MicroSplat

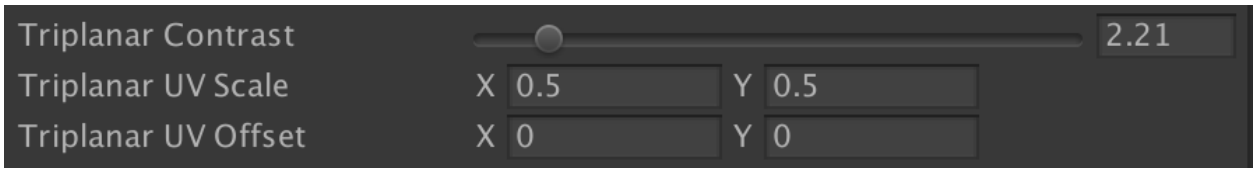
Triplanar

Documentation

Shader Features

The Triplanar modules adds a single option to the shader generator for triplanar UV coordinates, which comes in two modes- triplanar, and height blended.

Once enabled, each texture will be sampled once for the top, front, and side projection, and the results will be blended. If height blending mode is selected, the projections will be blended via a height based resolve, which looks more natural and less blurry.



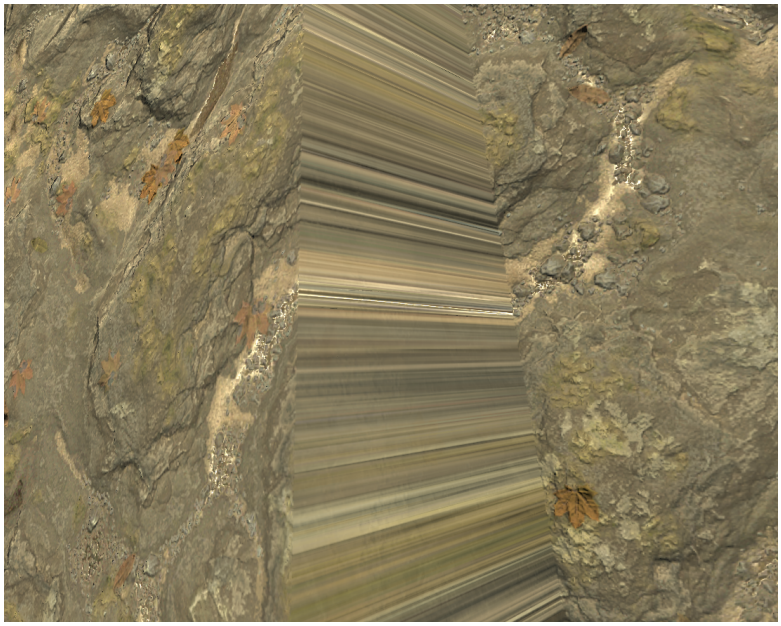
A triplar contrast setting is added which controls the blend between the top, front, and side projections. It is suggested to turn this down when using height based blends for trilinear

and instead turn up the interpolation contrast instead. When using non-height based blends, you will most likely want to turn this setting much higher.

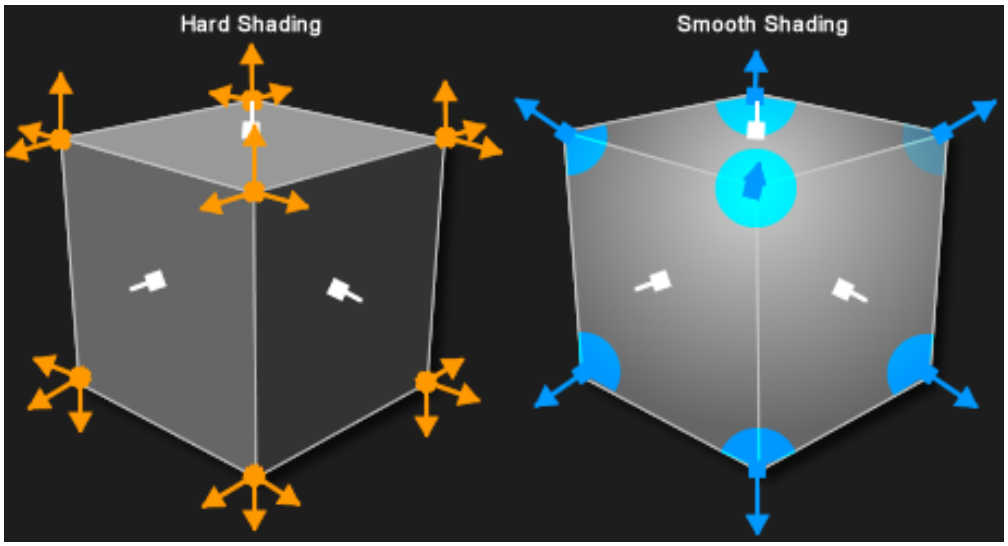
UV controls are provided to scale and offset the triplanar UVs- UV's for triplanar are in world space or local space, depending on the space setting used.

The Blend Face Normals option allows you to blend between the vertex normals (default) and face normals for use in choosing a texture. In modeling terms, we can think of the vertex normal as the smoothed normal of a mesh, and the face normal as the hard edged normal of the mesh.

Strictly speaking, Unity Terrains only support smoothed normals, but it's possible to generate a face normal in the shader. Using the smoothed vertex normal can cause streaking when the angle of the geometry changes rapidly::



To understand why this happens, you need to understand the difference between a smoothed normal and a face normal:

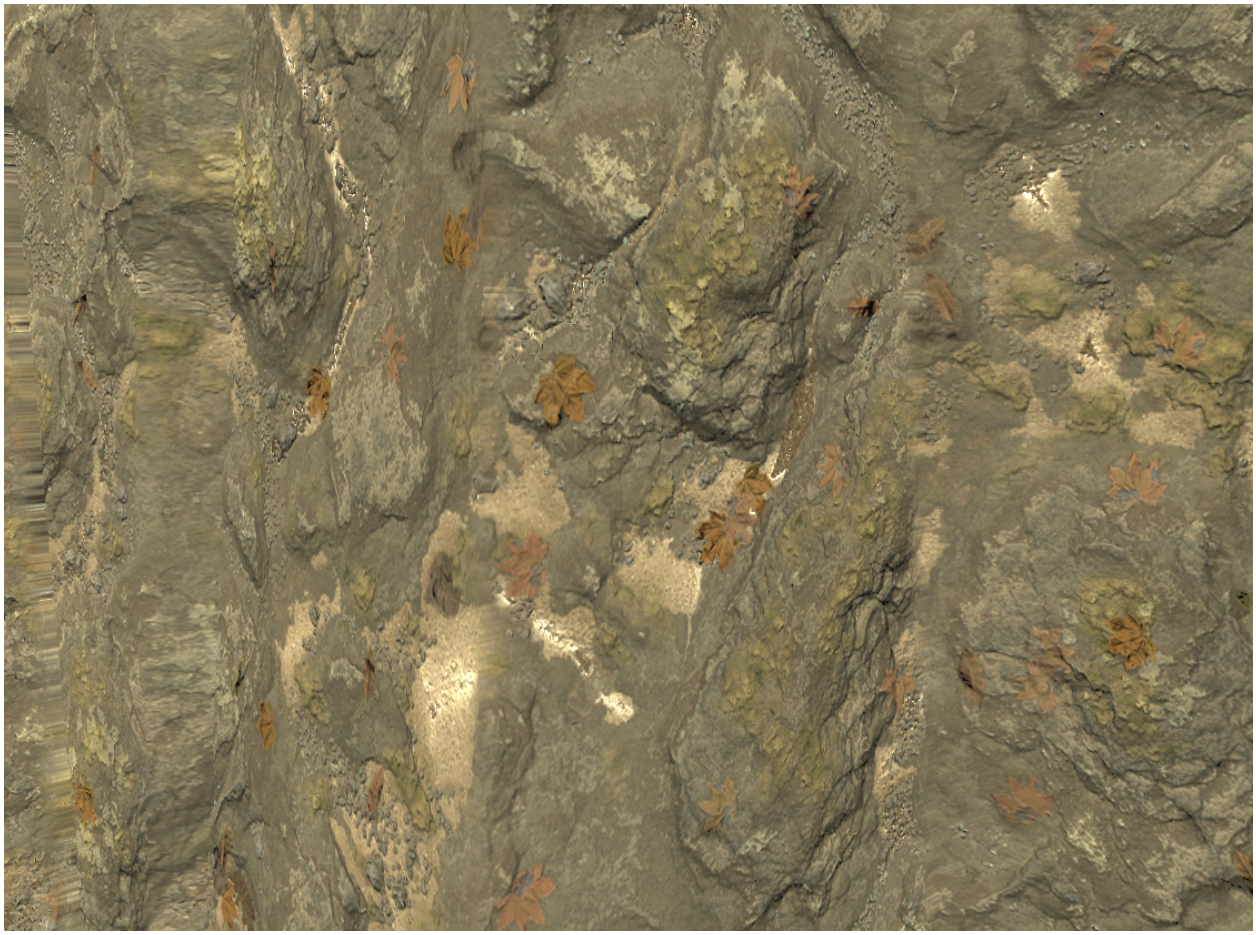


Notice that in the left image, we have 3 normals coming from each point on the cube. These all point in the same direction of the face's normal (in white). Now notice the example on the right, in which those normals are averaged together into a single normal, which makes the surface look smooth and continuous. Unity Terrains use smooth normals for all of their faces, and when we select a texture based on this normal, we are getting a direction that is 45 degrees off of the face normal. This causes triplanar techniques to select the wrong texture projection, creating a smearing effect as shown above.

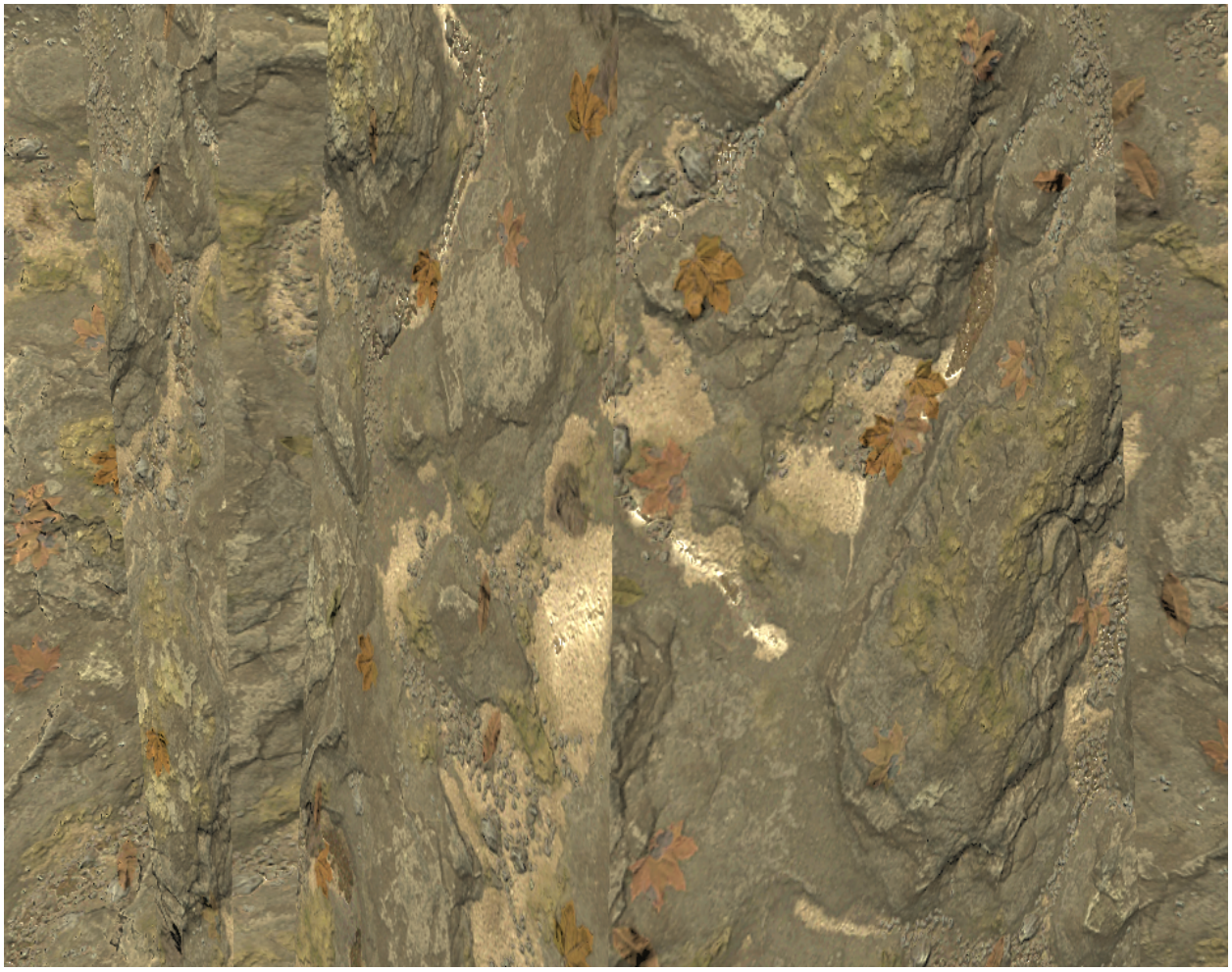
However, MicroSplat is able to fix this in certain cases. When using a Unity terrain, it can compute fake barycentric coordinates for each face along with a face normal, and use these to blend between the face normal and the vertex normal over each triangle, based on how close to the edge of the triangle the pixel is. A slider is available to adjust the blend width:

When used on meshes, the barycentric coordinates are not available, and this slide will blend between the vertex and face normal by a fixed amount instead of blending over the edge

of the triangle. This can produce discontinuities in the texturing, but can often look better than the alternatives.



With Blend Face Normals on terrain with a high blend factor.



The same geometry, but without the terrain's barycentric blending fix. Notice the discontinuities in the texture as the normals used for texture selection are not smoothly blended across the edges.

Per Texture Properties

Triplanar Projection allows you to to ignore triplanar texturing on certain textures, should you prefer the standard UVs.

Triplanar Height Contrast allows you to control the blend of each texture's height based trilinear blending individually.

Performance

Because 3 samples are required for each texture in Triplanar mode, the effect can have an noticable effect on performance. Note that this also applied to effects like Parallax, Tessellation, and Distance Resampling, since they will now require 3 times the samples as well.