UDK Intermediate – Material Transitions

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In this tutorial i will show you how to create materials that transition between textures or alphas. This can be used for a lot of different effects from transforming objects to making them appear or disappear. I will show you some basic uses using a couple of different material chains.

I'd like to thank danpaz3d on polycount for introducing me to this. You can find his blog on the subject here http://dp3dblog.tumblr.com/post/26742825968/thoughts-on-texture-transition-fx

You can also find information on this here http://udkc.info/index.php?title=Tutorials:Dissolve_Material_Effect and last but not least Eat3d has an entire DvD on it here http://eat3d.com/vfx

Creating the material

The basis behind this effect is telling UDK to transition between texture A and texture B based on values of a scalar parameter. We also want to include a pattern or texture that the material transitions through. The actual animation of this is driven through matinee.

To start off with we need to create a new material. Find two textures that you want to transition between (I'm just using default UDK textures) and put them into the material as texture samples. Now create a ScalarParameter and an IF node. Name the ScalarParameter 'Transition'

Lastly we need a texture that will determine the look of how the material transitions. I am going to use danpaz3d's texture as my first example, but I will show you how to create some custom ones in Photoshop later on in this tutorial. For danpaz3d's texture simple visit his blog and save it to desktop to import into UDK.

Now plug the ScalarParamter into the A slot of the IF node and the transition material's Red channel (danpaz3d's texture) into the B slot. Next plug the texture you want the material to start off as into the A<B slot of the IF node (bottom slot) and finally the ending texture into both the A>B and A=B slots of the IF node. The IF node is plugged into the diffuse channel.
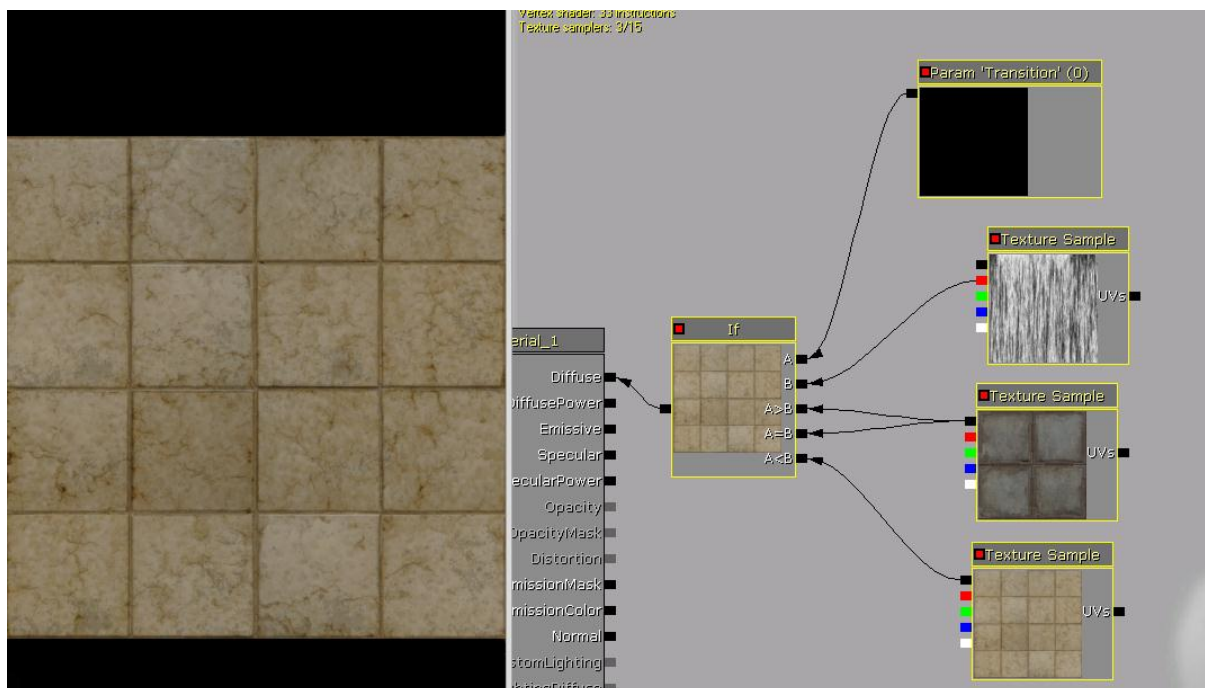
What we are telling UDK to do is that when our Scalarparameter = 0 our A<B texture will show, and when the ScalarParameter = 1 we want our A>b/A=B texture to show. In-between these values (0.1-0.9) we want to see the material fading from one to the other based on the texture in slot B.

ScalarParameter = 0.2   ScalarParameter = 0.5   ScalarParameter = 1

Now to get this to work as an animation ingame we need to set up a matinee sequence. Click on the little kismet button to open.


The kismet editor will open. Right click and say New matinee, then double click on the matinee.

This will open the matinee editor. I am going to use quite a few pictures to demonstrate what I'm doing here as it can be a little tricky to explain over text

Firstly I will show you the areas of the editor you need to know.

1. This is the timeline area. The green area represents our playback timeline, this is what we are actually using in the animation. The light grey area (blue) represents our total time. You can change these by moving the green and red triangles.
2. This area is where we input our various tracks.
3. This area is where we edit the properties and parameters of our tracks
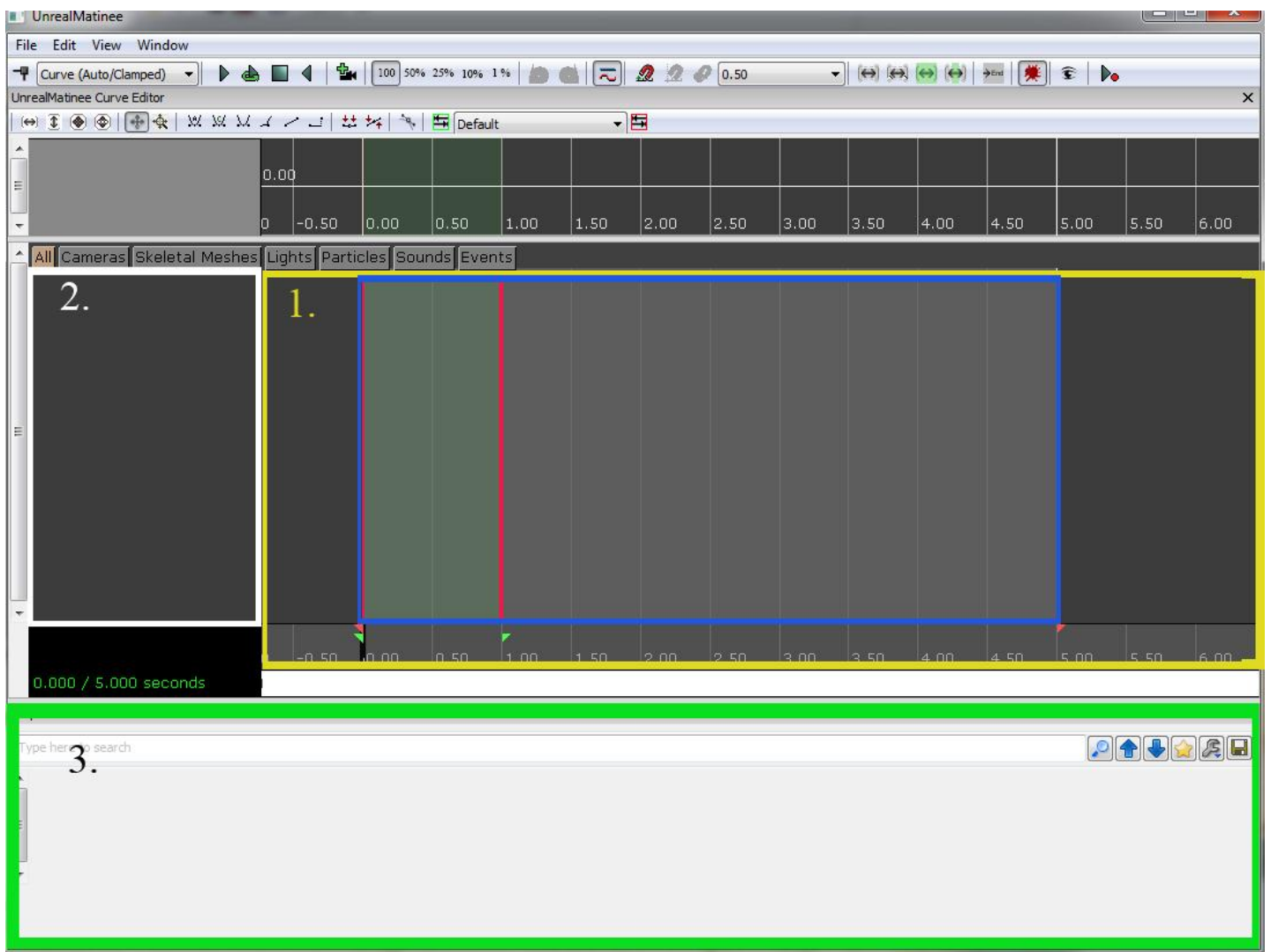
Now we need to bring in our material to animate. Right click in 2. Area and Add New Empty Group. Name this Transition.

Now right click on the transition group and 'Add New float material param track' this will appear under your group. Select this track and in its properties name it Transition and add your material.
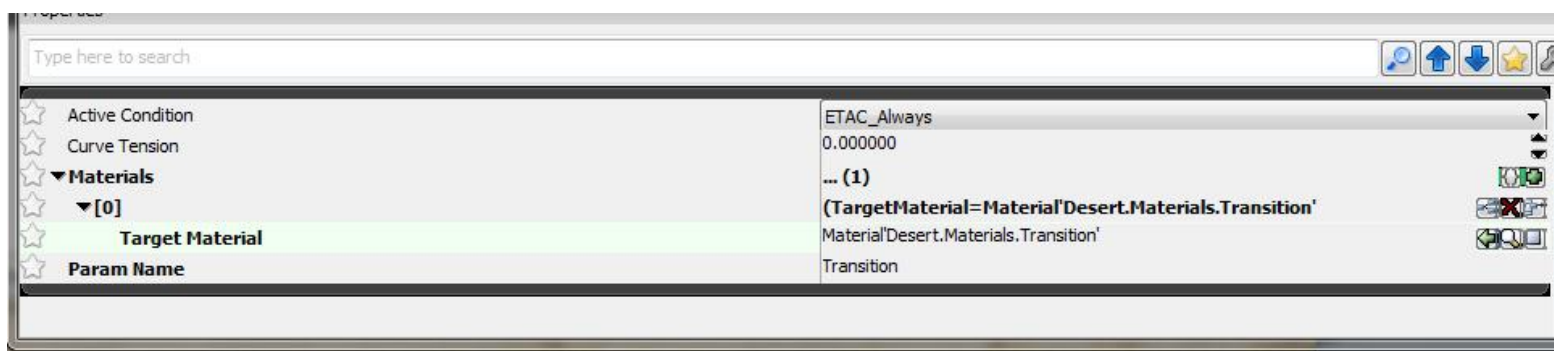
It is very important to have your Param name exactly the same as your ScalarParameter in the material or the animation will not work. If the name does not match the ScalarParameter's name then the Start letter of the name in the param track will be lower case. If it does match the ScalarParameter's then the start letter will be upper case.

I have had issues myself getting this to work even with the upper case letter. To make sure simply go into your material and copy paste the name over.

Now in the timeline zoom out (scroll wheel) and bring the total animation time (grey bar with red arrow) back to 1 second and make sure the green bar is also at 1 second. You now should have the animation set up to play from 0 to 1 second. You can move the black bar across the timeline to select areas for keying. Make sure the black bar is at 0 and hit enter to key it. 0.00s will appear just above the black bar and at the top you will now see a small upwards pointing orange arrow. Right click on that orange arrow and set value to 0.0. Now slide your black bar to the end of the animation (at 1second) and key it by pressing enter again. Set the value on this orange arrow to 1.

This is telling matinee that at 0 seconds the ScalarParameter will be = 0 and at 1 second the Scalar parameter will = 1. So it will take a total of 1 second to play through the animation. You can obviously edit this as you wish in the future.
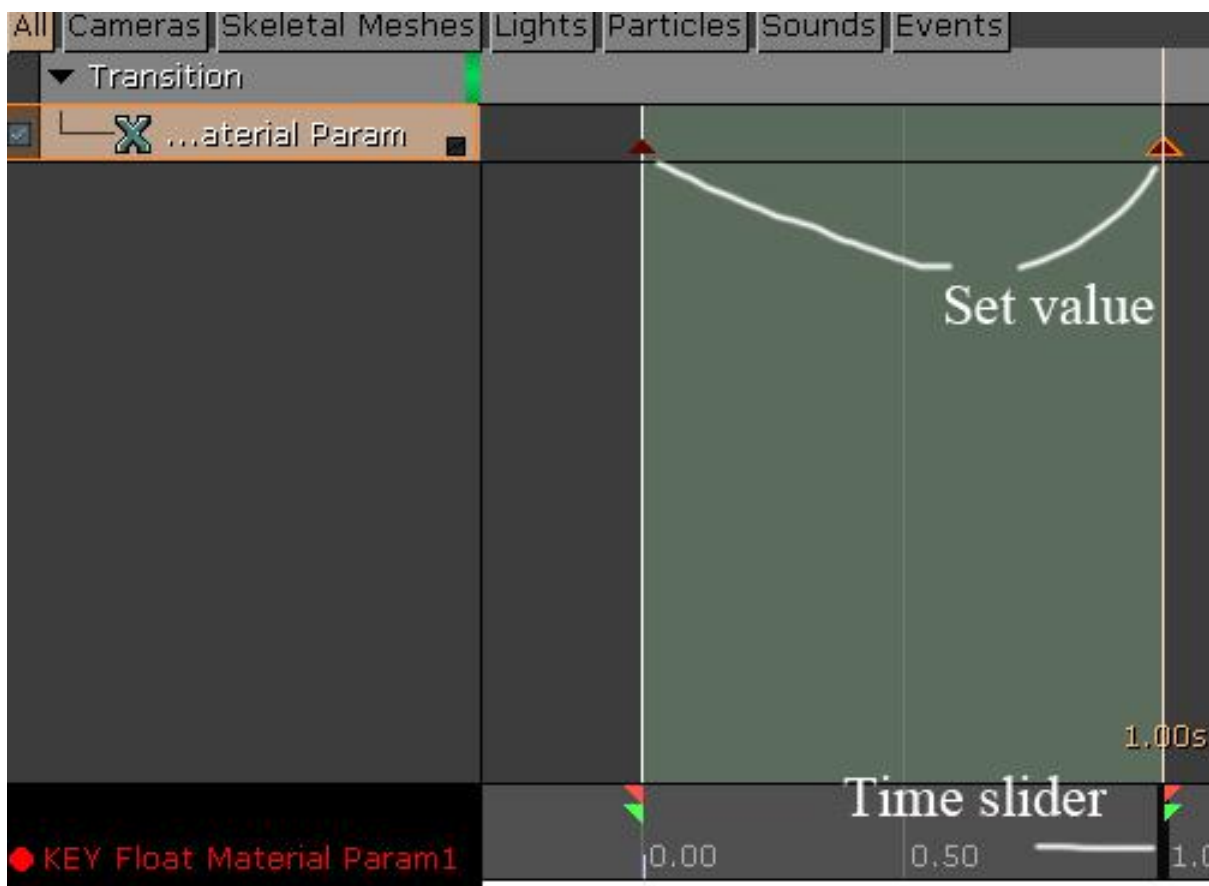

You can now drag your material onto an object in the viewport and use drag the slider manually to play through the animation. I am not going to go through setting up an actor in the viewport to activate the effect but you can find information on using kismet here http://www.youtube.com/watch?v=1AjI7C-G4hM&feature=player_embedded and of course on the UDK website documentation.

So now that we have our material working, I want to quickly show you now to change the transition effect. The transition effect is the texture that goes into the B slot of the IF node in the material. It is recommended to use a greyscale texture and to try to have no exact black or white values. The reason for this is that exact black values will show the second texture at the start before any transitioning has started. Exact white values do not seem to be a problem from what I have tested.

Another thing to note is that if you have a texture that is overall lighter (less darker values) the transition effect will appear very late in the animation. As an example, texture 1 and 2 are the same except I have changed their values using the levels in photoshop. The first image starts to transition around 0.5 and the second image starts to transition around 0.7.
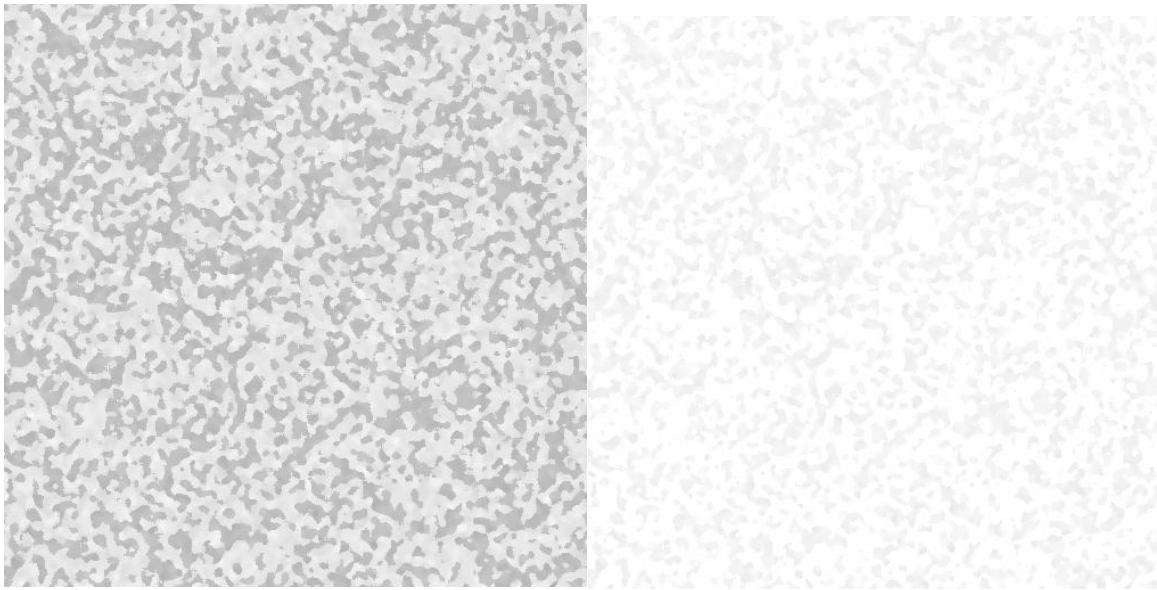

Danpaz3d's texture has the perfect mix of values creating a very nice transition. In photoshop choose dark grey and a light grey as your two colours, then go to Filter>Render>Fibers and adjust the values.
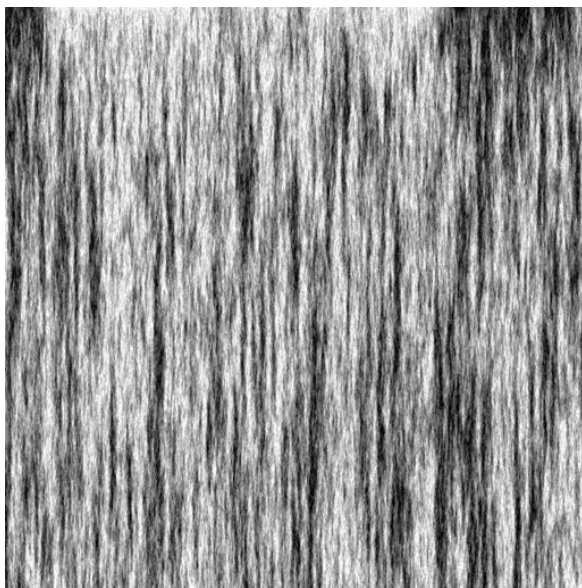
Here are some other ones I have created in Photoshop and there effects on the material.

Filter>Render>Clouds   ScalarParameter = 0.2
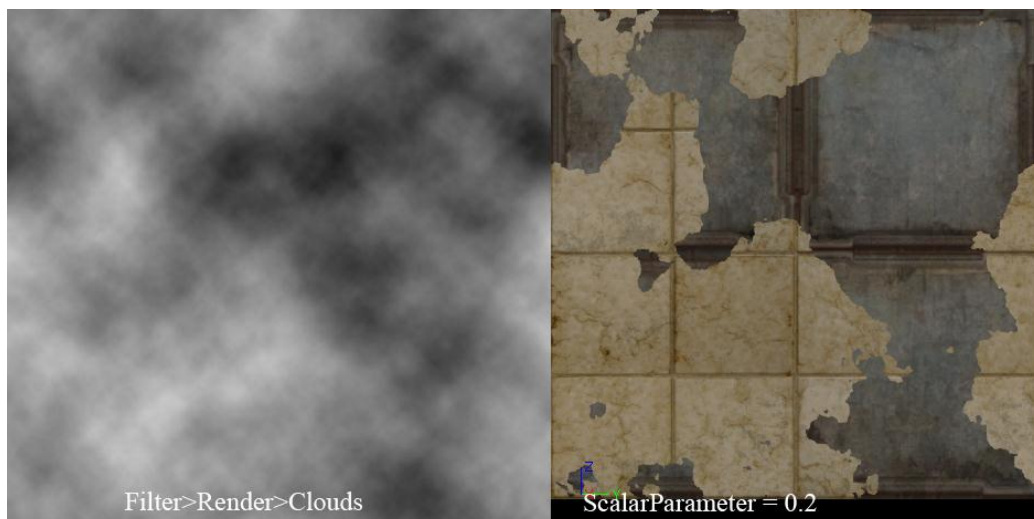
The clouds have much darker overall values so the transition starts very early.
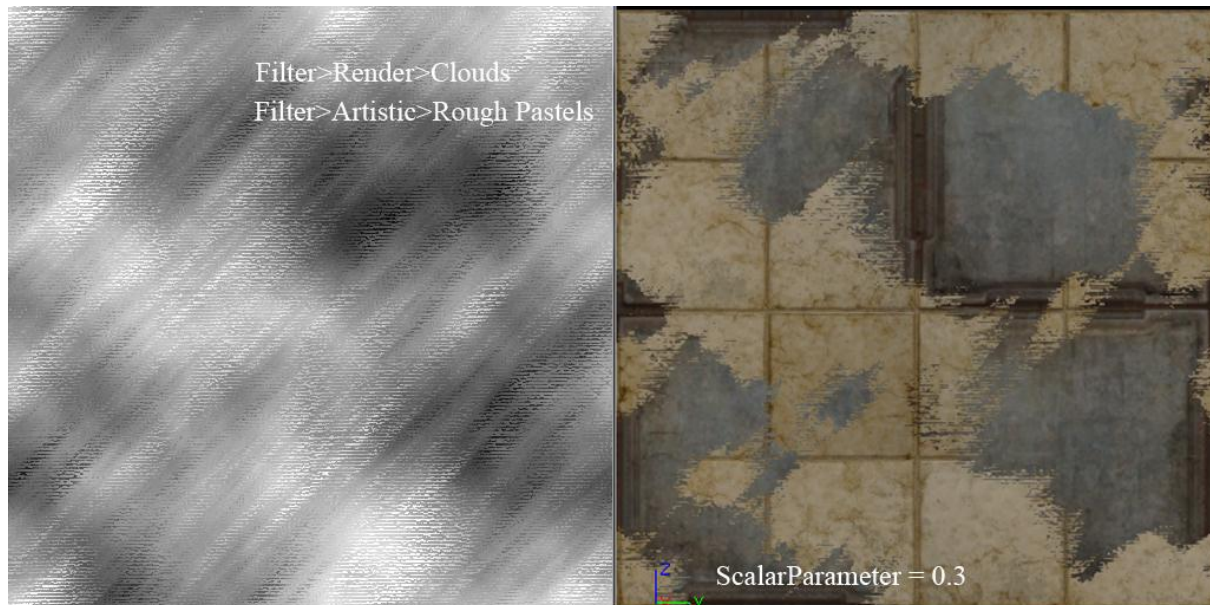

Adding Glow effects and Alphas

Now we have the base transition down we want to make it look cool right? Let's add a glow effect into our transition and ontop of that lets make it so instead of transitioning from one material to another, we transition from nothing into a texture. To do this we are going to be creating a bigger network with an alpha instead of our first texture.

I am going to start this from scratch with a new material. Bring in your transition (greyscale) texture sample and your ending texture sample (im going to just a floor material from UDK's default content). Create a ScalarParameter and name it Opacity. Now create a constant3vector with values of 0.2, 1, 100. This will create the blue glow colour, just change it if you want a different colour. Create an Add node and add the constant3vector to itself.

Now we are going to create a constant node and leave he value at 0. This is our alpha. Create an If node and plug the ScalarParameter into A, the transition texture (red channel) into B, the add into both A>B and A=B and the alpha into A<B. This first part of the chain says that when the ScalarParameter is 0, the texture is black and as we go higher (cap at 1) the glow comes through with the transition texture.
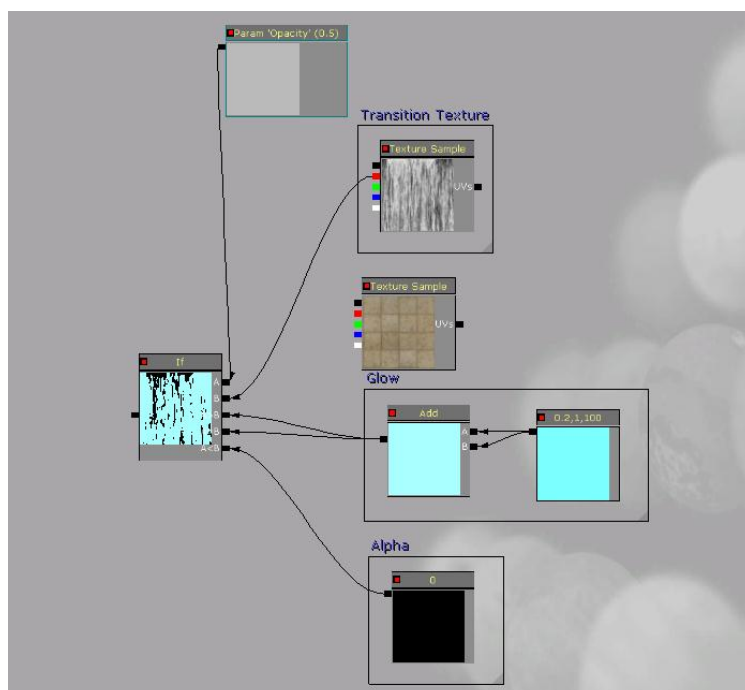
Now for the second part of our chain. Create a constant with a value of 0.1 and an Add node. Add the constant to the A slot and the Red channel of the transition texture to the B slot. Next create another IF now. Plug the ScalarParameter into A, the Add node into B, the brick texture sample (or whatever you have) into A>B and A=B and the first IF node into A<B. Plug This If node into the diffuse. For simplicity's sake I am going to be calling the first IF node we made IF 1 and the second IF node IF 2 (I created comments around the nodes to make them easy to understand. This is all plugged into diffuse.

What we have done here is say, when the ScalarParameter = 0 both IF nodes will be black (transparent). IF 1 will = black because of our alpha and IF 2 will = IF1. When our ScalarParameter = 0.5 If1 will be blending between transparent and the blue glow, and IF2 will be blending between IF1's blend and the brick texture. When the ScalarParameter = 1, IF1 will be completely blue, however IF2 will not show this because at a value of 1, only the brick texture will show. If you are getting some slight leftovers from the blend, change the ScalarParameter to 1.1 and it should fix the problem (remember to change the end value in matinee to the same)
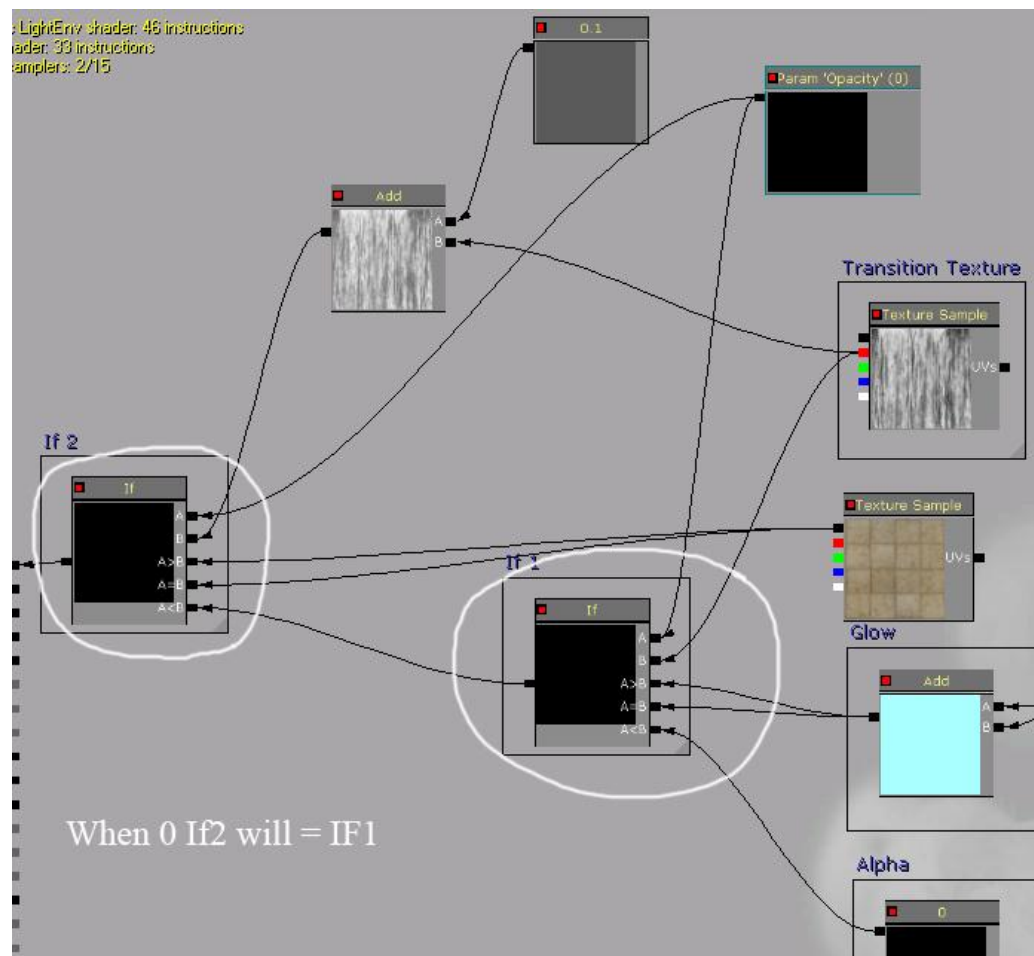
The next two parts of the chain are to emphasis the glowy effect.

Create a constant and leave its value at 0 (I am calling this node alpha transition). Now create another IF node(IF3), plug that constant into A<B, the add node from the glow into A>B and A=B, the transition texture's red channel into B and the ScalarParameter into A.

Now create another IF node (this is IF4). Plug If3 into the A<B of IF4, the Alpha transition constant into A>B and A=B, the top Add node that the transition texture is plugged into, into B and the ScalarParameter into A. Plug If4 into the emissive. Finally create another ScalarParameter, call it Alpha and plug it into the Opacity channel.

You will notice that the Opacity channel is greyed out, this is because our blend model is set to opaque. Make sure you change the Blend mode of the material to Translucent or the alpha will not show up. Instead you will just get a black box.

Save this out and open matinee again. Create a new matinee the same as before, go into the editor and create a new empty group and name it Transition again. Now create a New float material param track. If you get a box coming up saying stuff it requiring a dynamic actor but you only have a static, just say yes and ignore it.

Now in this track do the same as before. Add the material and call the first Param name Opacity (this name is the same as our first ScalarParameter in our material). Set the values as before, remembering to have 1.1 on the end instead of 1 to make sure the effect doesn't show at the end.

Now create another 'New float material param track'. This one is for our alpha. Add the material in again and this time for the param name type in Alpha. This will reference our ScalarParameter that is plugged into the opacity channel. Set the keys and make sure that your ending alpha key is set to 1.

Now you want to save this matinee by going to File (in the matinee editor) and exporting it as an fbx. You can later import this FBX into any scene. Apply the material to something and slide the black bar to see the effect!
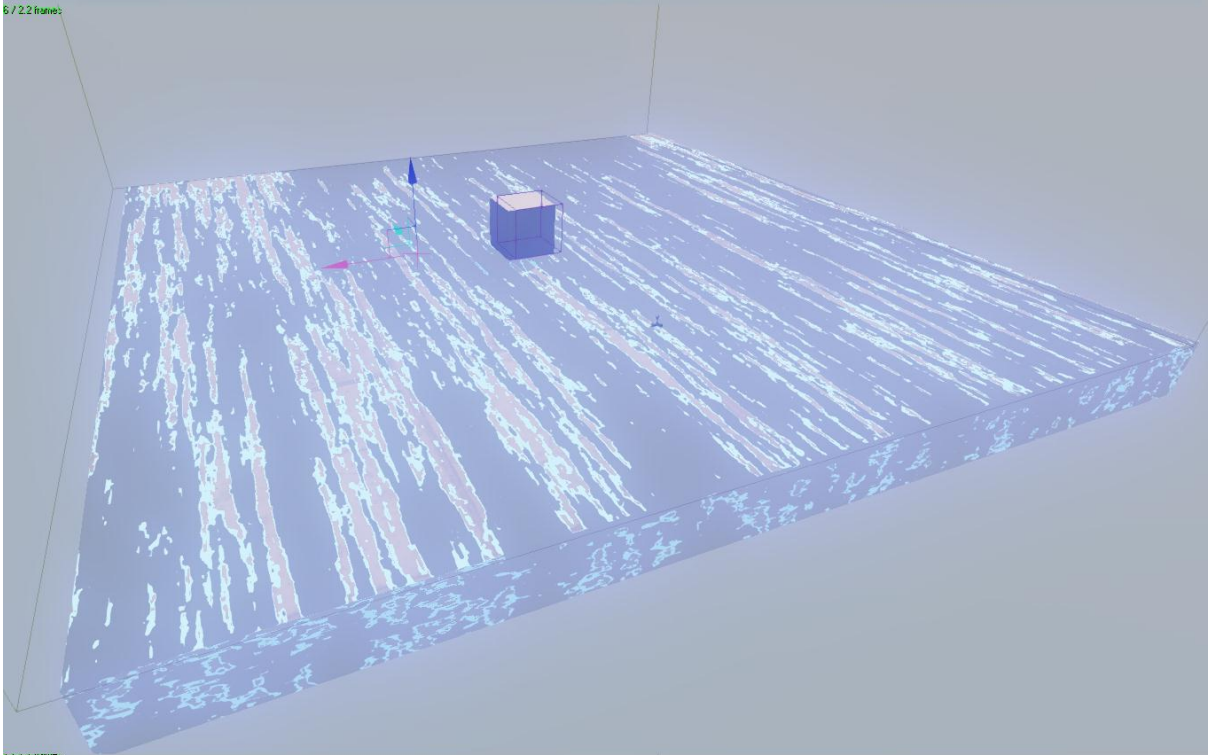
Remember if it doesn't work, make sure you check that the ScalarParameter names and the param track names are identical.
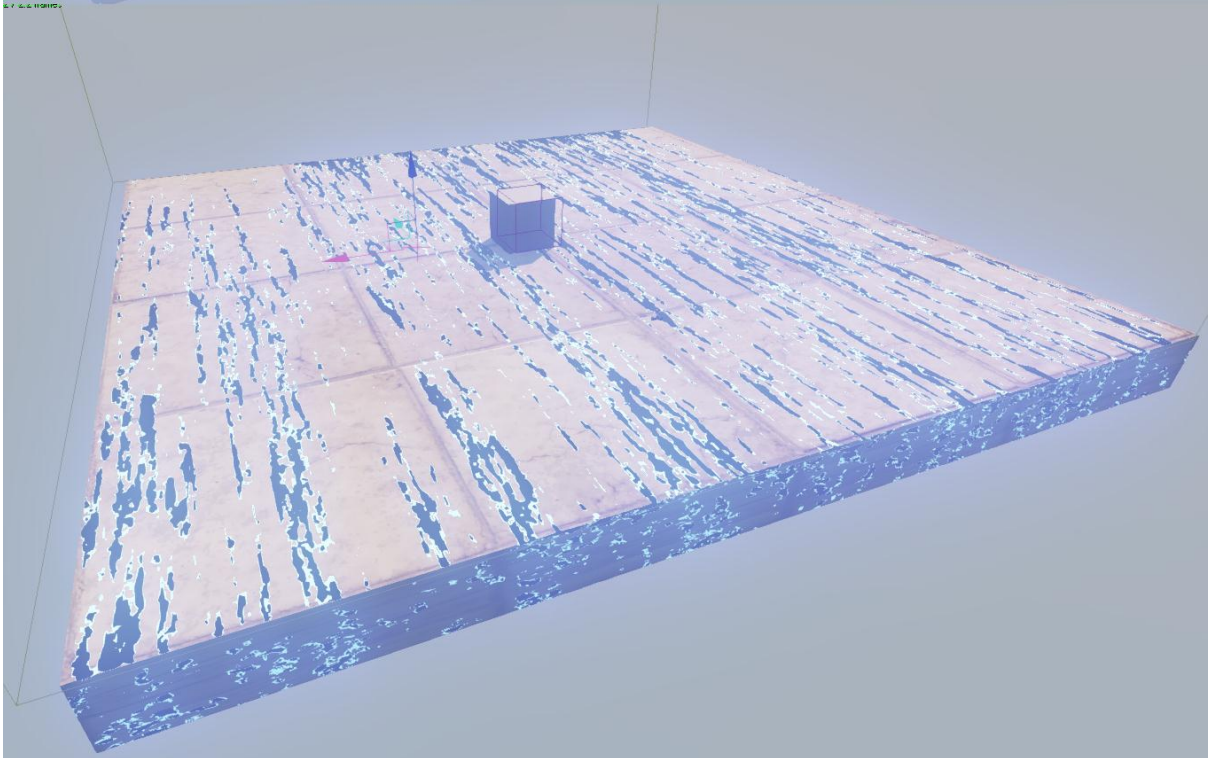
Here is the result.
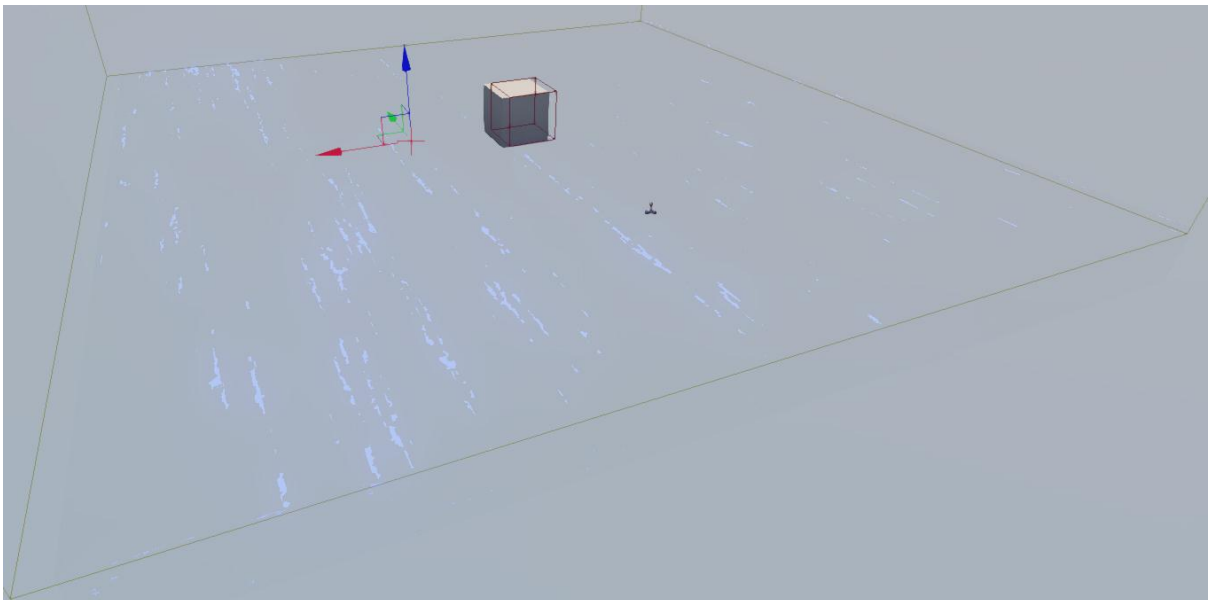
Alternate material

There is another way to create a material transition using a different material chain. This way is more suited to sudden changes such as damage to an object on hit and is also not as complex as the last chain.

Create a new material and bring in your two textures (non-damaged and damaged for example) Also bring in the normal maps for both if they have them. Separate the normal maps by moving them out of the way for the moment. Now create 2 multiply nodes, a Oneminus node, an Add node and finally a ScalarParameter (name it damaged). Now plug your primary texture into the A slot of one of the multiply's and the ScalarParameter into the Oneminus, plug the Oneminus into the B slot of the multiply and plug that multiply into the A slot of the Add node. Now plug your secondary texture into the A slot of the other multiply and the ScalarParameter into the B slot of that and plug this multiply into the B slot of the Add. Plug this into diffuse.

Do the exact same thing with the Normals.
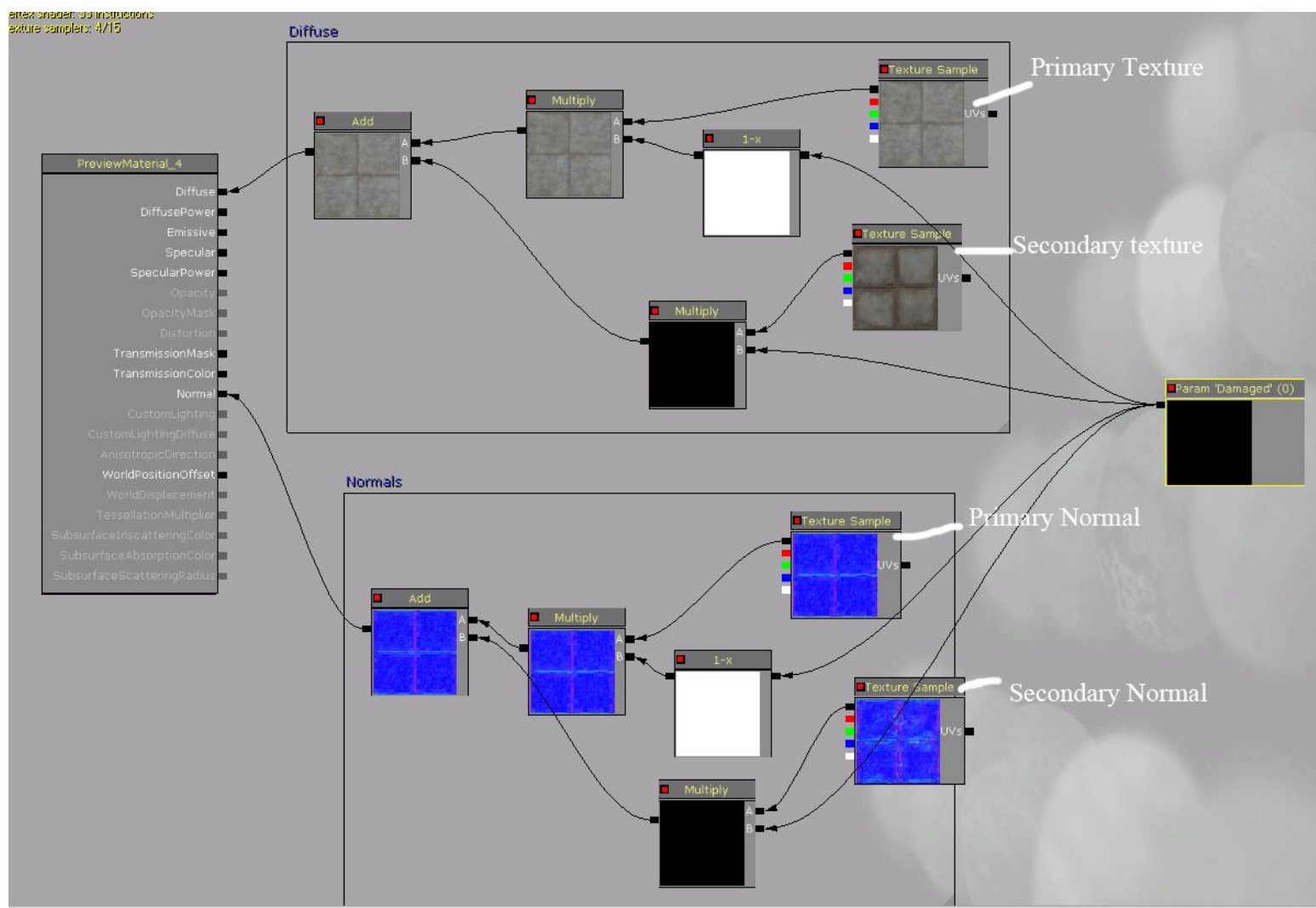
Now switching between 0 and 1 will change the textures. Using in-between values will give you a mix of both which can be useful for some things and not recommended for others. Use matinee the same as before to create the transition. If you want an instant change then Key the start frame (0) and the second last frame (0.9) to ScalarParameter = 0 and the last frame to 1 and you should get an instant switch.

Hope this tutorial was helpful to someone. Thanks for reading!