Soul Link spawner

Manual

Version 1.4.0

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magique
productions ltd

Table of Contents

Introduction

This document is intended to give detailed information on how to use the various features of SoulLink Spawner, including troubleshooting tips and general things to consider.

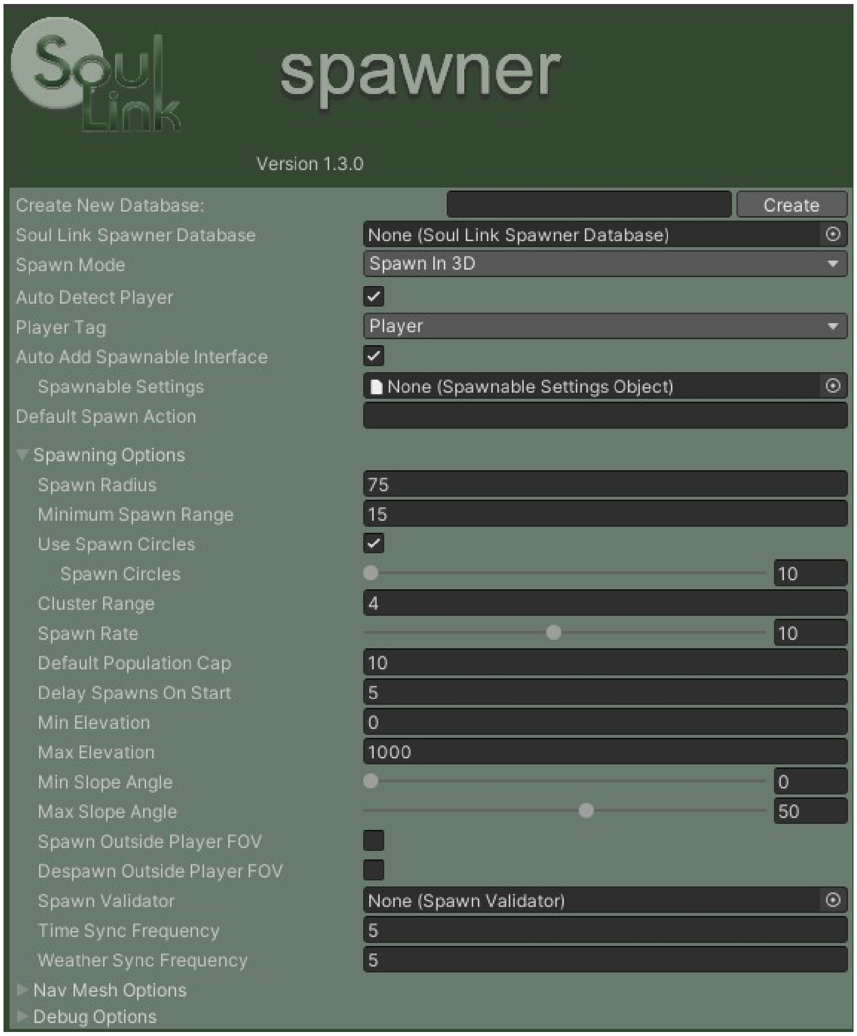
Note that all screenshots still say Version 1.3.0. Screenshots have not been updated from version 1.3.0 because there have been no changes to the user interface. The primary update for this version is multiplayer integration with NetCode for GameObjects and Mirror.

Getting Started

Please see the instructions in the Installation Guide, Integration Guide and Quick Start Guide to get Spawner up and running. Once you have followed those steps, this document will guide you in the proper use of Spawner and all the options available.

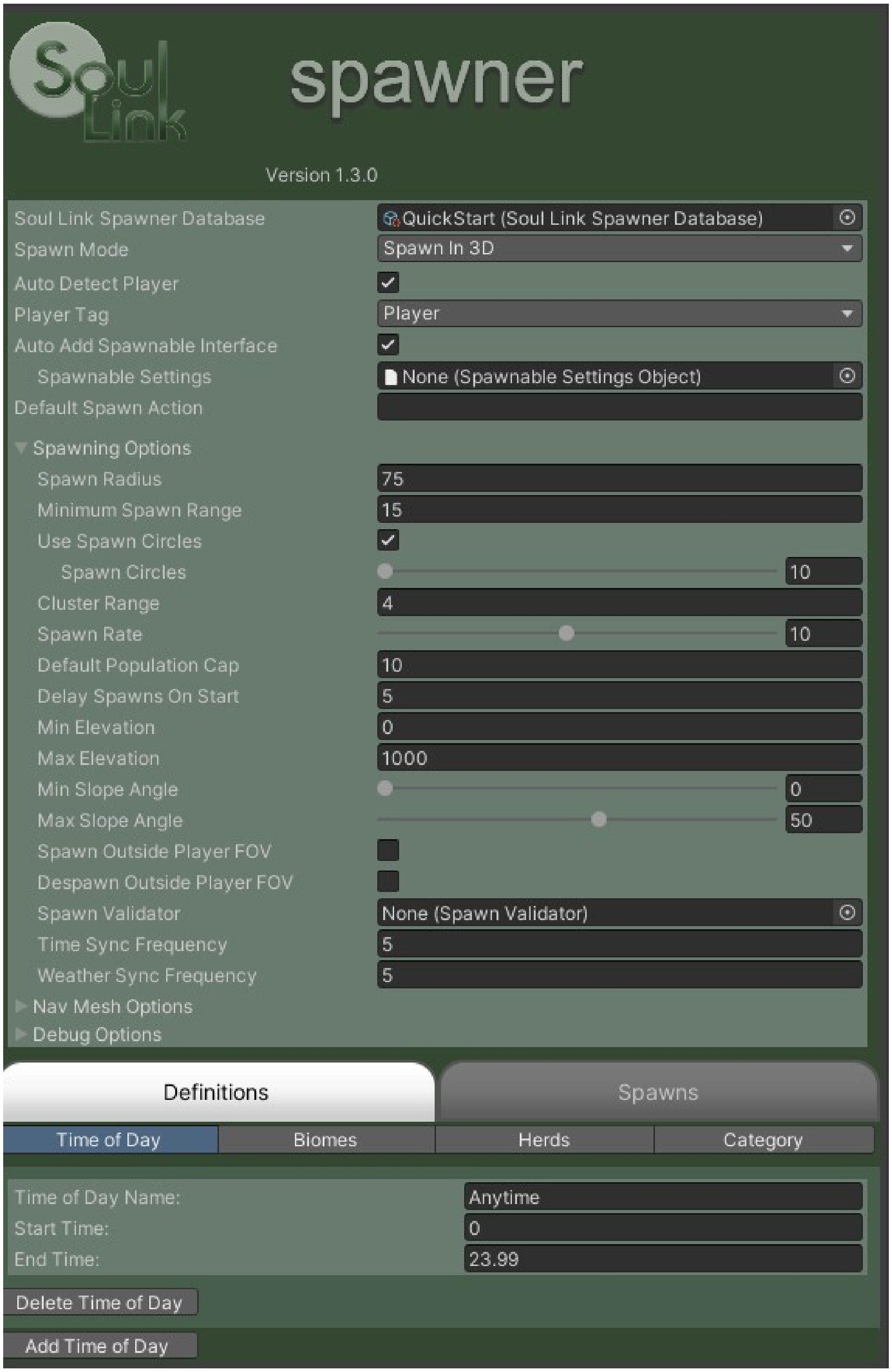
SoulLink Spawner Component

Selecting the SoulLink Spawner component in the scene hierarchy will show the following in the Unity Inspector:



Create New Database:	Create
Soul Link Spawner Database	None (Soul Link Spawner Database)
Spawn Mode	Spawn In 3D
Auto Detect Player	☑
Player Tag	Player
Auto Add Spawnable Interface	☑
Spawnable Settings	None (Spawnable Settings Object)
Default Spawn Action	
▼ Spawning Options	
Spawn Radius	75
Minimum Spawn Range	15
Use Spawn Circles	☑
Spawn Circles	10
Cluster Range	4
Spawn Rate	10
Default Population Cap	10
Delay Spawns On Start	5
Min Elevation	0
Max Elevation	1000
Min Slope Angle	0
Max Slope Angle	50
Spawn Outside Player FOV	☐
Despawn Outside Player FOV	☐
Spawn Validator	None (Spawn Validator)
Time Sync Frequency	5
Weather Sync Frequency	5
▶ Nav Mesh Options	
▶ Debug Options	

Once you have created a SoulLink Spawner Database, the inspector will look as follows:



Soul Link Spawner Database	QuickStart (Soul Link Spawner Database)
Spawn Mode	Spawn In 3D
Auto Detect Player	☑
Player Tag	Player
Auto Add Spawnable Interface	☑
Spawnable Settings	None (Spawnable Settings Object)
Default Spawn Action	
Spawning Options	
Spawn Radius	75
Minimum Spawn Range	15
Use Spawn Circles	☑
Spawn Circles	10
Cluster Range	4
Spawn Rate	10
Default Population Cap	10
Delay Spawns On Start	5
Min Elevation	0
Max Elevation	1000
Min Slope Angle	0
Max Slope Angle	50
Spawn Outside Player FOV	□
Despawn Outside Player FOV	□
Spawn Validator	None (Spawn Validator)
Time Sync Frequency	5
Weather Sync Frequency	5
Nav Mesh Options	
Debug Options	

Time of Day Name:	Anytime
Start Time:	0
End Time:	23.99

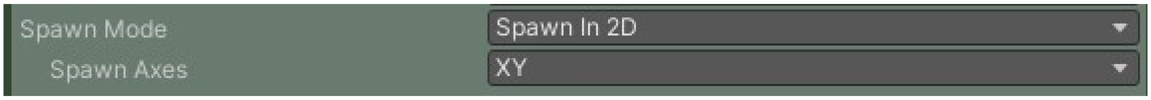
The following describe the fields in the inspector.

<u>SoulLink Spawner Database</u>
This points to the scriptable object database that stores all the biome, time of day, category, and spawn

data.

Spawn Mode

This allows you to specify whether you are spawning in 2D or 3D mode. The 2D mode is useful for sprite based shoot 'em up and RPG games. If you select 2D then you will be given the option to select which axes to spawn on.



Spawn Mode: Spawn In 2D
Spawn Axes: XY

Keep the default setting if you are using Unity's default 2D mode.

Auto Detect Player

Check this if you want SoulLink Spawner to automatically detect your player at run-time. If your player object is spawned at run-time, you may need to uncheck this option and use the AssignPlayer script instead. The AssignPlayer script can be attached to your player prefab and it will automatically assign its player reference to Spawner when the player is spawned.

Player Tag

Select the Tag that is used to identify your player so that the Auto Detect Player feature can find the player controller in your scene at run-time.

Auto Add Spawnable Interface

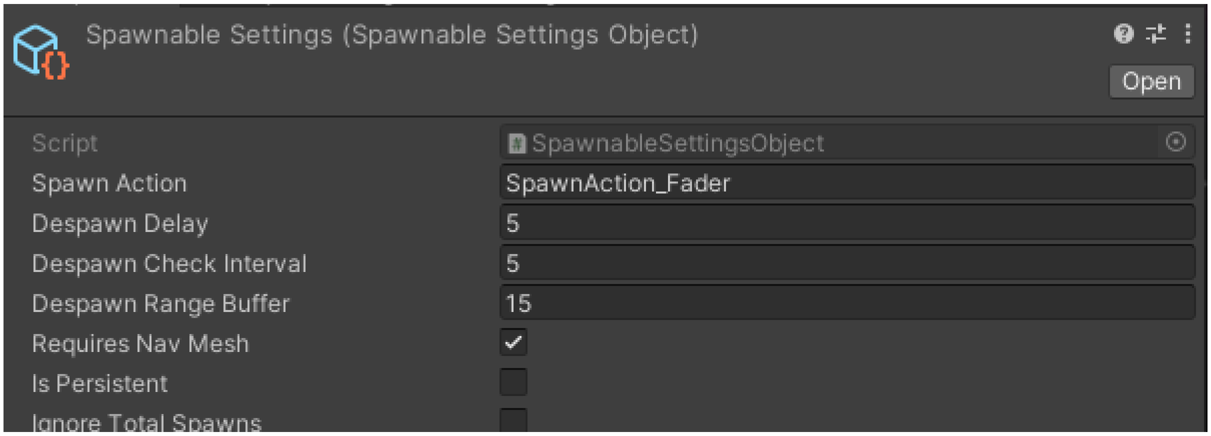
Check this if you want Spawner to automatically add the best possible Spawnable interface to your prefabs when you add it to Spawner. There are 5 possibilities at this time. Spawner can detect whether or not your prefab is Emerald AI, Invector FSM AI, GKC AI, Malbers Animal Controller, or something else. The following are the components that will be auto added based on detection.

SoulLink Spawner Detects	Component Auto Added
Emerald AI	Spawnable_EmeraldAI
Emerald AI 2024	Spawnable_EmeraldAI24
Invector FSM AI	Spawnable_InvectorFSMAI
GKC AI	Spawnable_GKCAI
Malbers Animal Controller	Spawnable_MAC
Survival Engine or Farming Engine	Spawnable_SurvivalEngine
Other	Spawnable

Note: Currently, custom Spawnable components can not be detected or added. This is under investigation and may be added in the future.

Spawnable Settings

This field is available if you've checked the *Auto Add Spawnable Interface* option. This allows you to specify a previously created SpawnableSettingsObject that will be used to set the values of your auto added spawnable components. To create a SpawnableSettingObject, you can do it from the Assets menu by selecting Assets/Create/SoulLink/Spawner/Spawnable Settings. You will create a scriptable object with the following settings:



Spawnable Settings (Spawnable Settings Object)

Script	SpawnableSettingsObject
Spawn Action	SpawnAction_Fader
Despawn Delay	5
Despawn Check Interval	5
Despawn Range Buffer	15
Requires Nav Mesh	☑
Is Persistent	☐
Ignore Total Spawns	☐

Once you've created this and changed the fields to your satisfaction, you can drag the object into the Spawnable Settings field. When the appropriate Spawnable component is added to your prefab, these settings will be copied to that prefab.

Default Spawn Action

Version 1.3.0 introduced a new feature called Spawn Action. This replaces the previous fading feature for spawns and allows you to do more than just fade in/fade out when spawning/despawning. If you want a spawn action to be added to your prefabs automatically when you add a prefab to Spawner, type in the name of the spawn action component here. Currently, *SpawnAction_Fader* and *SpawnAction_Scaler* are the only options. See the section on Spawnable Component for more details on these options.

Spawning Options

Spawn Radius

The maximum range that an object will spawn away from the player's position.

NOTE: This also represents the range at which an object will begin to despawn. An object will despawn when it leaves this radius plus any despawn buffer that is defined in the Spawnable component.

Minimum Spawn Range

The minimum distance away from the player that an object will spawn. Use larger values to avoid having object spawn right on top of the player.

Spawn Circles

In order for Spawner to evenly distribute spawns around the player, the system generates spawns in consecutive concentric circles around the player out to the maximum spawn radius. Adjust this value to increase or decrease the resolution in order to get the desired results.

Cluster Range

This defines how closely packed the spawns can be when spawning. The default cluster range of 4 will permit only a single spawn of this type from existing within 4 units of any other spawn of the same type. If you are spawning in smaller areas, you will need to reduce this value to insure you can spawn all the desired units otherwise you will receive failures because the spawns are too close.

Spawn Rate

This defines the rate at which the system will generate spawns. The max value of 20 indicates the system will attempt to generate a new spawn every 1/20th of a second. The minimum value of 1 indicates the system will attempt to generate a new spawn once every second.

Default Population Cap

This defines the default population cap that will be set for all new spawns that are added to Spawner.

Delay Spawns On Start

This setting allows you to delay spawning any object for the specified length of time after the scene runs. The default value is 5 seconds.

Min Elevation

This specifies the global minimum elevation required to spawn an object. This value can be overridden per spawn.

Max Elevation

This specifies the global maximum elevation required to spawn an object. This value can be overridden per spawn.

Min Slope Angle

This specifies the global minimum slope angle required to spawn an object. This value can be overridden per spawn.

Max Slope Angle

This specifies the global maximum slope angle required to spawn an object. This value can be overridden per spawn.

Spawn Outside Player FOV

If checked, the object will never spawn when they are within the player's FOV. Note that this can cause the areas directly in front of the player to remain bare until the player looks around the scene and is no longer looking in that direction.

Despawn Outside Player FOV

If checked, the object will never despawn when they are within the player's FOV.

Spawn Validator

If you wish to have more customized control over how spawns are generated, assign an object with a SpawnValidator script to this field. More details on how to create and use a SpawnValidator can be found later in this manual.

Time Sync Frequency

This is the frequency at which the system will synchronize the time of day with your sky system. The default is 5 seconds.

Weather Sync Frequency

This is the frequency at which the system will synchronize the weather with your weather system. The default is 5 seconds.

Biome Threshold

This value indicates the minimum influence that a Biome must have before being considered for spawns in that Biome. For example, if the threshold is set to .5 and the area currently only has an influence of .4 then that specific biome will not be considered for spawns defined in that biome.

Note: This is only used for MapMagic biomes. Custom biomes will solely be based on the specific texture rules defined for that biome.

Nav Mesh Options

Nav Mesh Ignore Layers

This specifies the Layers to ignore when checking for walkable surfaces to place AI on. In addition to the layers you select here, the Ignore Raycast layer will automatically be added at run-time.

This allows you to prevent an AI from spawning on a walkable surface that is baked into the navmesh. For example, you may have large rocks that are walkable, but you don't want the AI to spawn on them. For this use case you should add those rocks to a special layer and add that layer here.

Raycast Distance

The distance to check above the terrain for walkable surfaces to place a spawn on. This should be very low for indoor environments.

Generate Nav Mesh

If checked, then nav meshes will be generated dynamically at run-time. If not checked, it is assumed that you have already manually baked a nav mesh for your scene.

This is an advanced feature normally reserved only for scenes that cannot pre-bake a navigation mesh or for testing purposes. Do not turn this feature on unless you know how to use it properly. This feature will not work properly if you do not have all the right things in place. Refer to the Integration Guide and look for Map Magic 2. This section explains the steps required to use this feature properly.

Cell Divisions
This option is only available if you have checked Generate Nav Mesh. This determines how many nav mesh areas each terrain tile will contain. A value of 1, for example, will generate a single nav mesh for the entire terrain tile. A value of 8 will generate an 8 x 8 grid of nav mesh areas. The smaller the cell divisions, the longer it will take for nav meshes to be built when AI's spawn.

Nav Check Radius
This indicates how large of an area should be checked when an AI is spawned to determine if nav meshes have already been built. The larger the radius, the more nav mesh areas that may be impacted. Each nav mesh area that requires building will be triggered asynchronously and when they have been fully built, the AI will spawn. Specifying too small of an area may cause an AI to be unable to move to areas of the terrain that would otherwise be valid based on its wander range, for example. Eventually, however, when more nav meshes are built for other AI throughout the terrain, the unavailable areas will become available.

Agent Slope
This specifies the maximum slope angle that an AI agent can walk on.

Agent Height
This specifies the agent height for purposes of building a valid nav mesh.

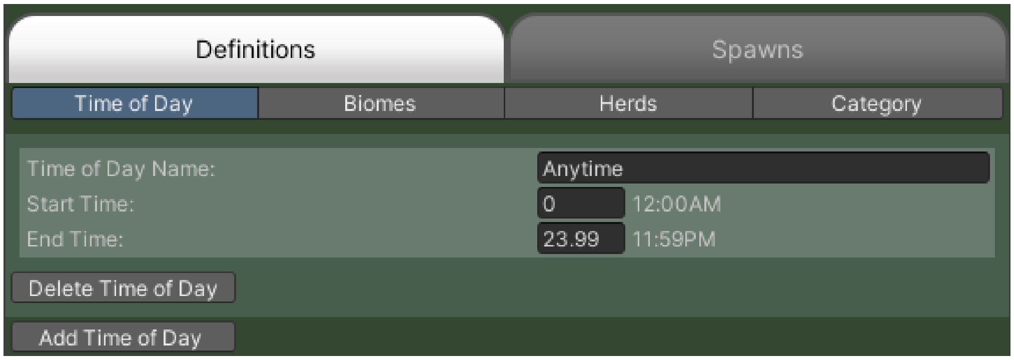
Debug Options

Disable Biome Spawns
This is useful for debugging Area spawns. This will disable all spawns defined under the ***by Biome*** section and only allow spawns to be generated from the ***by Area*** section.

Disable Area Spawns
This is useful for debugging Biome spawns. This will disable all spawns defined under ***by Area*** and only allow spawns to be generated from the ***by Biome*** section.

Time of Day

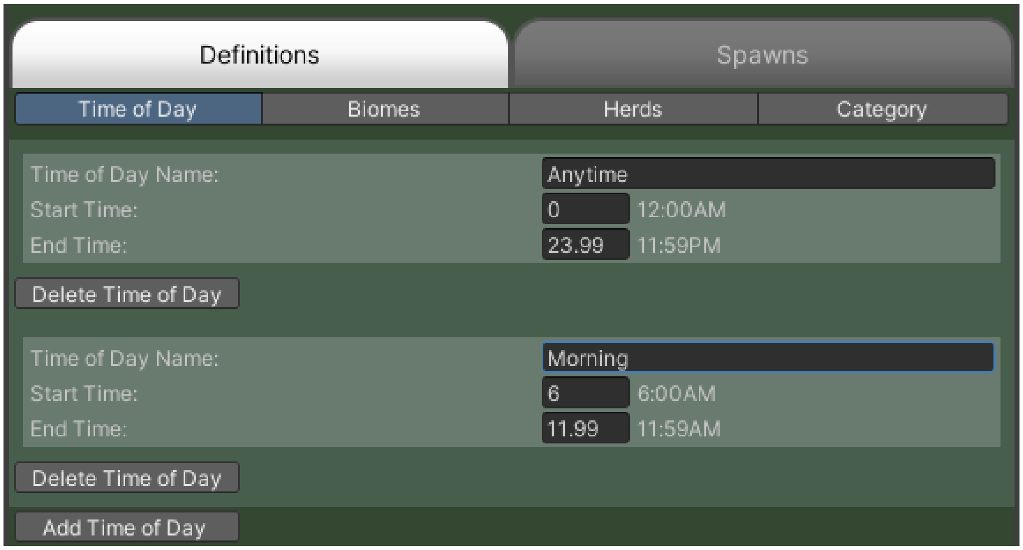
Spawner automatically adds an Anytime time of day to any new database. If you want to add more time of day options, go to Definitions and select Time of Day. You will see the following:



Time of Day Name: Anytime
Start Time: 0 12:00AM
End Time: 23.99 11:59PM

This is where you will define the time of day ranges that you wish to use for restricting your spawning.

Click the Add Time of Day button to add a new time of day definition.



Time of Day Name: Anytime
Start Time: 0 12:00AM
End Time: 23.99 11:59PM

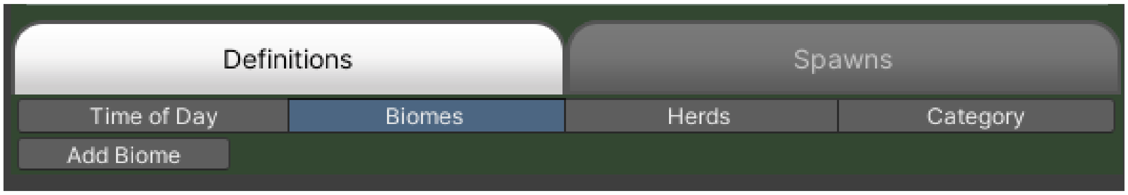
Time of Day Name: Morning
Start Time: 6 6:00AM
End Time: 11.99 11:59AM

In this example, we've added a time of day entry called Morning and set the Start Time to 6 and the End Time to 11.99. This covers the period from 6am to 11:59 am.

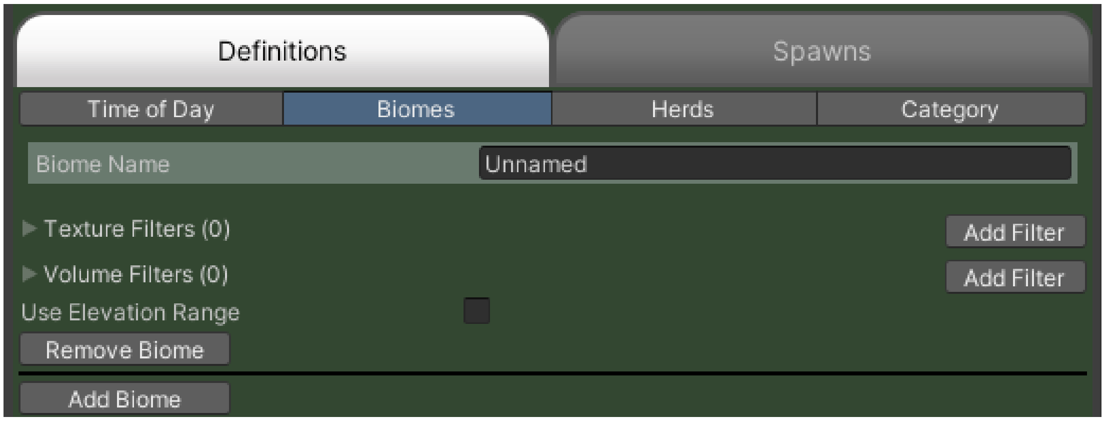
Biomes

If you are not using MapMagic 2, you will also need to define Biomes based on some texture rules. If you are using MapMagic 2, you can skip this step because Biomes will automatically be discovered and the list populated for you.

Select Definitions and then the Biomes tab. You will initially see the following:



Click Add Biome to create a new biome.



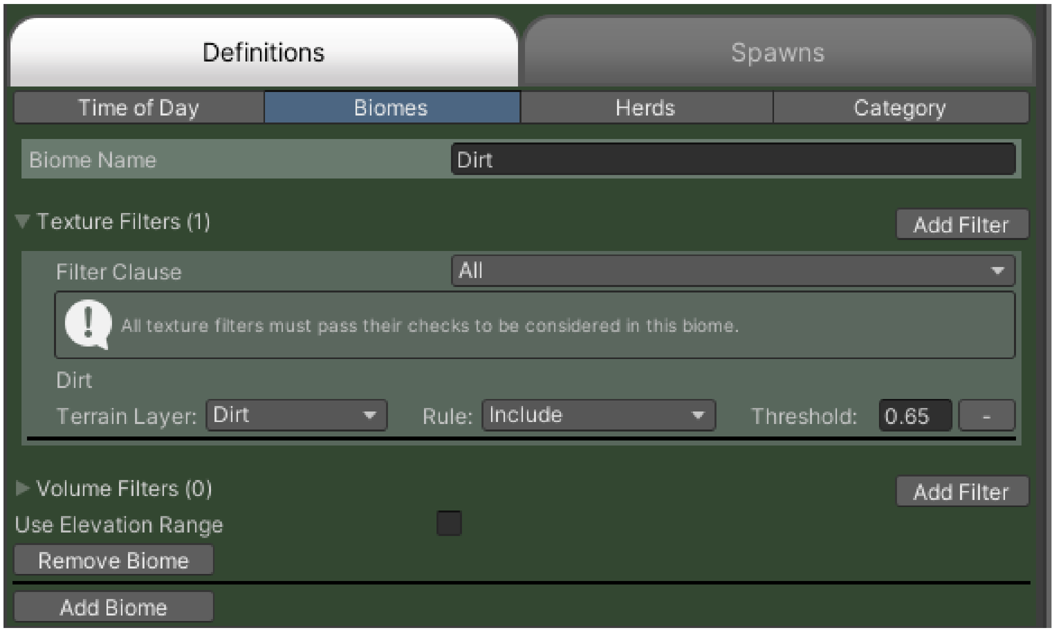
Biome Name: Unnamed

Use Elevation Range ☐

The Biome name defaults to Unnamed so be sure to change the name to something more meaningful.

Texture Filters

Click Add Filter next to Texture Filters to define your texture filters. For our example, we only want the Dirt biome to include a specific dirt texture with a high influence.



Biome Name: Dirt

Filter Clause: All

All texture filters must pass their checks to be considered in this biome.

Dirt

Terrain Layer: Dirt Rule: Include Threshold: 0.65

Use Elevation Range ☐

You may add additional texture filters to further refine your Biome.

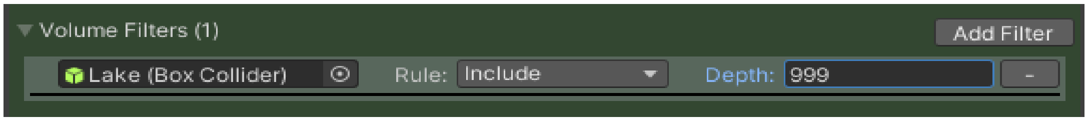
Texture Rule	Description
Include	The terrain must include that texture at the specified threshold value. For example, if you specify a threshold of .65 for a dirt texture then the terrain must have the dirt texture with an influence of at least .65.

Exclude	The terrain must exclude that texture at the specified threshold value. For example, if you specify a threshold of .25 for a rock texture then the terrain must not have the rock texture with an influence of .25 or greater.

You can further control your biome by selecting a Filter Clause of either All or Any. A filter clause of All means that all the filter rules must be met to be considered in this biome. A filter clause of Any means that if any of the filters is true then the area is in that biome.

Volume Filters

Use volume filters to include or exclude spawns in trigger collision volumes. This is especially useful for insuring that spawns will spawn inside a water volume or be restricted from doing so. Click Add Filter next to Volume Filters to define your volume filters.

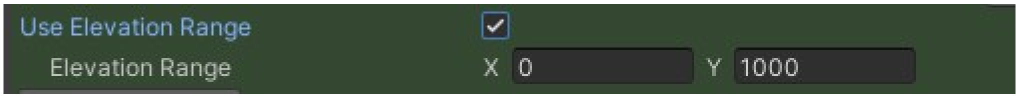


Lake (Box Collider) Rule: Include Depth: 999

Drag a collision volume into the Collider field and select Include or Exclude for the rule. Specify the maximum depth that the spawn is allowed to be at inside the volume. This will allow you to still spawn things along the shore of a body of water, but not deep in the water.

Use Elevation Range

Toggle this on if you want the biome to be restricted to a specific elevation range.



Use Elevation Range ☑

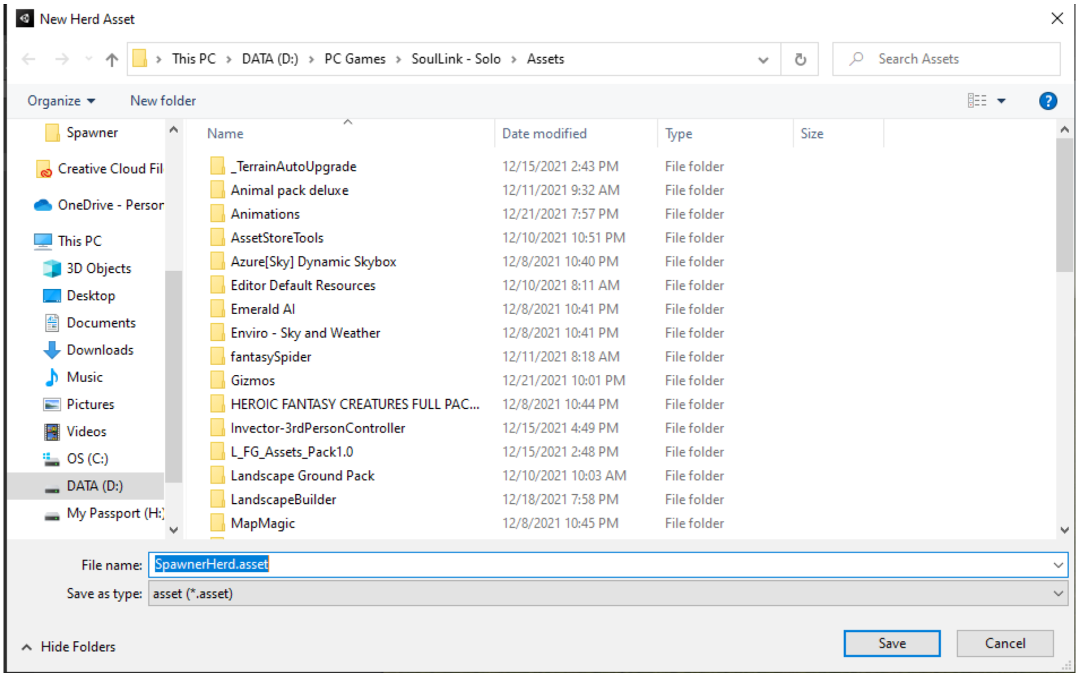
Elevation Range X 0 Y 1000

Herds

The Herd system allows you to define groupings of objects to spawn at a specific point in the game world. This is useful for spawning deer herds, mixed monster groups, etc. To create a Herd, select Definitions and the Herds. You will first see just a button labeled Load Herds. Click this button to load any existing herd definitions from your project. This may take some time as the component scans your entire project for Herd resource assets.

If you have the Demo folder installed, you will see one defined herd called Wander AI.

Herds are global assets that are automatically available to you in SoulLink Spawner independent of the database you've selected. This allows them to be re-used across databases. To create a new herd, click the Add Herd button. You will be asked to specify a name and a location in the project where you want the Herd asset to be created,



New Herd Asset

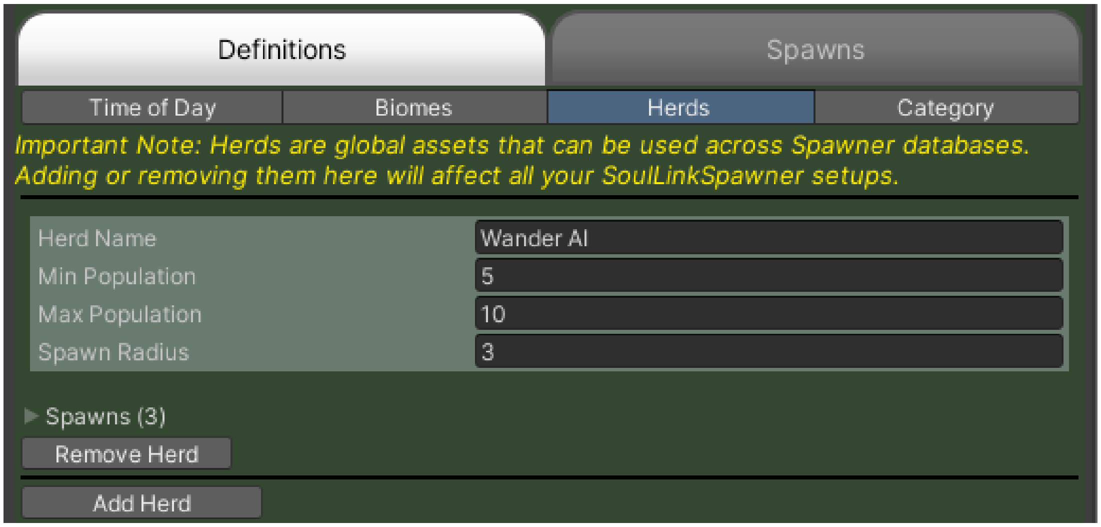
This PC › DATA (D:) › PC Games › SoulLink - Solo › Assets

Name	Date modified	Type	Size
_TerrainAutoUpgrade	12/15/2021 2:43 PM	File folder	
Animal pack deluxe	12/11/2021 9:32 AM	File folder	
Animations	12/21/2021 7:57 PM	File folder	
AssetStoreTools	12/10/2021 10:51 PM	File folder	
Azure[Sky] Dynamic Skybox	12/8/2021 10:40 PM	File folder	
Editor Default Resources	12/10/2021 8:11 AM	File folder	
Emerald AI	12/8/2021 10:41 PM	File folder	
Enviro - Sky and Weather	12/8/2021 10:41 PM	File folder	
fantasySpider	12/11/2021 8:18 AM	File folder	
Gizmos	12/21/2021 10:01 PM	File folder	
HEROIC FANTASY CREATURES FULL PAC...	12/8/2021 10:44 PM	File folder	
Invector-3rdPersonController	12/15/2021 4:49 PM	File folder	
L_FG_Assets_Pack1.0	12/15/2021 2:48 PM	File folder	
Landscape Ground Pack	12/10/2021 10:03 AM	File folder	
LandscapeBuilder	12/18/2021 7:58 PM	File folder	
MapMagic	12/8/2021 10:45 PM	File folder	

File name: SpawnerHerd.asset

Save as type: asset (*.asset)

Name your asset and then click Save.



Important Note: Herds are global assets that can be used across Spawner databases. Adding or removing them here will affect all your SoulLinkSpawner setups.

Herd Name: Wander AI

Min Population: 5

Max Population: 10

Spawn Radius: 3

The Herd name defaults to Unnamed so be sure to change the name to something more meaningful.

Alternatively, you can also create Herds by clicking Asset/Create/SoulLink/Spawner/Herd. A new Herd asset will be created in the current Project Hierarchy folder and will be called SpawnerHerd. Rename the asset as you want and then click on it to edit it in the inspector. Make sure you place your herd assets into a Resources folder or they will not be visible to SoulLink Spawner.

Fill out the basic herd information as follows:

Min Population

The minimum number of spawns to generate for this herd.

Max Population

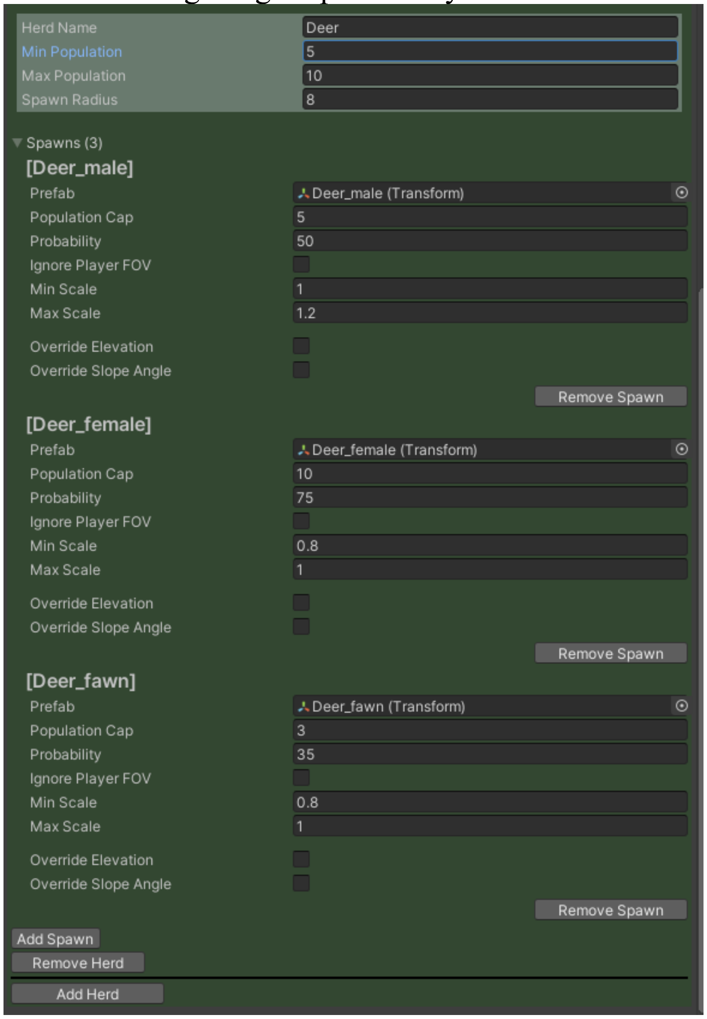
The maximum number of spawns to generate for this herd.

Spawn Radius

The area around the spawn point where spawns will be generated. If the herd randomly generates a population of 10 and the spawn radius is 20 then the 10 spawns will be randomly distributed within a 20 unit radius around the spawn point.

Open the spawn foldout and fill in the spawning parameters. See *Adding Spawns, by Biome* for details on entering spawn information. Note that there are no options for Texture Rules here. Texture Rules are be applied for the entire herd when you specify a herd in the spawning rules in SoulLink Spawner.

In the example below, I've added 3 different types of deer for a deer herd. The herd will consist of bucks, does, and fawns with there being a higher probability of does versus bucks and fawns.



Herd Name: Deer
Min Population: 5
Max Population: 10
Spawn Radius: 8

▼ Spawns (3)

[Deer_male]
Prefab: Deer_male (Transform)
Population Cap: 5
Probability: 50
Ignore Player FOV: ☐
Min Scale: 1
Max Scale: 1.2
Override Elevation: ☐
Override Slope Angle: ☐

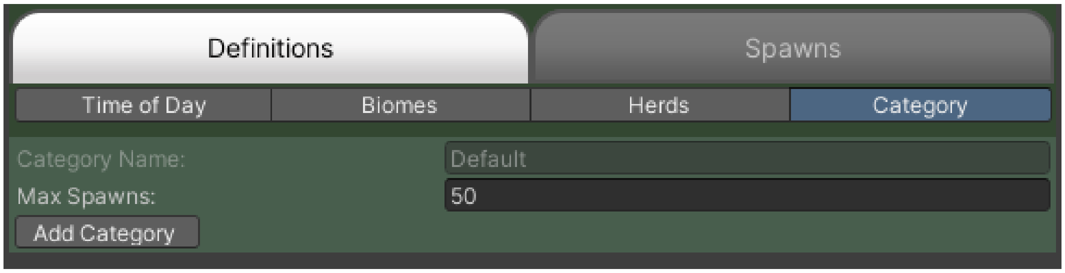
[Deer_female]
Prefab: Deer_female (Transform)
Population Cap: 10
Probability: 75
Ignore Player FOV: ☐
Min Scale: 0.8
Max Scale: 1
Override Elevation: ☐
Override Slope Angle: ☐

[Deer_fawn]
Prefab: Deer_fawn (Transform)
Population Cap: 3
Probability: 35
Ignore Player FOV: ☐
Min Scale: 0.8
Max Scale: 1
Override Elevation: ☐
Override Slope Angle: ☐

Once you have herds defined, you can select the Prefab Type of Herd and drag the herd reference into that field instead of an individual prefab.

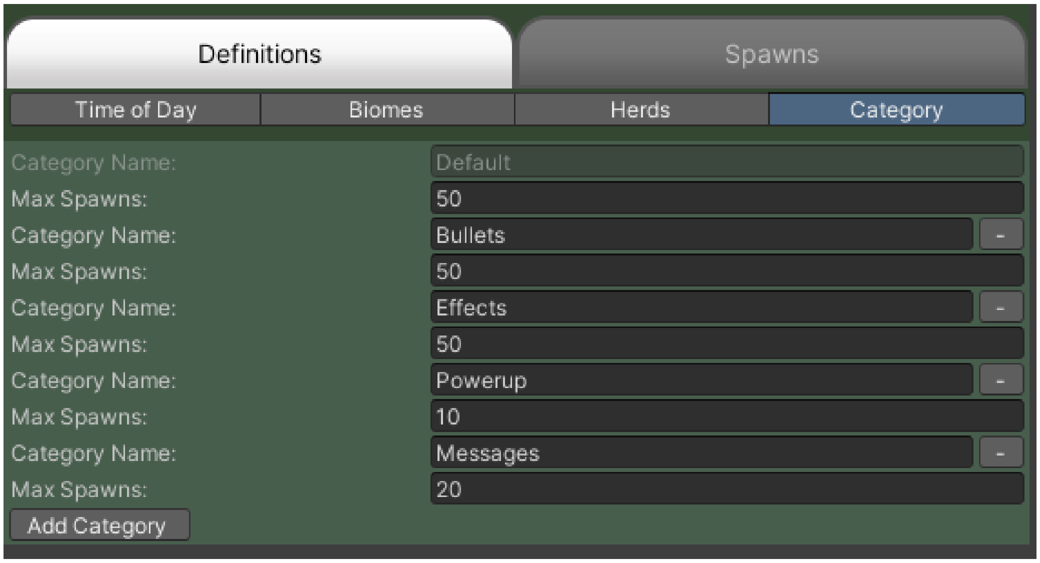
Category

Click on Definitions and then Category to go to category definitions.



Category Name: Default
Max Spawns: 50

Spawner automatically adds a Default category. You can spawn everything from this category if you want to, but if you want finer control over maximum spawns based on the type of spawn then you can add more categories here. Below is the setup used in the 2D Shmup demo provided with Spawner in the Demos folder.



Category Name: Default
Max Spawns: 50
Category Name: Bullets
Max Spawns: 50
Category Name: Effects
Max Spawns: 50
Category Name: Powerup
Max Spawns: 10
Category Name: Messages
Max Spawns: 20

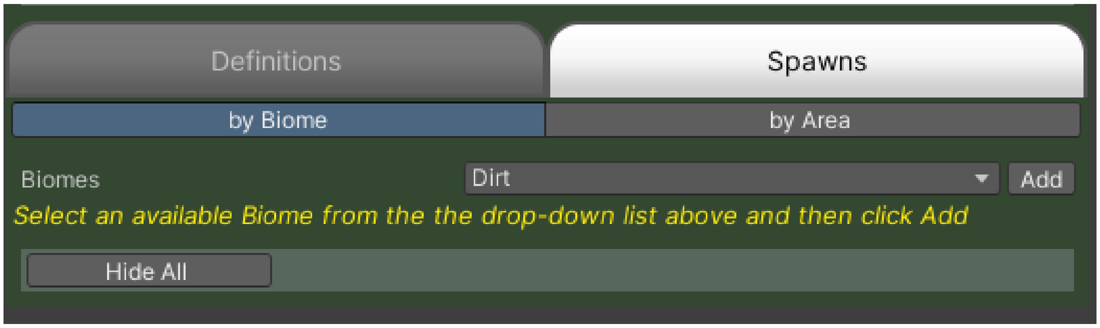
When you set up spawning rules, you will select which category your prefabs spawn into.

Adding Spawns

Now that you have set up some Time of Day, Biome, Herd, and Category definitions, you can begin adding spawns to your scene. You have the choice of either adding spawns by Biome or by Area.

by Biome

Select Spawns and then by Biome. Now you will see the following:

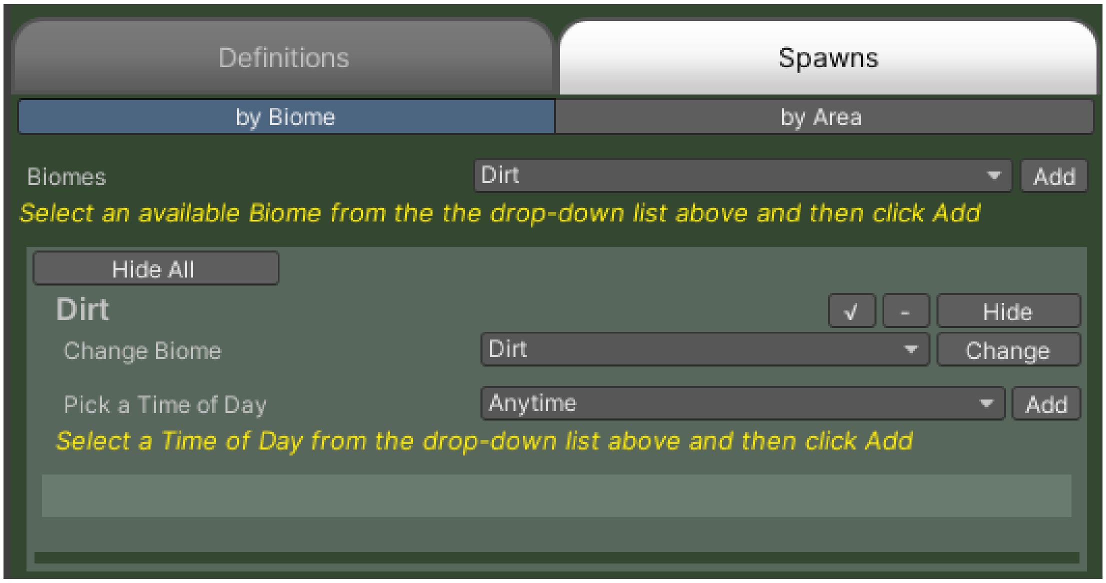


Biomes Dirt

Select an available Biome from the the drop-down list above and then click Add

The Biomes that you defined will be in the Biomes drop-down list. Or, if you are Using MapMagic 2, the drop-down will automatically be populated based on the exported Biomes from your map.

Select an available Biome from the drop-down list and then click the Add button.



Biomes Dirt

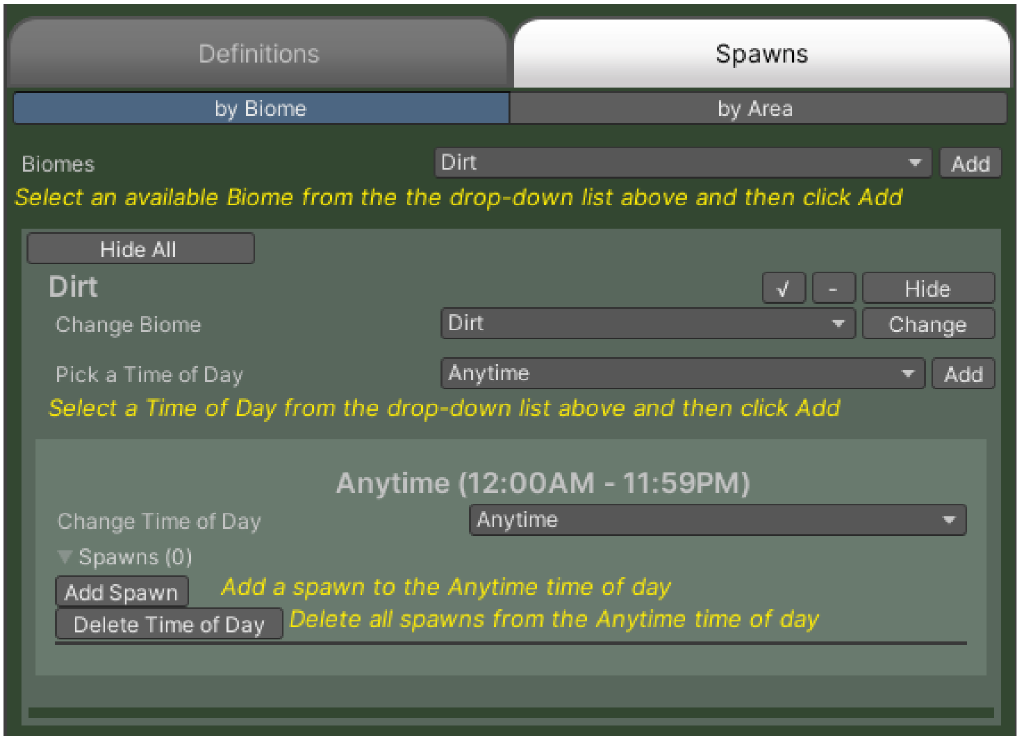
Select an available Biome from the the drop-down list above and then click Add

Change Biome Dirt

Pick a Time of Day Anytime

Select a Time of Day from the drop-down list above and then click Add

Now you will be asked to pick a time of day from the definitions you created earlier. Select a Time of Day from the drop-down list and then click the Add button.



Biomes: Dirt

Select an available Biome from the the drop-down list above and then click Add

Dirt

Change Biome: Dirt

Pick a Time of Day: Anytime

Select a Time of Day from the drop-down list above and then click Add

Anytime (12:00AM - 11:59PM)

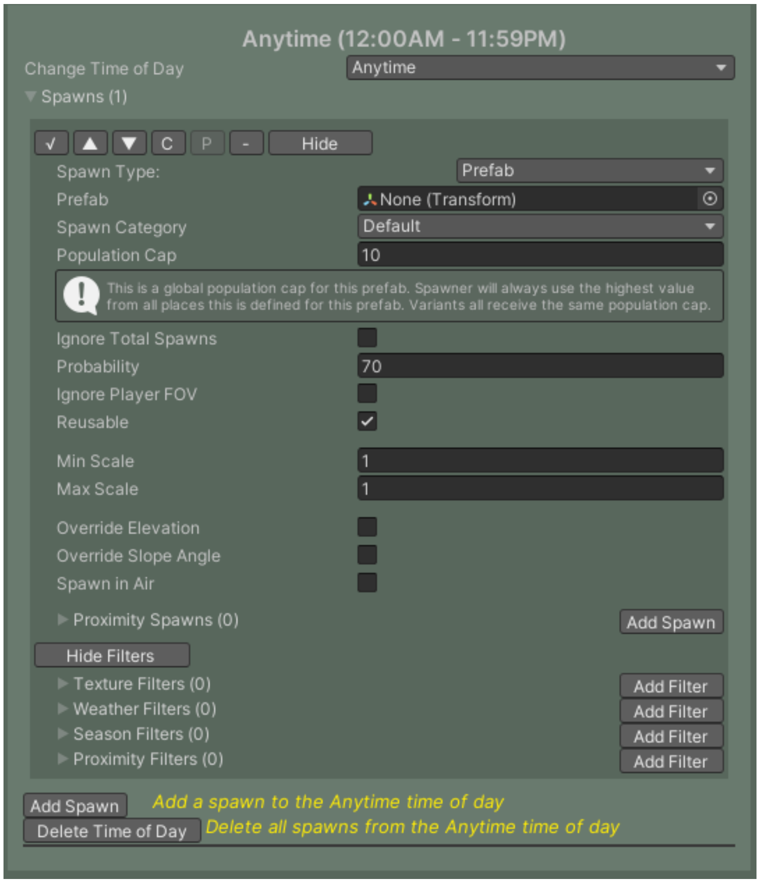
Change Time of Day: Anytime

Spawns (0)

Add a spawn to the Anytime time of day

Delete all spawns from the Anytime time of day

Now, click the Add Spawn button to begin adding a spawn definition.



Anytime (12:00AM - 11:59PM)

Change Time of Day: Anytime

Spawns (1)

Spawn Type: Prefab

Prefab: None (Transform)

Spawn Category: Default

Population Cap: 10

This is a global population cap for this prefab. Spawner will always use the highest value from all places this is defined for this prefab. Variants all receive the same population cap.

Ignore Total Spawns: □

Probability: 70

Ignore Player FOV: □

Reusable: ☑

Min Scale: 1

Max Scale: 1

Override Elevation: □

Override Slope Angle: □

Spawn in Air: □

Proximity Spawns (0)

Texture Filters (0)

Weather Filters (0)

Season Filters (0)

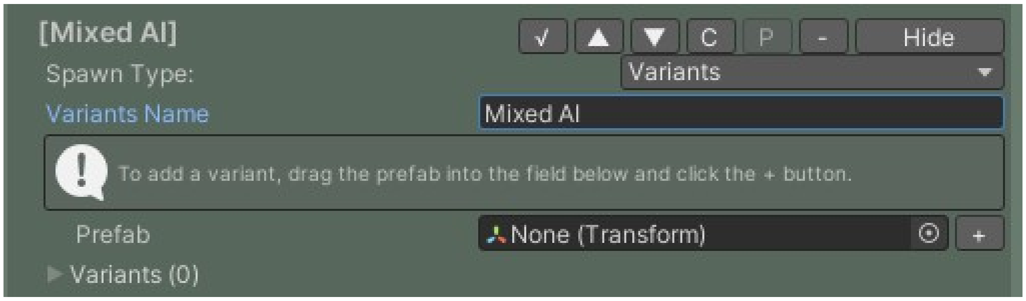
Proximity Filters (0)

Add a spawn to the Anytime time of day

Delete all spawns from the Anytime time of day

Select Prefab, Herd or Variants from the Spawn Type drop-down.

Drag a prefab into the Prefab field or a Herd asset into the Herd field. If you selected Variants, enter a name for the variants then drag prefabs into the Prefab field one at a time and click the + button to add it to the list.



[Mixed AI]

Spawn Type: Variants

Variants Name: Mixed AI

To add a variant, drag the prefab into the field below and click the + button.

Prefab: None (Transform)

Variants (0)

Then set the general spawning information as follows:

Spawn Category

Select the category to use for this spawn. If no category is selected, it will be assigned Default.

Population Cap
This represents the maximum number of this particular prefab that can be spawned at the same time in the game world. Note that this value is not the total number of this prefab that will ever exist in the world. Since the player can move over many terrain tiles, more of these prefab may spawn over time and exceed this value, but there may never be more than this number at any given time.

Ignore Total Spawns
If this is toggled on, the spawn will not count towards this category's total spawns.

Probability
This is the probability out of 100 that this prefab will spawn whenever Spawner randomly selects this entry as a possible spawn.

Ignore Player FOV
If you have selected Spawn Outside Player FOV from the general SoulLink Spawner settings, this checkbox will allow you to override that for this entry.

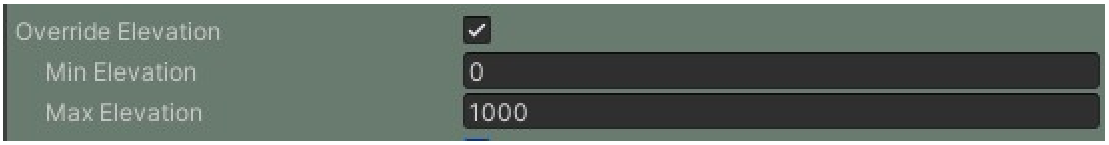
Reusable
Uncheck this field if you don't want this prefab to be re-used more than once. In the case where an AI system does not support re-spawning from an object pool, this allows you to continue to use Spawner without problems. When your object pool runs out, new instances of the AI will be generated instead of being re-used.

Min Scale
Enter a minimum scale for instances of this prefab when they spawn.

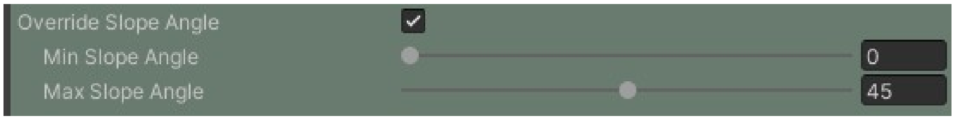
Max Scale
Enter a maximum scale for instances of this prefab when they spawn.

Note: Scaling values entered in the above two fields will be multipliers of the prefab's local scale. For example, if the prefab local scale is 3 then a min/max scale of 1 will keep the prefab always at local scale 3. A min/max scale of 2 will fix the spawns at a local scale of 6. For randomization, provide different values for min/max.

Override Elevation
If checked, you will be given the option to override the min/max elevation for this spawn.


Override Elevation ☑
Min Elevation 0
Max Elevation 1000

Override Slope Angle
If checked, you will be given the option to override the min/max slope angles for this spawn.



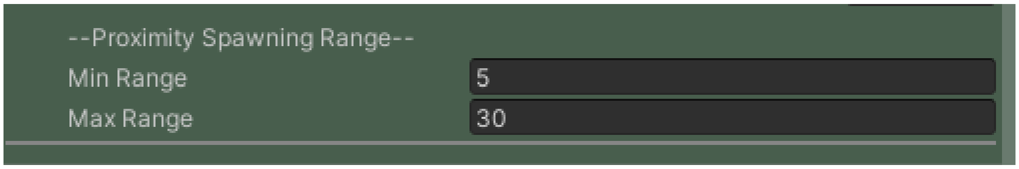
Override Slope Angle ☑
Min Slope Angle 0
Max Slope Angle 45

Spawn in Air

Check this box if your prefab will spawn in the air instead of on the ground. This can be used for flying AI or just to spawn objects that drop from the sky.

Proximity Spawns

Proximity spawns are special spawns that only generate when in close proximity to other spawns. For example, perhaps you want a wolf to have a 50% chance of spawning within 20 units of a deer herd. To create this sort of spawn, you would add a proximity spawn. The details for a proximity spawn are identical to a regular spawn except they also have a Min/Max Range.



--Proximity Spawning Range--
Min Range 5
Max Range 30

Proximity Spawning Range

Min Range

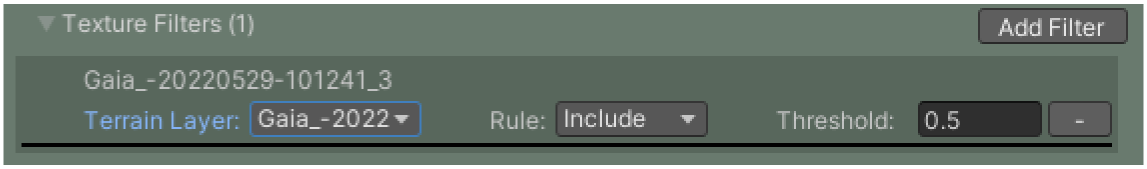
Set the minimum range away from the primary spawn that the proximity spawn with be generated.

Max Range

Set the maximum range away from the primary spawn that the proximity spawn with be generated.

Texture Filters

If you would like to further restrict this prefab's chances of spawning, expand the Texture Filters foldout and add your texture rules.



Texture Filters (1)
Gaia_-20220529-101241_3
Terrain Layer: Gaia_-2022 Rule: Include Threshold: 0.5

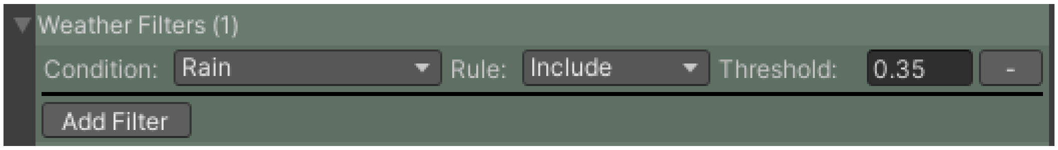
The Terrain Layer drop-down will automatically populate with the available terrain layers defined on your terrain. Select a terrain layer, a rule, and a threshold then click the Add Filter button.

Texture Rule	Description
Include	The generated spawn position must include the specified terrain layer at the required threshold or the prefab will not spawn there.
Exclude	The generated spawn position will be not be considered valid if that position has the specified terrain layer at the specified threshold.

You may freely combine Include and Exclude rules to get the desired results.

Weather Filters

If you would like to further restrict this spawn's chances of spawning, expand the Weather Filters foldout and add your weather rules. You must add a WeatherSystem to your scene before you can use weather filters. Note that some sky systems do not support the Temperature filter, but you can turn on custom temperature settings that are controlled by SoulLink.

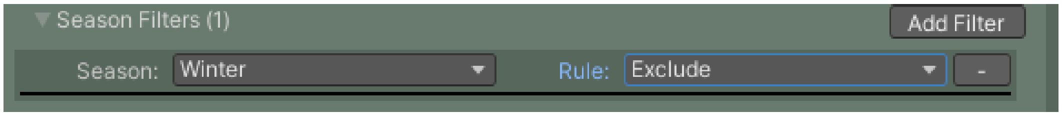


Weather Filters (1)

Condition: Rain Rule: Include Threshold: 0.35

Season Filters

Add a season filter to include/exclude your prefab based on the current season.

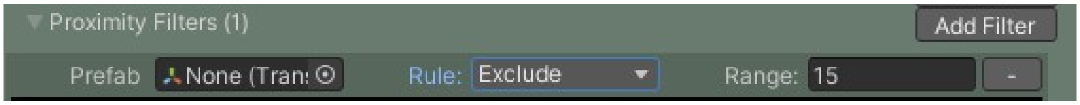


Season Filters (1)

Season: Winter Rule: Exclude

Proximity Filters

Add one or more proximity filters to include/exclude your prefab based on the proximity of other prefabs in your scene. For example, you may wish to prevent a deer herd from spawning if there is a Wolf within 15 units.

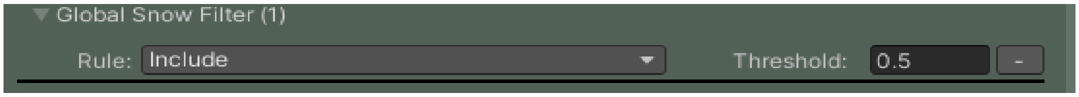


Proximity Filters (1)

Prefab None (Tran: Rule: Exclude Range: 15

Global Snow Filters

If you have installed Global Snow, by Kronnect, you will have an additional filter option available. This will allow you to include or exclude a spawn based on the level of snow at the spawn position.

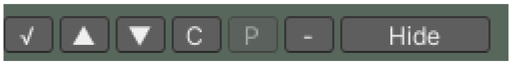


Global Snow Filter (1)

Rule: Include Threshold: 0.5

Spawn Widgets

At the top of every spawn are the following buttons:



Their functions are as follows:

Toggle this check mark to enable or disable this spawn.

Click these buttons to move the spawn up or down in the list for better organization.

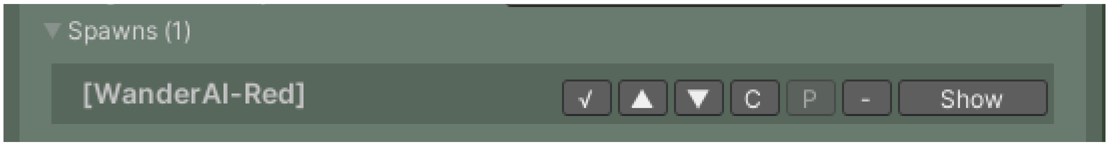
Click the C button to copy this spawn's data into the clipboard. Click the P button on another spawn to paste the values.

Click this button to delete this spawn. You will be prompted for confirmation.

Click this button to hide this spawn's information. When the spawn is hidden, the button will change to a Show button so you can restore the details and edit them.

Example:

When hidden, the spawn details are collapsed and just the spawn name is shown.

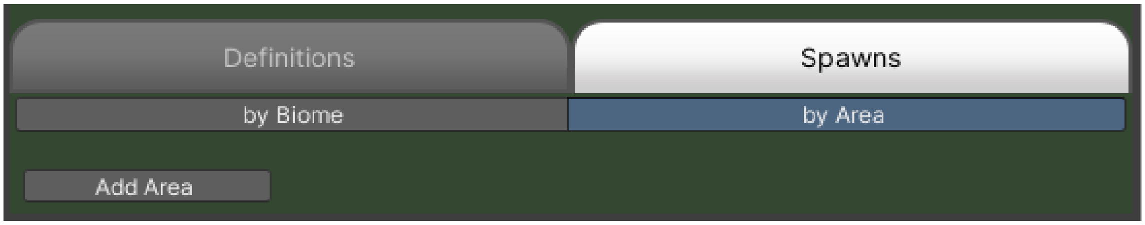


by Area

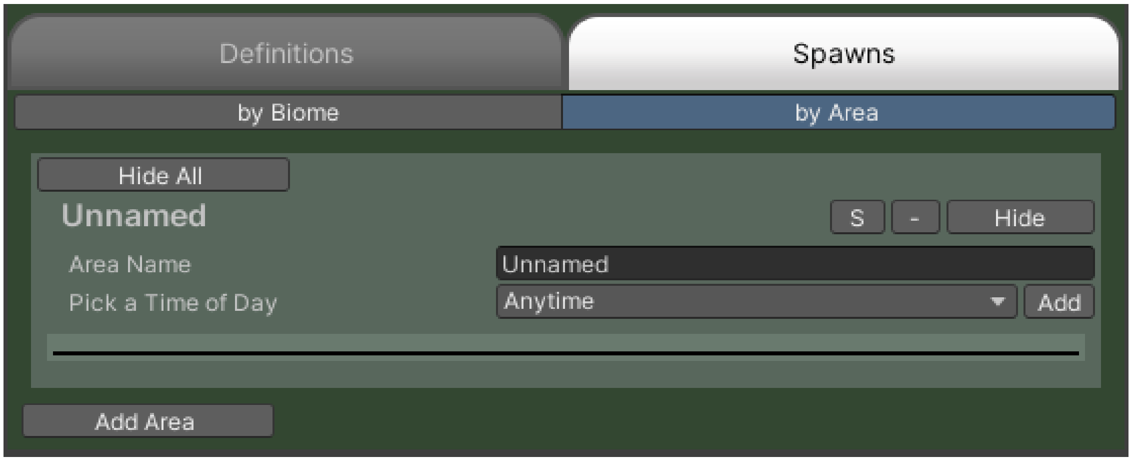
This tab lets you define spawns by specific spawn areas. An area is a named place that you can define in the game world such as a pond, a monster camp, a graveyard, some ruins, etc. These spawns are set up much the same as in Biomes.

Areas can be added in one of two ways. If you want to define an area as a reusable set of spawning information then add them into the Spawner component under Spawns/by Area. However, if you want to define one off areas that don't have their information stored in the Spawner database, you can simply add a SpawnArea component to your scene and choose the Use Local Spawn Data toggle to define the spawn information inside the component itself.

First we will explain how to create an area within the Spawner component. To define a reusable area in Spawner, first go to Spawns/by Area.



To set up a new Area, click the Add Area button.



Unnamed

Area Name: Unnamed

Pick a Time of Day: Anytime

Rename the area to something meaningful.

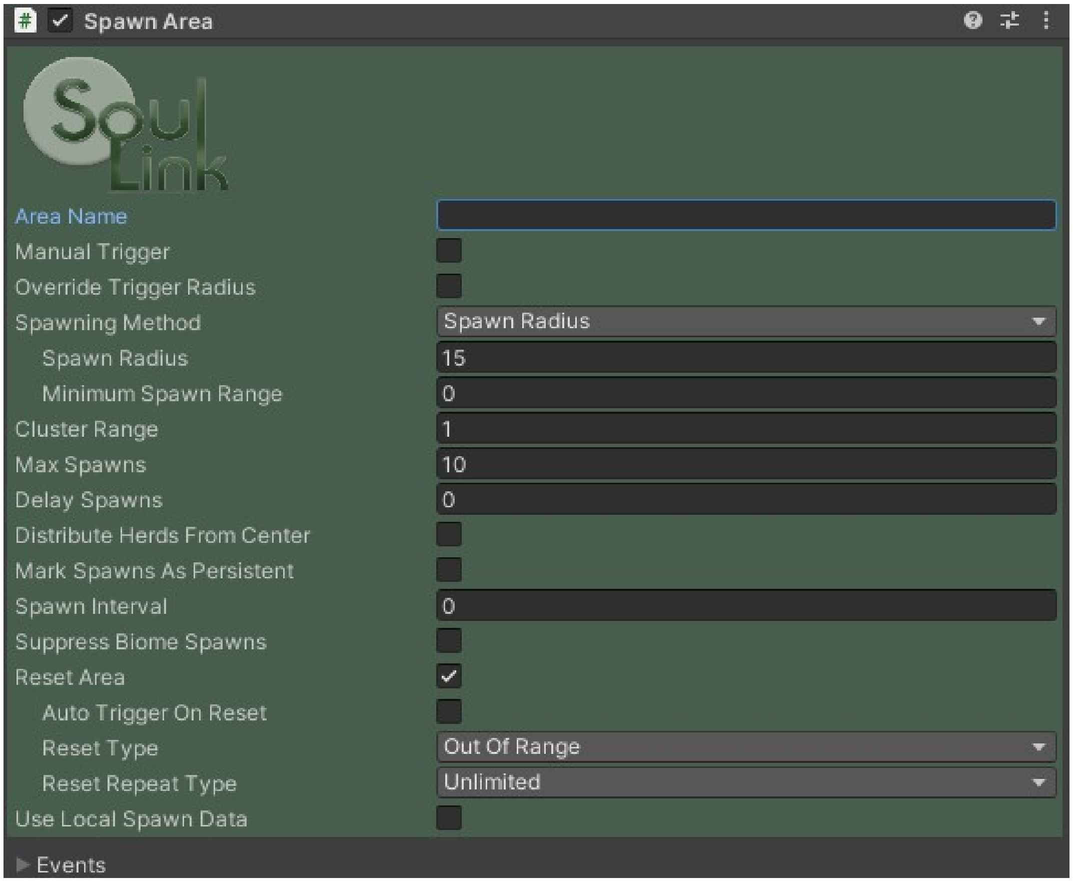
Select a Time of Day from the drop-down list and click Add.

Click the Add Spawn button to add a new spawn and then fill in the fields like you did for Biomes. You may choose Prefab, Herd or Variants spawn types as before.

Create SpawnArea in your scene
To create a SpawnArea in your scene using the spawning parameters defined here, go to the position in your Unity scene view where you want to add it and then click on the S button (i.e. S for Scene). This will create an object in your scene with the specified area name and it will be automatically named SpawnArea-<Area Name> (e.g. SpawnArea-Your Area Name). You can also manually create empty game objects in your scene and add the SpawnArea component to it. See the *SpawnArea Component* section below for more details.

SpawnArea Component

You use the SpawnArea component to place areas in your scene. Add an empty game object to your scene and add the SpawnArea component to it.



☑ Spawn Area

Area Name
Manual Trigger ☐
Override Trigger Radius ☐
Spawning Method: Spawn Radius
Spawn Radius: 15
Minimum Spawn Range: 0
Cluster Range: 1
Max Spawns: 10
Delay Spawns: 0
Distribute Herds From Center ☐
Mark Spawns As Persistent ☐
Spawn Interval: 0
Suppress Biome Spawns ☐
Reset Area ☑
Auto Trigger On Reset ☐
Reset Type: Out Of Range
Reset Repeat Type: Unlimited
Use Local Spawn Data ☐
▶ Events

Area Name
This must exactly match the name of a Area on the Areas tab, unless you toggle the Use Local Spawn Data option.

Manual Trigger
Check this option if you want to trigger the area's spawning through code. If you choose this option then an area will only trigger if the PerformTrigger method is called.

Override Trigger Radius

Check this box to override the global spawn radius.

Trigger Radius

Enter the trigger radius if you have selected Override Trigger Radius. In this example, I've overridden it to a radius of 20 so that the prefab will only spawn when the player is within 20 units of the area.

Spawn Method

Choose the method by which spawns will be generated for this area.

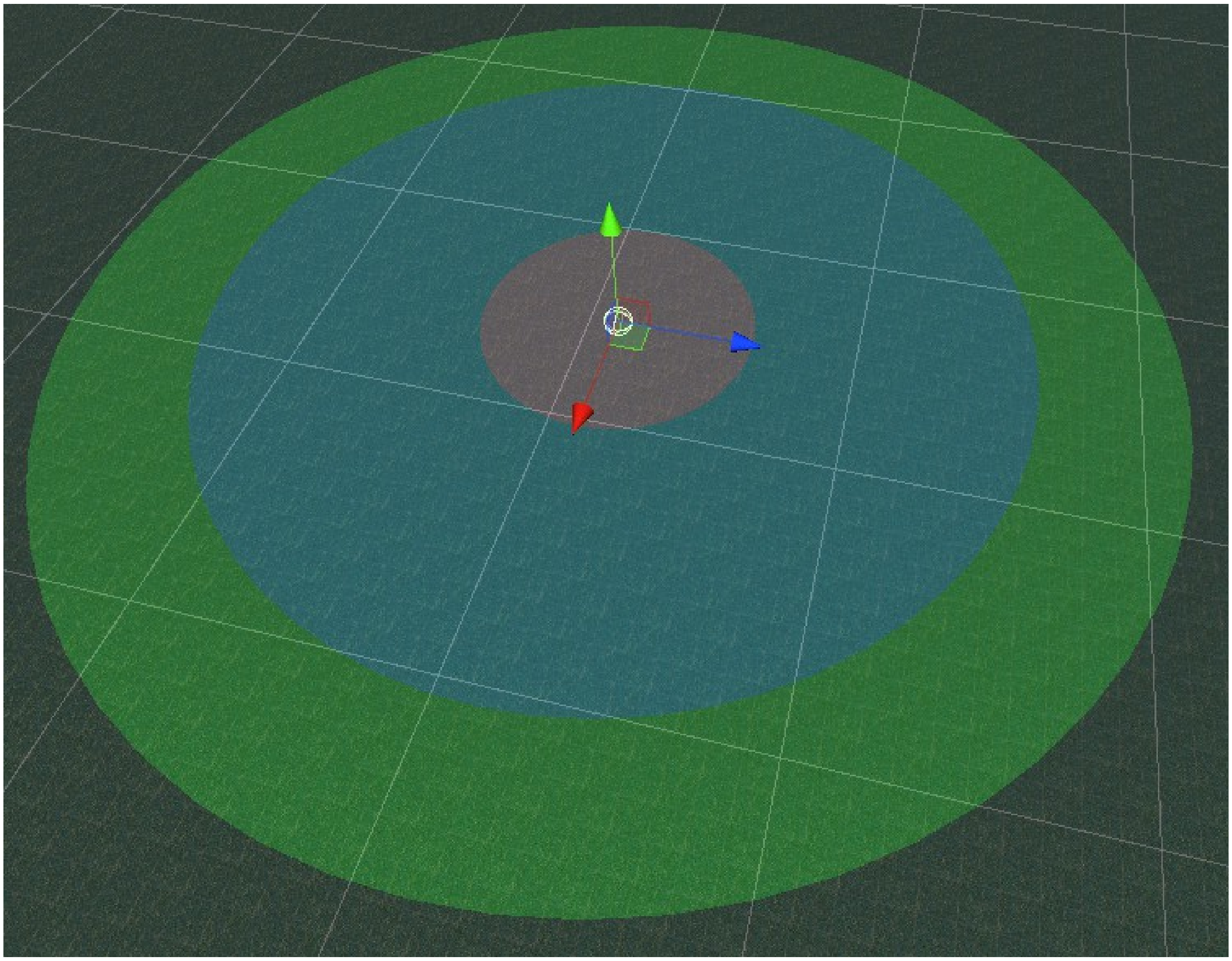
Spawn Method	Description
Spawn Radius	Spawns will be generated in random positions within the specified Spawn Radius and excluding the Minimum Spawn Range
Spawn Bounds	Spawn will be generated within one or more user defined bounds.
Spawn Points	Spawns will be generated at one or more specific user-defined spawning points. This option allows you to specify a spawn radius for each point. If you do not select this option then a spawn will be generated in the exact position of each point. You must create a game object in the scene for each spawn point and add it to the list of spawn points for this area.
Spline	Spawns will be distributed along a spline path. Note that you must have the Dreamtek Splines asset or have implemented a custom spline integration for another third party spline solution.

Spawn Radius

How far out from the SpawnArea position should the prefab spawn. This is only used if the Spawn Method is selected as Spawn Radius.

Minimum Spawn Range

The minimum range from the Area center that a prefab is allowed to spawn. When looking at in Scene view, you will see a red inner circle that represents the no spawn area and an outer blue circle representing the valid spawn area. This is only used if the Spawn Method is selected as Spawn Radius.



The above screenshot shows a visual representation of the 3 radii. The red circle is the minimum spawn range, the blue circle is the spawn radius, and the green circle is the override trigger radius.

Cluster Range

This defines how closely packed the spawns can be when spawning. The default cluster range of 4 will permit only a single spawn of this type from existing within 4 units of any other spawn of the same type. If you are spawning in smaller areas, you will need to reduce this value to insure you can spawn all the desired units otherwise you will receive failures because the spawns are too close.

Max Spawns

The maximum quantity of prefabs to spawn at this location.

Delay Spawns

This is the amount of time in seconds that an area will delay generating spawns when it has been triggered. You may need to set this to a value other than 0 to ensure an area will trigger if the player begins inside of the trigger radius.

Distribute Herds from Center

If checked, any herds specified for the Area will spawn around the center of the area. If unchecked, a random position around the area will be chosen and the herd will spawn in a radius around that point.

Mark Spawns As Persistent

When any item is spawned, it will be marked as persistent. This will force the item to remain in the scene until eliminated. It will not despawn due to out of range or other spawn filters like time of day or weather.

Spawn Interval

This defines the rate at which items will spawn. If set to 0 then the global Spawn rate will be used.

Suppress Biome Spawns

Check this box if you want the usual biome spawns to be disabled within the area's radius. This is useful if you want to have a small civilized area within your game world and don't want the usual wildlife spawning there. For example, you may have a small village inside a forest and you don't want the bears and wolves spawning in the middle of town.

Suppression Radius

This option is available when you toggle the *Suppress Biome Spawns* checkbox. This defines the radius around the area which will suppress biome spawns.

Build Nav Mesh After Spawning

If checked, this will force a nav mesh to be built or re-built in the area surrounding the Spawn Area. This is useful if you are spawning items that will be persistent and be walkable areas for your AI.

Note: This should only be used if you have turned on Generate Nav Mesh in your Nav mesh Options. This is an advanced option and you should fully understand how run-time nav mesh generation works before attempting to use this.

Reset Area

If checked, this SpawnArea will reset base on the specified Reset Type as described below.

Reset Type	Description
Out of Range	The area will automatically reset when the player is out of range. If the area is using an override trigger radius then out of range occurs as soon as the player has exited the trigger radius. If override trigger radius is not in use then out of range occurs when the player is further than the global Spawn Radius defined on the SoulLinkSpawner component under Spawning Options.
Game Time Duration*	The area will automatically reset when a specified game time duration has expired. The Reset Duration field represents game time in hours. You may use fractional units.
Realtime Duration*	The area will automatically reset when a specified real time duration has expired. The Reset Duration field represents real time in seconds.
Elimination*	The area will automatically reset when the AI have all been killed. This is useful for creating a series of enemy waves.

* - These options all expose the Reset Duration as well as Min/Max Change Max Spawns fields. This allows you to specify the reset duration as described in the table above as well as increase/decrease the maximum spawns when a reset occurs. This is useful for creating consecutive waves of increasing difficulty.

Auto Trigger On Reset

Toggle this on to automatically trigger the next wave of items when the area is eligible to reset. This is useful especially for Elimination mode reset where the next wave will begin spawning even if the player has not hit the trigger radius again.

Reset Repeat Type

When Reset Area is toggled on, this option is available. The options are as follows:

Reset Repeat Type	Description
Unlimited	The area will reset will repeat forever.
User Defined	When this option is selected, the Max Resets field is available. Set the value to number of times this area can repeat. Note that this value counts the repeats and not the initial spawn generation. So a value of 2 in this field will result in 3 waves of enemies.

Spawn Boss

Check this box if you want to be able to spawn a boss after a certain number of resets (waves).

Spawn Boss On Wave Number

Enter the wave number that must complete in order to spawn the boss. For example, if the number of resets is 3 then there will be 4 waves because you have the initial wave and then 3 resets. So, if you want to have the boss spawn on the completion of the final wave, then you would set this to 4.

Boss Prefab

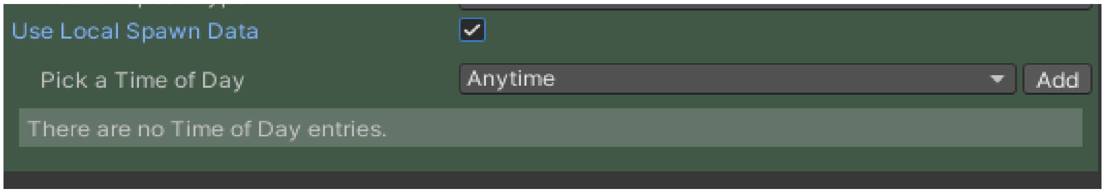
Drag the prefab of the boss into this field.

Boss Spawn Point

Create an empty game object in your scene and position it where you want the boss to spawn. Then drag that game object into this field. If you leave this field blank then the boss will spawn in the exact center of the SpawnArea.

Use Local Spawn Data

If you want to create independent spawn areas that are not tied to the Spawner database, toggle this option on. Once you do that, the Area Name is no longer required to be in the database and you can enter spawn data that applies only to this spawn area game object.

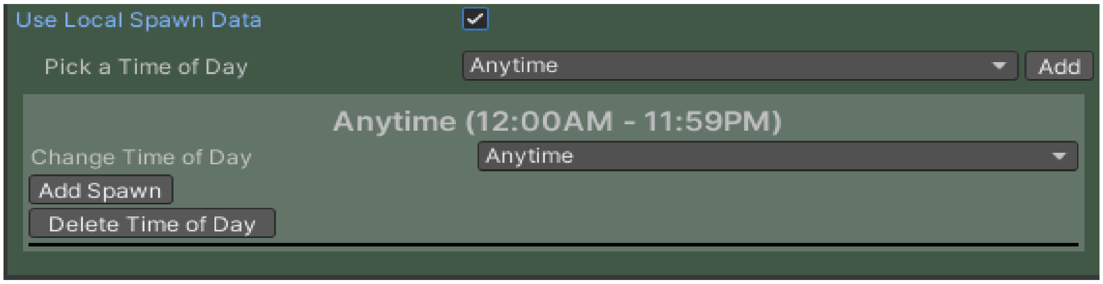


Use Local Spawn Data ☑

Pick a Time of Day: Anytime

There are no Time of Day entries.

Pick a time of day and click the add button.



Use Local Spawn Data ☑

Pick a Time of Day: Anytime

Anytime (12:00AM - 11:59PM)

Change Time of Day: Anytime

Click Add Spawn. Then follow the sames steps for entering spawn data as you did when adding spawns to Biomes.

Events

You may define several callback handlers to assist you in achieving certain spawning scenarios for your game. The following are available:

On Triggered
This callback happens as soon as the player triggers the area by entering the trigger radius,

On Start Spawning
This callback happens as soon as the area begins generating spawns. This takes the spawning delay into consideration.

On Spawning Complete
This callback happens when the spawn generation is completed.

On Wave Complete
This callback happens when an Elimination reset is completed. An Elimination resets when all the objects in the wave have been killed.

On Spawn Boss
This callback happens when the boss spawns.

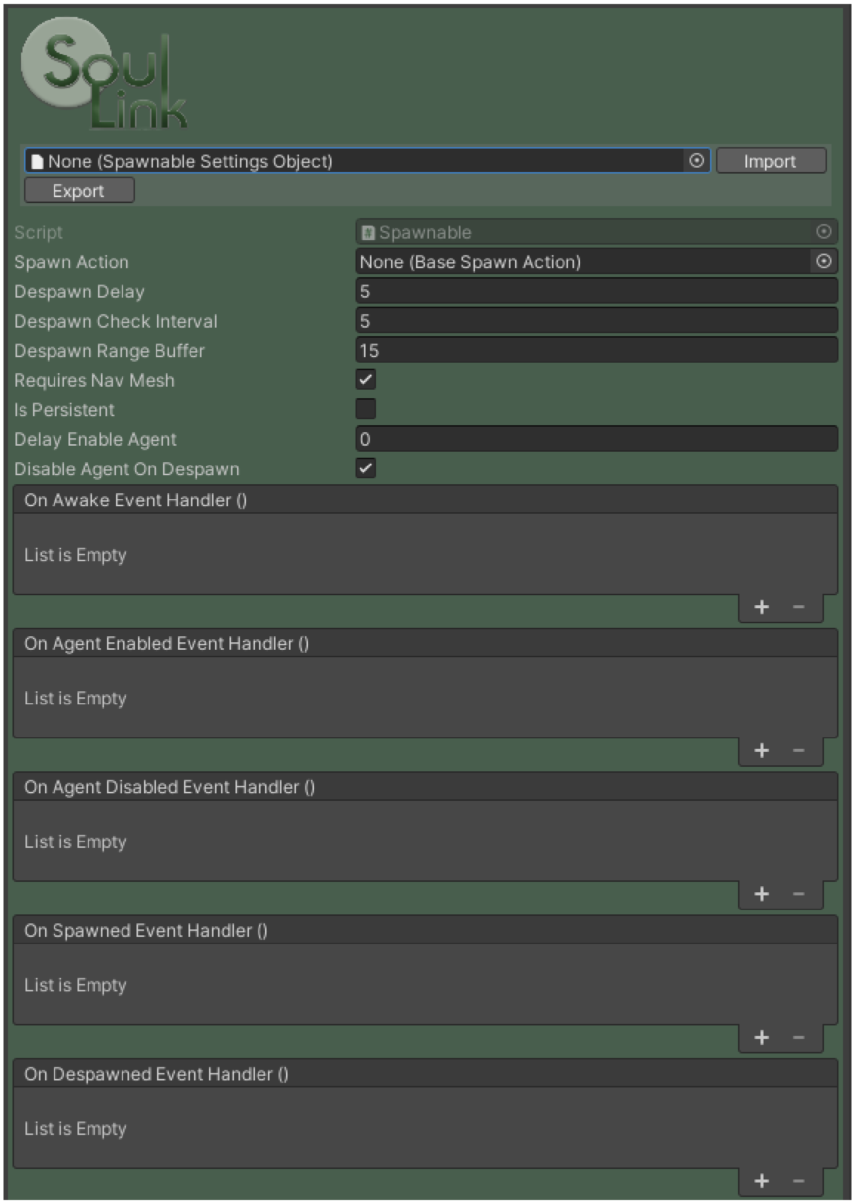
Spawnable Component

Every third party AI prefab must have a version of this component attached. For SoulLink AI, this component is not needed on AI prefabs since the interface is built into the SoulLinkAIUnit component. A custom component is provided for some third party AI systems as follows:

AI System	Component Name
Emerald AI	Spawnable_EmeraldAI
Emerald AI 2024	Spawnable_EmeraldAI24
Invector FSM AI	Spawnable_InvectorFSMAI
GKC	Spawnable_GKCAI
Malber's Animal Controller	Spawnable_MAC
Survival Engine & Farming Engine	Spawnable_SurvivalEngine

If you have selected the Auto Add Spawnable Interface option on your Spawner component, these component variants will be automatically added to your prefabs when they are added to Spawner. If not, you can add them manually as needed.

If you are adding non-AI spawns then you will only need the base Spawnable component itself. If you require a custom version for a third party asset not supported, you can write your own version based on the ones provided, or contact support for guidance.



None (Spawnable Settings Object)

Script	Spawnable
Spawn Action	None (Base Spawn Action)
Despawn Delay	5
Despawn Check Interval	5
Despawn Range Buffer	15
Requires Nav Mesh	☑
Is Persistent	□
Delay Enable Agent	0
Disable Agent On Despawn	☑

On Awake Event Handler ()

List is Empty

On Agent Enabled Event Handler ()

List is Empty

On Agent Disabled Event Handler ()

List is Empty

On Spawned Event Handler ()

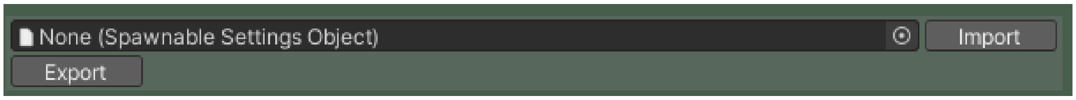
List is Empty

On Despawned Event Handler ()

List is Empty

Import/Export

This component allows you to import from or export to a SpawnableSettingsObject scriptable object. To import, drag an existing SpawnableSettingsObject into the field and click the Import button. To export, set the desired values and click the export button. Note, this does not export event handler references.

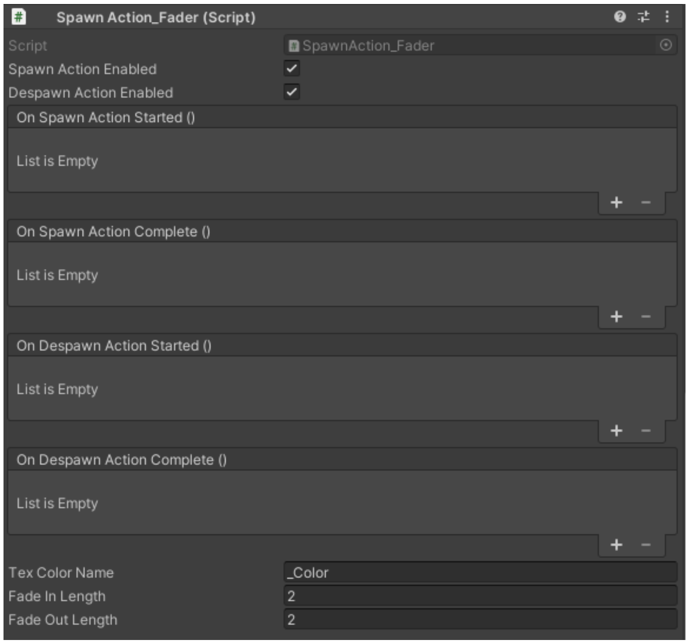


None (Spawnable Settings Object)

Spawn Action

If the prefab has a SpawnableAction component attached, drag the reference into this field. If the spawnable component has been added automatically in Spawner and you also have a default spawn action set then this will be done for you. You will want to use some sort of spawn action for spawns to avoid them instantly popping in and out of the scene on spawning/despawning. If you're using Spawn Outside Player FOV and Despawn Outside Player FOV then there is no need to use a spawn action since they will not be visible when spawning/despawning. The available spawn actions are as follows:

SpawnAction_Fader



Spawn Action_Fader (Script)

Script: SpawnAction_Fader

Spawn Action Enabled ☑

Despawn Action Enabled ☑

On Spawn Action Started ()

List is Empty

On Spawn Action Complete ()

List is Empty

On Despawn Action Started ()

List is Empty

On Despawn Action Complete ()

List is Empty

Tex Color Name: _Color

Fade In Length: 2

Fade Out Length: 2

Tex Color Name

This is the name of the shader keyword that is used to control the alpha color value in order to fade a prefab in and out. For the Standard Shader, the keyword is _Color and for the URP Lit shader, the keyword is _BaseColor. For other shaders, this may be a different value. Note that a shader must support transparency for fading to work.

Important information regarding fading for stand-alone builds

If you build a stand-alone project with Spawner that your AI will not fade in or fade out. They will simply pop into existence and pop out of existence. This is a Unity issue that does not automatically compile a shader variant that includes the transparent varieties that are being changed to at run-time.

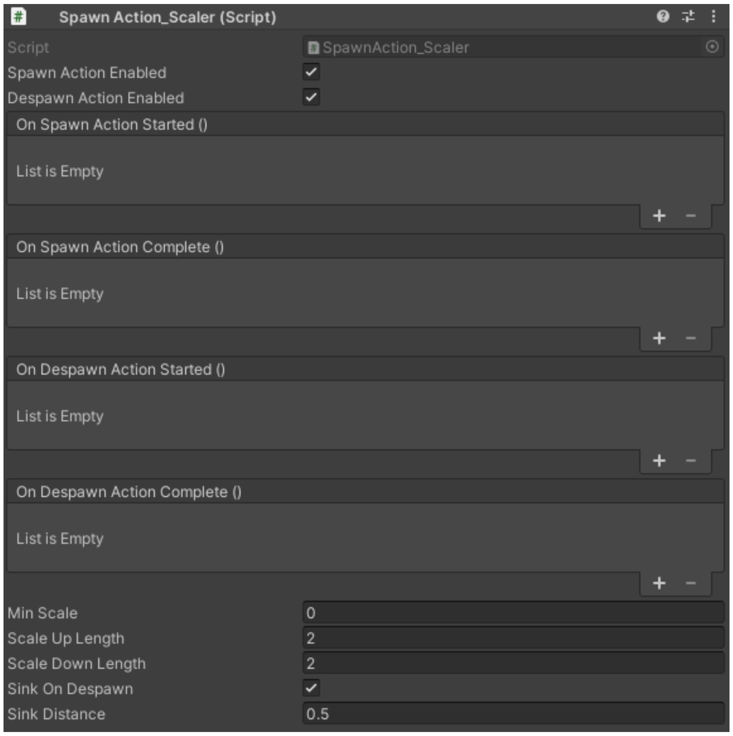
In order to fix this issue, you just need to have one actual concrete instance of the transparent shader in one of your Resources folders. The easiest way to do this is take one of your prefab's materials and duplicate it in a Resources folder and give it a new name. If the material is Wolf.mat then make it Wolf-Trans.mat or something like that. Then simply change the rendering mode from Opaque to Transparent. This will insure that Unity compiles a proper shader variant that supports transparent materials.

You should only have to do this for one material as it should ensure that a valid transparent shader is available. If you find that some are working and some are not then you may need to make another shader variant for the one that is failing. It may have special requirements.

Fade In Length
The length of time, in seconds, it should take for the prefab to fully fade in.

Fade Out Length
The length of time, in seconds, it should take for the prefab to fully fade out.

SpawnAction_Scaler



Spawn Action_Scaler (Script)

Script SpawnAction_Scaler

Spawn Action Enabled ☑

Despawn Action Enabled ☑

On Spawn Action Started ()

List is Empty

On Spawn Action Complete ()

List is Empty

On Despawn Action Started ()

List is Empty

On Despawn Action Complete ()

List is Empty

Min Scale 0

Scale Up Length 2

Scale Down Length 2

Sink On Despawn ☑

Sink Distance 0.5

Both components allow you to toggle the spawn and despawn actions. This allows you to have one action performed, but not the other.

Despawn Delay
The length of time to delay despawning the object when it has died, gone out of range, or is no longer valid by time of day.

Despawn Check Interval
Specify how often to check if the prefab should despawn based on Time of Day, Weather conditions, and/or Range from player. This value should be smaller with smaller Spawn radius values.

Depsawn Range Buffer
The extra range to allow an spawn to remain spawned beyond the general Spawn Radius. For example, if an object spawns at 150 range and the player immediately moves 151 away, this prevents the object

from immediately despawning. The player must move an additional range away from the spawn for it to despawn. The default is 15.

Requires Nav Mesh
Check this box if the spawn requires a nav mesh in order to spawn. In order to spawn objects that are not going to move around the terrain, you can leave this unchecked to avoid any issues.

Is Persistent
Check this box if the object you are spawning should remain in the scene after spawning and not despawn due to filtering rules or other conditions.

Delay Enable Agent
Set this value to greater than zero so an agent can remain disabled for a period of time after spawning and fading in. If *Perform Fading* is turned off then this delay will occur right after spawning.

Disable Agent On Despawn
Set this to true if you want the NavMeshAgent to be disabled when the object despawns. This is ignored if the spawn does not require a nav mesh.

Events

You may define several callback handlers to assist you in achieving certain spawning scenarios for your game. The following are available:

On Awake
This event happens at the beginning of the spawn's Awake sequence. This corresponds directly to Unity's Awake method.

On Agent Enabled
This event happens when the spawn has finished fading in. Once enabled, it may begin moving around the game world.

On Agent Disabled
This event happens the moment that the spawn begins fading out and before it is despawned.

On Spawned*
This event happens the moment that the spawn instance appears in the scene, but before it is enabled. A spawn is not enabled until it has completed its spawn action.

On Despawned*
This event happens the moment that the spawn is removed from the scene. This occurs after the spawn has completed its spawn action.

**** - Please note that if you want to have special handlers for OnSpawned and OnDespawned, you can simply create methods in your script called OnSpawned and OnDespawned. Those are special case***

handlers and will be called automatically by PoolManager. Be aware that because of this, you would never want to create an OnSpawned or OnDespawned method and assign it to these event handlers. That will result in those methods being called twice.

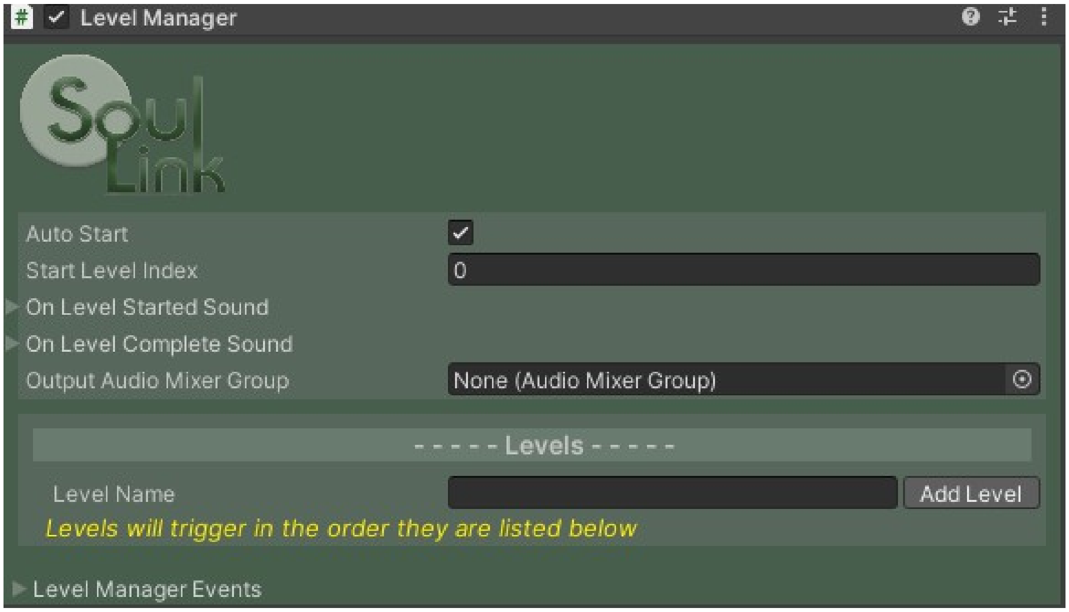
Advanced Wave Spawner

Before using the new Advanced Wave Spawner system, you must have your SoulLink Spawner already completely set up in your scene. This new spawning feature relies on the Time of Day definitions and some other basic parameters of SoulLink Spawner.

Once you have your scene set up with basic spawning capabilities, you can can begin using the advanced wave spawner. The system can work in two ways depending on your needs. You may use a level based workflow or a wave based workflow. The level based workflow requires the *LevelManager* component whereas the wave based workflow does not. If you don't plan to have multiple levels in your scene then you do not need a level based workflow. However, the level based workflow can also be used even if you only have a single level. That being said, we recommend you simply follow this workflow as it will be easier to add additional levels should the need arise. For that reason, this document will focus solely on the level based workflow.

Add Level Manager to Scene

Click on Tools/SoulLink/Spawner/Create Level Manager to add a new level manager to your scene.



Auto Start ☑
Start Level Index 0
On Level Started Sound
On Level Complete Sound
Output Audio Mixer Group None (Audio Mixer Group)

- - - - - Levels - - - - -

Level Name

Levels will trigger in the order they are listed below

Level Manager Events

The following are fields you can modify to suit your game's level:

Auto Start
If toggled on, the first level in the Level Manager will begin executing as soon as the scene is run. If toggled off, you must call the StartLevel method to get things rolling.

Start Level Index
If Auto Start is on then this is the level index that the game will start from. Leave at 0 if you want to

start from the first level.

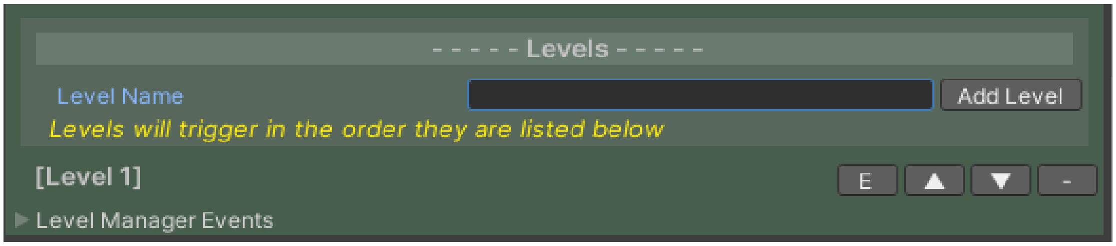
<u>On Level Started Sound</u>
Here you can specify an audio clip that will play whenever a new level is started.

<u>On Level Complete Sound</u>
Here you can specify an audio clip that will play whenever a level is completed.

<u>Output Audio Mixer Group</u>
Set the audio mixer group that will be used for playing event sounds such as the ones listed above for starting and competing a level.

Add Level

For each level, enter a name in the Level Name field and click the Add Level button.



Levels will trigger in the order they are listed below

The level will be listed along with some widgets. Each widget functions as follows:

E

Click this button to Edit the level. This will switch immediately to the WaveManager inspector for that level.

▲ ▼

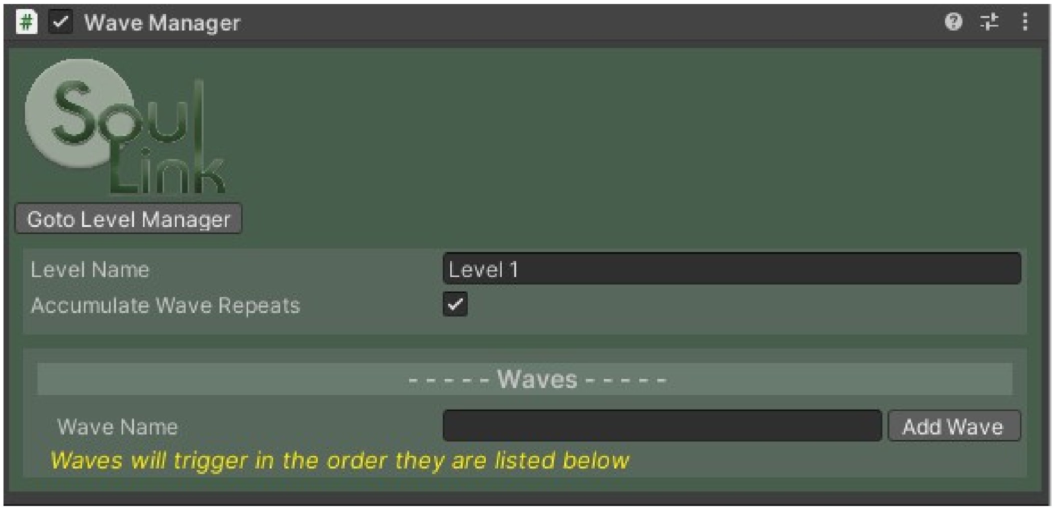
Click these buttons to move the level up or down in the list. Levels will execute in the order they are listed here.

-

Click this button to remove a level. You will be prompted for confirmation.

Edit Level

Click the E button to select the level for editing. This will take you to the inspector for the WaveManager that represents this level.



Level Name: Level 1

Accumulate Wave Repeats: ☑

Wave Name

Waves will trigger in the order they are listed below

Goto Level Manager

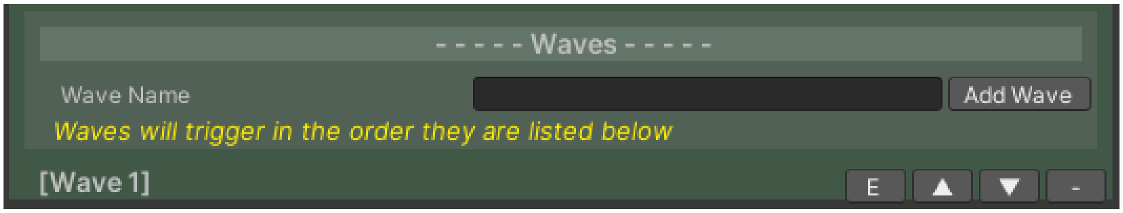
Click this button to go back to editing the Level Manager.

Accumulate Wave Repeats

Toggle this option if you want a wave repeat to count as a new wave.

Add Wave

For each wave, enter a name in the Wave Name field and click the Add Wave button.



Wave Name

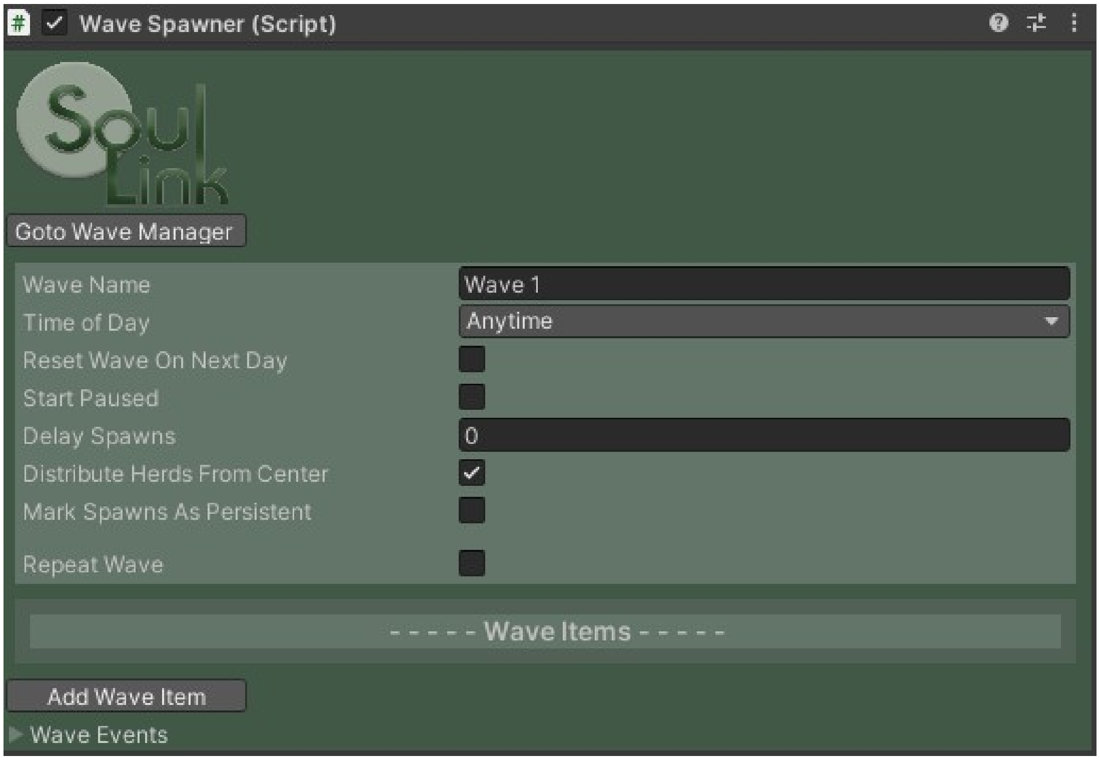
Waves will trigger in the order they are listed below

[Wave 1]

The wave will be listed along with some widgets. Each widget functions the same as described for the levels in Level Manager.

Edit Wave

Click the E button to select the wave for editing. This will take you to the inspector for the WaveSpawner that represents this wave.



Wave Name	Wave 1
Time of Day	Anytime
Reset Wave On Next Day	□
Start Paused	□
Delay Spawns	0
Distribute Herds From Center	☑
Mark Spawns As Persistent	□
Repeat Wave	□

Click this button to go back to editing the Wave Manager.

Wave Name
The name of this wave at the time of creation. You can edit this and change the name at any time.

Time of Day
Select the time of day that this wave spawner will spawn items. If using Anytime then the spawner will always be active.

Reset Wave On Next Day
If toggled on, this will check if the currently executing wave has gone past the time of day end time. If so, it will stop spawn generation and reset for the next day.

Start Paused
If toggled on, the wave spawner will be active, but in a paused state. To begin spawning, you will need to call the UnPauseWave method.

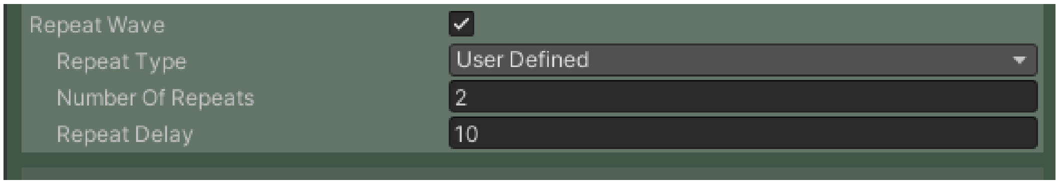
Delay Spawns
Setting this to a value greater than 0 will cause the spawner to wait a number of seconds before spawning items on this wave.

Distribute Herds From Center
If checked, any herds specified for the spawner will spawn around the center of the area. If unchecked,

a random position around the spawner will be chosen and the herd will spawn in a radius around that point.

Mark Spawns As Persistent
When any item is spawned, it will be marked as persistent. This will force the item to remain in the scene until eliminated. It will not despawn due to out of range or other spawn filters like time of day or weather.

Repeat Wave
Toggle this on if you want the entire wave to repeat when it completes.



Repeat Wave ☑
Repeat Type: User Defined
Number Of Repeats: 2
Repeat Delay: 10

Repeat Type
Select from the following options:

Type	Description
User Defined	You specify a finite number of times to repeat and the delay between each repeat.
Unlimited	The wave will repeat forever or until stopped manually. You must specify the delay between each repeat.

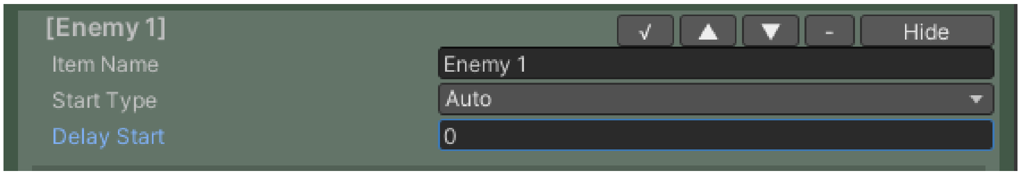
Add Wave Item

Under Wave Items, you can now click Add Wave Item to start filling in the information for your wave. Note that you may have multiple Wave Items per wave and they can be set to spawn simultaneously or be delayed per item. Use the Delay Start field to delay a wave item until later. For example, you might have 2 wave items with delays as follows:

Low Level Zombies	Delay Start = 0
Mid Level zombies	Delay Start = 30

This will cause your low level zombies to spawn immediately and your mid-level zombies to spawn after 30 seconds have elapsed.

A lot of the in a wave item should be familiar. The spawn data is the same as seen in other components.



[Enemy 1]

Item Name: Enemy 1

Start Type: Auto

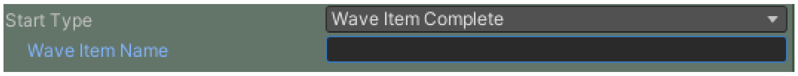
Delay Start: 0

Item Name

Enter the name for this wave item. In the example, we've chosen Enemy 1.

Start Type

This determines how the wave item will be started. The default is Auto. The options are defined as follows:

Start Type	Definition
Auto	The wave item will start automatically when it is time.
Manual	The wave will not start until the PerformWaveTrigger method is called.
Wave Item Complete	The wave will only start when another named wave is completed.  Start Type: Wave Item Complete Wave Item Name: When selected, enter the name of the other wave item that must complete in order for this one to start.

Min/Max Spawns

A random range of how many spawns will be generated for this item.

Spawn Interval

How long of a delay between each spawn. For example, if you have a min/max of 5 spawns and an interval of 0.1 then one spawn will be generated every 1/10th of a second.

Spline Path

This option is for future expansion and is not currently used.

Repeat Item

Check this to repeat this item multiple times.

Repeat Type

Select Custom for a specific number of repeats or Unlimited for unlimited repeats.

Number of Repeats

How many times to repeat this wave item, not counting the initial batch.

Repeat Delay

How long to wait for the repeat to start after the first batch of spawns has been eliminated or despawned.

Repeat Change Type
Specify whether or not the number of spawns increases or decreases on each item repeat.

Complete Type
Select how a wave item is considered complete.

Complete Type	Description
Auto Complete	The wave item is immediately considered complete.
Spawning Complete	The wave item is considered complete as soon as all its spawns have been generated.
Auto Complete	Considered complete immediately
Elimination Kill	The spawn must be eliminated by killing it.
Elimination Kill or Despawn	The spawn must be eliminated by killing it or when it despawns for any reason.

Level manager Events

On Level Started Event Handler
This event fires whenever a level has started.

On Level Complete Event Handler
This event fires whenever a level is completed.

Wave Spawner Events

On Wave Started Event Handler
This event fires whenever a wave has started.

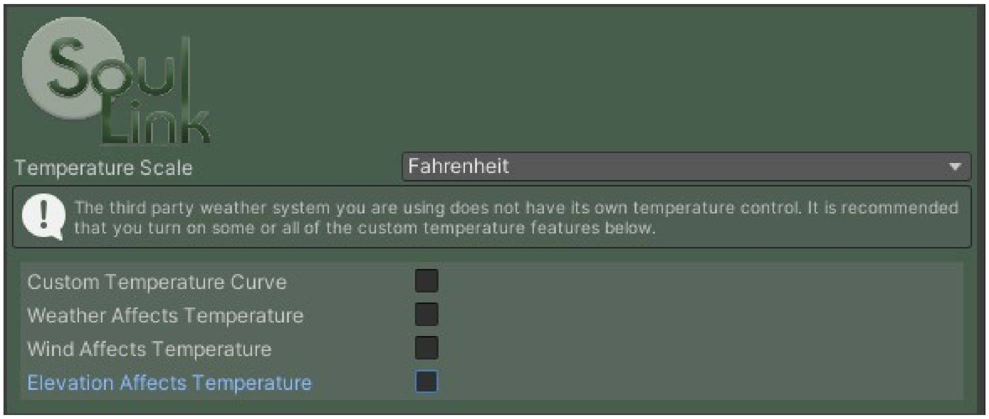
On Wave Completed Event Handler
This event fires whenever a wave has completed.

On Wave Item Repeat Started Event Handler
This event fires whenever a wave item has started to repeat.

On Wave Item Repeat Completed Event Handler
This event fires whenever a wave item has completed a repeat.

Weather System Component

If you are using a third party sky system that has a weather system then you will get a weather system component in your scene when you perform the Scene Setup.



Temperature Scale: Fahrenheit

The third party weather system you are using does not have its own temperature control. It is recommended that you turn on some or all of the custom temperature features below.

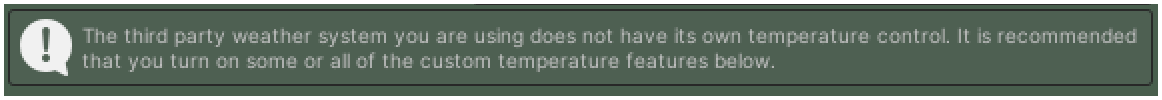
- Custom Temperature Curve □
- Weather Affects Temperature □
- Wind Affects Temperature □
- Elevation Affects Temperature □

By default, only the Temperature Scale option is active.

Temperature Scale

This allows you to switch between Fahrenheit and Celsius temperature scales. The currently selected option will be whatever the default scale is for your third party weather system.

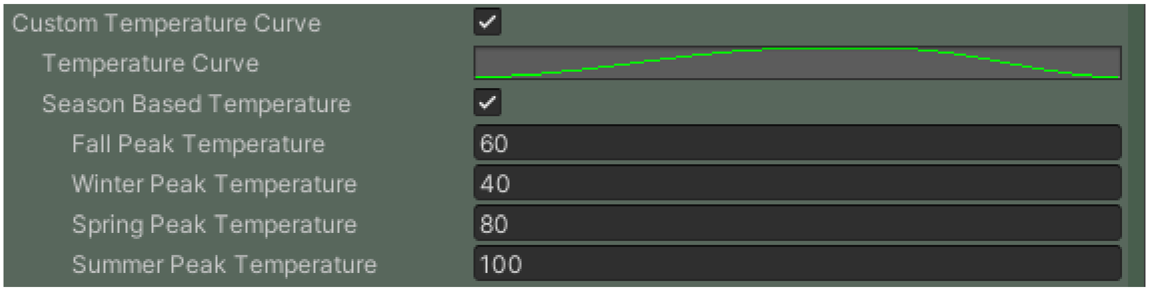
In addition, you may or may not get a help box that informs you that your third party weather system has its own temperature control.



The third party weather system you are using does not have its own temperature control. It is recommended that you turn on some or all of the custom temperature features below.

Custom Temperature Curve

If your third party weather system does not have it's own temperature system then you will have the option of turning on a custom temperature curve. If you check this option, you will be able to edit the temperature curve and you will also have the option to select the Season Based Temperature feature.



Custom Temperature Curve ☑

Temperature Curve

Season Based Temperature ☑

Fall Peak Temperature 60

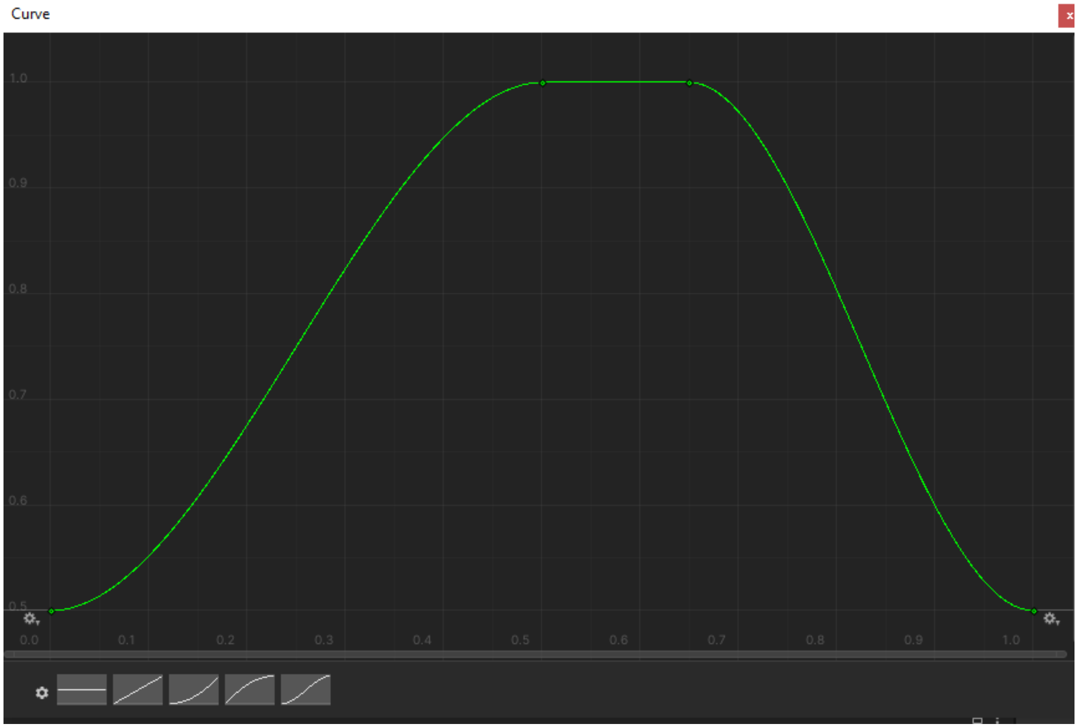
Winter Peak Temperature 40

Spring Peak Temperature 80

Summer Peak Temperature 100

Temperature Curve

Click on the graph to edit the temperature curve.



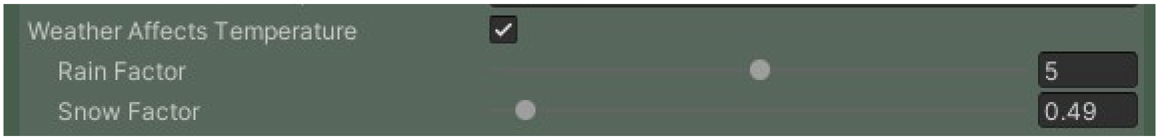
The curve represents the percentage of the peak temperature over time of day. The default lowest value is set to 0.5 (i.e. 50%) at time 0. Therefore, you will get 50% of the peak temperature at midnight. Near the center of the graph the default is set to 1.0 (i.e. 100%). After a few hours, the curve drops down again towards 0.5 at the end of the day cycle. You can modify this curve any way you want to get the desired range of temperatures throughout the day.

Season Based Temperature

Check this option to specify different peak temperatures for each season of the year (Fall, Winter, Spring, and Summer).

Weather Affects Temperature

Check this when you want the current weather conditions to affect the temperature.



Weather Affects Temperature ☑

Rain Factor 5

Snow Factor 0.49

Rain Factor

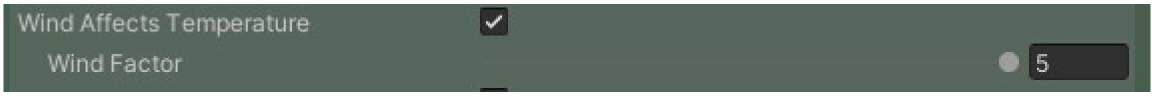
Set the slider from 0 to 10 to specify how much the rain affects the temperature. The higher the number, the more the temperature will drop when raining.

Snow Factor

Set the slider from 0 to 10 to specify how much the snow affects the temperature. The higher the number, the more the temperature will drop when snowing.

Wind Affects Temperature

Check this when you want the wind speed to affect the temperature.



Wind Affects Temperature ☑

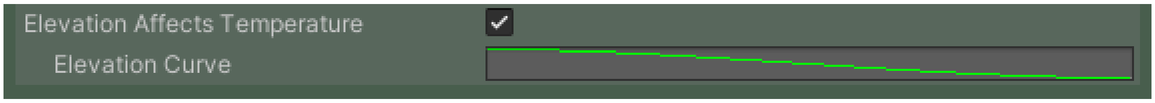
Wind Factor 5

Wind Factor

Set the slider from 0 to 10 to specify how much the wind affects the temperature. The higher the number, the more the temperature will drop when wind is gusting.

Elevation Affects Temperature

Check this when you want elevation to affect the temperature.



Elevation Affects Temperature ☑

Elevation Curve

Elevation Curve

Edit this curve to specify how the elevation affects the temperature. The default curve starts at 1.0 (i.e 100%) at the lowest elevation and drops to 0.5 (i.e. 50%) at the highest elevation.

Spawn Validator

A custom Spawn Validator script can be created in order to override the spawning behavior for your game. It can be used to provide more complex spawning scenarios with special filters and other conditions that are not available out of the box.

In order to create a custom validator, simply create a new script and inherit from SpawnValidator as follows:

```
using Magique.SoulLink;
using static Magique.SoulLink.SoulLinkTypes;

public class MySpawnValidator : SpawnValidator
{
   override public bool PreValidateSpawn(SpawnInfoData spawnInfoData)
   {
      return true;
   } // PreValidateSpawn()

   override public bool PostValidateSpawn(SpawnInfoData spawnInfoData, SpawnValidationFailure
failureReason)
   {
      // Override and return true from any failure as you wish.
      switch (failureReason)
      {
         case SpawnValidationFailure.Probability:
            break;
         case SpawnValidationFailure.TextureFilter:
            break;
         case SpawnValidationFailure.WeatherFilter:
            break;
         case SpawnValidationFailure.PopulationCap:
            break;
         case SpawnValidationFailure.SlopeAngle:
            break;
         case SpawnValidationFailure.SuppressionArea:
            break;
         case SpawnValidationFailure.Elevation:
            break;
         case SpawnValidationFailure.QuestFilter:
            break;
         case SpawnValidationFailure.ProximityFilter:
            break;
          case SpawnValidationFailure.SeasonFilter:
            break;
         case SpawnValidationFailure.GlobalSnowFilter:
            break;
      } // switch

      return base.PostValidateSpawn(spawnInfoData, failureReason);
   } // PostValidateSpawn()
} // class MySpawnValidator
```

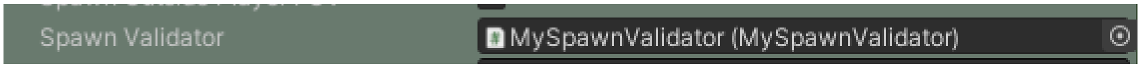
From this template, you can fill in the blanks with whatever additional rules you want to control your spawn generation with. For example, if you want to reject all spawns that have the names Spider then you could add the following code to the top of the PreValidateSpawn method:

```
// Reject all spiders
if (spawnInfoData.prefab.name.Contains("Spider"))
   return false;
```

PreValidateSpawn assumes all spawns will pass the spawning rules and so this is your opportunity to reject spawns at the earliest possible point.

PostValidateSpawn assumes that the spawn has failed some rule and it gives you the opportunity to allow it to spawn anyway. You are provided with the failure reason and you can re-evaluate the spawn data to decide whether or not you wish to allow it to spawn anyway. Simple return true if you decide to override the failure.

Once you have your custom validator, add an empty game object to your scene and add the custom validator script to it. Then drag the object into the Spawn Validator field of SoulLink Spawner.

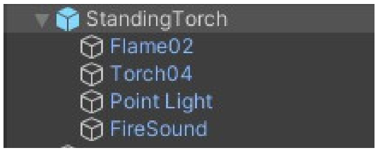


Spawn Validator   MySpawnValidator (MySpawnValidator)

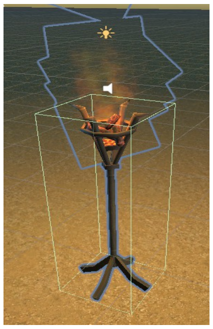
Additional Scripts

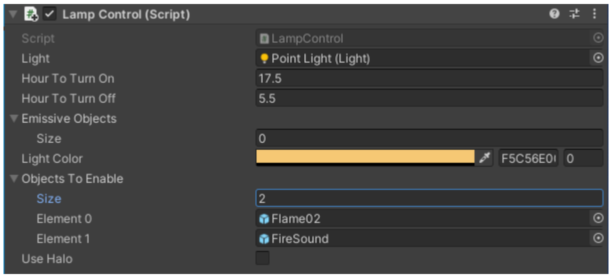
LampControl

This is a bonus script that allows you to control lights in your scene based on the time of day. It can be used for lanterns, torches, campfires, and other objects that have a light and effects. For example, consider the following torch object with a light and a fire particle effect and fire sound:



StandingTorch
   Flame02
   Torch04
   Point Light
   FireSound





Lamp Control (Script)

Script	LampControl
Light	Point Light (Light)
Hour To Turn On	17.5
Hour To Turn Off	5.5
Emissive Objects	
Size	0
Light Color	F5C56E0(0
Objects To Enable	
Size	2
Element 0	Flame02
Element 1	FireSound
Use Halo	□

The StandingTorch has 4 child components of which there is a light source, a particle effect, and a fire sound. The LampControl script is set to enable/disable the particle effect and fire sound at the appropriate times of day.

In addition, you may specify emissive objects that will be affected by the light color. This allows you to have an opaque lantern object become bright when lit and go dark when off.

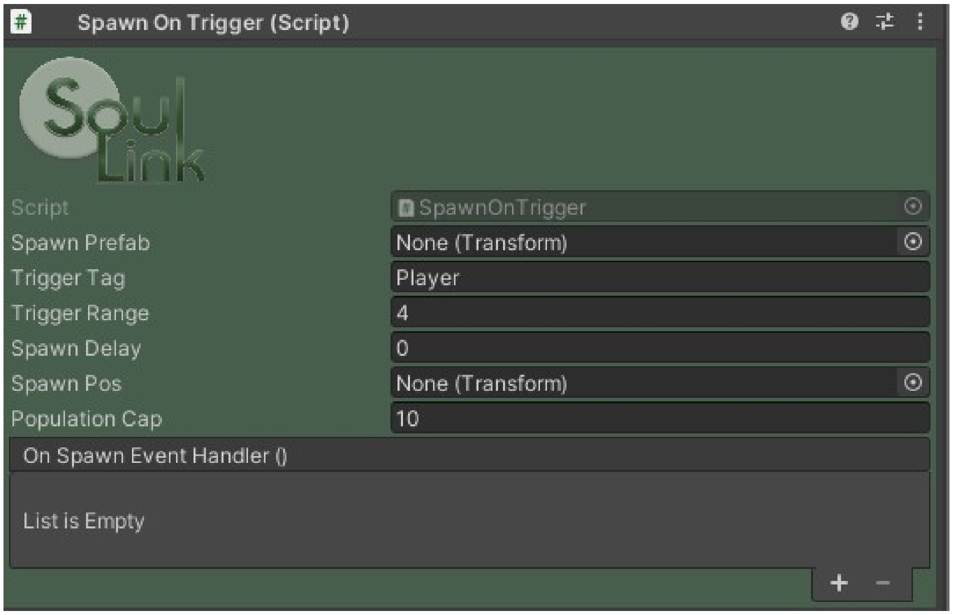
TimedDespawn

This utility script can be attached to your spawn prefab so that it will automatically despawn itself after a certain number of seconds.

SpawnOnTrigger

This is a utility script to allow for a very lightweight solution to placing an individual spawn in a specific position without the need for a defined SpawnArea.

To use, create an empty game object in your scene at the point you'd like to trigger a spawn. Add the SpawnOnTrigger script to your game object.



Spawn On Trigger (Script)

Script	SpawnOnTrigger
Spawn Prefab	None (Transform)
Trigger Tag	Player
Trigger Range	4
Spawn Delay	0
Spawn Pos	None (Transform)
Population Cap	10

On Spawn Event Handler ()

List is Empty

Drag a prefab into the Prefab field and set the Trigger Tag and the Trigger Range. At run-time, the prefab will be added to PoolManager and will spawn when the trigger is fired.

Note that this feature does not support any kind of filters or time of day.

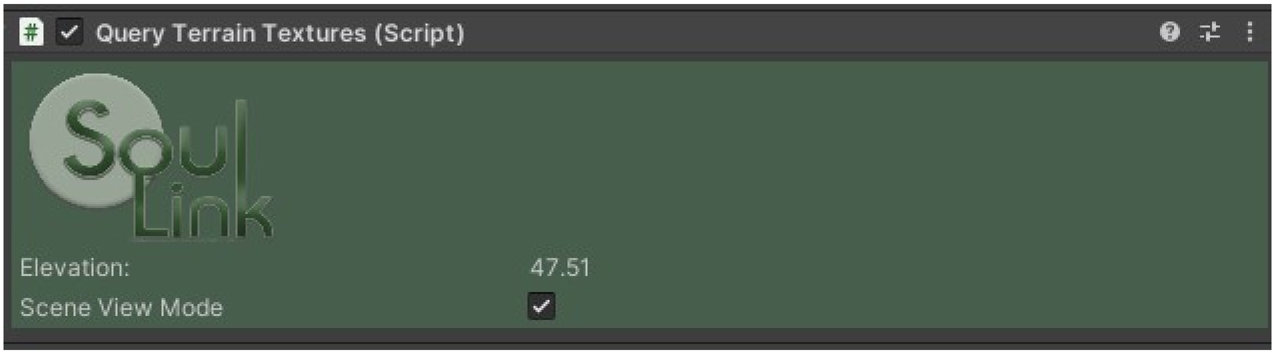
QueryTerrainTextures

This utility script is useful for analyzing your game scene to see what the terrain texture influences are. This can help you to more easily define your biomes and help to prevent issue where you might expect spawning to occur, but the texture influences are not as you expected them to be.

There are 2 ways to use this script as follows:

Scene View

For scene view usage, attach this script to some game object in your scene. I recommend you attach to the SoulLink global object since it will be easy to remember and easy to find. Once attached, toggle the Scene View checkbox.

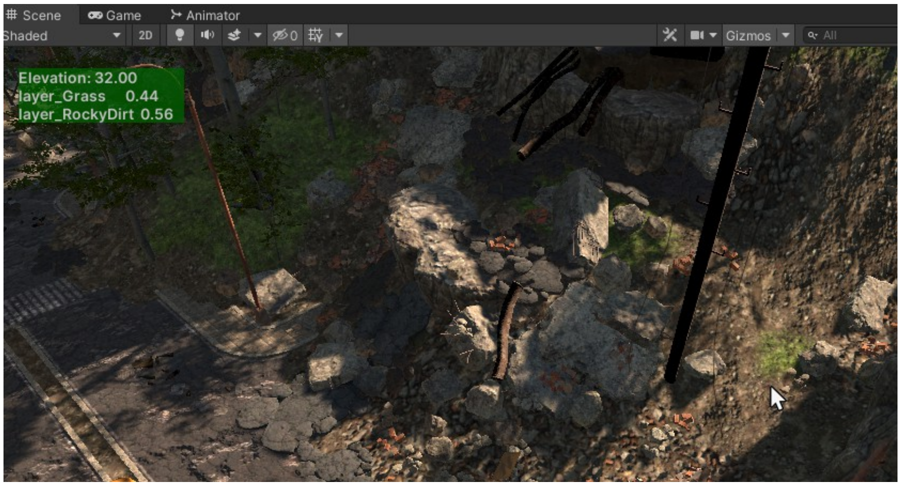


Query Terrain Textures (Script)

Elevation: 47.51

Scene View Mode ☑

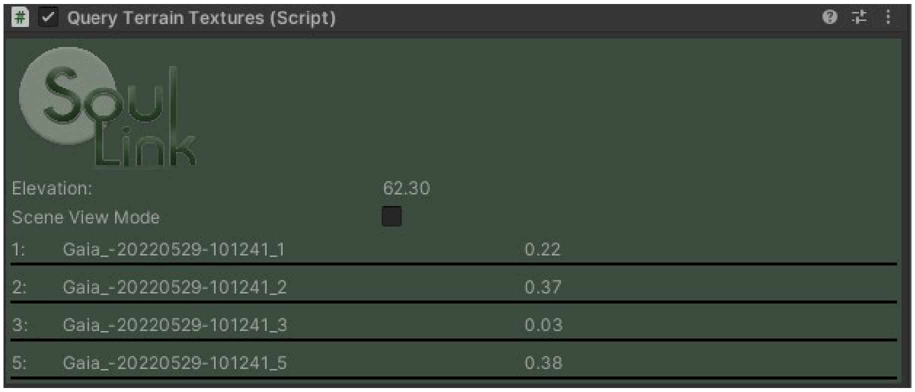
Once toggled, you can go to your scene view and move your mouse over your terrain to get a sampling of the texture influences as well as the terrain's elevation at any point.



```
Elevation: 32.00
layer_Grass    0.44
layer_RockyDirt 0.56
```

Run-time

For run-time usage, attach this script to your player object and run your scene with the player object selected. As you move around the terrain, you should be able to see the texture influences in the inspector.



Query Terrain Textures (Script)

Elevation: 62.30

Scene View Mode □

1:	Gaia_-20220529-101241_1	0.22
2:	Gaia_-20220529-101241_2	0.37
3:	Gaia_-20220529-101241_3	0.03
5:	Gaia_-20220529-101241_5	0.38

APIs

The following section describes various APIs that you will find useful when developing using SoulLink Spawner.

SoulLink Spawner Component

Public Fields

float RaycastDistance
Get or set the raycast distance use for checking valid spawn positions.

bool DisableBiomeSpawns
Returns whether or not biome spawns are disabled.

bool DisableAreaSpawns
Returns whether or not area spawns are disabled.

bool Paused
Set to true to pause Spawner and false to unpause it. Or check the current value.

float CurrentTime
Returns the current time as a floating point number.

string CurrentTimeString
Returns the current game time as a string.

string CurrentDateString
Returns the current game date as a string.

float CurrentSnowStrength
Returns the current snow strength.

float CurrentWetness
Returns the current wetness level. His directly relates to the rain strength.

float CurrentTemperature
Returns the current temperature.

List<BiomeTerrain> Biomes

Returns the list of defined biomes.

BaseGameTime GameTime
Returns a reference to the GameTime object in the scene.

int TotalSpawns
Returns the total number of active spawns for all categories.

Methods

Here some of the more useful methods found in spawner.

public void SwitchDatabase(SoulLinkSpawnerDatabase database)

Instructs Spawner to switch the currently referenced database.

public bool IsInSuppressionArea(Vector3 spawnPos)

Returns true if a spawn position is within a suppression area.

public int GetTotalSpawns(string spawnCategory)

Get the total number of spawns currently in the scene for the specified category

public bool CanSpawn(string spawnCategory)

Returns whether or not an object is allowed to spawn for the specified category based on total spawns in existence and max spawns for the category.

public void DoSyncTimeOfDay()

Force SoulLink to sync time of day immediately.

public bool ValidateSpawnRules(SpawnInfoData spawnInfoData, Vector3 spawnPos, string tod, bool ignorePlayerFOV, float minElevation, float maxElevation, float minSlopeAngle, float maxSlopeAngle, bool isAreaSpawn = false)

Perform various checks against spawning rules to ensure that the proposed spawn position is valid.

public Transform Spawn(SpawnData spawnData, bool manualSpawn = false, bool randomRotation = true, bool validatePosition = true)

Spawn a prefab based on the passed in SpawnData.

public void Despawn(Transform spawn)

Despawn the specified instance.

public float GetTerrainYPos(float x, float y, float z)

Samples the terrain at the specified position to get the height at that position.

public float GetTerrainYPos(Vector3 pos)

Samples the terrain at the specified position to get the height at that position.

public bool IsPositionValid(float x, float y, float z, float range = 30f)

Determines if a point in the game world is a valid spawn position by checking a raycast against any layers that should be ignored.

Troubleshooting

The following are some tips for resolving issues that you may encounter while using Spawner.

If you just upgraded from 1.2.18 to 1.3.0 and your existing scenes are not spawning

You will need to go into the Spawner component and select Spawns by Biome and by Area. Once you've done this, the component will upgrade your database to put all spawns into the Default category. Once they have been assigned to this category, spawning will work again.

You've completed all setup steps, but when you run the scene nothing ever spawns

This can occur for a variety of reasons. The first thing to do if you are having this issue is to turn on Debug Mode and run the scene. You will most likely see some output that will give you further insight as to why spawns are not being generated.

Here are some possible debug logs you may see:

Failed to spawn. Could not find valid spawn position at (<x, y, z>)

This occurs if you do not have a valid navmesh. This can happen if you did not bake your Nav Mesh and are not using the Generate Nav Mesh feature. Either turn on Generate Nav Mesh or bake the navmesh manually in Unity's Navigation system.

IsInBiome failed [BioneName] on include texture = <index> with threshold of <threshold>, influence = <influence>

This will occur if the system cannot find a valid biome to spawn your AI. You may have created texture filters for your Biome that are too restrictive. To debug your terrain to understand the texture influences, use the QueryTerrainTextures script. See the previous section of this manual for more details.

No spawns for the current time of day and available biomes for the proposed spawn position

There are no time of day definitions that match the spawn or biomes at the attempted spawn position.

No Time of Day Definitions qualify for spawns. Nothing will spawn.

No time of day definitions match the current time of day.

Area '<Area Name>' does not exist in the SoulLink Spawner Database.

You have added a SpawnArea to your scene with an Area Name that is not defined in the SoulLink Spawner database. You must go to the *by Area* tab and add an area with the same name as the SpawnArea component's Area Name.

"GetRemainingDistance" can only be called on an active agent that has been placed on a NavMesh.

This error occurs when an AI spawns on an invalid nav mesh. SoulLink Spawner has code to prevent this from ever happening so this error should not occur for that reason.

This also happens when legacy Emerald AI prefabs are instantiated into the PoolManager object pool at the start of the game. In order to fix this issue with legacy Emerald AI, please see the *SoulLink Integration Guide* PDF in the Documentation folder for code changes to fix this.

SoulLink Spawner Error: There is no time/sky object in the scene. Time of Day functionality will be disabled.

Your scene must have a GameTime object in order for *by Biome* spawns to work. If you do not want a sky system in your scene, you can create a new empty GameObject and add the BaseGameTime script to it. This will keep track of time, but will not affect your lighting.

Nothing is spawning on my MapMagic 2 Map

Ensure that your MapMagic 2 map object is at 0, 0, 0 coordinates.