CTI Runtime Components HDRP 10

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 2020. and HDRP 10.2.2. 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.*

LOD Groups

For some unknown reasons "Animate Cross-fading" in the LOD Group settings does not add any 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 LOD 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. Only the billboard shader is in HLSL as it needs functions which are not supported by Shader Graph.

CTI HDRP 10/CTI SG Bark HDRP 10

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

Normal Strength Lets you adjust the strength of the normal.

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

Wind Multipliers

> **X** Multiplier for the Primary Strength. *Must match the value in the leaf material.*
>
> **Y** Multiplier for the Secondary Strength. *Must match the value in the leaf material.*
>
> **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 10/CTI SG Leaves HDRP 10

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 *Flip*.

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 most likely 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.
>
> **Wind Multipliers**
>
> > **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.

Tumble Strength defines the strength of the tumbling animation.

Tumble Frequency lets you adjust the frequency of the tumbling.

Leaf Turbulence lets you adjust the strength of the turbulence.

Leaf Noise 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.

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 10/CTI SG Leaves VS Normals HDRP

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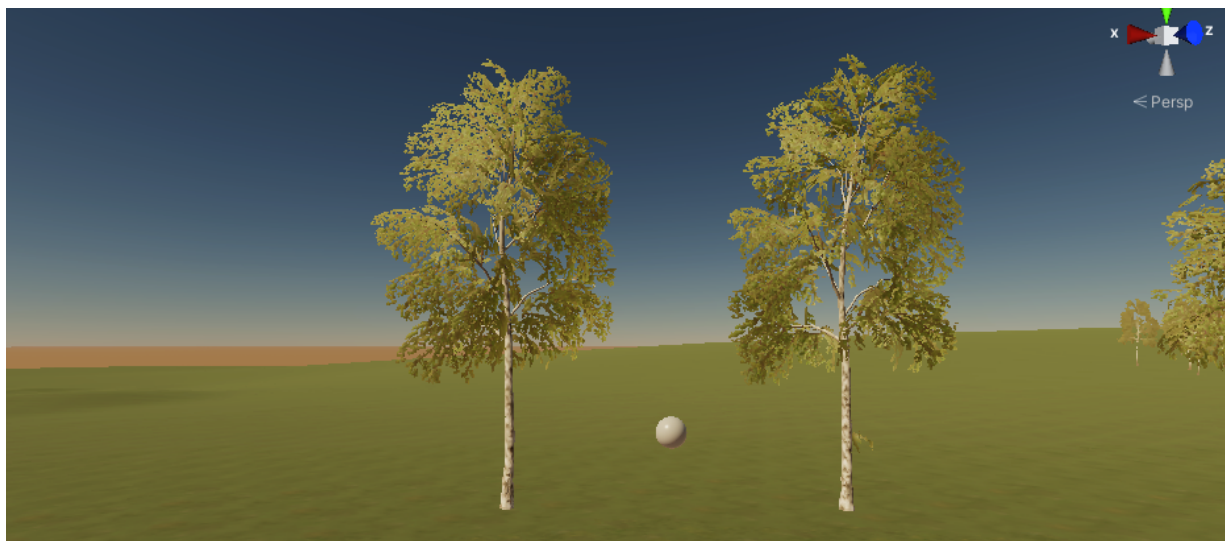
Both trees use smoothed normals (projected from a simple sphere). The left tree uses the VS Normals shader so its shape is a bit more readable and it shows up less noise in lighting. The right tree uses the standard leaf shader and flipped normals which makes it a bit more difficult to read the light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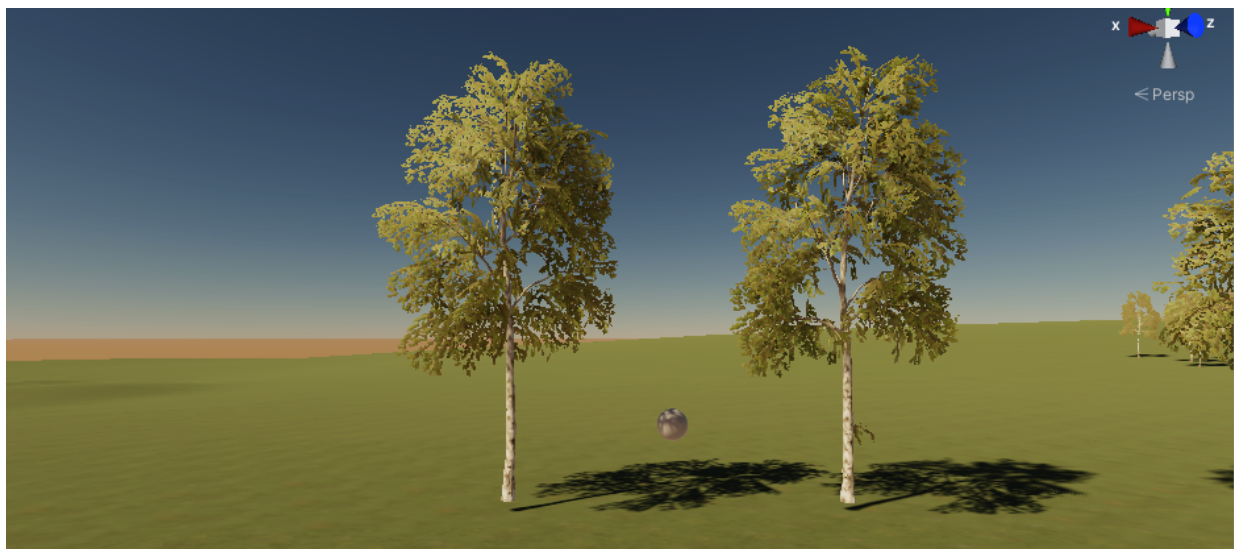
Real time shadows however minimize the benefit a bit.

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 10/CTI HSLS Billboard HDRP 10

As mentioned above this is the only HLSL shader as Shader Graph simply does not support the functionality needed to make it work (namely calculating custom UVs or color variation in the vertex shader which can't be done in the fragment shader when it comes to billboards).

Shader inputs

Surface Options

> **Surface Type** Opaque
>
> **Double-Sided** Must be checked!
>
> > **Normal Mode** Must be set to *None*!

Exposed Properties

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

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.

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.

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.*