



Eadon Spawner

Version 1.0

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Introduction

Eadon Spawner is a sophisticated, high performance runtime spawning system with the following features:

- Pooling of spawnable objects
- Spawning in background via Coroutines
- Support for network spawning (using Mirror)
- Network synchronization of spawn pools
- Support for time of day (via Enviro), with day and night spawn lists
- Support for spawning only on selected textures (for terrain spawning)
- Support for spawning only on selected materials (for mesh spawning)
- Support for spawning NPC Ais (Invector FSM AI, Emerald AI and Eadon AI)
 - Automatic despawning on death
 - Automatic AI reset on respawning

Changelog

V 1.0	Initial release
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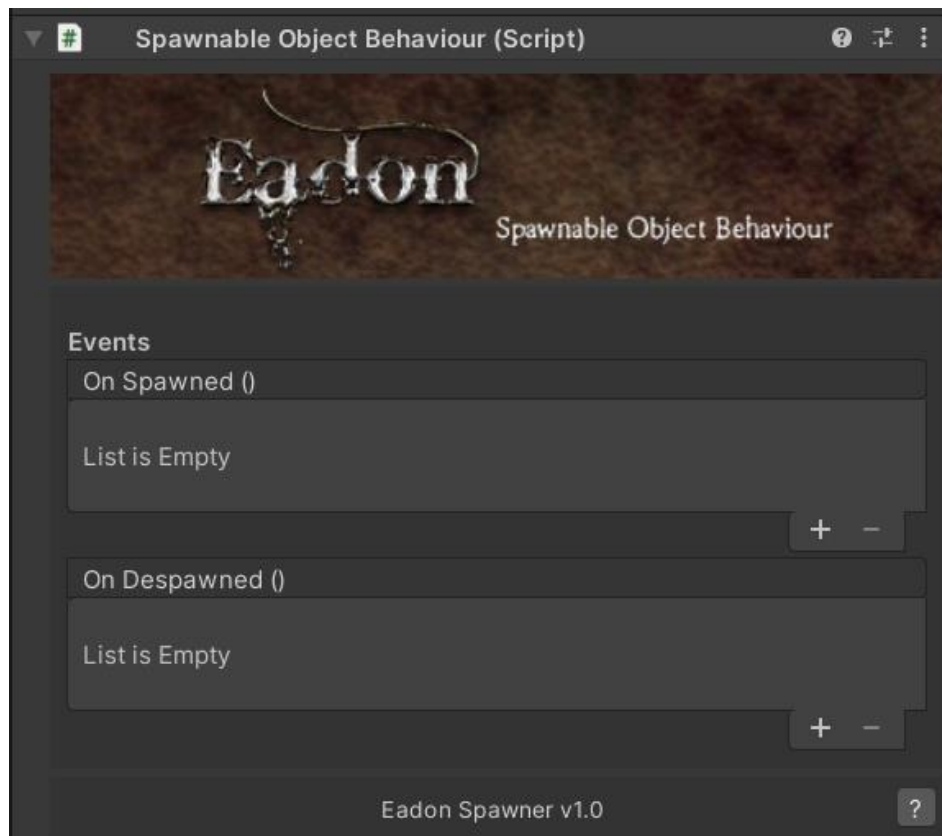
Configuration

The configuration of a spawnable object is a two step process:

- The object needs a **SpawnableObjectBehaviour** component attached
- A **SpawnableObject** needs to be created

SpawnableObjectBehaviour

Every object that can be spawned by Eadon Spawner needs to have a **SpawnableObjectBehaviour** component attached to the main game object:



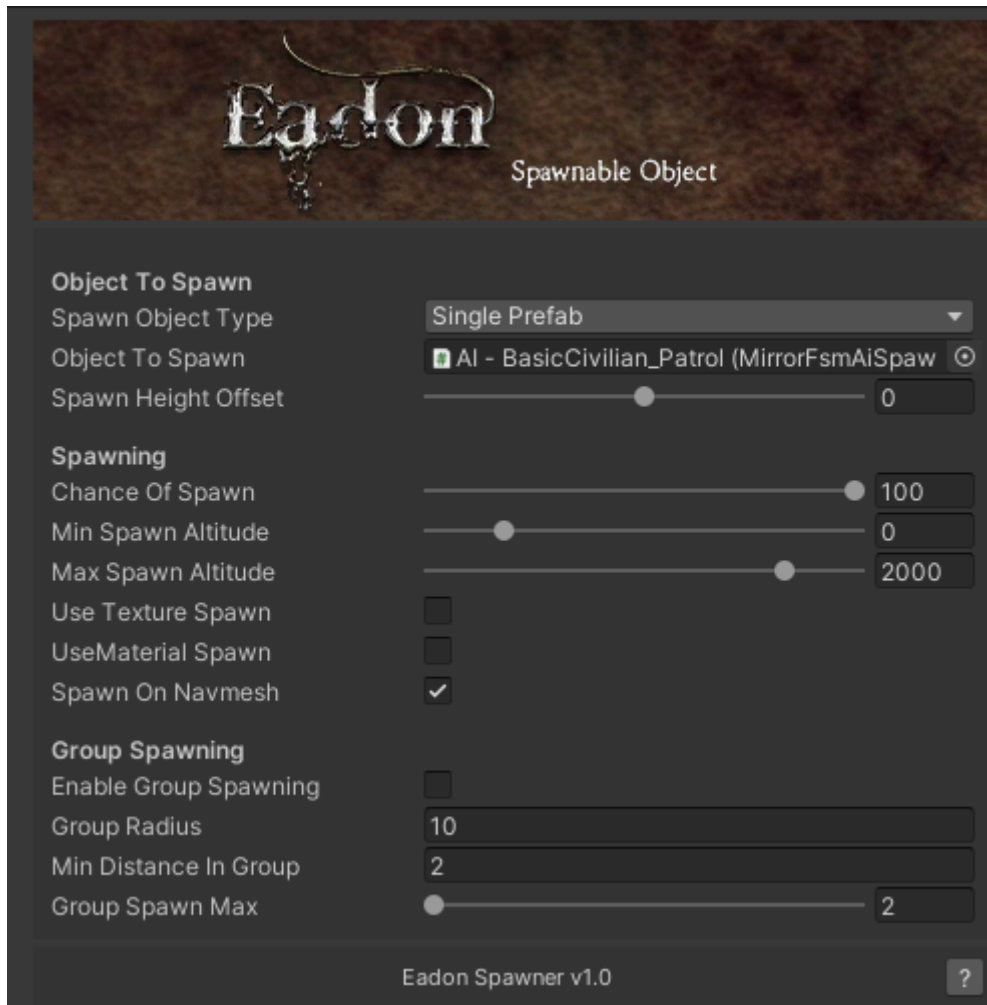
This component exposes two events, triggered when the object is spawned and despawned. There are other specialized components with support for AI spawning:

Component	Requirement
EmeraldAiSpawnableObjectBehaviour	Emerald AI
MirrorEmeraldAiSpawnableObjectBehaviour	Emerald AI and Eadon Emerald Mirror
FsmAiSpawnableObjectBehaviour	Investor FSM AI
MirrorFsmAiSpawnableObjectBehaviour	Investor FSM AI and Eadon Investor Mirror

These specialised components automatically despawn NPC Ais on death (see below for details).

SpawnableObject

In order to spawn something, a **SpawnableObject** needs to be created. This is a **ScriptableObject** which contains all the information needed to spawn:



The fields are as follows:

Field	Role
Spawn Object Type	Choice of Single Prefab or Random From List
Object To Spawn	The prefab to spawn (needs to have a SpawnableObjectBehaviour). Visible if Spawn Object Type is Single Object
Objectss To Spawn	The list of prefabs to choose from to spawn (needs to have a SpawnableObjectBehaviour). Visible if Spawn Object Type is Random From List
Spawn Height Offset	An optional offset from the ground at which to spawn the object
Chance of Spawn	The chance of the object spawning
Min Spawn Altitude	The minimum spawn altitude
Max Spawn Altitude	The maximum spawn altitude

Use Texture Spawn	A flag to indicate whether to use textures to constrain spawning
Target Textures	A list of textures to use for spawning, only visible if Use Texture Spawn is selected
Use Material Spawn	A flag to indicate whether to use materials to constrain spawning
Target Materials	A list of Materials to use for spawning, only visible if Use Material Spawn is selected
Spawn On Navmesh	A flag to indicate if the spawn position needs to be a valid navmesh location
Enable Group Spawning	A flag to enable spawning the object in groups
Group Radius	The radius of the area in which the group members will spawn
Min Distance In Group	The minimum distance between group members
Group Spawn Max	The max size of the group

In order to create a **SpawnableObject**, you need to right click in you project and select **Create/Eadon/Spawner/New Spawnable Object** from the popup menu.

Group spawning happens as a best effort. At least one will spawn, but there might not be enough spawn positions for a given group size and radius. Also, it might be that there are not enough entities in the pool to reach the group size.

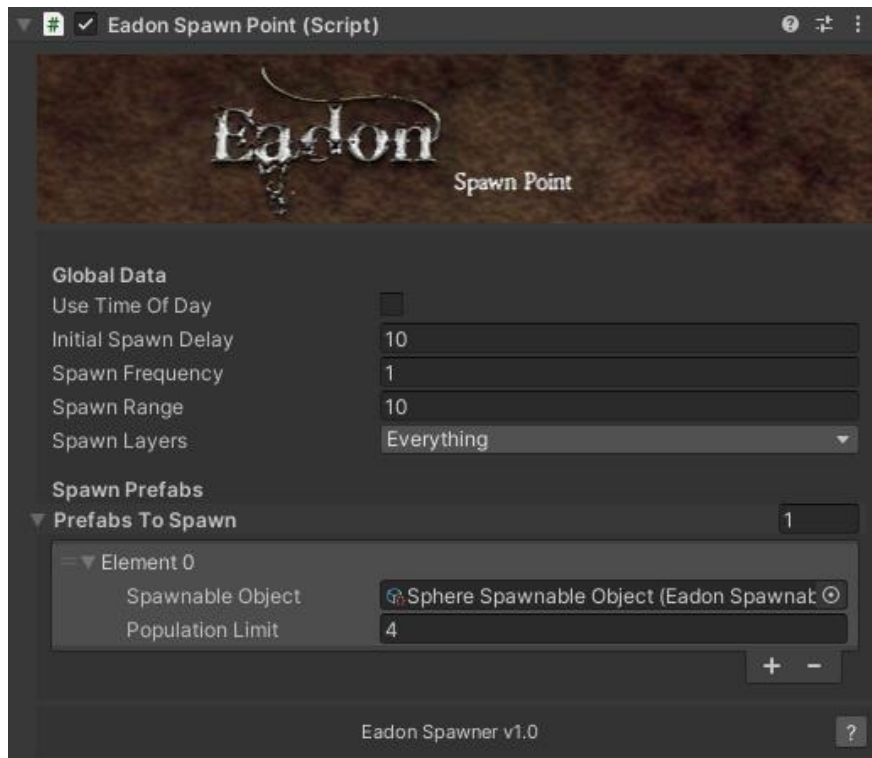
The Random From List option allows you to create, for example, a Spawnable Object for merchant tent with a choice of different tents.

Spawning

In order to spawn, you need two things in your scene: an **EadonSpawnManager** object and one or more **EadonSpawnPoint**.

Spawn Points

Spawn points are locations in your scene around which objects can be spawned:



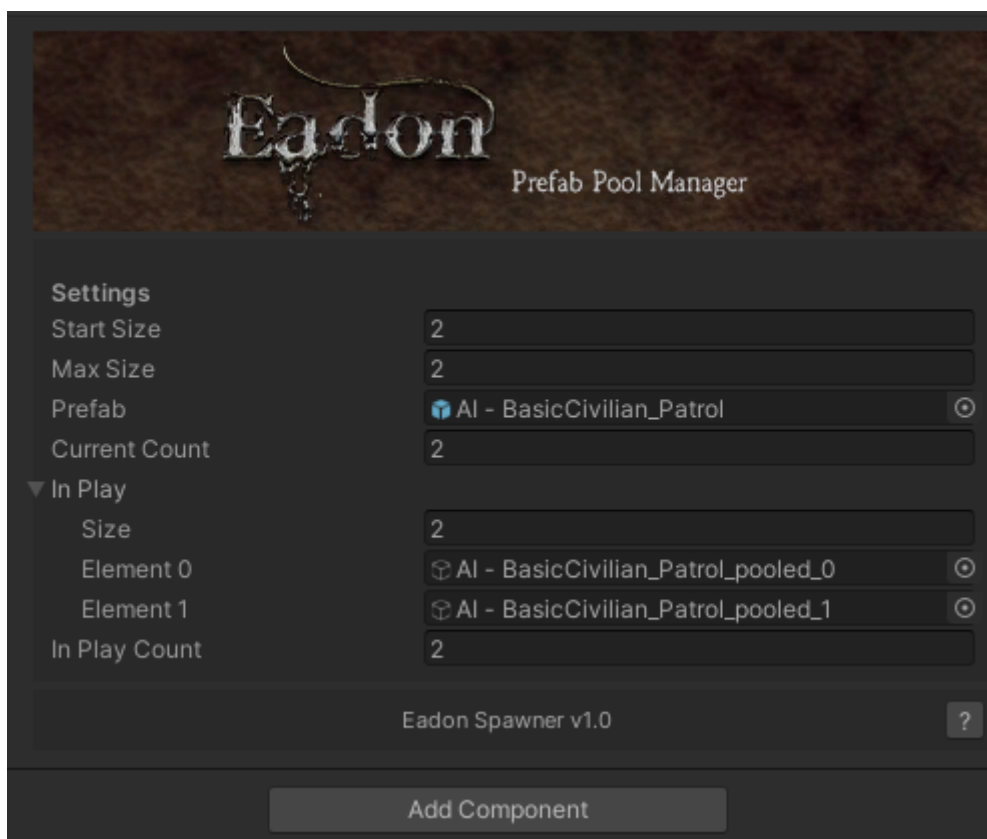
The fields are:

Field	Role
Use Time Of Day	If enabled, two lists of spawnable appear (day and night). Only available if Enviro is installed
Initial Spawn Delay	How long after scene start should the spawn point start spawning
Spawn Frequency	How long after the initial spawn should the spawn point check for new spawns
Spawn Range	The range around the spawn point in which spawning happen
Spawn Layers	The layers on which spawning can happen
Prefabs to Spawn	The list of spawn object, and the corresponding population cap
Prefabs to Spawn Day	The list of spawn objects, and the corresponding population cap, to spawn during the day. Only available if Enviro is installed

Prefabs to Spawn Night

The list of spawn objects, and the corresponding population cap, to spawn during the night. Only available if Enviro is installed

At start, the spawn point will create a pool for each of the spawnable objects, with a size equal to the population limit set for the object. This population limit is the maximum number of the object that can be in play at the same time. Every time a new object needs to be spawned, it's taken from the pool, and when the object is despawned, it will be placed back into the pool.

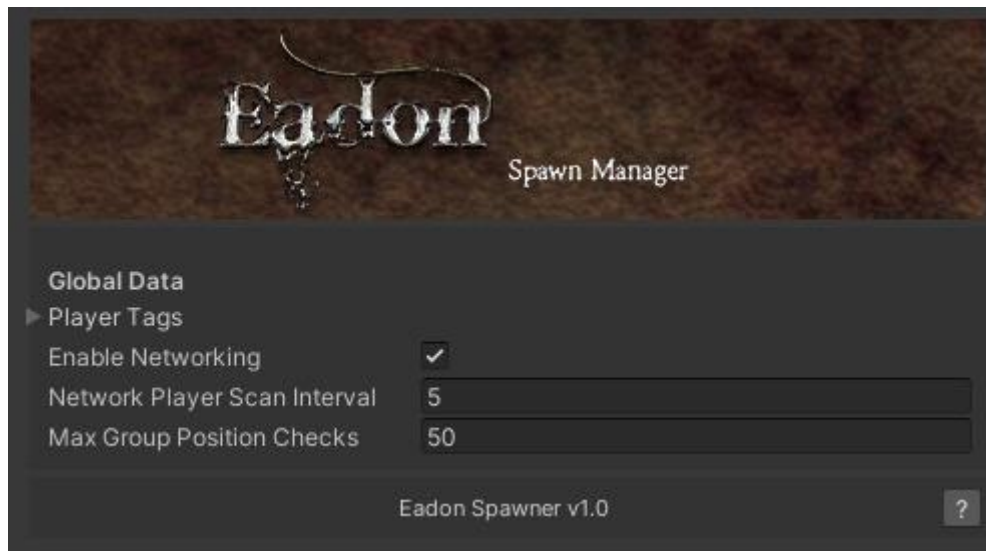


As this is a runtime created component, the data shown is for information purpose. The fields are:

Field	Role
Start Size	The start size of the pool, by default the population limit
Max Size	The max size of the pool, by default the population limit
Prefab	The prefab to spawn
Current Count	The current count of pool members
In Play	A list of all the spawned game objects
In Play Count	The number of in play spawned game objects

Spawn Manager

You need one Spawn Manager in the scene. Its role is to spawn from each spawn point according to the spawn point frequency. All spawn happens in parallel in the background, which coupled with spawning from pools gives virtually no fps drop. It looks like this:



The fields are:

Field	Role
Player Tags	A list of all the tags for player objects
Enable Networking	A flag to indicate if spawning should be network wide. Requires Mirror to be installed and configured
Network Player Scan Interval	How often the spawner should look for new network players
Max Group Position Checks	How many times the system will look for a valid group position in a single spawn

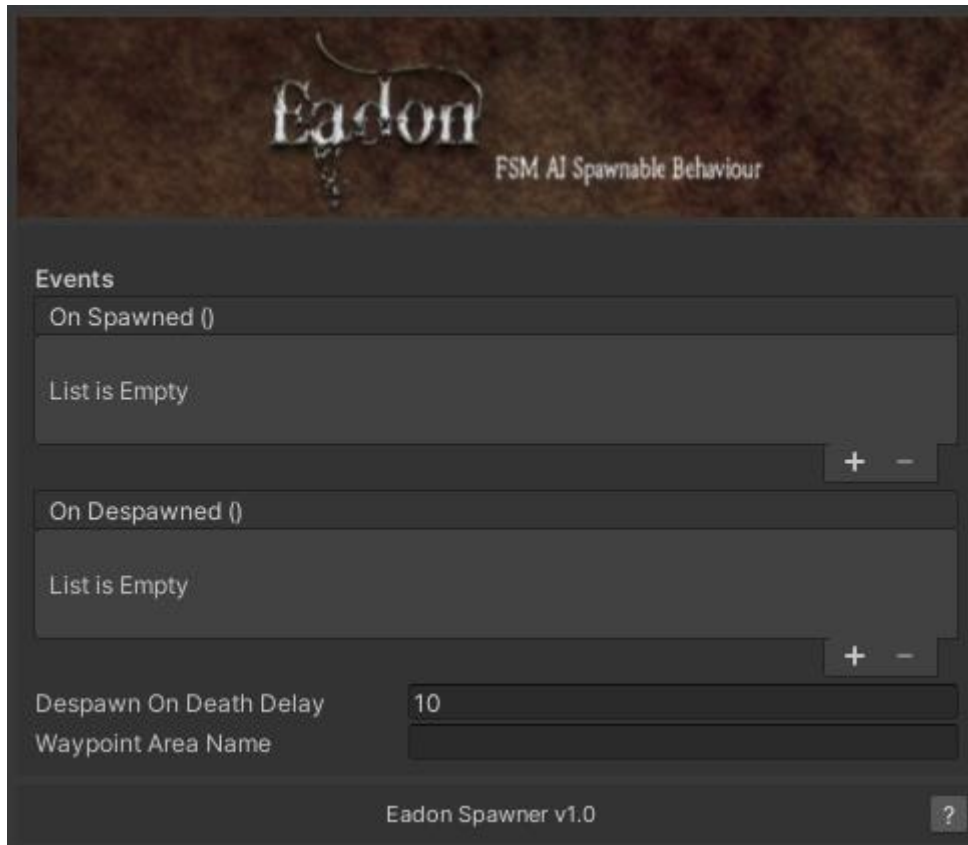
A spawn point will spawn (dictated by spawn frequency) if any player is in the spawn range. Spawned objects (such as Ais) can move out of the spawn range, and will be despawned if at any point will be further away from any player than the spawn range.

Spawning NPC AIs

NPC AIs are a slightly different case to handle. There are specialised SpawnableObjectBehaviour components for Invector FSM AI, Emerald AI and Eadon AI. The role of these components is to disable the AI when it's placed in the pool (at creation or despawning time) and enable it when spawned. In addition, the component automatically hooks into the AI lifecycle so that on death the AI will automatically be despawned.

Invector FSM AI

The Invector FSM AI component looks like this:



The fields are:

Field	Role
Despawnd On Death Delay	How long after death the AI will be despawnd
Waypoint Area Name	A field to inject into the FSM AI the waypoint area (normally it's a scene reference which gets lot on the prefab)

Emerald AI

The Emerald AI component looks like this:

Eadon

Emerald AI Spawnable Behaviour

Events

On Spawned ()

List is Empty

+ -

On Despawned ()

List is Empty

+ -

Despawn On Death Delay

10

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Network spawning

Network spawning of entities happens transparently, but you need to use the Mirror* versions of the **SpawnableObjectBehaviour** for FSM AI and Emerald AI.

In order to enable network spawning, the **EadonSpawnManager** needs to have a Mirror **NetworkIdentity** component attached