CTI Runtime Components URP 3.0

About this documentation

In case you want to use CTI trees along with the URP you have to assign the *CTI LOD URP* shaders and use the *CTI_SRP_CustomWind* script. Both shaders and script or slightly different from the CTI Runtime Components for the built in RP.

Table of Content

Limitations

- Only basic LOD trees are supported. No tessellation.
- The shaders only except wind from script.
- Shaders need Unity 2019.3+ and URP 7.2.+ Other versions have not been tested.
- You can not author billboard textures using URP nor can you use the debug shader, so authoring should take place using the built in RP.

Changes

- Bark and Leaf shader only use two **textures**: The Albedo/Smoothness and Normal/Occlusion (bark) or the Albedo/Alpha and Normal/Smoothness/Translucency (leaves) textures. *→ You have to create new combined normal maps.*
- The shaders only except **wind from script**. *→ The Tree component is not needed at all and should be removed.*
- The CTI LOD URP shaders need a slightly different input for the **wind from script**. *→ You have to use the CTI_SRP_CustomWind script instead of the old one.*

- **Fade out Wind** has been dropped.
- **Fade out Translucency** has been dropped.
- **Tumbling** and **Turbulence** have slightly been reworked and optimized. *→ You may have to adjust their settings.*
- **Wind multipliers** for primary and secondary bending as well as edge fluttering have been added. *→ Now you can tweak the bending without editing the tree. Make sure multipliers in the bark material match those in the leaf material.*

CTI URP LOD Shaders

CTI/URP LOD Bark shader

Shader Inputs

Surface Inputs

Color Variation Trees will be slightly different tinted according to their position in world space. RGB defines the tint color, alpha the strength of the tint. *Always make sure that all shaders (leaves, bark and billboard) share the same color variation values.*

Albedo (RGB) Smoothness (A) Diffuse texture which contains **smoothness** (unlike the leaf shader which expects transparency) in the alpha channel.

Enable Normal Map (GA) Occlusion (B) Map If checked the shader will sample the assigned map.

> **Normal Map (GA) Occlusion (B)** contains the combined normal and occlusion map. *Red color channel should be black.*

Smoothness Multiplier for the smoothness as sampled from the *Albedo (RGB) Smoothness (A)* map.

Specular Specular Color

Wind Multipliers

Primary Strength Multiplier for the Primary Strength. *Must match the value in the leaf material.*

Secondary Strength Multiplier for the Secondary Strength. *Must match the value in the leaf material.*

Edge Flutter Multiplier for Edge Flutter. *Does not matter here.*

CTI/URP LOD Leaves shader

Shader inputs

Surface Options

Culling Use “Off” in case you use single sided geometry (recommended). “Back” would be the correct choice for double sided geometry. “Front” is available just because it would be the third possibility…

Surface Inputs

Color Variation Trees will be slightly different tinted according to their position in world space. RGB defines the tint color, alpha the strength of the tint. *Always make sure that all shaders (leaves, bark and billboard) share the same color variation values.*

Albedo (RGB) Alpha (A) Diffuse texture which contains transparency in the alpha channel.

Alpha Cutoff If the alpha channel of the Base texture contains different shades of gray instead of just black and white, you can manually determine the cutoff point by adjusting the slider.

Enable Normal (GA) Smoothness (B) Trans (R) If checked the shader will sample the assigned map:

Normal (GA) Smoothness (B) Trans (R) contains the combined normal, smoothness and translucency map.

Smoothness Multiplier for the smoothness as sampled from the *Normal (GA) Smoothness (B) Trans (R)* map. If this map is disabled *Smoothness* defines the final smoothness value.

Specular Specular Color

Transmission

Strength acts as factor which gets multiplied with the translucency value sampled from the “AO (G) Translucency (b) Smoothness (A)” map and lets you fine adjust final translucency.

Power or *View Dependency* determines when the translucent lighting effect will kick in depending on the view angle: Lower values will make translucent lighting appear already at rather flat viewing angles while high values will make it appear only if you look directly towards the sun.

Wind Multipliers

Primary Strength Multiplier for the Primary Strength. *Must match the value in the bark material.*

Secondary Strength Multiplier for the Secondary Strength. *Must match the value in the bark material.*

Edge Flutter Multiplier for Edge Flutter.

Advanced Wind

Enable Leaf Tumbling If checked the shader will calculate Leaf Tumbling.

Tumble Strength defines the strength of the tumbling animation.

Tumble Frequency lets you adjust the frequency of the tumbling.

Enable Leaf Turbulence You have to check this to enable leaf turbulence. *You may use turbulence even on meshes not having any UV3 in case you want to* *improve bending. If so make sure that "Tumble Strength" is set to 0 (to make the shader skip the whole tumble animation).*

Leaf Turbulence lets you adjust the strength of the turbulence.

Edge Flutter Influence lets you adjust the strength of the edge flutter (stored in vertex color green) affecting the leaf turbulence. Using edge flutter influence values above 0.0 will most likely add some distortion to the leaf meshes – which in fact looks really nice.

Enable normal rotation Checking this will make the vertex shader rotate the vertex normal according to tumbling. This is a bit more expensive but will improve lighting..

Ambient

Ambient Reflection Strength of the ambient reflections.

Shadows

Shadow Caster Culling Lets you determine how the faces are culled in the shadow caster pass. Usually it is set to *Off.* In order to speed up rendering a bit you may try to set it to *Back.*

CTI/URP Billboard shader

Shader inputs

Surface Inputs

Color Variation (RGB) Strength (A) Make sure that the color fits the one you have added to the mesh trees.

Albedo (RGB) Alpha/Occlusion (A) This slot should contain the created albedo texture atlas.

Alpha Cutoff If the alpha channel of the Base texture contains different shades of gray instead of just black and white, you can manually determine the cutoff point by adjusting the slider. A value of 0.45 should just be fine.

Alpha Leak Suppression: As the alpha channel of the Albedo textures stores both: *Alpha* and *Occlusion* dark pixels from the alpha mask might leak into the occlusion texture (caused by bilinear filtering) which would end up in full occlusion at the outer parts of the billboard. But if you set it about 0.6 all pixels darker than that will be set to white so you will get simply no occlusion on outer pixels – which in fact makes much more sense.

Enable Normal Map If checked the shader will sample the assigned texture.

Normal (AG) Translucency (R) Smoothness (B) This slot should contain the created texture atlas.

Normal Scale Scale of the normal.

Smoothness Multiplier for the smoothness as sampled from the *Normal (AG) Translucency (R) Smoothness (B)* map. If this map is disabled *Smoothness* defines the final smoothness value.

Specular Specular Color as simple solid color which you most likely should set to the default value of dielectric materials which is RGB = 51,51,51.

Transmission

Strength acts as factor which gets multiplied with the translucency value sampled from the “*Normal (AG) Translucency (R) Smoothness (B)*” map and lets you fine adjust final translucency.

Power or *View Dependency* determines when the translucent lighting effect will kick in depending on the view angle: Lower values will make translucent lighting appear already at rather flat viewing angles while high values will make it appear only if you look directly towards the sun.

Wind

Wind Strength As Billboards do not have any baked wind information you may use this parameter to make the bending of the billboard better match the bending of the mesh tree.

Ambient

Ambient Reflection Strength of the ambient reflections.

Legacy

Billboard Scale Should be set to 2.0 due to an old bug. If you scale the billboard asset by factor 2 regarding its height it must be set to 1.

Optimizations

Unity seems to have dropped the cross fading on the speedtree mesh models. So the included demo contains one prefab that uses a manually setup fading - which just works.

If you do not need cross fading: The CTI/URP LOD Leaves shader stipples out the mesh. In order to make it a bit faster when it comes to transitions between mesh and billboard and to reduce the number of shader variants and speed up compile and build time you may comment *all:*

```
#pragma multi_compile _ LOD_FADE_CROSSFADE
```

directives in the shader.