Cloud System
Reference

Version 1.7.1

by

Edelweiss
Interactive

1. Introduction

The Cloud System is an artist friendly and time saving tool to create billboard based clouds in Unity.

All technical aspects of the Cloud System are described in this reference. Further you find lots of information in the Cloud System editor itself. It is equipped with numerous explanations and tool tips.

2. Overview

In this section, it is described, how clouds have to be created and which modes exist in the inspector view to modify them.

2.1. Getting Started

Creating a new cloud is straight forward. With the Cloud System package imported, you need to select **GameObject → Create Other → Cloud** from the menu. This creates both a new cloud prefab in the project view and a new cloud game object which is an instance of the prefab. You can mostly work with them as with any other assets. Keep in mind, that the prefab of a cloud contains a lot of data, that is needed by each cloud that was instantiated from that prefab. That is also the case if the cloud is not anymore connected to the prefab. If you delete the prefab, all clouds that depend on it become useless!

WARNING
Never delete a cloud prefab, if any cloud is based on it.

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3. Cloud Inspector Modes

Clouds are configured within the inspector view. At the top you see a toolbar with seven modes. We are going to explain all of them shortly here. For every mode you find a more detailed description in this reference.

Cloud Mode

Lets you specify some high level properties for the cloud.

Shape Mode

Model clouds in this mode. The cloud creator will generate particles in those shapes.

Particle Group Mode

Define what kind of particles have to be generated by the cloud creator.

Shading Mode

If the selected renderer supports shading groups, you may modify its properties in this mode.

Vertical Color Mode

If the selected renderer supports vertical colors, you may modify its properties in this mode.

Particle Mode

Modify particles or even create a whole cloud in this mode.

Setting Mode

The editor settings can be changed within that mode.

4. Cloud Mode

In this mode it is possible to adjust several high level properties.

Renderer

Select a renderer from the drop down list. Changing it will automatically modify the game object's components. You can find further information renderers in the fifth section of this document.
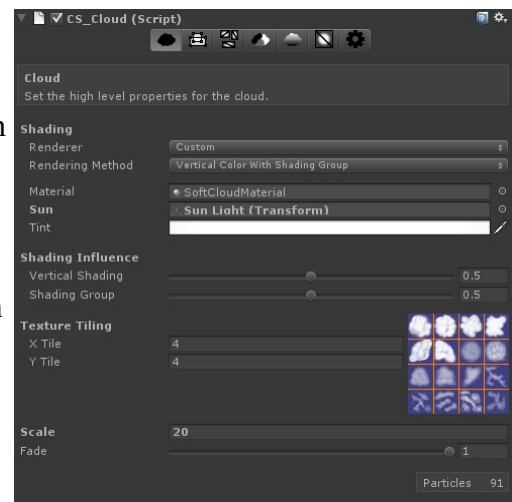
Rendering Method

Define how the particle's color has to be computed.

Particle Material

The material that is used for this cloud. The Cloud System comes with three materials that are ready for use. All contain the same texture. You can certainly use your own material with any appropriate shader and texture.

The SoftCloudMaterial relies on soft particles which smooth the intersection of the cloud particles with opaque geometry. Soft particles only work with the deferred lighting rendering path (Unity Pro only).

Sun

All rendering methods that make use of shading groups need a sunlight direction that is taken from that transform.

Tint

Base color for this cloud.

Shading Influence

For renderers that support both vertical colors and shading groups, the influence of them can be changed.

Texture Tiling

Specify the tiling of the particle material.

Cloud System

Scale

The size of the cloud can be changed with this value. It is not recommended to use the scale from the transform, as that may produce unwanted results.

Fade

Changes the cloud's transparency. Values from 0.0 to 0.5 change the transparency of the core particles, whereas values from 0.5 to 1.0 modify the transparency of all other particles.
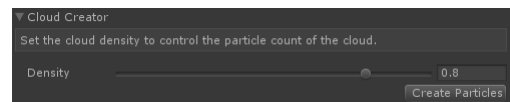
5. Cloud Creator

The cloud creation process basically consists of two steps that are necessary to generate the particles for a cloud. The cloud modeling is needed to define the cloud's shape and the particle groups are used to declare which kind of particles have to be used for the creation.

For the fine tuning of generated clouds, it is further possible to adjust individual particles in the particle mode.

5.1. Cloud Creator Foldout

Both the shape and particle group mode have the cloud creator functionality within a foldout below the cloud toolbar. It only contains a **Density** value that is used to remove particles and a **Create Particles** button to perform the creation process. Tweaking the density allows you to easily visualize a cloud with varying amounts of particles.

5.2. Shape Mode

You model the cloud's overall shape with cubes. Each of those shapes can be modified like an arbitrary game object in Unity. They further contain several parameters for the cloud creation.

The following properties all belong to the selected shape, except for the visualization. You can select another shape in the scene view by clicking on the circle in the middle of the shape, or by using the shape index.

Particle Count

Number of particles that are generated by the cloud creator within the selected shape.

Particle Group

Decide which particle group has to be used during the cloud creation for the selected shape.

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Shading Group

Particles that are generated by the cloud creator for the selected shape will belong to this shading group.

Position, Rotation, Scale

Transform values for the selected shape, just like the ones for a usual game object.

You can move, rotate or scale the selected shape in the scene view using the same tools that you also use as you change the transform of any game object.

Additionally, the faces of the selected shape can be dragged in the same way as colliders can be resized. Press the shift key, to make the draggable elements visible.

Delete

Delete the selected shape either using this button, by pressing **Delete**, or with the context menu in the scene view.

Duplicate

Duplicate the selected shape either using this button, by pressing **Shift-D**, or with the context menu in the scene view.

Add

Add a new shape by clicking on this button.

Shape Index

It is not always easy to pick a certain shape in the scene view. That's why we include this value that lets you iterate through all shapes.

Shape Color

Specify if the shapes in the scene view have to be visualized with the colors of the shading or particle group. It does not influence the cloud generation.

5.3. Particle Group Mode

Every shape is associated to a certain particle group. The particle group defines which kind of particles have to be generated by the cloud creator within those shapes.

5.3.1. Particle Groups

You may construct as many particle groups as you wish, but it is necessary, that each cloud has at least one. A particle group consists of one or more particle types, which specify how the generated particles have to look like, and how likely it is for those kinds of particles to be created.
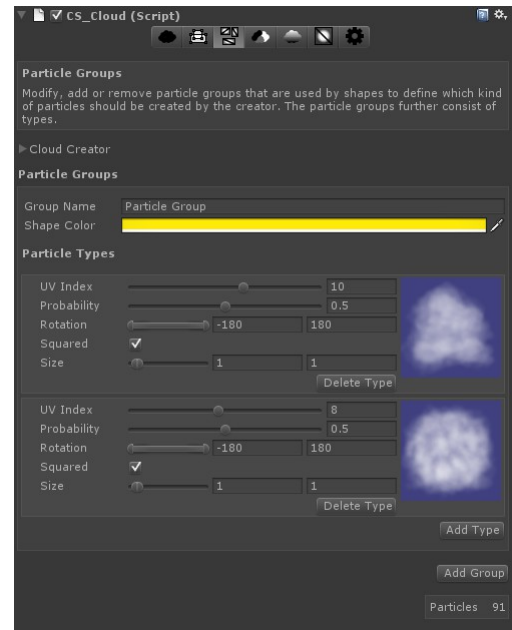
Group Name

This name is used in the shape mode for the particle group selection.

Shape Color

The shape color is used by the shape mode. If you select **ParticleGroup**s to be visualized there, the shapes in the scene view are colored according to the particle group's shape color they belong to.

Add Type

Add a new particle type to this particle group using this button.

Delete Group

Delete this particle group using this button. It is only available if there are at least two particle groups.

Add Group

Create a new particle group using this button.

5.3.2. Particle Types

Every particle type specifies a kind of particle for a particle group. It contains several user definable properties.

UV Index

Decide which tile of the texture has to be used for this particle type, if such a particle is created.

Probability

The decision of the cloud creator about how many particles of which particle type have to be generated, is based on the probability of each particle type. The higher the probability, the more particles from this particle type are going to be generated.

As you manipulate the probability, it influences the probabilities of all other particle types from this particle group.

Rotation

The particles that are generated based on this particle type are going to get a random rotation from this given rotation range.

Squared

Should the particles, that are based on this particle type, be squared? This option is only available for the custom renderers, as the Unity particle system only supports squared particles.

Size

Define the size range for particles that are generated based on this particle type. Non squared particle types have a **X Size** range and a **Y Size** range.

Delete Type

All particle types can be deleted using this button, as long as the particle group has at least one particle type.
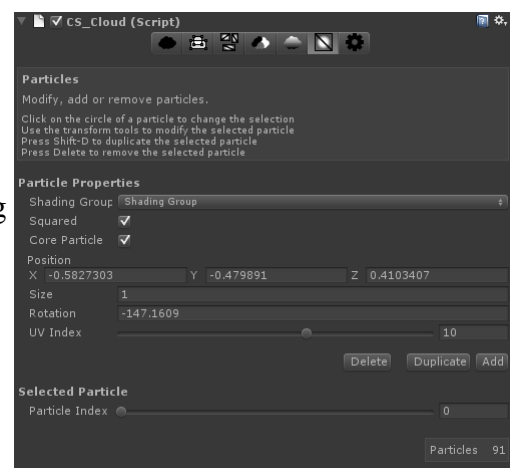
5.4. Particle Mode

Within this mode, you can create, delete or modify the particles directly.

The following properties all belong to the selected particle. You can select another particle in the scene view, by clicking on the circle in the middle of the particle, or by using the particle index.

Shading Group

The shading group to which this particle belongs. This

property can only be set, if the selected renderer supports shading groups.

Squared

Is the selected particle squared? This property can only be set, if the selected renderer is not based on the Unity particle system, as that one only supports squared particles.

Core Particle

Is the selected particle a core particle? This property is used for cloud fading only. The fading lets you control the core and non core particle transparencies separately.

The cloud creator sets this property depending on the distance from the particle to the cloud center. All particles, that are close to the center, belong to the core and all others not.

Position, Size, Rotation

Those values are comparable to the usual transform, with the exception that it doesn't have as many values. The number of values for the size varies depending on the renderer – whether it supports non squared particles – and the squared property. The rotation is always just one value.

You can move, rotate or scale the selected particle in the scene view in the same way as any other game object's transform can be changed.

UV Index

The tile index of the texture that is being used. It has no preview in the inspector, as the texture is visible in the scene view.

Delete

Delete the selected particle either using this button, by pressing **Delete**, or with the context menu in the scene view.

Duplicate

Duplicate the selected particle either using this button, by pressing **Shift-D**, or with the context menu in the scene view.

Add

Add a new particle using this button.

Particle Index

It is not always easy to pick a certain particle in the scene view. That's why we included this value that lets you iterate through all particles.

6. Renderer

The Cloud System supports several kinds of renderers. The visual appearance is mostly influenced by what a specific kind of renderer supports. The simplest renderers only support tint, which means all particles have the same color. Further some renderers support shading groups and/or vertical colors, which are more complex rendering strategies that give you more artistic control about the look. Those rendering strategies were integrated in three different kinds of particle systems.

6.1. Shading Mode

In the shading mode, you can control how the light influences the color of the particles. It mimics that cloud particles that are closer to the sun are brighter. You can specify the colors for particles that are facing to or away from the sun relative to its shading group's center and you can modify the shading group centers.
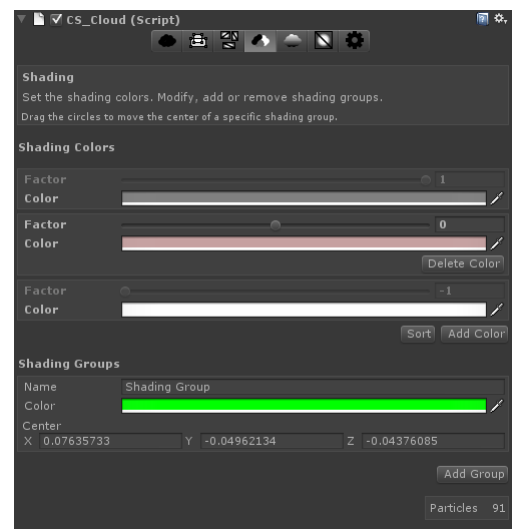
The shading mode is only available, if the selected renderer supports shading groups.

6.1.1. Shading Colors

A cloud has at least two shading colors. The color of the shading color with a factor of -1.0 is used for particles that are facing the sun relative to their shading group's center, whereas the color of the shading color with a factor of 1.0 is used for particles that are facing away from the sun relative to their shading group's center. You may add as many shading colors as you wish.

Factor

The factor of a certain shading color has to be between -1.0 and 1.0, where -1.0 stands for particles facing to and 1.0 stands for particles facing away from sun, relative to the shading group's center to which the particle belongs. The position of the sun is actually not used, but its rotation or more precise the forward direction, which stands for the light ray direction. It is not allowed that there are two shading colors with the same factor in the same cloud. The shading colors have to be sorted according to their factor.

group's shape color they belong to. In the shading mode, the center's of each shading group is visualized as circle in the scene view with this color.

Center

The center coordinates of this shading group. You may also modify it by dragging the circle in the scene view.

Add Group

Create one more shading group using this button.

Delete Group

Remove that shading group with this button. This only works if there is neither a shape nor a particle using this shading group.

6.2. Vertical Color Mode

Clouds usually have darker bottoms, as the particles filter the sun light. In the Cloud System, this physical property is mimicked using vertical colors. Vertical colors influence the colors along the local y axis of the cloud.

A cloud has at least two vertical colors. The color of the vertical color with a height of 0.0 is used as the bottom color, whereas the color of the vertical color with a height of 1.0 is used as the top color. You may add as many vertical colors as you wish.
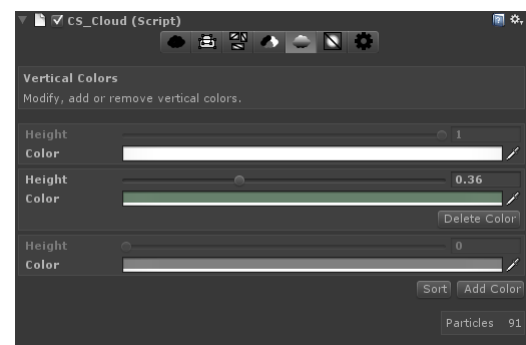
The vertical color mode is only available, if the selected renderer supports vertical colors.

Height

The height of a certain vertical color has to be between 0.0 and 1.0, where 0.0 stands for the bottom and 1.0 for the top. It is not allowed that there are two vertical colors with the same height in the same cloud. The vertical colors have to be sorted according to their height.

Color

The color of a vertical color for that specific height.

Add Color

Use this button to add a new vertical color. Make sure that the vertical colors are always sorted.

Delete Color

Remove this specific vertical color using this button.

Sort

Sort the vertical colors according to their heights using this button.

6.3. Custom Particle System

The custom particle system is the only particle system where the particle's corners get individual colors. Both other particle systems just have one color per particle. This has the advantage that you can get a much smoother appearance and it reduces the particle popping. Further the custom particle system supports non squared particles.

The main drawback certainly is that the colors for the corners have to be calculated in every frame, if the camera is rotated.

6.4. Simple Custom Particle System

The simple custom particle system only allows particles to have one color, just like the Unity particle system. It supports non squared particles.

It is not recommended to be used, if the camera's rotation is changed often. In that case the Unity particle system mostly offers a better performance.

6.5. Shuriken

Shuriken – the new default particle system for Unity introduced in version 3.5 – outperforms both others. It only supports squared particles and each particle can only have one color.

Compared to its predecessor it has several advantages, especially from a performance point of view. Check the Unity documentation for more information on that subject.

6.6. Legacy (Unity Particle System)

The former default Unity particle system. It is up to you if you still want to use it. Even if it is not yet planned to drop the support, we assure you to announce before we actually remove it.

REMARK

Clouds using a Legacy (Unity particle system) get a scale of 1.0001 in all directions. This was a workaround for a bug in Unity and will be removed.

7. Setting Mode

The settings for the editor can be made within this mode.

Accelerate

This flag heavily accelerates the cloud rendering within the
Unity editor. But it has the drawback that only the selected
cloud gets completely recalculated. If you perform undo,
only the selected cloud will be visually updated, all other clouds remain unchanged.

<div style="border:1px solid #000; background:#ccc; padding:10px;">
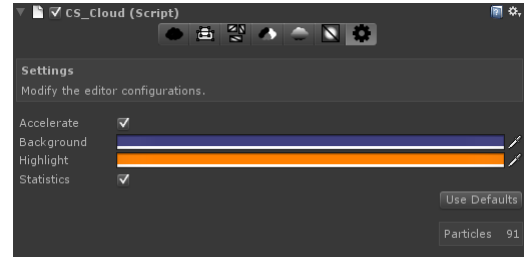
WARNING

If the acceleration is enabled in the settings, undo will only be visible for the selected cloud.

</div>

Background

The background color for the texture previews.

Highlight

The highlight color is used for the lines in the texture preview to split it into tiles, the circles in the
scene view for selectable shapes and particles in their modes and the small boxes to change the
shape size by grabbing them in shape mode.

Statistics

Should the number of particles be shown at the end of the inspector view of the cloud script?

Use Defaults

Revert the settings to the defaults with this button.

8. Cloud System Free

Beside the Cloud System, there is also a free edition that comes with several limitations. It does not support all cloud renderers and rendering methods. Even if all of them can be selected in the inspector, a warning appears for unsupported rendering types. If one of those is selected, the cloud becomes invisible.

REMARK

All clouds are compatible between Cloud System Free and Cloud System. You can upgrade without the need to recreate any cloud.

Here is an overview of the rendering types that are supported in Cloud System Free.

	Custom	Simple Custom	Shuriken	Legacy
Tint	Free	Free	Free	Free
Vertical Color	X	X	X	X
Shading Group	X	Free	Free	Free
Vertical Color with Shading Group	X	X	X	X

9. Known Issues

9.1. Texture Leaking

If the scene is saved while a cloud is selected, there is a warning in the console about leaked textures. That message is harmless and can not be avoided.

9.2. Billboard Trees

Clouds and semi-transparent objects in general are not correctly rendered with billboard trees. The issue has been reported to Unity.

9.3. Prefab Applying

If a prefab is applied that contains a cloud, the console reports a NullReferenceException. We don't see this as a critical issue, as the prefab was always applied even if the error occurred.

We are in contact with Unity about this issue. According to Unity, this issue should be resolved with Unity 4.