# **Creating Waypoints in UE4**

Chaima Jemmali

Version 2.1

March 2016

## Overview:

This tutorial is designed to walk you through two methods of creating Nodes (waypoints) in UE4. The waypoints can be used to code a pathfinding algorithm, such as A\*.

## **Details:**

#### Method 1 – Blueprint start

This first method creates a waypoint starting from a Blueprint. Such Blueprints are easy to make and convenient.

- 1. Create a Blueprint class (Actor). Name it PathNode.
- 2. Open the PathNode Blueprint and create a new Variable called nextNode. Change the type of the variable for a reference of PathNode and make the variable public (visible) by clicking the eye next to it. Right click on the icon to the left of the name to toggle it to an array.

11 🖉 🚇 PathNode-	x	P 📚 🗕 🕨 🗙
File Edit Asset View Debu	Window Help	Parent class: Actor Search For Help
	🗖 📩 🔜 📖 📖 📰 🛛 🛝 🗌	🧕 Details 🛛 🛛
+ Add Component -	- 🚧 - 🖬 😕 🐝 👥 🔍 🕷 🛛	Search D 📰 👁
PathNode(self)	Compile Save Find in CB Search Class Settings Class Defaults Simulation	▲ Variable
▲ Que Contemporaria de la contemporaria de	Viewport × f Construction Script × Event Graph ×	Variable Name nextNode
Billboard	🖕 🔶 📑 PathNode > EventGraph Zoom -4	Variable Type 🕂 Path Node 🗸
		Editable
		Tooltip
	Right-Click to Create New Nodes.	Expose on Spawn
		Private
🚢 My Blueprint 🛛 🛛		Category
+ Add New 👻 Search 👂	⊙⊽	Replication Vone -
⊿Graphs		
EventGraph		Fditing this value is not allowed
▲Functions (21 Overridable)		
ConstructionScript		
Macros	+	
<b>⊿</b> Variables	+	
▲ Components		
🋞 Billboard		
DefaultSceneRoot		
nextNode		
Event Dispatchers	BUILEPKINI	

Compile and save.

3. Go to the editor and place two PathNodes. Under the details panel under Default, make the nextNode variable of each Node reference to the other Node.

<b>U</b> ThirdPerson File Edit Winde	1ExampleMap ow Help	4 V	1 1 1 1 1 1 1		4.4.4	11-11-14		4 4 6	, ( 	MyProje earch For Help	ect 💷	× ت م
Windes	×	/ »	Save Source Control Conten	t Marketplace Settin	gs Blueprints	Matinee B	uild - Play	- 剩 -	Search	* ×	Type	<b>ب</b> و
Search Classes		Q	Perspective Vit She	w	🔹 🕑 🖉	*® 😵 🔳	10 🛆 10°	0.25	🖎 🚷 Doci	umentationActo	rl Docun	nentatio
Recently Placed	Emp	ty ⊘		_	-1 <sup>2</sup>			P	<ul> <li>Network</li> <li>Network</li> <li>Path</li> </ul>	orkPlayerStart Node	Player Edit P	rStart PathNod
Basic	<b>.</b>			-					🗢 🍆 Path	Node2	Edit P	PathNod
Lights	The second secon	ty 🕜							25 actors (1 sel	ected)	💿 View	Options <del>-</del>
Visual Effects	Poin	ti 🕺		1					(1) Details	×		
BSP									PathNode			6
Volumes	🔄 Play	er 🕜	THE L	]				The second	+ Add Compo	nent 🗸 🔷	g Edit Blu	eprint <del>-</del>
All Classes	Cube	2 7			PathNode(self)      DefaultSceneRoot (inherited)      DefaultSceneRoot (inherited)							
	Sphe	ere 🕜		~					Search		Q	•••
									▲ Transform			
	Cylir	ndı 🕜	7	00					Location -	-550.0 c -660	0.0 c 130.0 c	cn P
			X						Rotation -	0.0 0.0	0.0	
	Cone		0				evel: ThirdPersonEx	ampleMap (Persistent)	A Defende	1.0	1.0	
🐺 Content Browser 🛛 🔪						A Next Node	1 elemente	1				
🕆 Add New 🗸	🕹 Import	🖹 Sav	e All 🛛 🗲 🍝 🕒 Content 🕨	ThirdPersonBP	Blueprints 🕨			<b>"</b>		PathNode?		
						4 Dendering						
					Actor Hidden In C							
				Editor Billboard S								
Mannequin     Mannequin     ThirdPerson     ThirdPersonBP		Hundherson ThirdHerson					⊿ Input					
		Character GameMode				Auto Receive Inp Disabled -						

4. Create an Actor C++ class named MapActor. In this class we are going to iterate over all the actors in our world that contain "PathNode" in their name (those correspond to our waypoints) and we are going to display their location to the screen.

In MapActor.cpp, add the following inclusions:

```
#include "EngineUtils.h"
#include <string>
```

Then Change your BeginPlay() method to look like this

The TActorIterator iterates over all the actors in our world. Then we are displaying the location only the ones that contain "PathNode". You can save the locations of all your nodes in a List and use it as your A\* map nodes.

- 5. Back in the level editor, place an instance of the MapActor class in the level. It can be anyplace.
- 6. Compile and Play/Launch. You should get output on the screen (yellow text in the upper right) indicating locations of the waypoints when you press play.



#### Method 2 – C++ start

Waypoints made with Method 1 have the disadvantage of not being able to access the Blueprint variables (e.g., nextNode) from the C++ code. Method 2 starts with C++ and creates a waypoint that does not have this restriction.

1. Create a C++ class that extends Actor and call it NodeActor. In NodeActor.h, to the NodeActor class definition, add the following property at the bottom.

UPROPERTY(EditAnywhere, BlueprintReadWrite)

ANodeActor\* nextNode;

The UPROPERTY() macro allows linking of C++ code and features in the Unreal Editor, among other things. UPROPERTY() options can be found here: <a href="https://docs.unrealengine.com/latest/INT/Programming/UnrealArchitecture/Reference/Properties/index.html">https://docs.unrealengine.com/latest/INT/Programming/UnrealArchitecture/Reference/Properties/index.html</a>

Compile your code.

2. Create a Blueprint class called Node\_BP. The class should extend NodeActor.



Now you can open the editor of Node\_BP, you can change the "nextNode" variable at the top.

🛍 Node_BP 🛛 🛛 🕹			P (*)	×
File Edit Asset View Debug Window Help			Parent class: Node Actor Search For Help	ρ
Compile Save Find in CB				
😽 Class Defaults 🛛 🛛				
NOTE: This is a data only blueprint, so only the default values are shown. It does not	have any script or variables. If you	u want to add some, Open Full Blueprint Editor		
Search			ا م	0.
₄ Node Actor				
Next Node		• p #		
▲ Actor Tick				
Start with Tick Enabled				
Tick Interval (secs)	0.0			
A Rendering	_			
Actor Hidden In Game				
Editor Billboard Scale	1.0			
▲ Replication				
Only Relevant to Owner				
Always Relevant				
Replicate Movement				
Net Load on Client				
Net Use Owner Relevancy				
Replicates				
Net Cull Distance Squared	225000000.0			
Net Update Frequency	100.0			
Net Priority	1.0			
		▼		
▲ Input				
Block Input				
Auto Receive Input Public View	Disabled 👻			