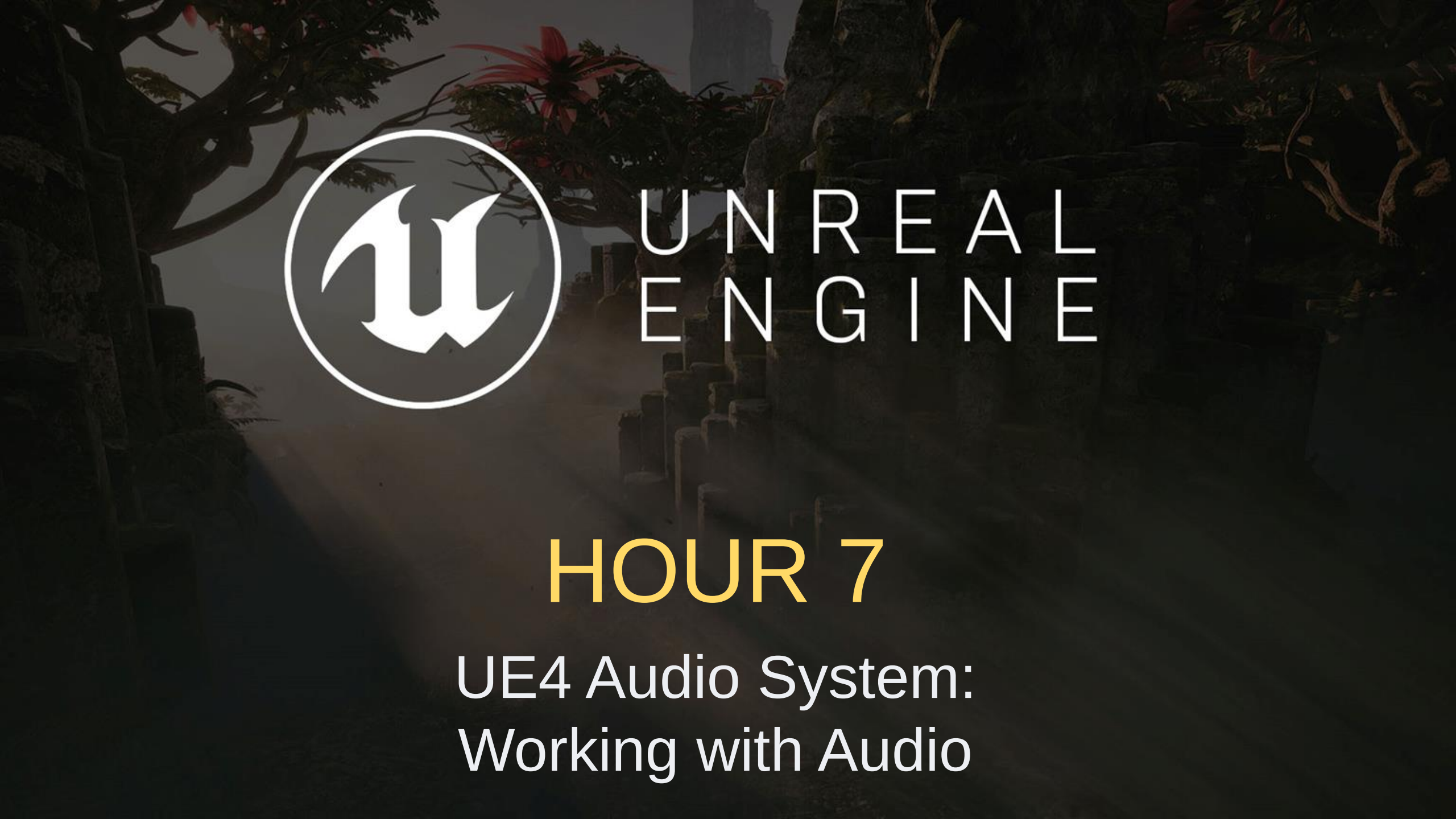


HOUR 7

UE4 Audio System: Working with Audio

INTRODUCTION

Whatever game you're creating, it's likely that sound will play a big part in the experience. From ambient sounds in a scene to spoken dialog between characters and even background music, the audio in a game can make or break the user's experience. Most of the time, players don't realize it, but sound is a large part of overall gameplay.

In this lecture, you will learn to work with audio assets and Actors in Unreal. You will start by learning about the basic components of audio and then how to place sounds in a scene with Sound Actors. You will also learn about the powerful capabilities of Sound Cues and working with the Sound Cue Editor.

LECTURE GOALS AND OUTCOMES

Goals

The goals of this lecture are to

- Understand audio basics
- Learn how to work with Sound Actors
- Learn about Sound Cues
- Learn how to control audio volumes

Outcomes

By the end of this lecture you will be able to

- Import a Sound Wave asset
- Place an Ambient Sound Actor
- Create a basic Sound Cue

UE4 AUDIO

The audio system in UE4 is powerful, and it has a large number of components and terminology. Noted below are the most common assets and the Actor used when working with sound in UE4:

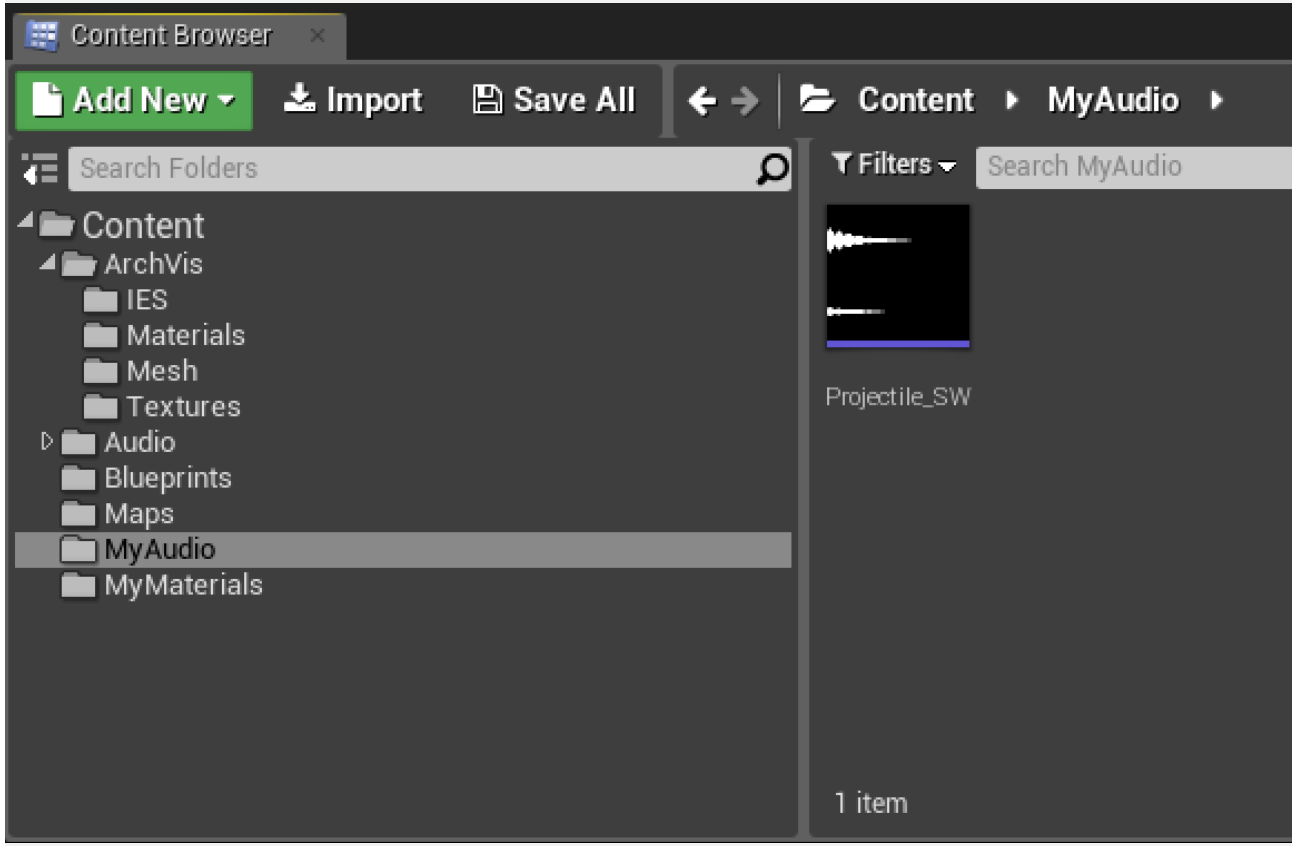
- A **Sound Wave asset** represents an imported audio file and settings related to the playback and storage of that file.
- **Sound Cue assets** and the Sound Cue Editor enable you to combine sounds and modifiers to alter the final output.
- The **Sound Attenuation asset** defines how a sound is heard based on the player's distance from the sound's origin.
- An **Ambient Sound Actor** is used to represent an audio source in a scene.

IMPORTING AUDIO FILES

For import, UE4 supports .wav files.

The easiest way to import audio is simply to drag a .wav file from your operating system's file manager into the Content Browser or by clicking Import in the Content Browser and finding and choosing the file to import. This will add the Sound Wave asset to the Content Browser.

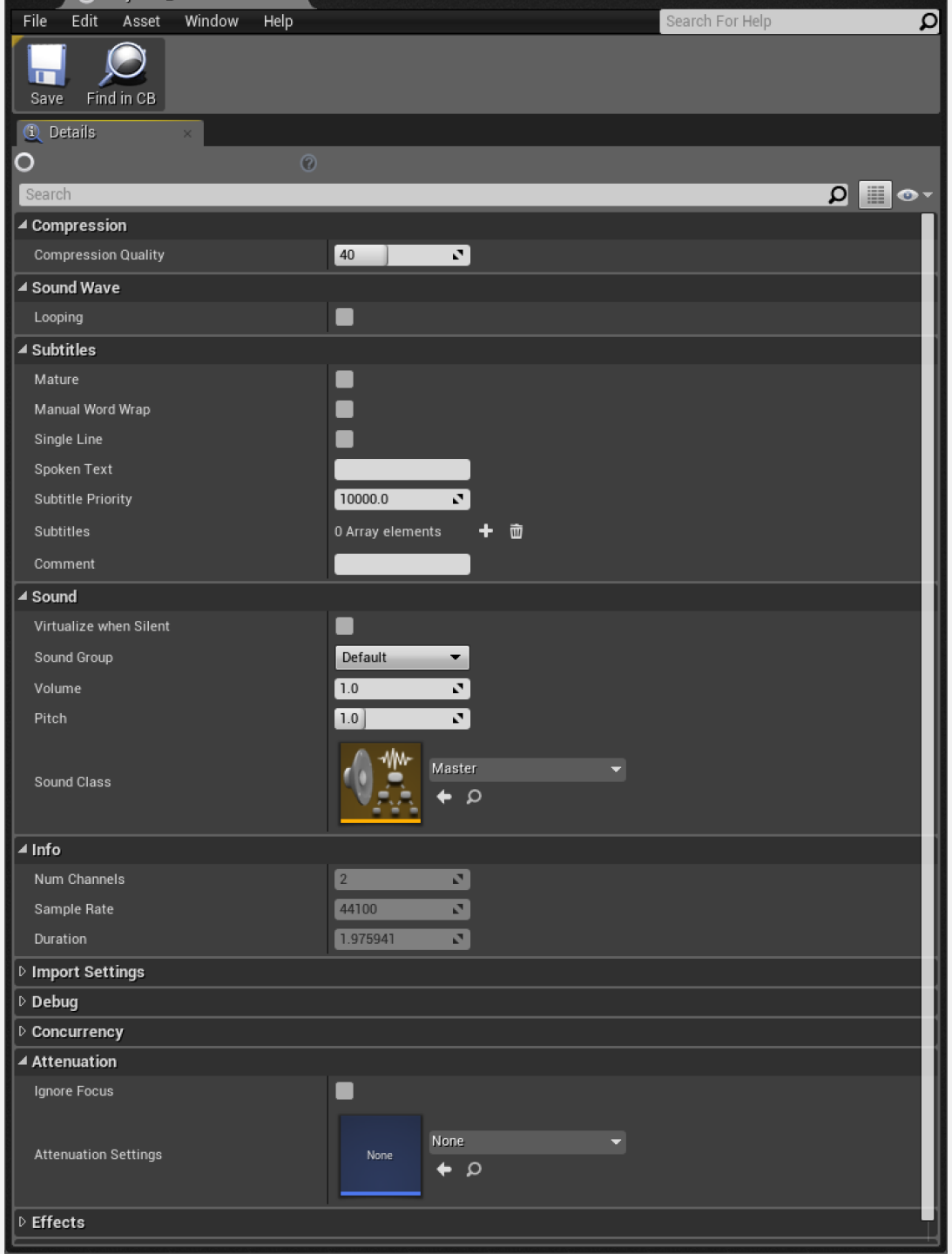
Specifications	PCM, ADPCM, DVI ADPCM
Format	.wav
Bit Rate	16
Speaker Channels	Mono, Stereo, 2.1, 4.1, 5.1, 6.1, 7.1



IMPORTING AUDIO FILES

Once it is imported, you can double-click the audio asset to see its properties in the Generic Asset Editor’s Details panel.

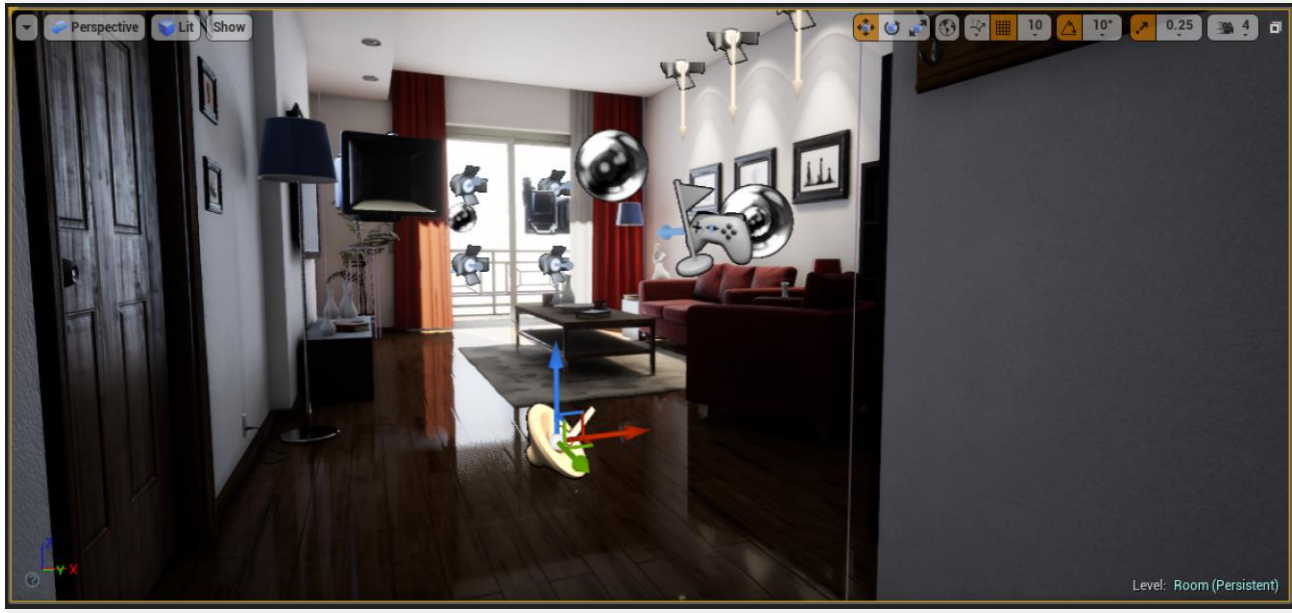
Here you can edit the Sound Wave asset properties. You can set a number of properties, including the compression amount, whether the Sound asset loops by default, and the pitch, and you can even add subtitle information.



SOUND ACTORS

Sound Wave assets are of no use without a source to play them. Ambient Sound Actors are the components that allow you to play sounds in a Level.

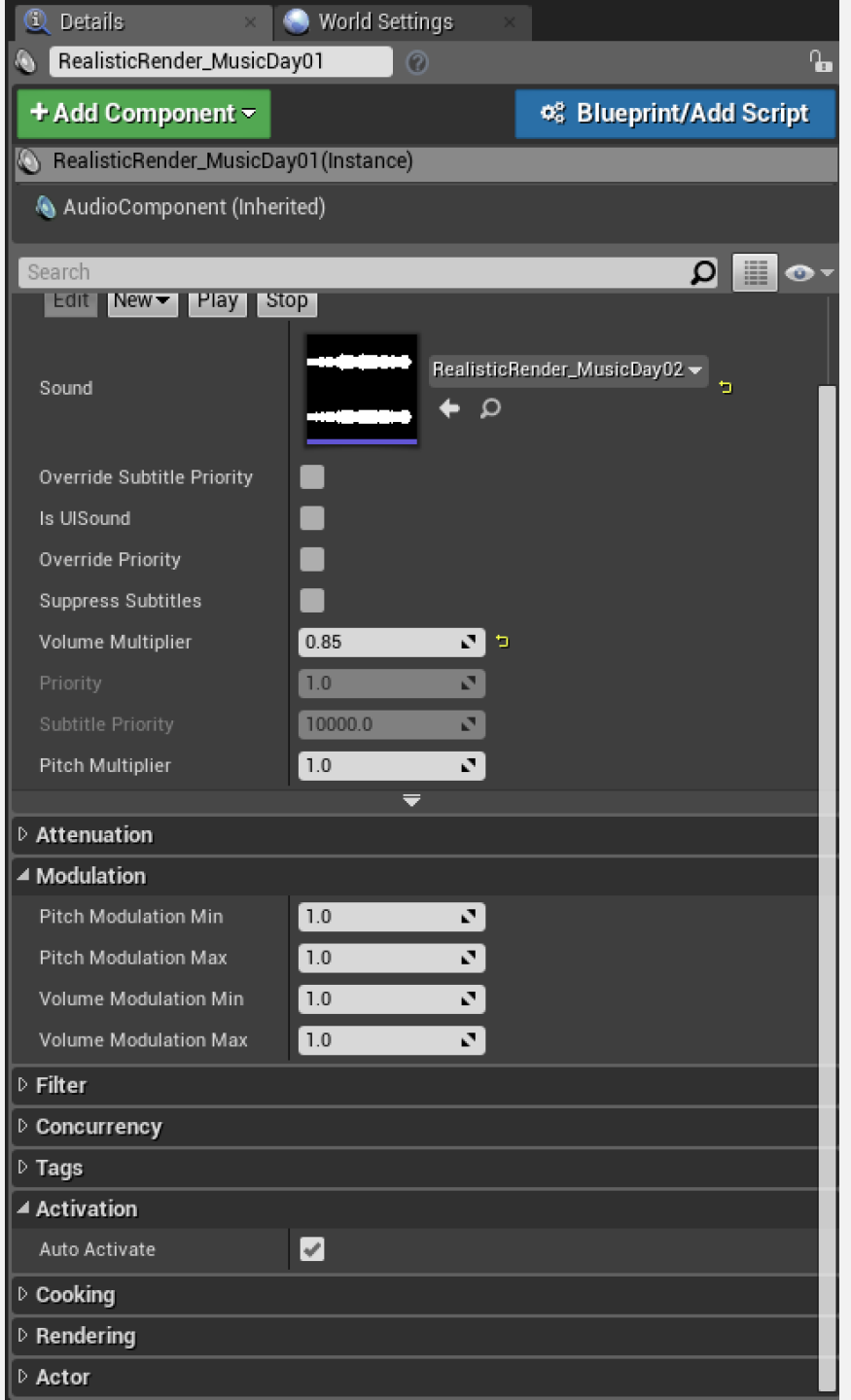
The simplest way to create them is to drag a Sound Wave asset into a scene. This will add an Ambient Sound Actor.



SOUND ACTORS

You can create many Ambient Sound Actors in a scene and edit various properties for each individual Actor.

When an Ambient Sound Actor is selected in your Level, you can see its properties displayed in the Level Details panel.



SOUND ACTORS

The table on the right shows some of the properties available in the Details panel when an Ambient Sound Actor is selected.

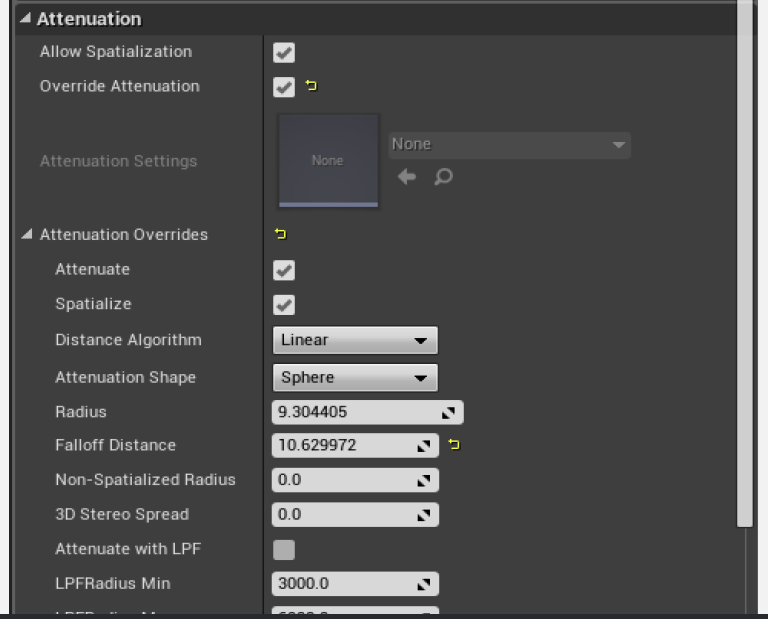
Property	Description
Sound	Points to a Sound Wave asset or Sound Cue asset.
Is UISound	Determines whether the Sound asset plays when the game is paused.
Volume Multiplier	Sets the overall volume of the sound.
Pitch Multiplier	Sets the overall pitch of the sound.
Instance Parameters	Allows addition of per-instance parameters for the sound.
Sound Class Override	Optionally assigns a group for the Sound asset.

ATTENUATION

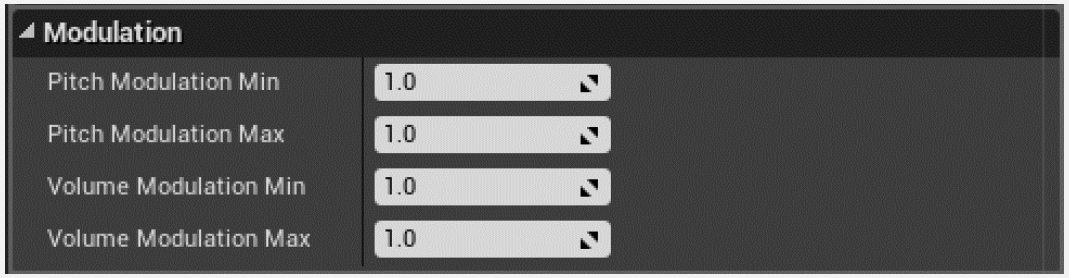
For sound to appear to have a position in 3D space, you need to specify the attenuation. Attenuation is the falloff of the sound as you move farther away from it in 3D space.

ATTENUATION

You can adjust the attenuation for each placed Ambient Sound Actor. You can also create Sound Attenuation assets that can be reused and applied to Sound Wave assets or Ambient Sound Actors.



Property	Description
Attenuate	Enables the use of attenuation via volume.
Spatialize	Enables the source to be positioned in 3D space.
Distance Algorithm	Specifies the type of volume versus distance algorithm to use for the attenuation model.
Attenuation Shape	Specifies the shape of the attenuation volume, which is a sphere by default.
Radius	Specifies the overall size of the volume. Outside this radius, no sound will be heard.
Falloff Distance	Specifies the distance over which falloff occurs.
Non-Spatialized Radius	Specifies the distance at which spatialization begins.



SOUND MODULATION

Modulation effects add motion and depth to sound.

The Modulation settings allow you to control the minimum and maximum modulation for both pitch and volume as well as set a high-frequency gain multiplier.

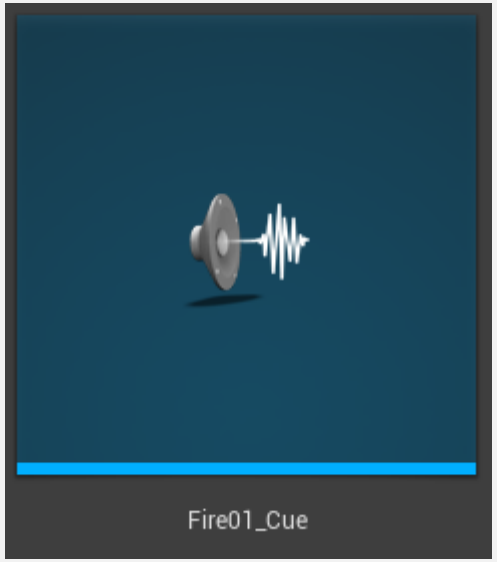
Property	Description
Pitch Modulation Min	Specifies the lower bound to use when randomly determining a pitch multiplier.
Pitch Modulation Max	Specifies the upper bound to use when randomly determining a pitch multiplier.
Volume Modulation Min	Specifies the lower bound to use when randomly determining a volume multiplier.
Volume Modulation Max	Specifies the upper bound to use when randomly determining a volume multiplier.
High Frequency Gain Multiplier	Specifies a multiplier to apply to the high-frequency gain for sounds generated by the component.

SOUND CUES

Sound Cues give you an enormous amount of control over your audio.

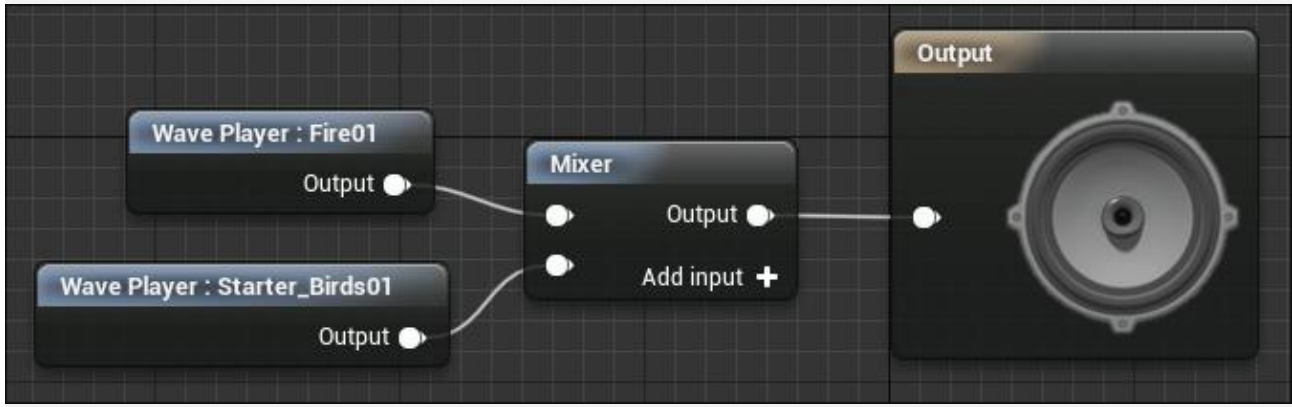
- You can alter sounds randomly, such as footsteps or the wind rustling the trees.
- You can apply modulations and other effects.
- You can blend several Sound Waves together.

Sound Cues are created in the Content Browser and edited in the Sound Cue Editor.



SOUND CUES

Sound Cues can be used to mix Sound Wave assets or even create random variation, such as having a Sound Cue randomly pick from a list of explosion sounds.



SOUND CUE EDITOR

The Sound Cue Editor is a node-based editor that gives you the ability to apply modifiers to Sound Waves and store the result as a Sound Cue asset.

To create a new Sound Cue asset:

- Right-click on a Sound Wave asset and select Create Cue.
- Once the Sound Cue is created, double-click on the Sound Cue asset to open the Sound Cue Editor.

SOUND CUE EDITOR: TOOLBAR

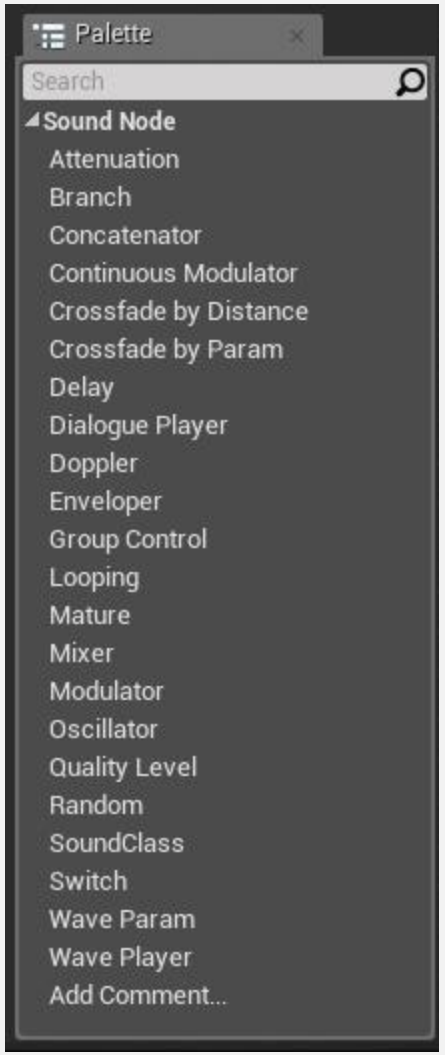
The Play Cue toolbar button plays an entire Sound Cue, which is equivalent to playing the output node.

The Play Node button plays just the audio coming from a selected node (which includes those before it).

SOUND CUE EDITOR: PALETTE PANEL

The Palette panel lists various Sound nodes that you can drag into the Graph panel of the Sound Cue Editor.

You can chain nodes together to create complex sounds.



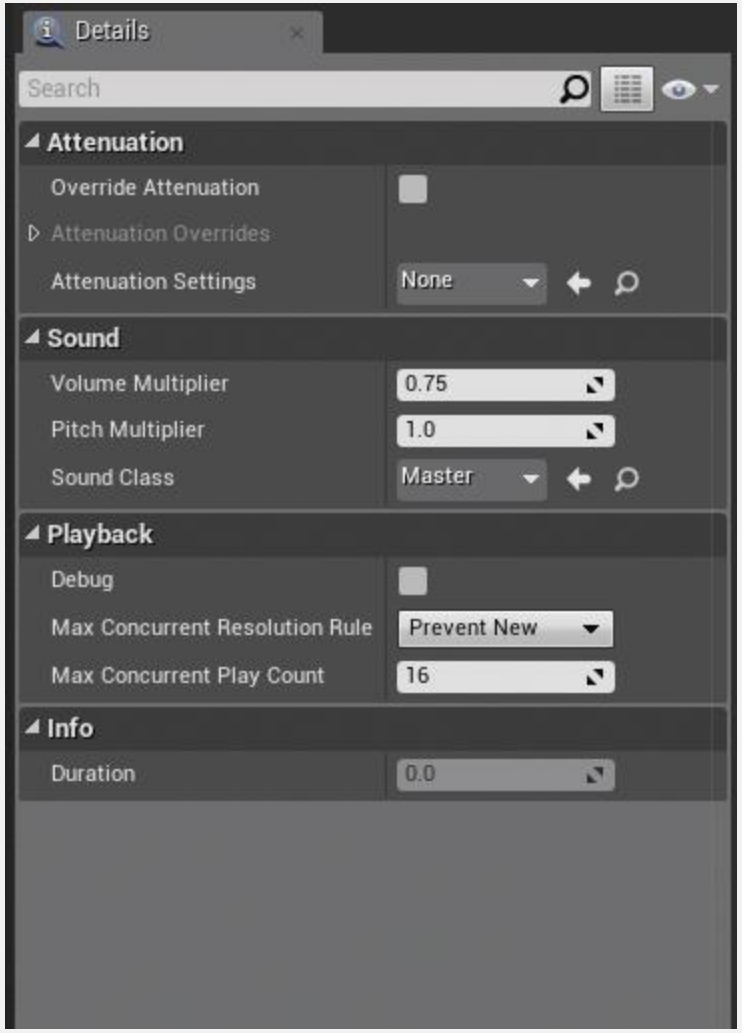
SOUND CUE EDITOR: PALETTE PANEL

The table on the right lists some of the 22 nodes found in the Palette panel of the Sound Cue Editor.

Node	Description
Wave Player	Contains a Sound Wave asset from the Content Browser.
Looping	Used to set a Sound Wave to looping. It can be used to loop multiple audio files independently when used in conjunction with the Mixer node.
Mixer	Used to trigger multiple Sound Wave nodes simultaneously. Sound nodes can be connected directly to the Mixer node inputs, but you can also add nodes between them for independent control per layer.
Random	Used to randomly trigger a Sound Wave node from within a group of possible Sound Wave nodes.
Delay	Inserts a delay into the audio node chain to cause a pause before the input sound is passed to the output. The amount of the delay is a random value between the Delay Min and Delay Max values specified in the Details panel.

SOUND CUE EDITOR: DETAILS PANEL

The Details panel shows the properties of the current selected node in the Graph panel.



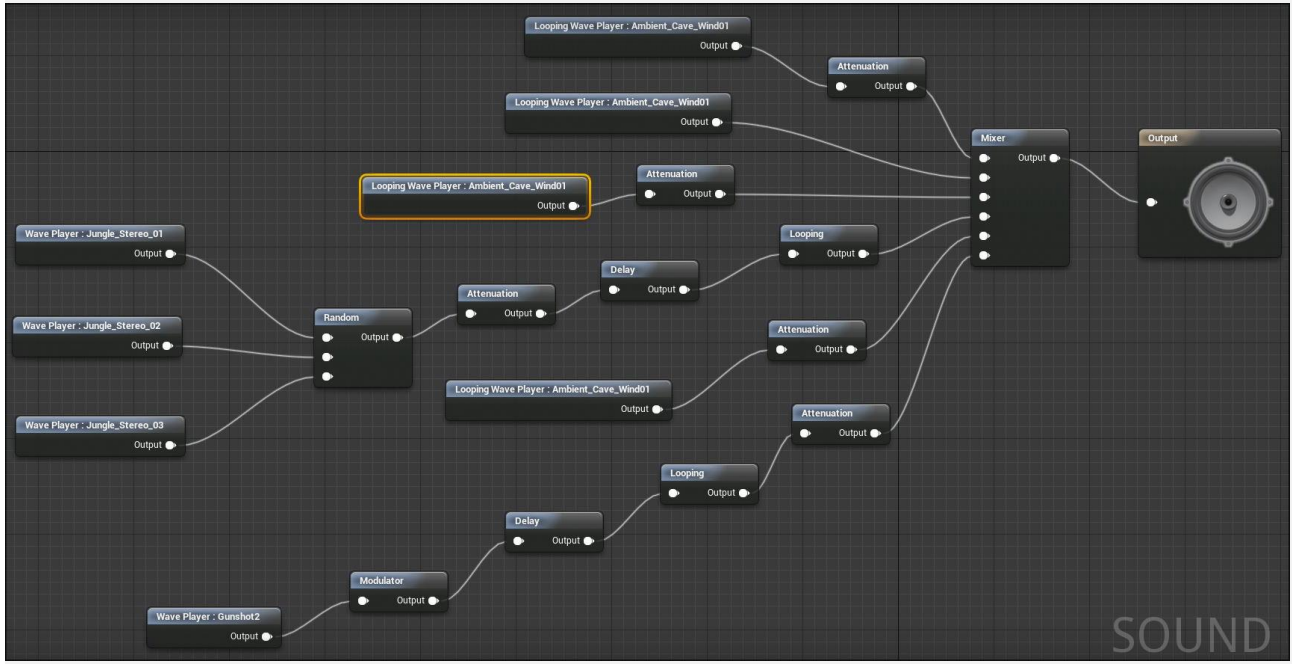
SOUND CUE EDITOR: GRAPH PANEL

The Graph panel displays the flow of the audio from left to right. The output node, which has an image of a speaker on it, represents the final output.

ADVANCED SOUND CUES

You can accomplish incredibly complex behavior with Sound Cues.

The Sound Cue example on the right mixes together sound waves with a variety of properties, including attenuation, randomization, looping, and delays.

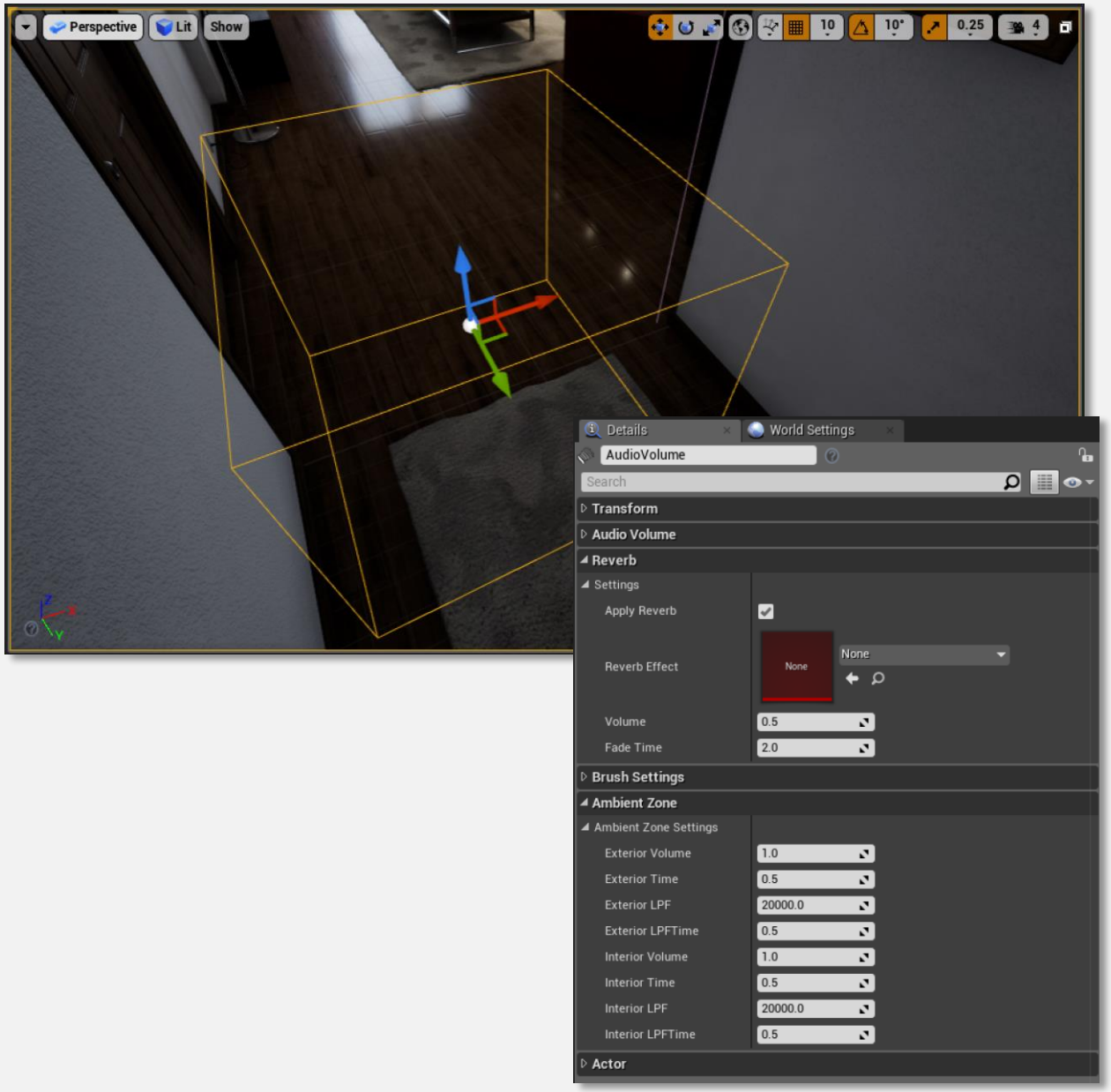


AUDIO VOLUMES

Audio volumes are not Sound assets, but they can be used to control and apply various sounds in a scene.

You can also use them in zones to control where sounds can be heard from.

For example, an audio volume in a small tunnel may have a reverb effect to simulate the bouncy echo acoustics you'd expect to hear in such a tunnel.



REVERB ASSET

Reverb Effect is another Sound asset class like Sound Attenuation.

You can set up a collection of your own reverb effects that you can assign to audio volumes.

Reverb effects allow you to control elements such as reverb, echo, air absorption, and other parameters. You can easily adjust and apply them to any audio volume placed in a Level.