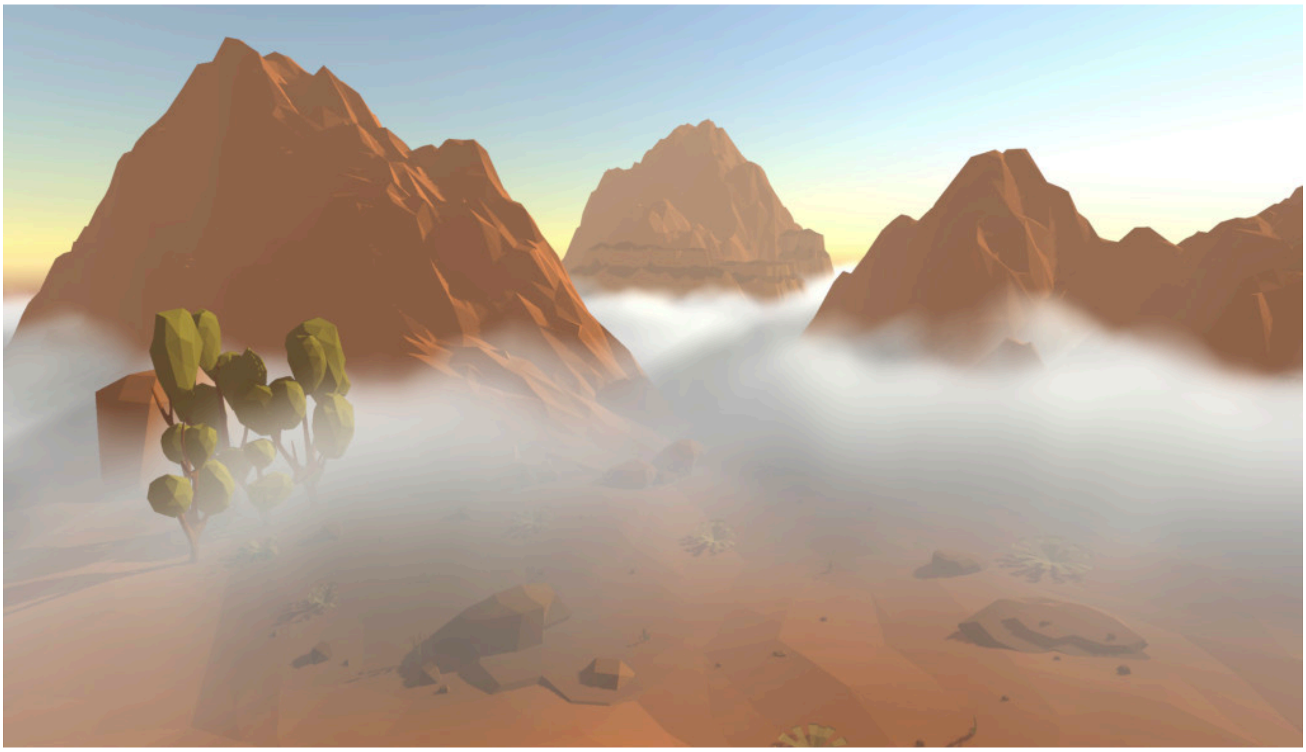


VOLUMETRIC FOG & MIST 2

Universal Rendering Pipeline Edition

Quick Start Guide

Kronnect

Contents

Introduction

Thanks for purchasing!

Volumetric Fog & Mist 2 is an advanced full-screen post-image effect for Unity that adds realistic fog, mist, dust and clouds effects to your scenes.

This version of Volumetric Fog & Mist 2 has been created from scratch for Universal Rendering Pipeline. It won’t work with other pipelines. Please use regular Volumetric Fog & Mist package for built-in pipeline.

Requirements

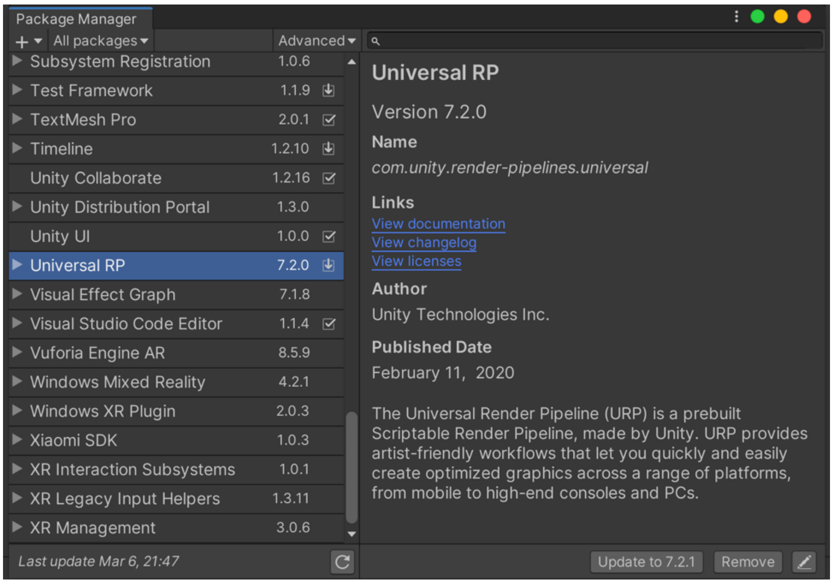
Volumetric Fog & Mist 2 for Universal Rendering Pipeline requires:

- Unity 2019.3 or later
- Universal Rendering Pipeline 7.1.8 or later
- Universal Rendering Pipeline asset must have “Depth Texture” enabled.

Setup Instructions

Step 1: Install Universal Rendering Pipeline

Go to Windows -> Package Manager. Select Universal RP (7.2.0 or later preferably) and click “Install”.



Subsystem Registration	1.0.6
Test Framework	1.1.9
TextMesh Pro	2.0.1
Timeline	1.2.10
Unity Collaborate	1.2.16
Unity Distribution Portal	1.3.0
Unity UI	1.0.0
Universal RP	7.2.0
Visual Effect Graph	7.1.8
Visual Studio Code Editor	1.1.4
Vuforia Engine AR	8.5.9
Windows Mixed Reality	4.2.1
Windows XR Plugin	2.0.3
Xiaomi SDK	1.0.3
XR Interaction Subsystems	1.0.1
XR Legacy Input Helpers	1.3.11
XR Management	3.0.6

Last update Mar 6, 21:47

Universal RP

Version 7.2.0

Name

com.unity.render-pipelines.universal

Links

View documentation
View changelog
View licenses

Author

Unity Technologies Inc.

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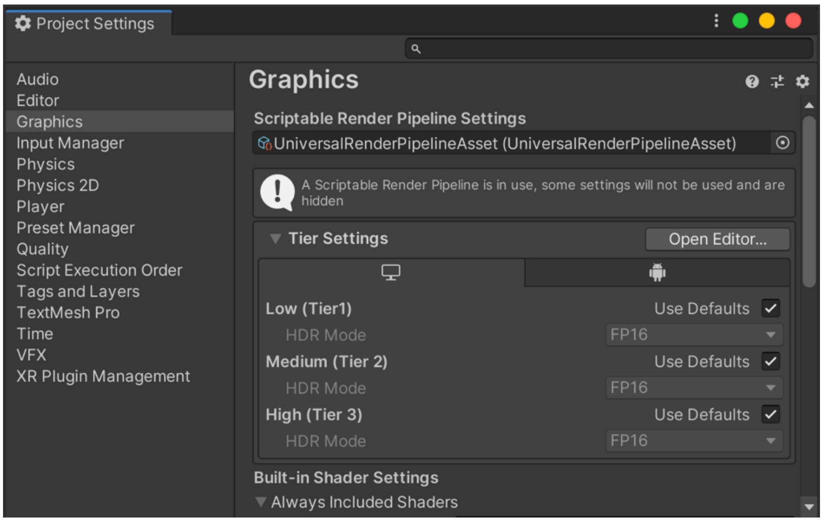
February 11, 2020

The Universal Render Pipeline (URP) is a prebuilt Scriptable Render Pipeline, made by Unity. URP provides artist-friendly workflows that let you quickly and easily create optimized graphics across a range of platforms, from mobile to high-end consoles and PCs.

Step 2: Assign the Universal Rendering Pipeline asset

Go to Project Settings -> Graphics and assign an Universal Rendering Pipeline asset. You can use the asset include in the demo folder (Volumetric Fog 2 /Demo /URP Pipeline Settings folder).



Graphics

Scriptable Render Pipeline Settings

UniversalRenderPipelineAsset (UniversalRenderPipelineAsset)

A Scriptable Render Pipeline is in use, some settings will not be used and are hidden

Tier Settings

Low (Tier1) — Use Defaults ☑
HDR Mode: FP16

Medium (Tier 2) — Use Defaults ☑
HDR Mode: FP16

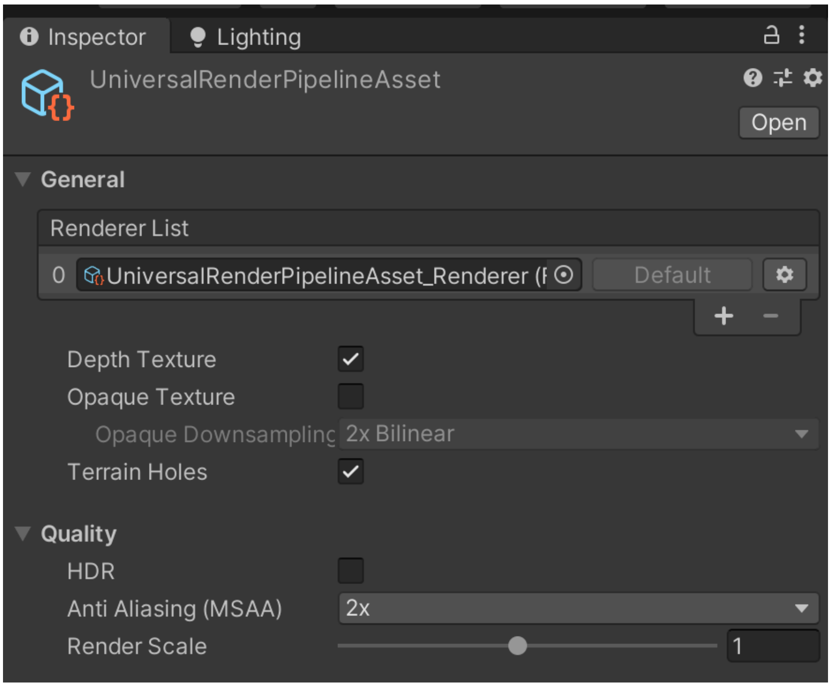
High (Tier 3) — Use Defaults ☑
HDR Mode: FP16

Built-in Shader Settings

Always Included Shaders

Step 3: Configure Universal Rendering Pipeline asset

Double click the Universal Rendering Pipeline asset to show its properties.
Then enable "Depth Texture". Enabling MSAA is also recommended:



UniversalRenderPipelineAsset

General

Renderer List

0 UniversalRenderPipelineAsset_Renderer (F Default

Depth Texture ☑

Opaque Texture □

Opaque Downsampling 2x Bilinear

Terrain Holes ☑

Quality

HDR □

Anti Aliasing (MSAA) 2x

Render Scale 1

Important note!

Check both "Project Settings / Graphics" and "Project Settings / Quality" sections since you can define URP settings overrides in Quality levels. You need to enable Depth Texture option in all URP settings used in any Quality Level.

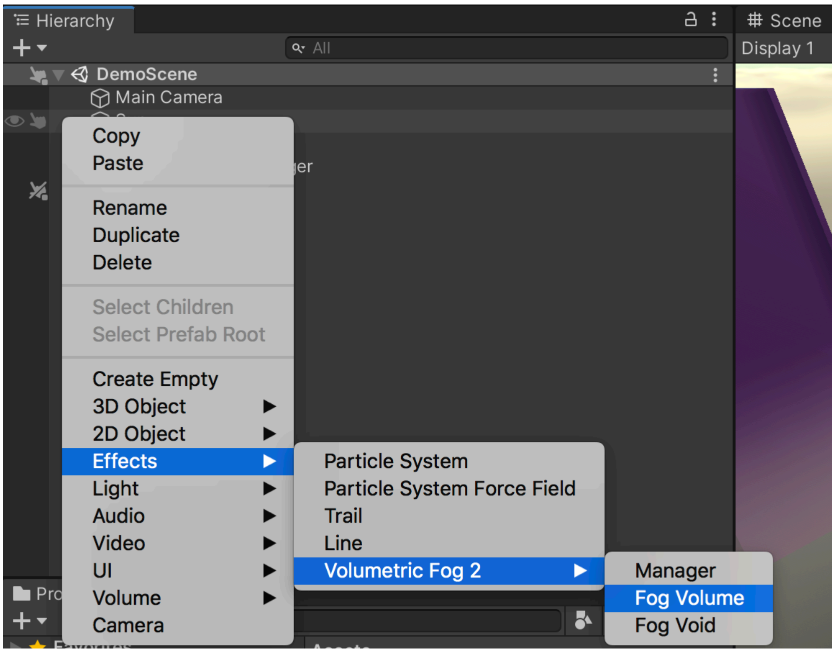
Now you can use Volumetric Fog & Mist 2!

Demo Scene

The asset includes a demo scene to let you quickly familiarize with the different features. Please make sure you have completed the Setup explained in previous section.

Adding Volumetric Fog & Mist to your scene

Step 1) Right click in the Hierarchy panel and select "Effects" -> "Volumetric Fog & Mist 2" -> Fog Volume:

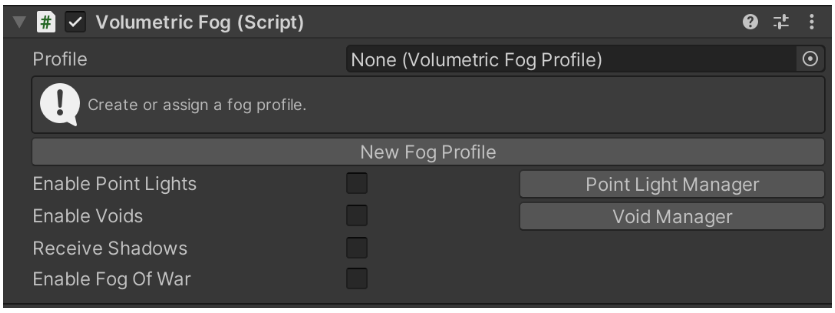


A Fog Volume is a boxed area that contains the fog effect.

Note: the first time a fog volume is added, a "Volumetric Fog Manager" gameobject is automatically created. This manager is responsible for finding point lights and void areas and send this data globally to all fog volumes.

Step 2) Create or assign a fog profile

A Fog Profile contains many appearance options and can be reused among fog volumes.
Click "New Fog Profile" or assign an existing profile.



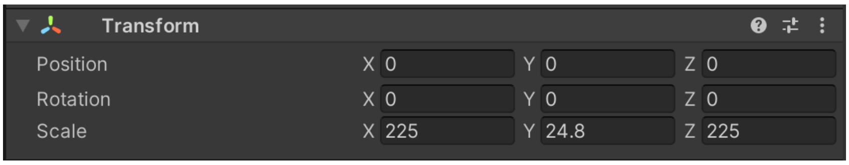
Profile: None (Volumetric Fog Profile)

Create or assign a fog profile.

Enable Point Lights □
Enable Voids □
Receive Shadows □
Enable Fog Of War □

Step 3) Position/scale/customize fog properties

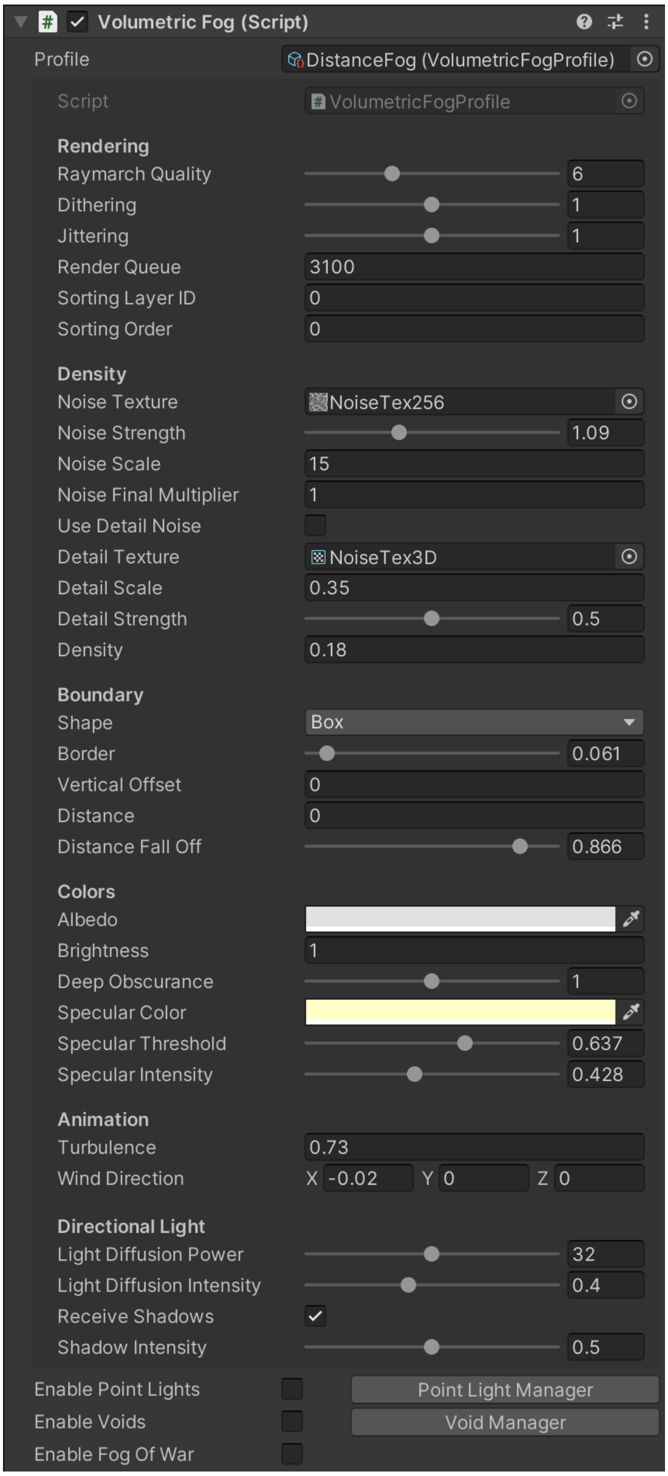
Adjust the fog position and scale using the usual Transform component:



Transform

Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 225	Y 24.8	Z 225

Customize the appearance of the fog changing the profile values:



☑ Volumetric Fog (Script)

Profile: DistanceFog (VolumetricFogProfile)

Script: VolumetricFogProfile

Rendering

- Raymarch Quality: 6
- Dithering: 1
- Jittering: 1
- Render Queue: 3100
- Sorting Layer ID: 0
- Sorting Order: 0

Density

- Noise Texture: NoiseTex256
- Noise Strength: 1.09
- Noise Scale: 15
- Noise Final Multiplier: 1
- Use Detail Noise: □
- Detail Texture: NoiseTex3D
- Detail Scale: 0.35
- Detail Strength: 0.5
- Density: 0.18

Boundary

- Shape: Box
- Border: 0.061
- Vertical Offset: 0
- Distance: 0
- Distance Fall Off: 0.866

Colors

- Albedo:
- Brightness: 1
- Deep Obscurance: 1
- Specular Color:
- Specular Threshold: 0.637
- Specular Intensity: 0.428

Animation

- Turbulence: 0.73
- Wind Direction: X -0.02 Y 0 Z 0

Directional Light

- Light Diffusion Power: 32
- Light Diffusion Intensity: 0.4
- Receive Shadows: ☑
- Shadow Intensity: 0.5

Enable Point Lights □ Point Light Manager

Enable Voids □ Void Manager

Enable Fog Of War □

Most profile settings are self-explanatory. Default values are recommended for most cases:

- **Raymarch Quality**: represents the amount of samples used by the shader. A lower value uses less samples and improves performance.
- **Dithering**: reduces banding artifacts when fog renders in front of solid surfaces.
- **Jittering**: reduces banding artifacts on fog edges.
- **Noise Texture**: you can use any other noise textures from the demo folders or use the Noise Generator tool (from Volumetric Fog Manager) to create a new noise texture.
- **Noise Strength**: defines how noise affects fog shape.
- **Noise Scale / Final Multiplier**: control the size and final amplitude of the noise.
- **Use Detail Noise / Detail Noise options**: combines regular noise with additional 3D noise to create more compelling fog effect.
- **Detail Noise Texture**: custom 3D noise texture (red channel is used only). You can find more noise and detail noise textures inside the demo folder.
- **Density**: defines the sample density. Use a low value to create subtle mist while a high value produces a thicker fog.
- **Border**: smooth fog volume edges.
- **Distance / Distance Fall Off**: the distance at which the fog starts.
- **Albedo**: base color of the fog, including transparency.
- **Brightness**: overall brightness of the fog.
- **Deep Obscurance**: makes the fog darker at the middle of the fog volume.
- **Specular Color/Threshold/Intensity**: simulates light speculars/reflections on the fog by the directional/main light.
- **Turbulence / Wind Direction**: animates the fog along the time.
- **Light Diffusion Power/Intensity**: controls the effect of the directional/main light when crossing through the fog in direction of the camera.
- **Receive Shadows / Shadow Intensity**: controls shadows over the fog.

Special Features

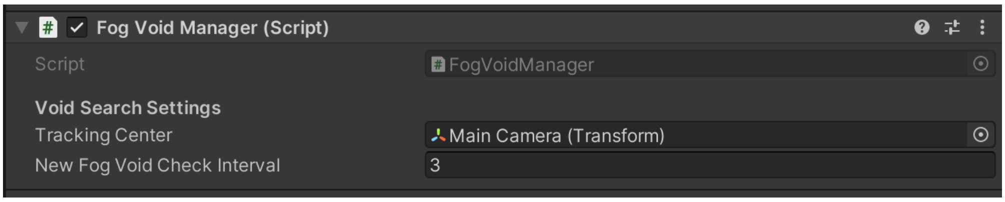
Orthographic Camera Support

Locate and edit **CommonsURP.hlsl** file and uncomment this line:

```
#define ORTHO_SUPPORT
```

Fog Voids

A fog void is a circular area which is not covered by fog. Up to 8 fog voids can be applied to a fog volume. The Fog Void Manager component is responsible for sending the fog void positions and sizes to the shaders:



Fog Void Manager (Script)

Script: FogVoidManager

Void Search Settings

Tracking Center: Main Camera (Transform)

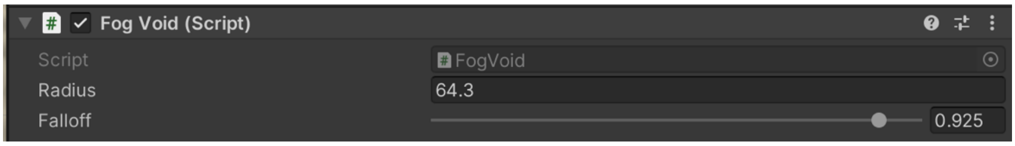
New Fog Void Check Interval: 3

The Fog Void Manager sorts fog voids by distance to the Tracking Center. You can adjust the time interval for looking new fog voids.

To add a Fog Void to the scene, right click in the Hierarchy and select “Effects” -> “Volumetric Fog & Mist 2” -> Fog Void.

You can position / scale the fog void anywhere in the scene. Also, you can parent a fog void around characters so they will not be covered by fog.

Use the Radius and Falloff slider of the Fog Void component to customize the appearance of each void.



Fog Void (Script)

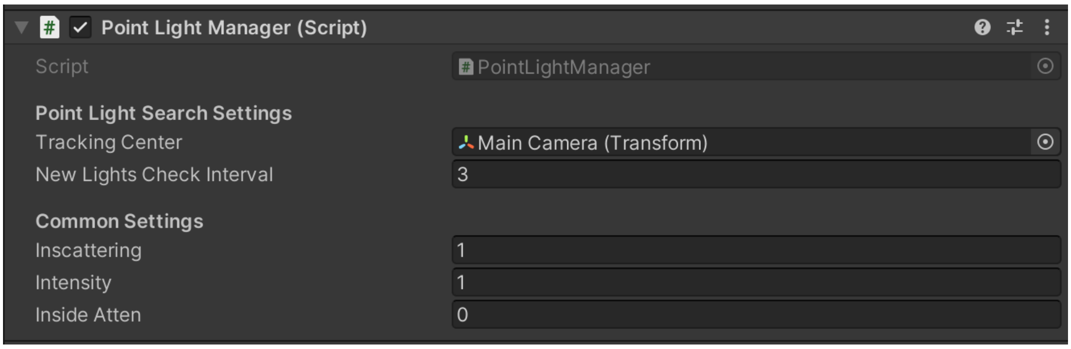
Script: FogVoid

Radius: 64.3

Falloff: 0.925

Point Lights

Up to 16 point lights can illuminate the fog volume. The Point Light Manager is responsible for sending the positions and settings of each point light to the shader.



Point Light Manager (Script)

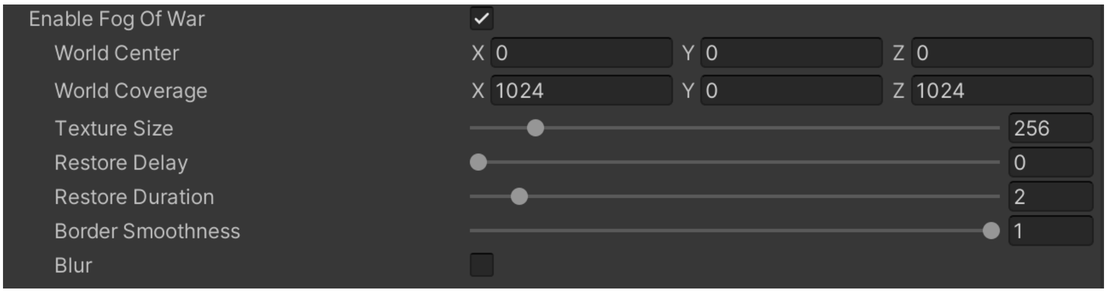
Script	PointLightManager
Point Light Search Settings	
Tracking Center	Main Camera (Transform)
New Lights Check Interval	3
Common Settings	
Inscattering	1
Intensity	1
Inside Atten	0

The Point Light Manager sorts lights by distance to the Tracking Center. You can adjust the time interval for checking new point lights in the scene. You can also call TrackPointLights(true) of this component to cause an immediate refresh.

The **Inscattering** and **Intensity** are global multipliers to the point lights range and intensity respectively. The "**Inside Atten**" setting reduces the point light intensity when camera is very near to the point light to avoid "screen burn" effect.

Fog of War

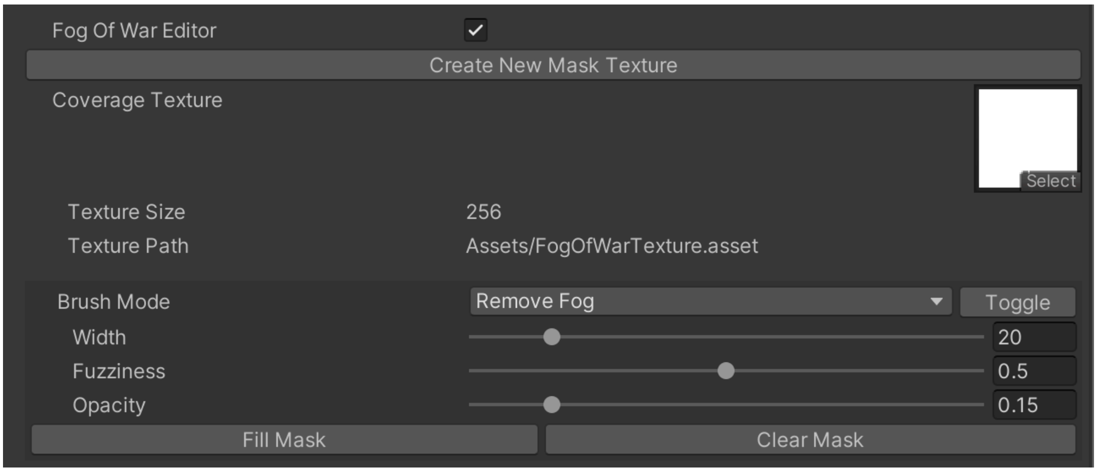
The fog of war feature uses a color texture to control the opacity of the fog on the world. It can be used to clear / add fog at any custom position. This feature is commonly used to show which areas of the world have been visited or are visible to the player.



Enable Fog Of War ☑
World Center X 0 Y 0 Z 0
World Coverage X 1024 Y 0 Z 1024
Texture Size 256
Restore Delay 0
Restore Duration 2
Border Smoothness 1
Blur □

- **World Center / Coverage**: maps the fog of war texture to the world using this center and size.
- **Texture Size**: the size of the fog of war texture. A big texture allows finer details but it can result in a slower operation.
- **Restore Delay / Duration**: controls when the fog restores it original appearance. It can be used to allow the fog to disappear while the character is at certain position and gracefully restore the fog when character abandons the place. A delay of 0 means the fog won't never be restored. A duration of 0 means immediate change (no transtition).
- **Border Smoothness**: controls the smoothness of the border of clear areas.
- **Blur**: produces a softer transition between clear and opaque fog areas.

Fog of War Editor



Fog Of War Editor ☑
Create New Mask Texture
Coverage Texture
Texture Size 256
Texture Path Assets/FogOfWarTexture.asset
Brush Mode Remove Fog
Width 20
Fuzziness 0.5
Opacity 0.15

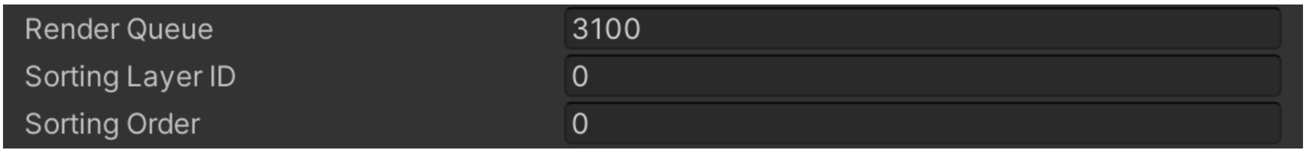
Enable the Fog of War Editor to interactively add, paint with color or remove fog in Scene View.

Click "Create new Mask Texture" to create the texture asset which will hold the opacity states of the fog of war.
The Brush Mode selects the paint/erase mode as well as Width, Fuzziness and Opacity allow you to customize the artistic result.

Transparency support

Customizing the rendering order

Each Volumetric Fog volume can have a different render queue setting, located in “Rendering Section”:



Render Queue	3100
Sorting Layer ID	0
Sorting Order	0

These settings allows you to control the rendering order.

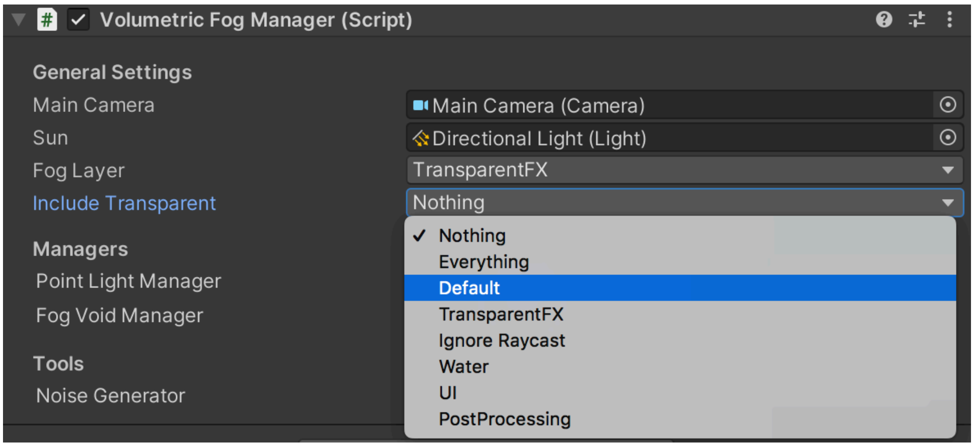
Respecting other transparent objects

The fog effect relays on the depth buffer to compute ray marching distance. Since transparent objects do not render to depth buffer, it means the fog effect will always render on top of previously rendered objects, regardless of the space position, for example water, rivers and any other transparent objects located between the fog and the camera.

To avoid this issue, you should first try solving the issue by customizing the rendering order (see previous section).

Alternatively, you can force a custom depth prepass for certain transparent. This option requires two steps:

1) Specify which transparent layers should be included in the depth prepass. This is done in the Volumetric Fog Manager:



Volumetric Fog Manager (Script)

General Settings

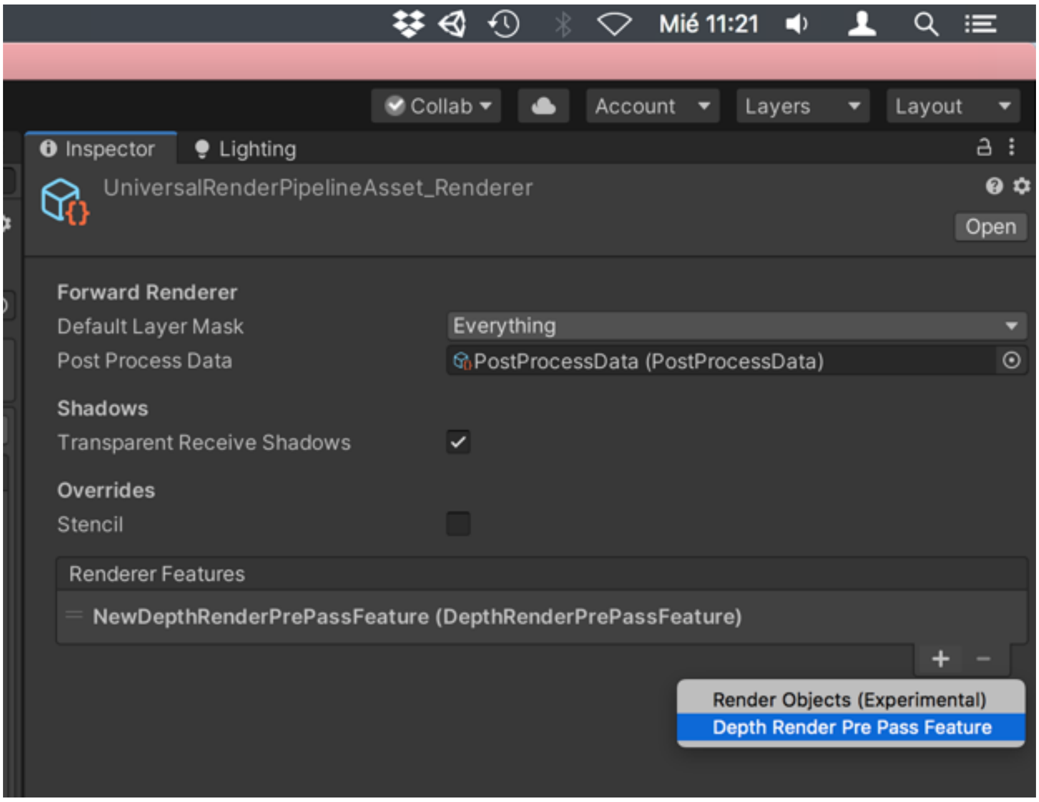
Main Camera: Main Camera (Camera)

Sun: Directional Light (Light)

Fog Layer: TransparentFX

Include Transparent: Nothing

2) Install the Depth Render Pre Pass Feature in the Forward Renderer of the Universal Rendering Pipeline asset. Simply go to Project Settings -> Graphics -> Double click on the Universal Pipeline asset -> Double click on the Forward Renderer asset -> Add the “DepthRenderPrePassFeature” to the list:



UniversalRenderPipelineAsset_Renderer

Forward Renderer

Default Layer Mask: Everything

Post Process Data: PostProcessData (PostProcessData)

Shadows

Transparent Receive Shadows ☑

Overrides

Stencil □

Renderer Features

NewDepthRenderPrePassFeature (DepthRenderPrePassFeature)

Scripting Support

Accessing global fog properties

All properties shown in the inspector can be set or modified at runtime using scripting. First you need to get a reference to the main script which can be done easily using:

```
using VolumetricFogAndMist2;
…
VolumetricFog fog = volumeObject.GetComponent<VolumetricFog>;
```

(where volumeObject is the gameobject of the fog volume)

Then, you can set any property like the fog color or wind speed/direction:

```
For.profile.albedo = new Color(1,0,0);
fog.windDirection = Vector3.right;
```

etc.

Creating fog volumes at runtime

Use this code to create a new fog volume using code:

```
GameObject fogVolume = VolumetricFogManager.CreateFogVolume(“New Fog Volume”)
```

Creating fog voids at runtime

Use this code to create a new fog void using code:

```
GameObject fogVoid = VolumetricFogManager.CreateFogVoid(“New Fog Void”)
```

Fog of War methods

The following fog of war methods are available:

fogOfWarTexture
Property that returns or set the fog of war texture.

ResetFogOfWar()
General reset function which removes any previous change to fog of war transparency.

ResetFogOfWarAlpha(…)
Restores fog immediately at a given position with radius or bounds.

GetFogOfWarAlpha(…)
Returns the opacity of the fog at a given world position.

SetFogOfWarAlpha(…)
Changes the transparency of the fog in an area. This method is overloaded and can accept different paremeters and options:

- A world position and a radius, or a bounds object or a world position and size.
- Desired alpha and specify if this value replaces the existing transparency or if it blends with it (blendAlpha parameter).
- The duration of the transition (pass 0 to set the alpha immediately).
- The smoothness/harshness of the border (by default it uses the global setting in Fog Of War section which is 1f).
- The restore delay and duration (by default it uses the global settings in Fog Of War section). Pass 0 to restore delay to make the change permanent.

Performance Tips

Volumetric Fog uses an extremely optimized ray-marching algorithm to provide “volumetric sense” fog in front of your player. If you need to improve performance, you can try the following options:

- Reduce Raymarch Quality: reducing this value will indeed reduce the number of texture fetches per pixel.
- Use Fog of War instead of Fog Voids: consider switching to fog of war instead of fog voids if you use many voids.
- Detail Noise adds an additional texture3D sample during the ray-marching loop: consider disabling this option to increase performance if needed.
- Reduce Render Scale in the Universal Rendering Pipeline asset. This will reduce the resolution of the framebuffer, improving the overall performance. This setting is especially useful on mobile devices since they use very high DPI screens and can afford to use a lower resolution.

Known Issues / Questions

Shadow Cascade Bug

Universal Rendering Pipeline 7.1.8 has a bug with shadow cascade.
Solution: please make sure you use URP 7.2.0 or later.

Inverted Depth Bug

Universal Rendering Pipeline 7.2.0 has a bug which produces an incorrect (flipped) depth texture. This bug occurs when HDR is OFF, MSAA is x1 and Render Scale =1. More details here: https://forum.unity.com/threads/inverted-depth-texture-and-unresolved-shadowmap.824703/#post-5466879

Solution:
Option 1) Enabling HDR, MSAA or changing Render Scale (any of the three) produces the correct depth texture.
Option 2) Enable “Flip Depth Texture” option in Volumetric Fog Manager.

Shadows not showing in WebGL 2.0

Edit RayMarch2D.cginc file in Resources/Shaders folder and uncomment this line:
// UNITY_UNROLLX(50)
(Increase the 50 value if needed)

Fog not rendering correctly when using VR in URP

URP 7.4 has a known bug related to inverted matrices not being set correctly in VR. While this bug is not fixed by Unity, the workaround requires editing the file CommonsURP.hlsl and uncomment the line below:

```
//#define USE_OLD_RECONSTRUCT_API
```

Additional noise textures

You can find additional noise and detail noise textures inside the Demo / Noise Textures folder.

Support

Please visit kronnect.com for questions, support and more info.
If you have any suggestion to improve the asset, please contact us. We'll gladly consider it.