

Auto Nav Link Generator

Plugin documentation

1. Motivation

Placing navigation links by hand is both *hard* and *time-consuming*, especially when the level is big and there are multiple disconnected areas. There is little to no documentation about how to work in an automated (or, at least, faster) way, so I thought that creating this tool would speed up my workflow when working with big, open-world and, unfortunately, continuous-changing levels.

This tool will help you by automatically creating navigation links in your level based on a series of parameters, **using just standard features** included in the engine (*navigation meshes, navmesh bounds volumes, nav link proxies, nav modifier volumes...*), so you just have to follow the standard navigation workflow stated by Epic Games.

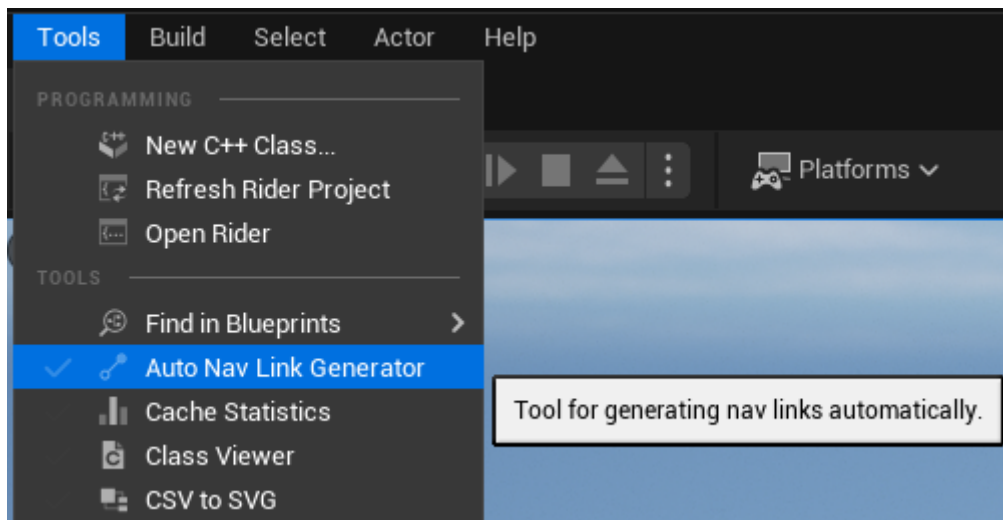


Imagine placing nav links manually here. Yes, I wouldn't want that either.

2. How to use

2.1 Opening the tool

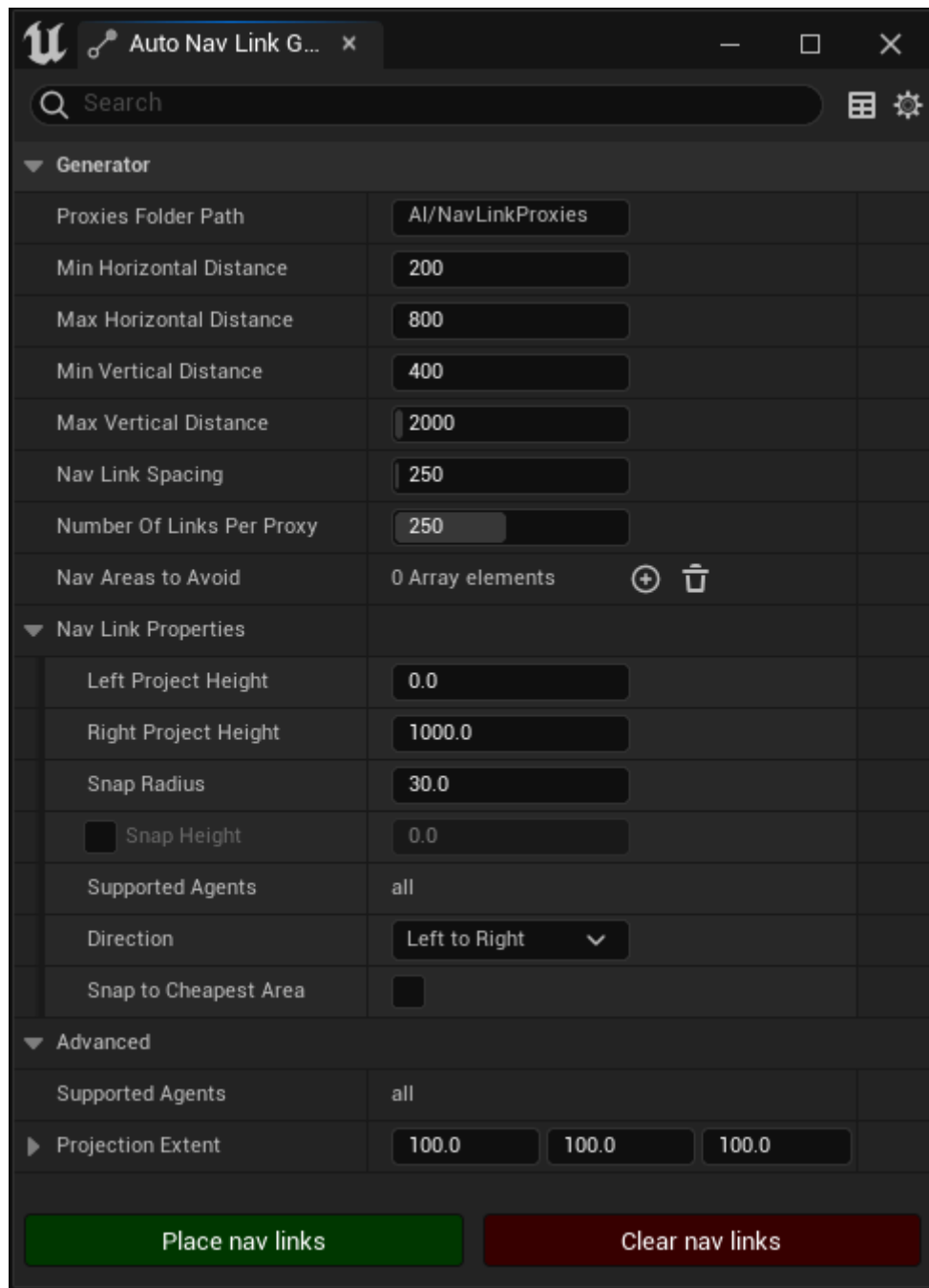
Opening this tool is really simple. After installing the plugin and enabling it, you will find a new entry in the Tools menu at the top of your editor window.



You can find the Auto Nav Link Generator tool under the Tools section.

2.2 Setting up

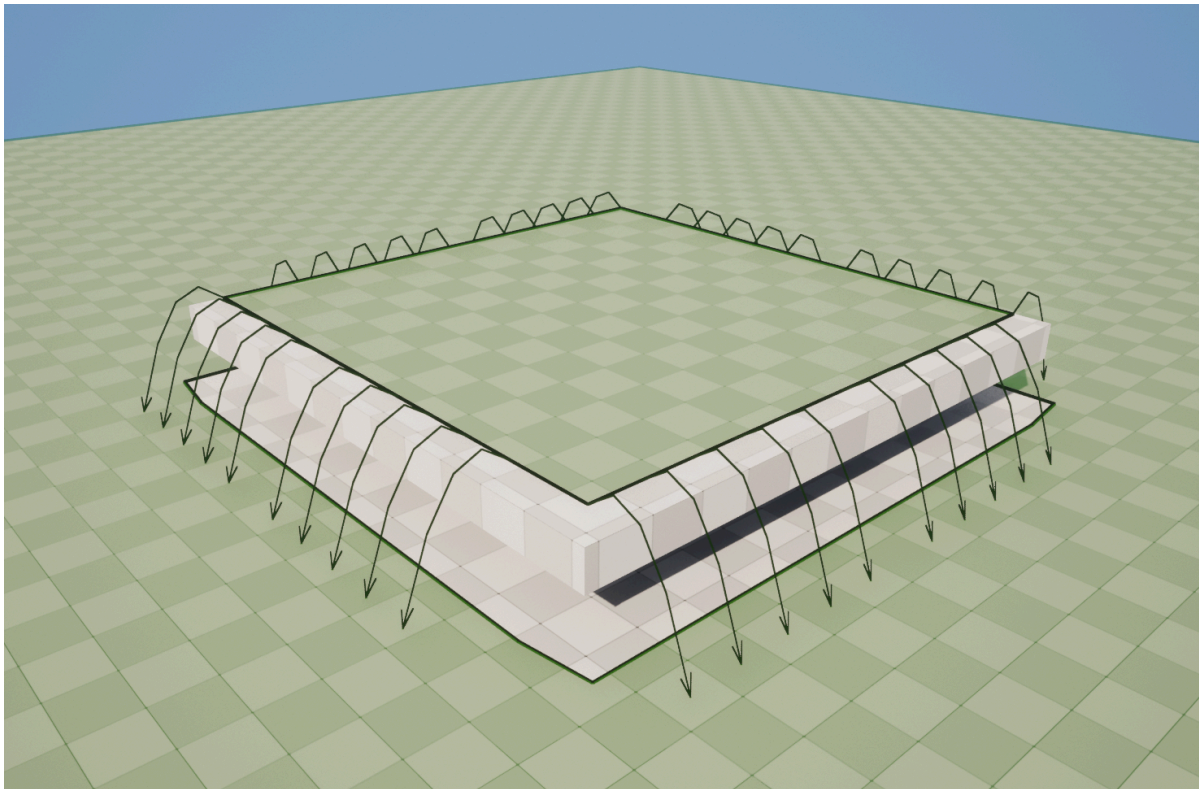
Once opened, you will see all the available parameters for generating navigation links, as well as two buttons at the bottom of the window, once for generating the navigation links and another one for removing them.



The tool window, in all of its glory.

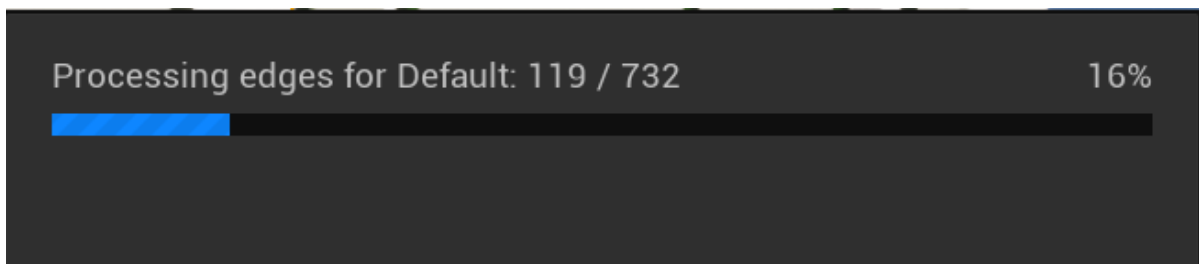
2.3 Generating nav links

Once you've finished setting up the parameters, you can just click on the **Place nav links** button and let the scientific magic of automation work for you.



The final result.

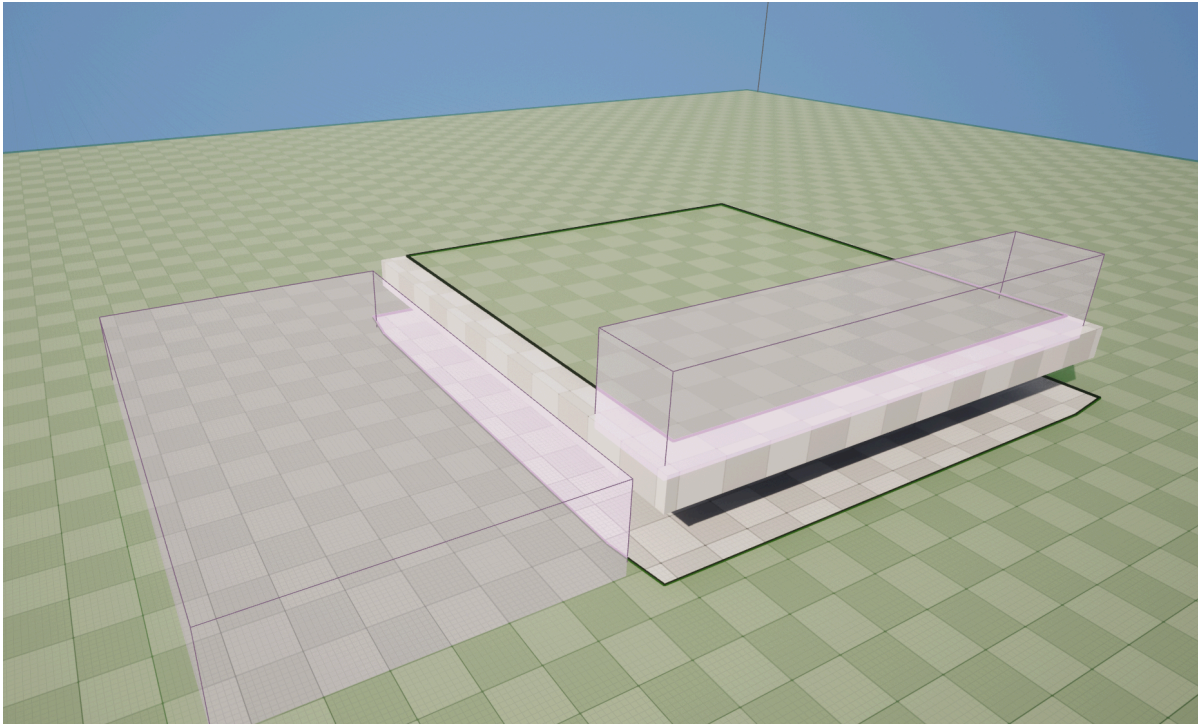
Depending on your level size or generation parameters, the generation could take a while, but don't worry, you'll see a progress bar.



Slow tasks deserve progress bars.

2.4 Avoiding navigation areas

If you want your nav links not to be generated within certain navigation areas, or you just want to discard some edges from the generation process, you just need to add those navigation areas inside the **Nav areas to avoid** parameter.

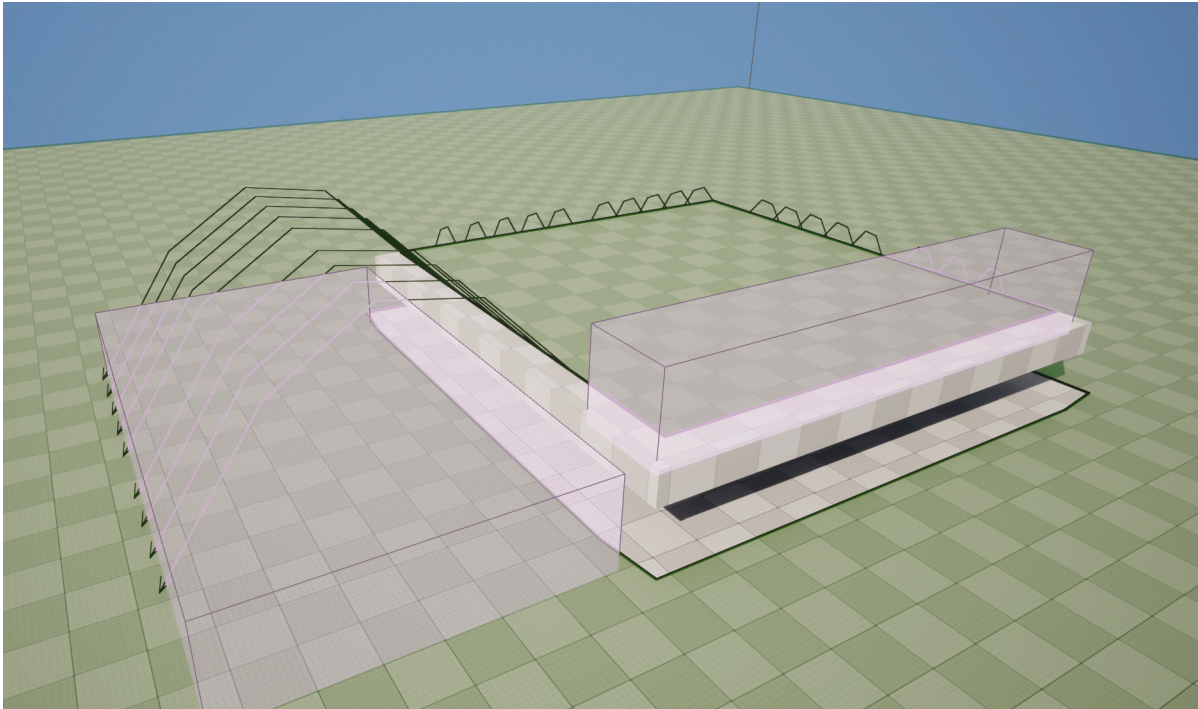


▼ Default	
Area Class	NavArea_Default ▼ ⏪ 🔍 ⊕ ✕ ⏩
▶ Advanced	

Add your nav modifier volumes and set the **Area Class** parameter to the ones you want to avoid.

Number Of Links Per Proxy	250	
▼ Nav Areas to Avoid	1 Array elements	⊕ 🗑
Index [0]	NavArea_Default ▼ ⏪ 🔍 ✕ ▼	

Add those same area classes to the **Nav Areas to Avoid** list inside the tool window.



*The nav links will avoid those volumes when being generated. If the volumes are placed in the edges of the navmesh, the links will simply be discarded (since the left point is inside the volume). However, if the volumes are placed somewhere different from an edge, the generator will keep projecting into the navmesh (using the **min** and **max** distance parameters) until finding a suitable spot to put the right nav link point.*

2.5 Clearing nav links

If you want to clear all generated nav links, just click on the **Clear nav links** button. This process will remove any nav link proxy inside the path specified in the **Proxies folder path** parameter (that is, if you have nav link proxies outside that path, they won't be removed).

3. Parameters

3.1 Generator

- **Proxies folder path:** the path within the world outliner where the nav link proxies will be created.

- **Min horizontal distance:** the minimum horizontal distance from an edge from which the nav link right point will be generated. Increasing this value will make the right point further away from the edge horizontally.
- **Max horizontal distance:** the max horizontal distance from an edge from which the nav link right point will be generated. Increasing this value will make nav links cover greater distances horizontally.
- **Min vertical distance:** the minimum vertical distance from an edge from which the nav link right point will be generated. Increasing this value will make the right point further away from the edge vertically.
- **Max vertical distance:** the maximum vertical distance from an edge from which the nav link right point will be generated. Increasing this value will make nav links cover greater distances vertically.
- **Nav link spacing:** the space to leave between nav links. Increasing this value will result in less nav links generated.
- **Number of links per proxy:** the maximum number of nav links that each nav link proxy will hold inside.
- **Nav areas to consider:** the list of navigation areas to be considered (using nav modifier volumes) when generating nav links. If any area is present in this list, nav links will be generated only inside nav modifier volumes of this area.
- **Nav areas to avoid:** the list of navigation areas to be avoided (using nav modifier volumes) when generating nav links.
- **Nav link properties:** these are a copy of the standard nav link properties. They will be used to set up every generated nav link. Here you can also change the nav link proxy class that will be used for adding new proxies.

3.2 Advanced

- **Supported agents:** the list of agents that will be considered when generating nav links. If you have multiple agents and all of them are included in this list, then there will be generated nav links for each agent recast navmesh.
- **Projection extent:** the extent used in the generation process. The larger the extent, the easier it will be for the navigation system to project it onto the navmesh.
- **Create links between reachable points:** if true, the generator will place nav links between points that don't really need them, since there is a valid navigation path between them. This is useful for places where you may want to force placing a nav link.

- **Avoid obstacles:** if true, the generator will avoid generating nav links that have an obstacle between the left and right points.
- **Obstacle collision channel:** the collision channel of the obstacles to be avoided.
- **Collision check vertical offset:** the vertical distance from the projected nav link points (upwards) for raycasting when avoiding obstacles. Increase it if there are obstacles being avoided that you believe they shouldn't.

4. Suggestions

The tool itself is pretty straightforward in terms of usage, but bear in mind that having a huge amount of nav links in your level isn't the right thing to do. Of course, it all depends on your needs, but here are some suggestions I feel are useful based on my experience using this tool:

- Avoid setting low values in the **Nav link spacing** parameter, since it directly affects how many nav links will be generated.
- Increase the values of the **Projection extent** (especially the **Z** value) if you don't see any nav links being generated after running the tool. This is because the generator uses the **Projection extent** for determining where to place the end of the nav link. Increasing the Z value will help with jumps with high vertical distances (> 100 units).
- Disable the **Update Navigation Automatically** feature in **Editor Preferences**. This is particularly useful when dealing with big levels and a high number of nav links. I think it's better to disable this option and then **build paths manually** after you're done.

