ReflectionManagerCheap() which will work the same on all devices.

## **Frequently Asked Questions**

After exporting and running my project, reflections don't look the same as the editor or are broken?

- The current method of automatically linking probes to geometry happens at runtime, so you will have to disable static batching for now. You can manually link probes if you require static batching. In the reflection probe shared settings, for Probe Linking, select NONE to disable runtime linking.

Can I use the supplied sample objects and textures in my commercial project?

- All materials provided with Reflection Manager can be used royalty free in commercial productions! Textures are provided freely from GameTextures.com, the door model has been provided by GameArt.me. The remaining miscellaneous props and audio are taken from Unity technologies sample applications, which are freely licensed to all Unity license holders.

I'm using Unity Free and I can't generate cubemaps.

- The default generation method is not supported by Unity Free. Select a reflection probe and double click on the settings. In settings change the Generation Algorithm to FRAME\_BUNKER and generation should now work on Unity Free.

## **Future Development**

Many features planned for Reflection Manager have not been fully implemented. The planned future feature set is as follows:

- Ellipsoidal parallax correction volumes for non-cuboid geometry
- Non-destructive editor linking of probes to geometry to allow for static geometry batching
- Better mobile gloss support
- Improved performance for dynamic cubemaps
- ATI style mipmapping implementation. Smoother edges on cube corners.
- Separate linking volumes from parallax volumes.
- Custom camera support

## ***Credits***

Lead Programmer: Mark Laprairie – [www.MarkLaprairie.com](http://www.MarkLaprairie.com)

Door Model provided by: [GameArt.me](http://GameArt.me)

Textures provided by: [GameTextures.com](http://GameTextures.com)

Misc assets taken from Unity sample applications.