CTI Runtime Components HDRP 12plus

About this documentation

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

Table of Content

Limitations

- Shaders need Unity 2021.1 and HDRP 12. or above.
- Only basic LOD trees are supported. Tessellation is not supported..
- The shaders only accept wind from script.
- You can not author billboard textures using HDRP nor can you use the debug shader, so authoring should take place using the built in RP.

Changes

- The leaf shader uses the **built in transmission lighting.** So you have to add/edit a diffusion profile.
- **Specular color** has been dropped. This is driven by the *Index of Refraction* in the diffusion profile..

- The **leaf shader** uses a **regular normal** or bump map. Lighting uses the built in transmission feature. An **alternative leaf shader** is added: Check it out.
- The shaders only accept **wind from script**. → *The Tree component is not needed at all and should be removed.*
- The CTI LOD HDRP 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. **Leaf Noise** has been added. → *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.*
- **Texture Packing** has been reworked

LOD Groups

For some unknown reasons “Animate Cross-fading” in the LOD Group settings does not add any “visible” cross fading when it comes to the switch from the last mesh LOD to the billboard. For this reason You can uncheck it and add a little “Fade Transition Width” to the last mesh LOD instead.

CTI HDRP Shaders

As HDRP 10.x.x. Fixed a lot of issues regarding Shader Graph i switched back from HLSL to Shader Graph to make the shaders most accessible. Since HDRP 12 also the billboard shader has been converted to Shader Graph.

CTI HDRP Bark / CTI HDRP Bark Array

Shader Inputs

Surface Options

Surface Type Opaque

Rendering Pass *Should be Default.*

Alpha Clipping *Should be unchecked.*

Double-Sided *Should be unchecked.*

Exposed Properties

Color Variation (RGB) Strength (A) Color variation in RGB. Alpha contains the strength.

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

Normal Map (GA) Occlusion (B) contains the combined normal and occlusion map. *Red color channel should be set to pure black.*
The array shader here expects a texture array.

Normal Strength Lets you adjust the strength of the normal.

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

Base Wind

Main(X) Branch(Y) Flutter(Z)

Main(X) Multiplier for the Primary Strength. *Must match the value in the leaf material.*

Branch(Y) Multiplier for the Secondary Strength. *Must match the value in the leaf material.*

Flutter(Z) Multiplier for Edge Flutter. *Does not matter here.*

Advanced Options

Enable GPU Instancing In case You use the SRP Batcher you may just uncheck this.

Baked Emission Not supported.

Motion Vector For Vertex Animation Make sure this is checked in case You use TAA.

Add Precomputed Velocity Not supported.

CTI HDRP Leaves

Shader inputs

Surface Options

Surface Type Opaque

Double-Sided Please check if your leaf geometry is only single sided (recommended)

Normal Mode Should be set to *Mirror*.

Exposed Properties

Color Variation(RGB) Strength(A) Color variation in RGB. Alpha contains strength.

Albedo (RGB) Diffuse texture

Alpha (R) BC4 compressed alpha or opacity texture. *As HDRP will perform a depth prepass it makes a lot of sense to separate albedo and alpha in order to save a lot of bandwidth.*

Alpha Cutoff Cutoff value.

Normal Map The Normal Map.

Normal Scale Scale of the normal.

AO(G)Translucency(B) Smoothness(A) contains the combined ambient occlusion, normal, translucency and smoothness map.

Smoothness Min / Smoothness Max Lets you tweak the smoothness as sampled from the *Normal(GA) Smoothness(B) Trans(R)* map.

Thickness Lets you remap the thickness as sampled from the *AO (G) Translucency (B) Smoothness (A)* texture. Unlike smoothness Min / Max this is just a multiplier.

Base Wind

Main(X) Branch(Y) Flutter(Z)

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

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

Z Multiplier for Edge Flutter.

Advanced Wind

Enable Leaf Tumbling If checked the shader will calculate and apply *Leaf Tumbling*. (needs baked pivots)

Tumble Strength defines the strength of the tumbling animation.

Tumble Frequency lets you adjust the frequency of the tumbling.

Enable Leaf Turbulence If checked the shader will calculate and apply *Leaf Tumbling*. (needs baked pivots)

Baked branch Axis If you have baked the *branch axis* into the mesh you may check this in order to enhance turbulence.

Leaf Turbulence lets you adjust the strength of the turbulence.

Edge Flutter Influence determines the influence of the baked *edge flutter* on turbulence (strength)

Enable Normal Rotation if checked tumbling and turbulence will affect the normals.

Leaf Noise lets you adjust the time offset added when calculating leaf turbulence and tumbling based on the baked *edge flutter* (stored in vertex color green). Using values above 0.0 will most likely add some distortion to the leaf meshes – which in fact looks quite nice.

Enable advanced Edge Flutter Checking this will add a low frequency edge fluttering driven by vertex color blue and green and:

Strength(X) and Frequency(Y)

Advanced Options

Enable GPU Instancing In case You use the SRP Batcher you may just uncheck this.

Baked Emission Not supported.

Motion Vector For Vertex Animation Make sure this is checked in case You use TAA.

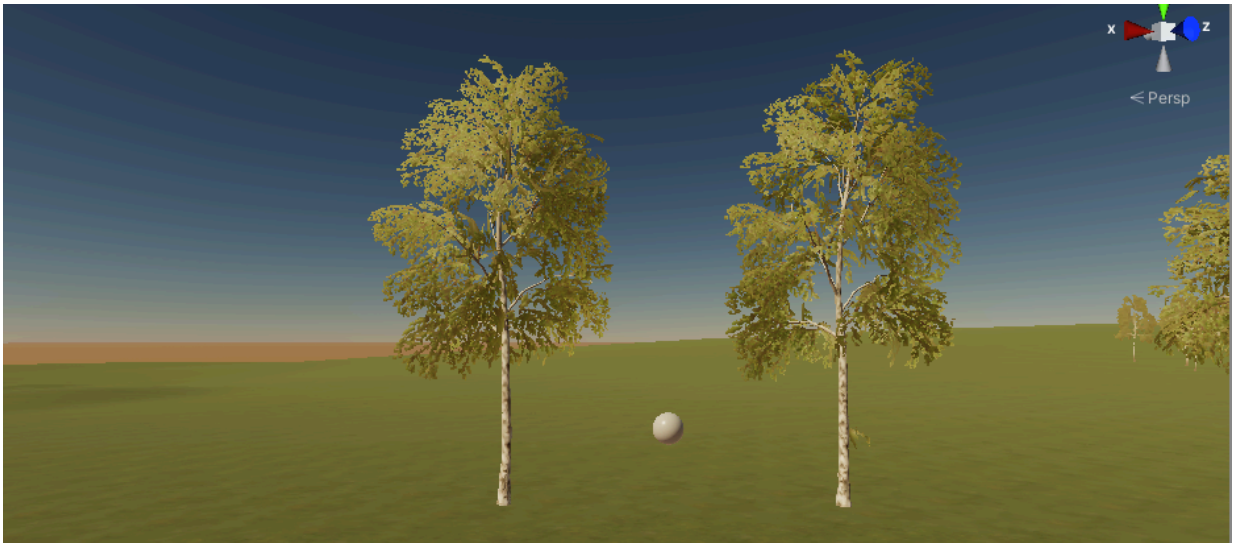
Add Precomputed Velocity Not supported.

CTI HDRP Leaves VS Normals

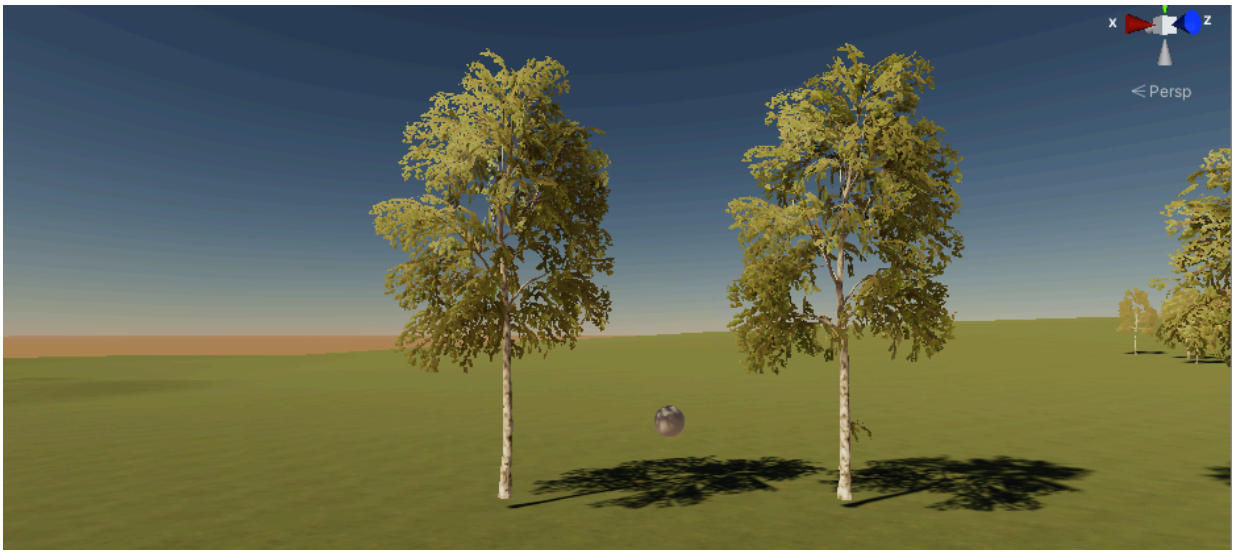
This shader is like the one above but smoothes normals in view space (VS). Doing so may give you better normals in case these are “heavily” smoothed to reveal the original shape of the

tree, as the shader will not simply flip or mirror them but takes them as they are and forces them to point towards the camera.

Due to the custom normal correction it is a bit more heavy than the regular leaf shader but I think when using HDRP and a depth prepass this is more or less negligible (my fps dropped from 56 to 55 when flooding the screen with 1000 mesh trees).



Both trees use smoothed normals (projected from a simple sphere). The left tree uses the VS Normals shader so its shape is a bit more readable and it shows less noise in lighting. The right tree uses the standard leaf shader and flipped normals which makes it a bit more difficult to read the light direction.



Real time shadows however minimize the benefit a bit.

Special shader inputs

Surface Options

Double-Sided Should be checked of course :)

Normal Mode Should be set to ***None***. The shader will “flip” the normals automatically in view space to make them point towards the camera. This is what we want. Using built in *Flip* or *Mirror* here would corrupt the effect.

CTI HDRP SG Billboard

Shader inputs

Surface Options

Surface Type Opaque

Double-Sided Must be checked!

Normal Mode Must be set to ***Mirror***!

Exposed Properties

Blend Billboards If checked the shader will blend between two samples from the billboard atlas which gives you a nicer blending at slightly higher costs.

The alpha texture needs some noise in it to make this work which on the other hand means that we will lose the ability to add some ambient occlusion to the alpha as well. So set “Alpha Leak Suppresion” to 1.0.

Enable Dithering If checked blending does not need any noise in the alpha. Instead a dither pattern will be calculated within the pixel shader. This results in a less organic blending but allows you to keep occlusion in the alpha.

Base Inputs

Alpha Map(R) The alpha or opacity map. Alpha must be stored in the red color channel.

Alpha Cutoff Cut off.

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

Color Variation(RGB) Strength(A) Color variation in RGB. Alpha contains strength.

Occlusion Lets you adjust the occlusion strength

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.

Thickness Remap Lets you remap the thickness as sampled from the translucency channel. Nevertheless the bark will never get fully opaque when using the built in Foliage diffusion profile… *Consider creating a diffusion profile just for billboards.*

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.

Wind Power Power value which drives the wind strength along the y axis. Should match the power value used on importing the tree. Default is 1.5.