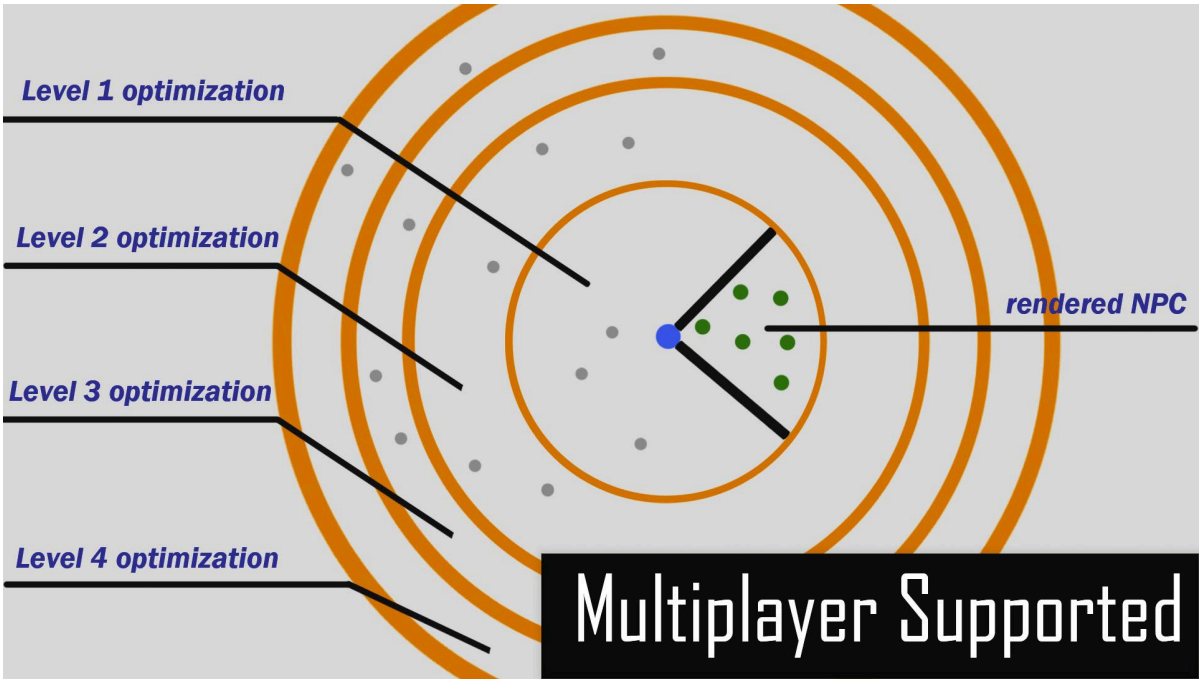
World Director NPC PRO



The **World Director NPC PRO** plugin is ideal for creating games where there are many pawns in the world at the same time. The level of your pawns, their location, scale, the rotation will always be preserved, as well as they will always move, even if you are very far away, which creates a simulation of the living world. You can simulate a whole world of thousands of pawns. You can create an entire populated city. The plugin is easy to use.

This is a comprehensive system for optimizing a large number of NPCs in locations. **World Director NPC PRO** is perfect for creating open-world games of any size. You will no longer have to think about spawning characters and removing pawns if your character has come or gone from the place where the pawns should be. If you spawn pawns near the character and leave this place, the pawns continue to move and they do not affect the FPS. On my system with an AMD 2700X processor, I achieved **200000+ pawns at 120+FPS**. When the character returns to the same location, the pawns return to the world with the same characteristics (health, level.).

Now I'll explain how it works. The system is divided into 4 optimization levels that work simultaneously for the best FPS performance.

Level 1 - if the pawn is out of the camera's view, all its components and skeletal meshes are disabled from the render, and a set of optimization measures is applied, such as animation playback and tick rate.

Level 2 - if the pawn is further away from the character than you set in the settings of The **World Director NPC PRO** plugin, it is deprecated while retaining all its settings. At this level, this pawn is calculated for its position in the world, as well as finding a way to walk. The search takes place in the radius you set completely randomly. All calculations are based on your Navigation Mesh. Pawns will also bypass walls and obstacles.

Level 3 - If the pawn is even further away, on the border of level 3. the number of simultaneously walking pawns is further reduced for optimization.

Level 4 - at this level, the pawn stops moving, but still continues to exist. And if your character gets closer, the pawn gets to level 3 and starts moving.

While at level 2.3.4, pawns can't act according to the Behavior Tree, but they can still walk.

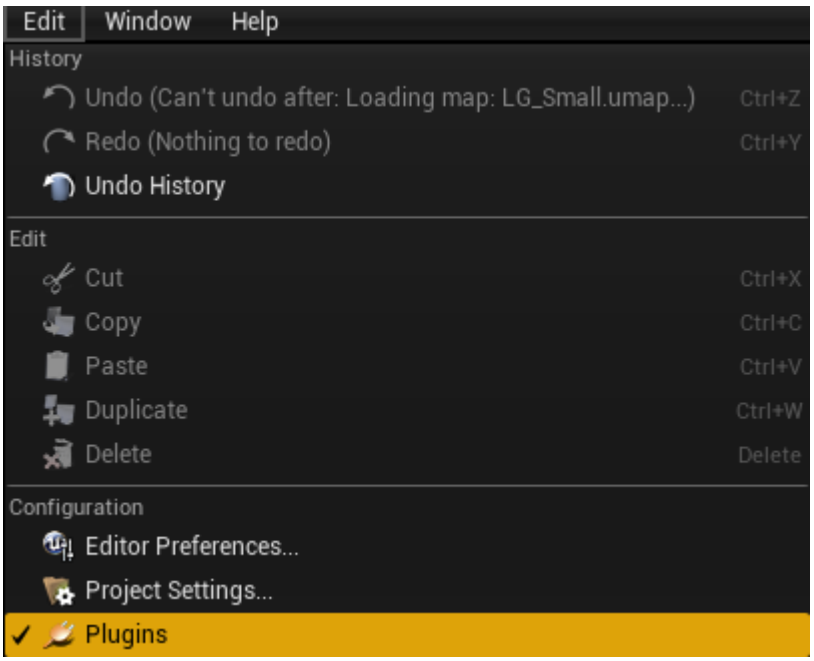
All calculations for hidden pawns at level 2.3.4 occur using multithreading for better FPS.

Now with multiplayer. All calculations take place on the server-side!

Bonus: The example includes blueprint BP_NPC_SpawnerPro.

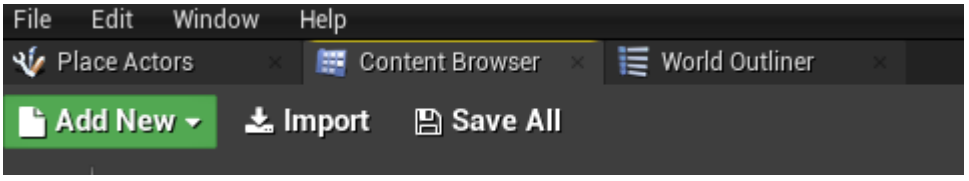
Setup

1. Install plugin from Epic Store Launcher
2. Open your project
3. In the Edit menu, select Plugins.

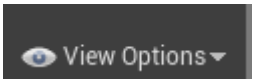


4. Find and enable the Plugin WorldDirectorPRO

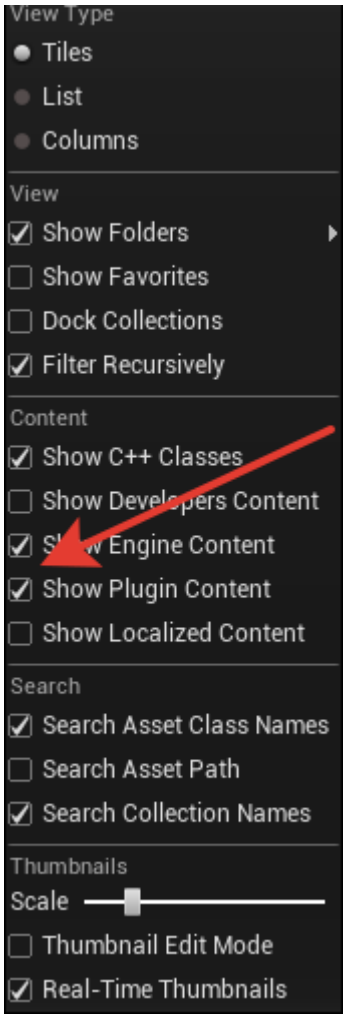
5. Select “Content Browser”



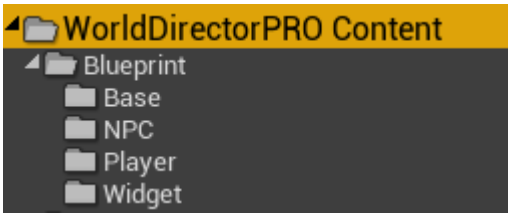
6. Select “View Options”



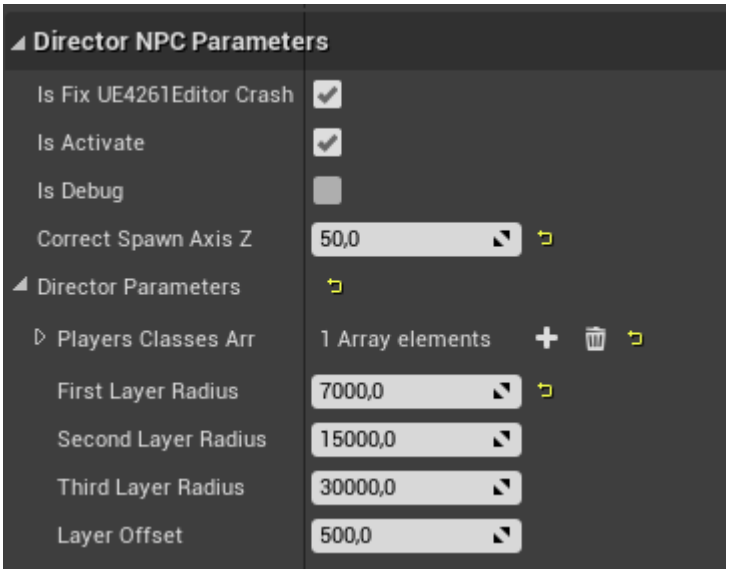
7. Select “Show Plugin Content” and “Show Engine Content”



8. Go to “WorldDirectorPRO Content\Blueprint”

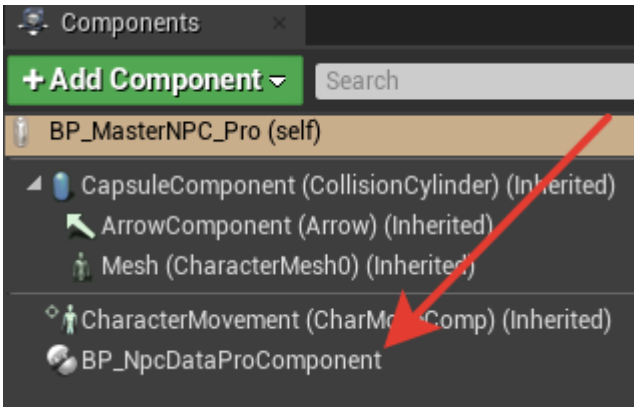


9. Drag and Drop **BP_WorldDirectorNpcPRO** in your scene.
10. Select **BP_WorldDirectorNpcPRO** in the scene and choose the parameters you need.

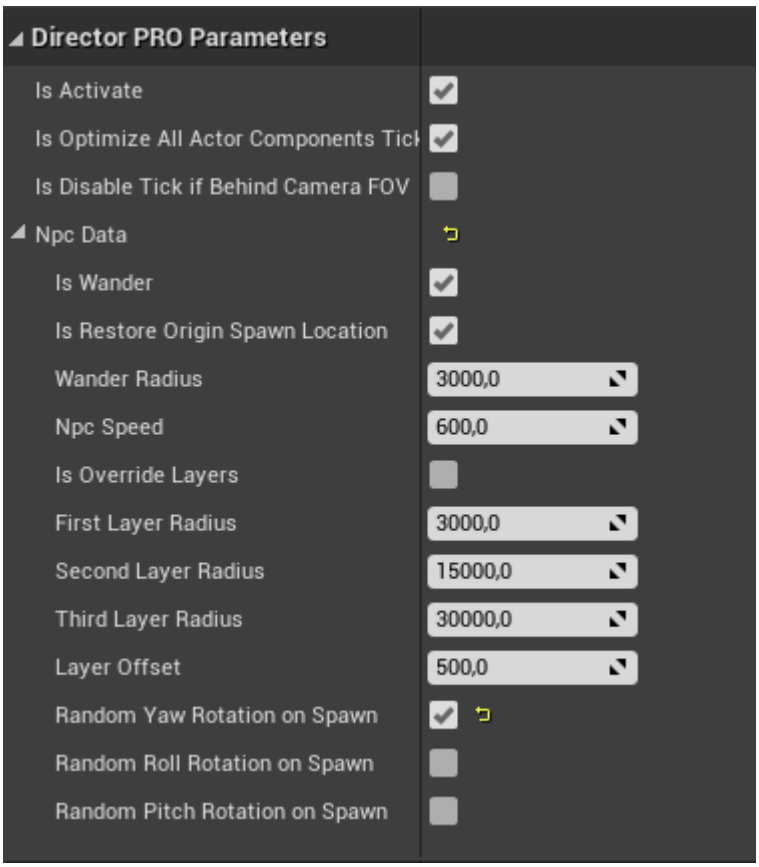


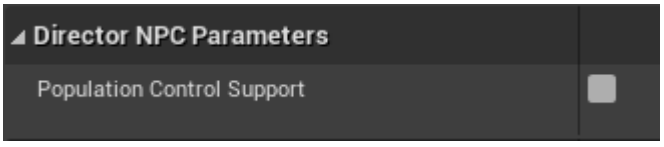
Is Activate - Enable/Disable plugin.
Is Debug - Enable/Disable background pawns visualization.
Correct Spawn Axis Z - You can adjust this value so that characters don't fall through the floor when they return from the background.
First Layer Radius - If the distance between player and pawn **>** the pawn goes to level 2
Second Layer Radius - level 2 is located between First Layer Radius and Second Layer Radius.
Third Layer Radius - level 3 is located between Second Layer Radius and Third Layer Radius.
Layer Offset - This removes the shaking when the actor is on the boundaries of the optimization layers. We recommend it (300-500)

11. Open your NPC and add **BP_NpcDataProComponent**



12. Select **BP_NpcDataProComponent** and choose the parameters you need.





Is Activate - Enable/Disable component.
Is Optimize All Actor Components Tick Interval - Optimizes the tick interval in all the components of the actor if it is out of the camera's field of view.
Is Disable Tick if Behind Camera FOV - Disables the tick in all components of the actor if it is out of the camera's field of view.

Parameters for NPC
Is Wander - Enable/Disable wander NPC in the background.
Is Restore Origin Spawn Location - Enable/Disable restore origin location. The pawn will walk near the spawn location.
Wander Radius - radius for wandering NPC in the background.
NPC Speed - NPC walking speed in the background.

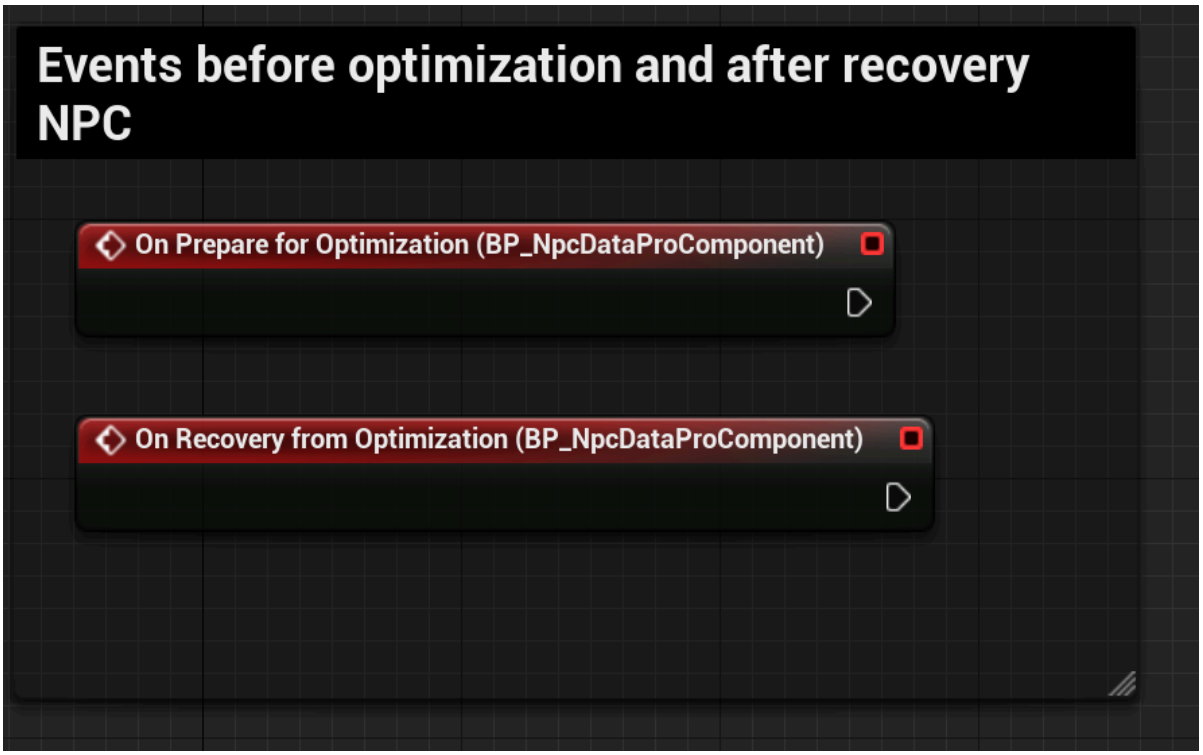
Options to override the global layers

Is Override Layers - Enable if you want to override the global layers option for this actor.
First Layer Radius - If the distance between player and pawn **>** the pawn goes to level 2
Second Layer Radius - level 2 is located between First Layer Radius and Second Layer Radius.
Third Layer Radius - level 3 is located between Second Layer Radius and Third Layer Radius.
Layer Offset - This removes the shaking when the actor is on the boundaries of the optimization layers. We recommend it (300-500)
RandomYawRotationOnSpawn, RandomRollRotationOnSpawn, RandomPitchRotationOnSpawn - Added the ability to set a random rotation when spawning an NPC or an actor (for each actor). If nothing is selected, the rotation will be restored from the one saved before destroying the actor.
Population Control Support - Enable if used Population Control plugin.

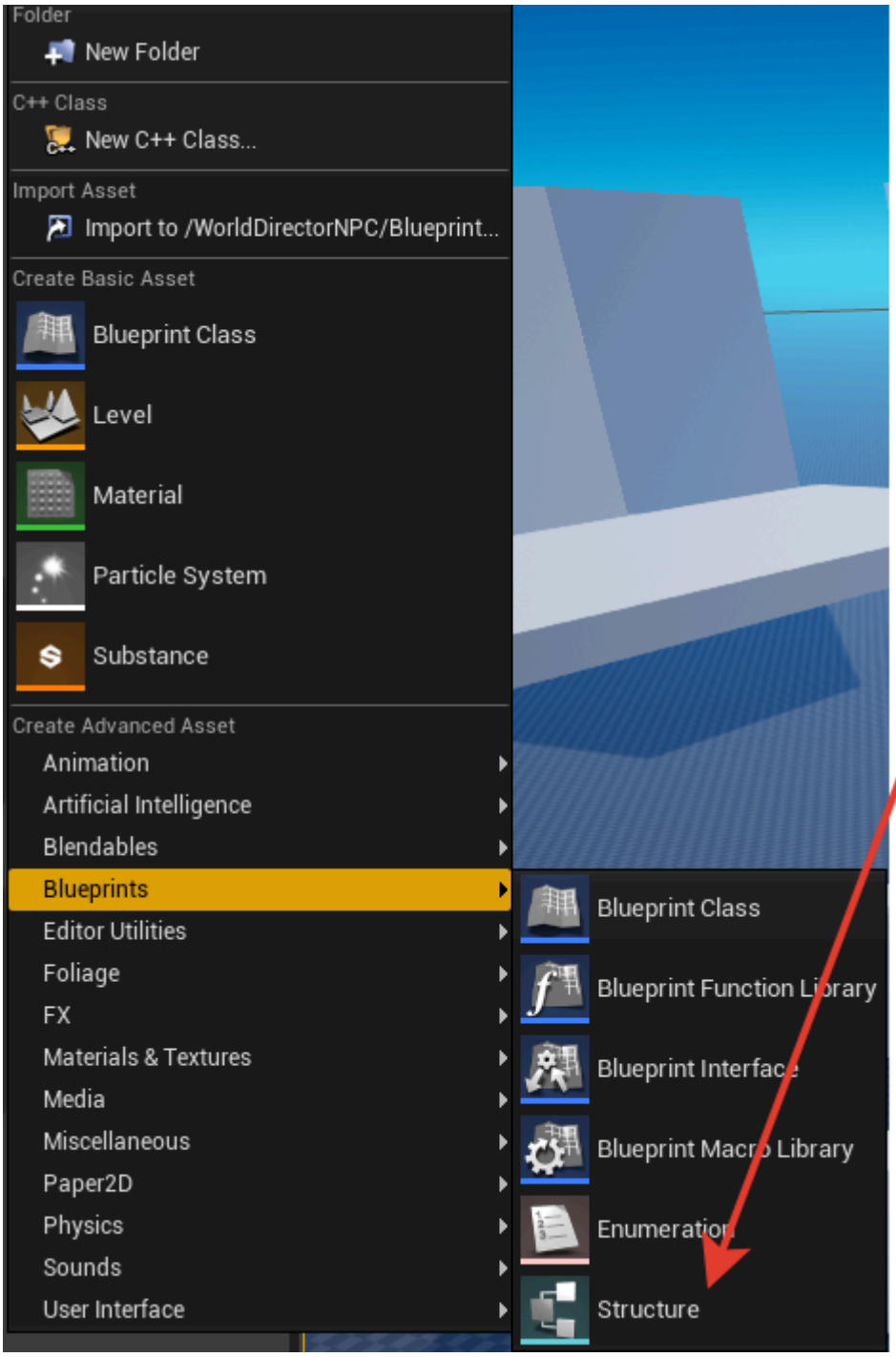
Auxiliary events BehindCameraFOV and In Camera FOV to optimize your code. And OnPrepareOptimization (before the NPC gets from level 1 to level 2 optimization) and OnRecoveryFromOptimization (spawn after optimization)

BehindCameraFOV and InCameraFOV for optimization your code.

Events before optimization and after recovery NPC

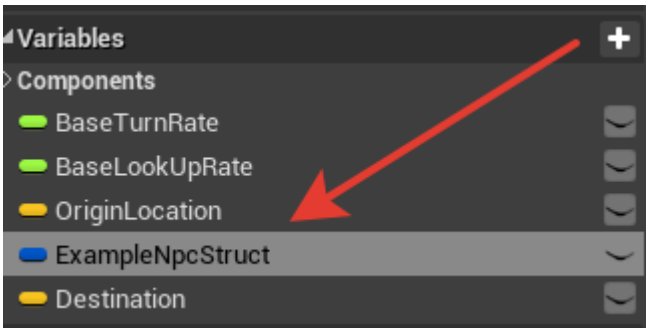


13. And so, if you want to save data about your NPC and restore it when it appears, then create a structure.

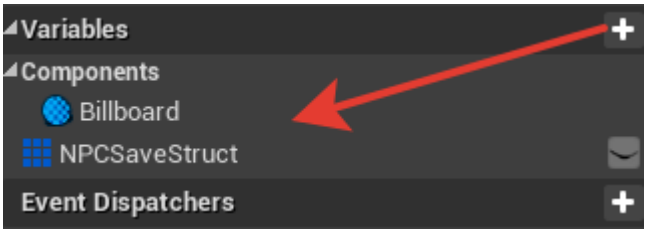


You can use any of your data.

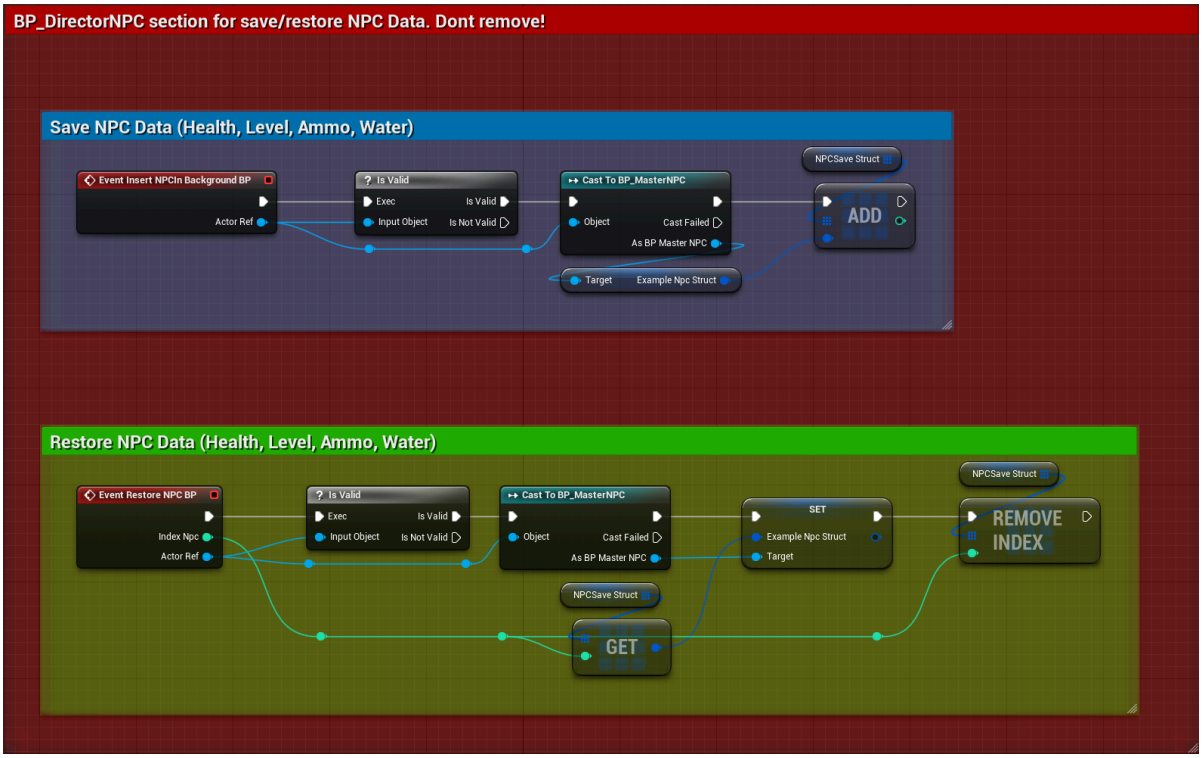
12. Add your structure variable to your NPC.



13. Open **BP_WorldDirectorNpcPRO** blueprint. And create your struct array.

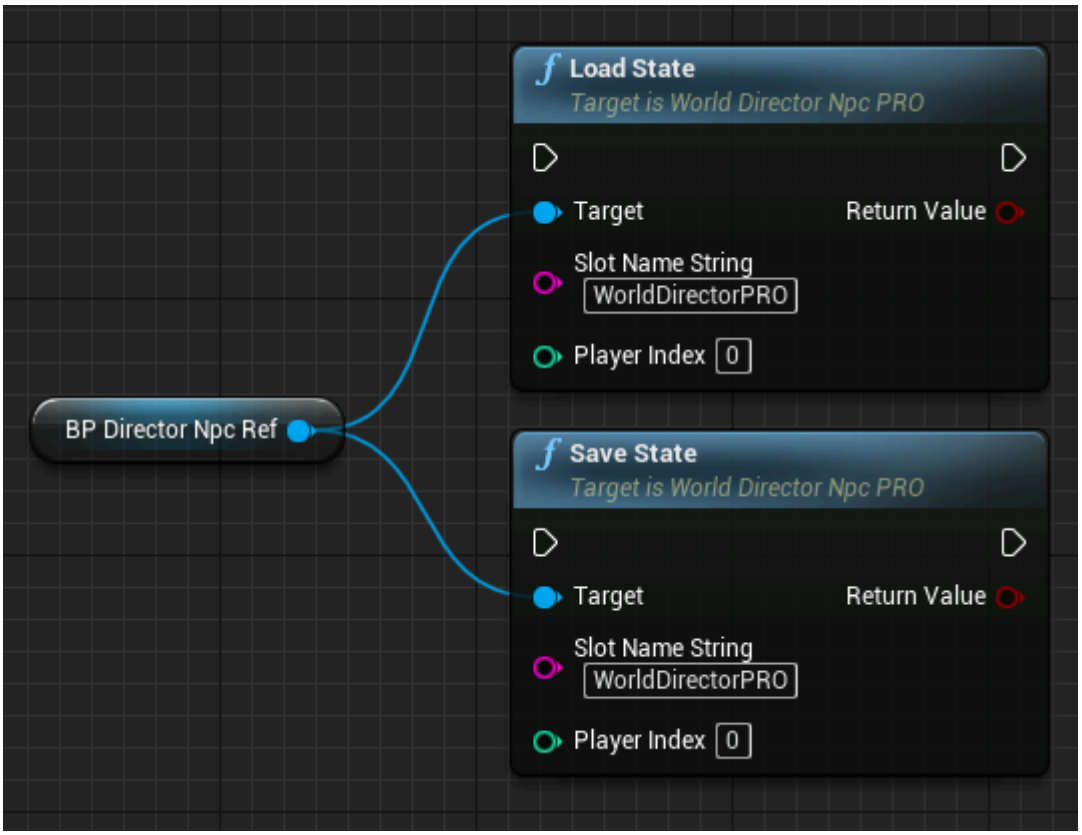


14. In Event Graph set your array and cast your NPC master class

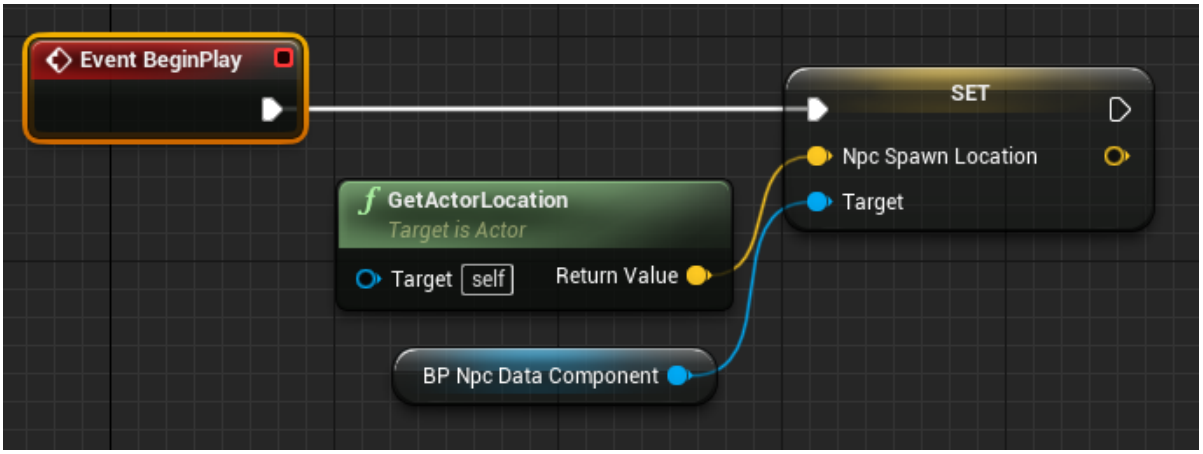


Now the desired characteristics of your NPC will be saved and restored.

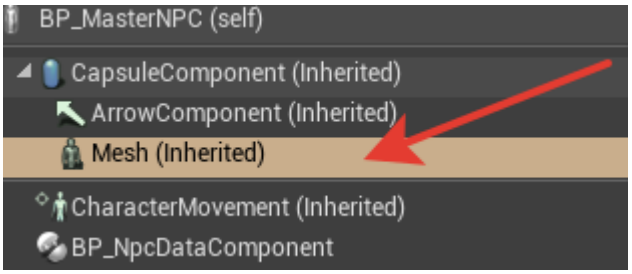
15. To save or load the state of the World Director, use the **SaveState** and **LoadState** nodes

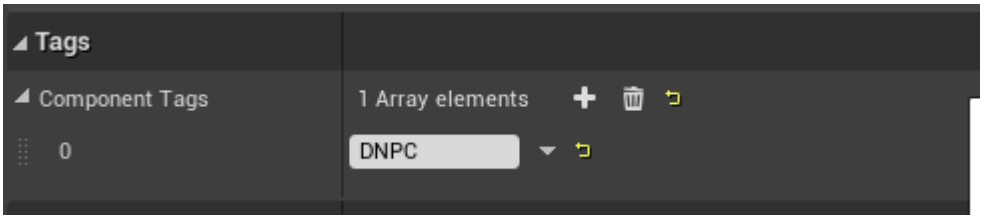


16. Open your NPC master class. And in Event Graph set for **BP_NpcDataProComponent->**npcSpawnLocation. This is necessary for the NPC to walk near the spawn location



17. In your NPC's components master class, add the "DNPC" tag to hide all visual components for maximum optimization.

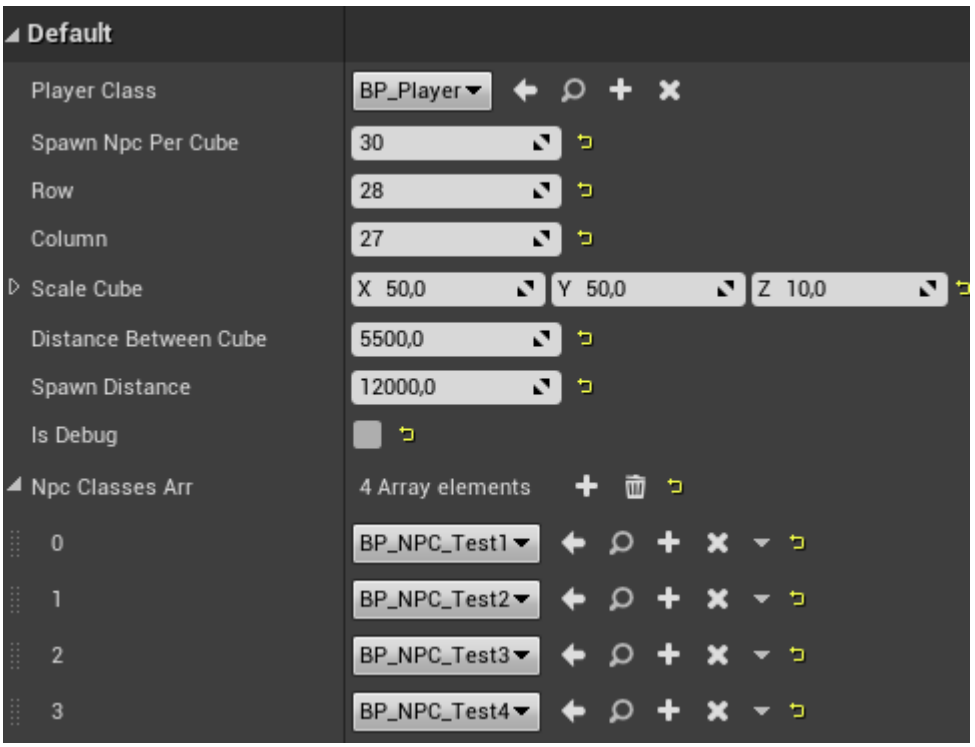


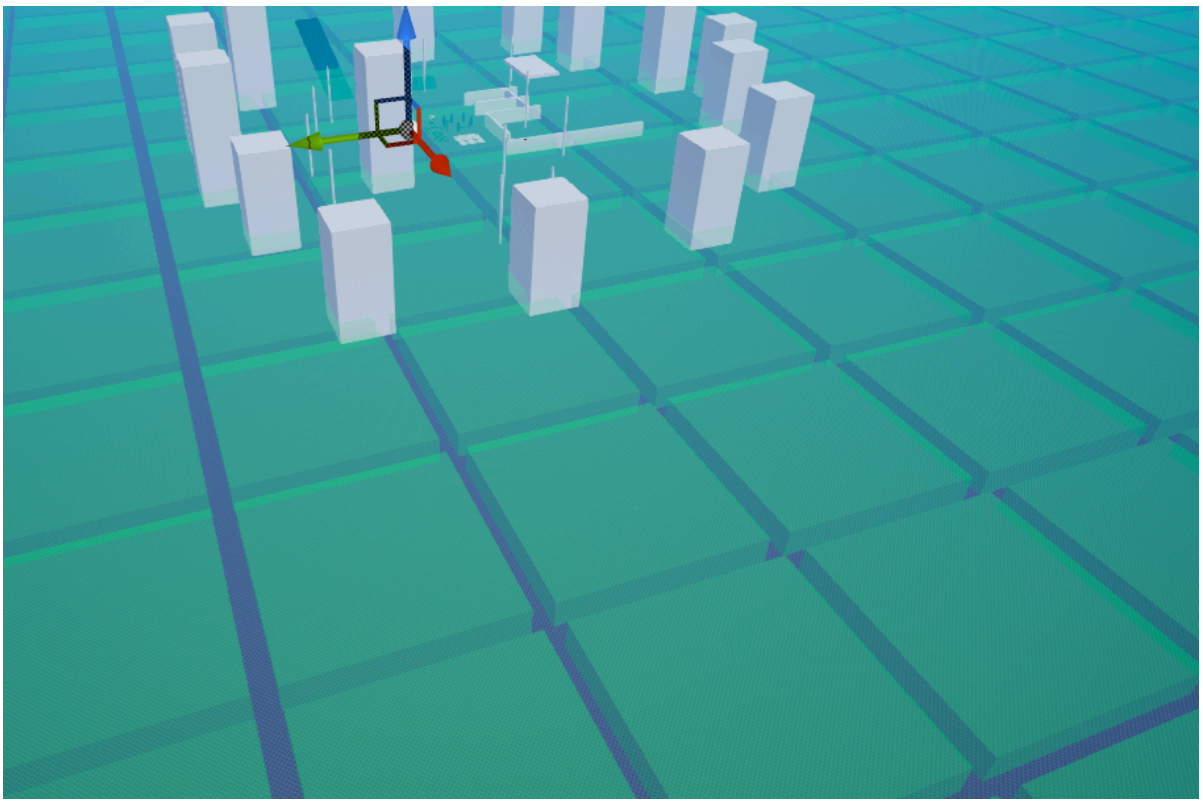


Everything is ready!

Bonus: You can use a simple NPC Spawner. **BP_NPC_SpawnerPro**

1. Drag and Drop **BP_NPC_SpawnerPro** in your scene.
2. Select **BP_NPC_SpawnerPro** in the scene and choose the parameters you need.





The **BP_NPC_SpawnerPro** will create a matrix of cubes in which the NPC will spawn. This is very convenient for quickly populating the world.

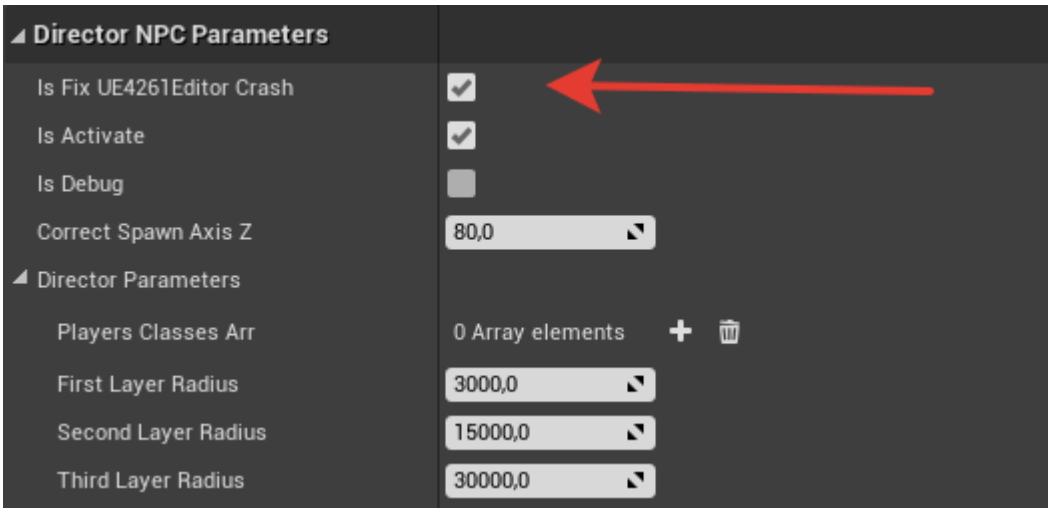
Now you can add the NPCs you need to the NPC array.

To play on the demo map “**PROWorldDirectorNPCDemo**”, you must configure the character control buttons. These are the standard buttons for the Third Person Template. You can download file **DefaultInput.ini** and put to **“Your_Project\Config\”**

In the Example level press “**1**” if you want to see background NPCs. Be careful with a very large number of NPCs, displaying this information can greatly reduce performance. We recommend you to use this information only to debug.

Crash editor version UE 4.26.1.

Please note that after updating UE 4.26 to 4.26.1, the editor may crash after starting and finishing. I have already reported this issue to Epic Games and am doing everything possible to fix this error. I made a small update that will help you in the development. Please set IsFixUE4261EditorCrash = true if the version of your engine is 4.26.1, there is no such problem on other versions. If IsFixUE4261EditorCrash = true, your NPCs will not randomly move at optimization levels 2-3. When you want to build your project in shipping, just disable IsFixUE4261EditorCrash = false. This update does not affect the stability of the plugin itself and manifests itself only in the development mode in the editor. Please excuse the inconvenience



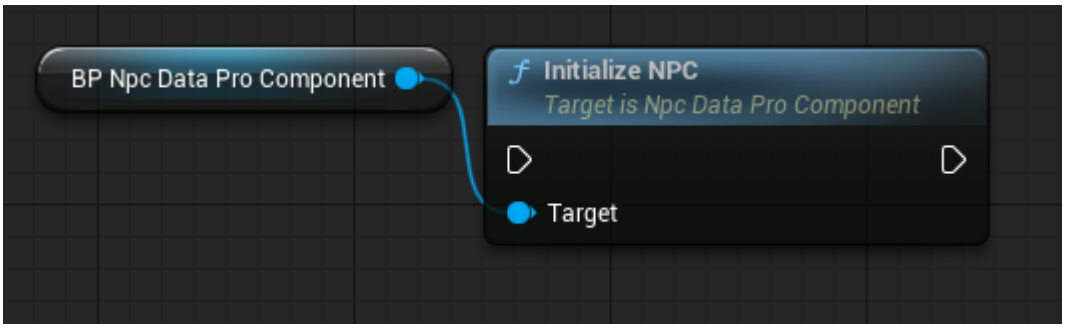
Update 1.1

1. + Support all the features of the World Director Actor plugin.
2. + Add offset parameter to layers. This removes the shaking when the actor is on the boundaries of the optimization layers.
3. + Added override the global parameters of the layers. All settings in the component.
Now you can adjust the radius separately for each actor and NPC.
For example, you can spawn small objects much closer, which gives additional optimization.
After all, a rabbit is smaller than a dinosaur and it is not necessary to see it at a distance of several hundred meters.
And the wind generator is bigger than a flashlight.

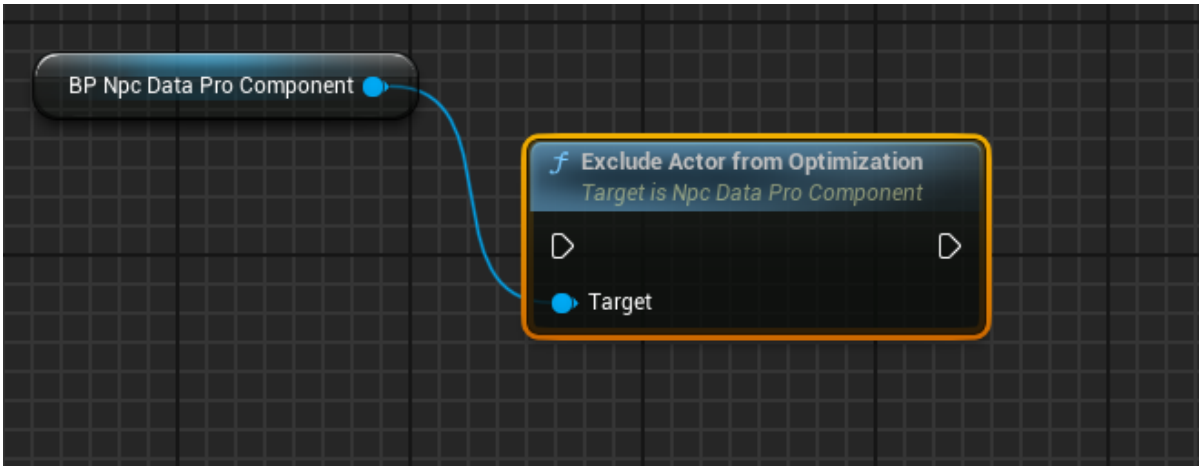
[Population Control + World Director NPC/PRO documentation]

Update 1.2.4

If the World Director Actor was not in the scene at the time of spawning of the NPC, you can register the NPC manually.



+ Added the ability to remove an actor from optimization in runtime. Now you can decide for yourself when to turn optimization on and off for a specific NPC.


BP Npc Data Pro Component
Exclude Actor from Optimization
Target is Npc Data Pro Component
Target