

# !PLEASE READ FIRST!

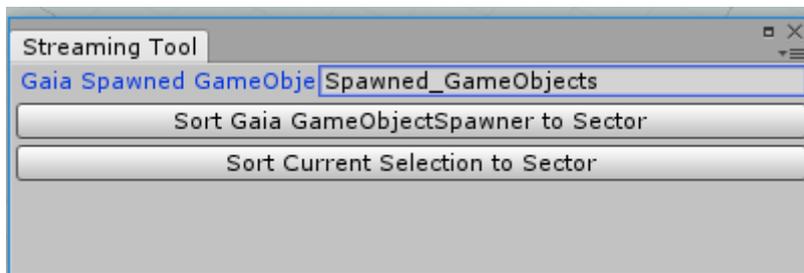
This document is a first attempt to get a minimal amount of information out to the community in regards to streaming terrains with SECTR and the surrounding tools. Please take it as such. It does neither represent the final state of the documentation for these tools, nor the final state of fidelity and technical integration for these tools.

**Do not use the information contained in this guide without backing up your project first or working in a new, empty test project. Setting up for streaming might easily destroy a scene you are currently working on!**

**A word on performance: I did various tests with multiple settings and noticed that a single setting can have huge impact on the final streaming performance. I would recommend to start small and low first, and add more and more details to your setup as you get an impression how much these impact streaming performance.**

## STREAMING TOOLS SCRIPT

I made a small tool to make it easier to assign GameObjects to the terrain streaming sectors. You can download the script here: <https://drive.google.com/open?id=1lmeE5naaYON4oI0cqecIznvz6wHrela7>  
Add this script to a folder named "Editor" in your Asset hierarchy so it gets compiled as Editor script. You can find the script under Window > Streaming Tools after compilation, the window looks like this:



The only input parameter is the name of the parent object for all Spawned Gameobjects of a Gaia Spawner.

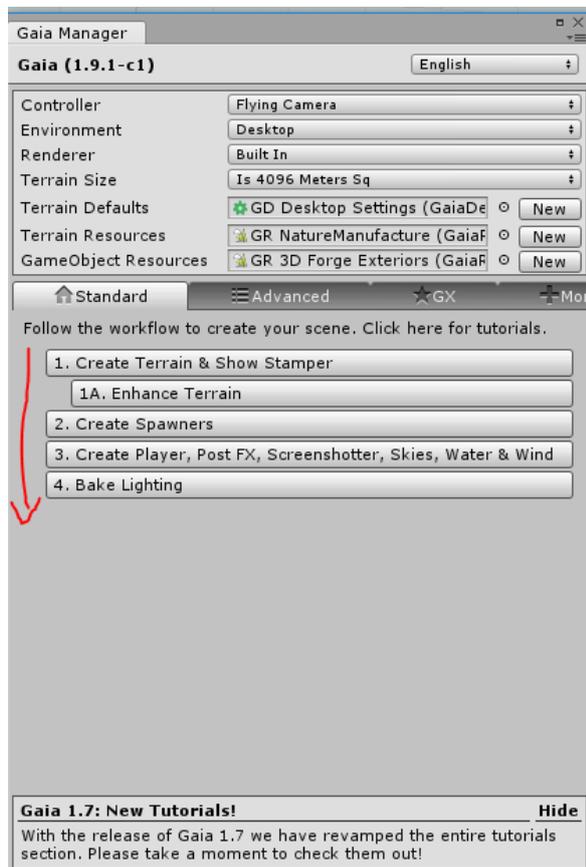
The two buttons do the following:

**Sort Gaia GameObjectSpawner to Sector** – Goes through all Gaia GameObject Spawners and puts the spawned GameObject in the correct Sector.

**Sort Current Selection to Sector** – Sorts the current Scene Hierarchy selection (select multiple objects with Ctrl or Shift) in the correct Sector.

# GAIA

Create your Gaia terrain as usual. If you are not sure about this, you can follow the Gaia Quickstart tutorial document that comes with Gaia. You can also just follow the steps outlined in the Gaia Manager in general, but there are some pitfalls:



- a) Choose your terrain size and settings carefully. If you are planning to test terrain streaming, there is no use of creating your epic 100 square kilometre terrain right away. The larger your terrain is, the longer it will take to generate, sectorize and export it. Chances are you will be doing this multiple times until you find your ideal terrain parameters, and you will just wait hours for nothing when you notice you need to re-do your setup later. I recommend to start with the following settings, and then work your way up later when you are more comfortable with these settings:

Resolution	
Terrain Width	1024
Terrain Length	1024
Terrain Height	300
Heightmap Resolution	257
Detail Resolution	256
Detail Resolution Per Patch	16
Control Texture Resolution	1024
Base Texture Resolution	1024

- b) Unity grass kills streaming performance. I made multiple tests in the beginning where I got bad streaming performance with visible freezes when the terrain chunks were loaded in. Removing the

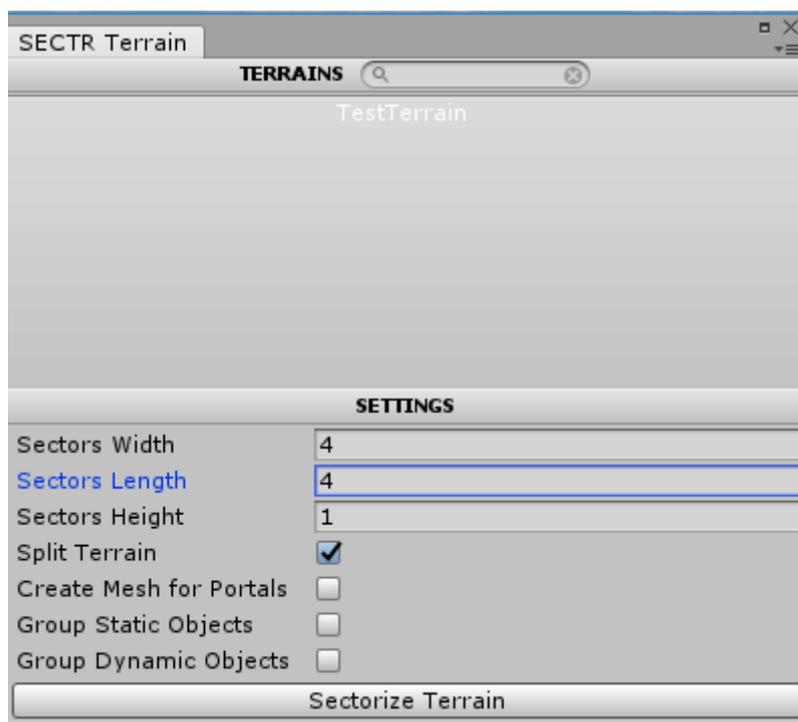
grass made this better instantly, I noticed that each terrain detail you add makes it a little bit worse, so you can maybe add 1 or 2 grass types. This is something I experienced in my personal project as well which made me buy Vegetation Studio.

- c) After you spawn game objects they need to be sorted from the spawner into the sectorized terrain. I prepared a script for you that can either sort all GameObjects from all Gaia spawners into sectors, or do the same for a manual selection of objects. (See “Streaming Tools” script at the beginning of this guide)

A working order of operations when using Gaia together with SECTR is:

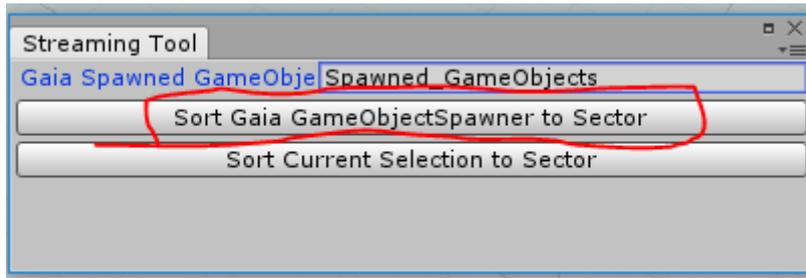
1. Create Terrain and spawn Textures, Trees, GameObjects, Terrain Details
2. Make a backup copy of the terrain and deactivate it. The sector terrain tool will split up your terrain when sectorizing, and it is convenient to just reactivate the backup and try again.
3. Sectorize the terrain via

**Window > SECTR > Terrain**



The number of sectors influence performance; more sectors mean less loading time per sector but also longer export & build times. I used 4x4 and 8x8 in my experiments with the 1024 sized terrain.

4. Sort all GameObjects spawned by the spawners with the streaming tools script to the right sector. See the chapter at the beginning of this guide for more information.



5. Export all Sectors via

**Window > SECTR > Streaming**

6. Attach a loader to your player, I used NeighbouringLoader on the FlyCamera that came with Gaia for my experiments.

7. Press play and test your streaming terrain. If everything works, you can skip the next chapter as it explains only how to set up SECTR Stream independently of Gaia.

# SECTR STREAM

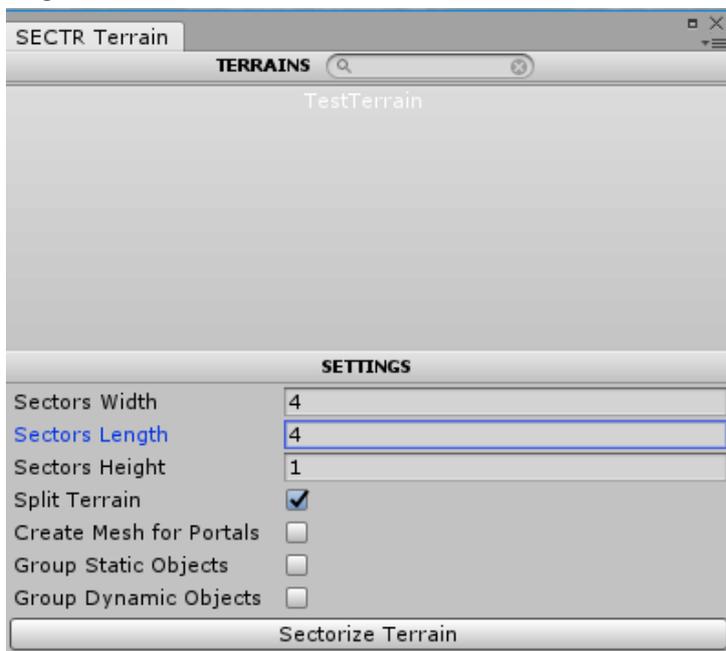
Getting a terrain to stream with SECTR can be set up in a few steps.

1. Start with a scene that contains any terrain. If you own Gaia, you can make a test terrain with the instructions of the previous chapter. Make sure the terrain does not contain any child GameObjects, those will be lost when the terrain is split up into sectors. If you want to add GameObjects to your terrain, store them somewhere else in your hierarchy for now, we will get to them later.

2. Open

**Window > SECTR > Terrain.**

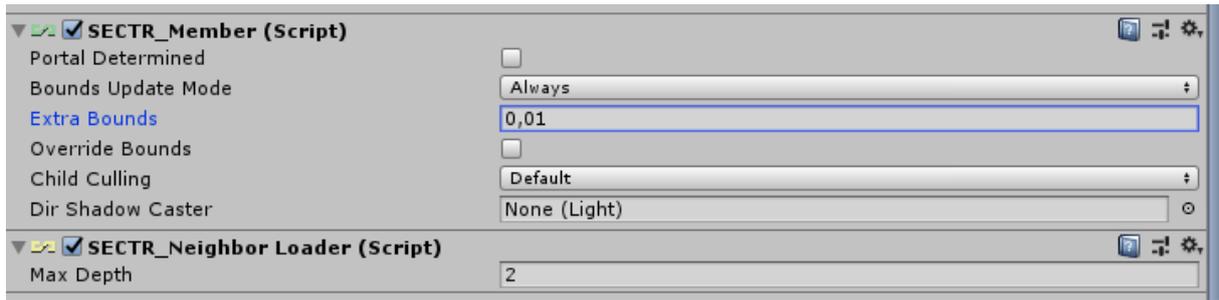
This opens a window that allows you to split up your terrain and create the required sectors in one single click:



The number of sectors influence performance; more sectors mean less loading time per sector but also longer export & build times. I used 4x4 and 8x8 in my experiments with the 1024 sized terrain. Click "Sectorize Terrain" to start the process. During the process your original terrain will be destroyed and split up.

3. After sectorization your scene should look the same, but if you look closely you will notice that your terrain now consists of multiple smaller terrains.
4. Add all GameObjects that you want to be part of your streaming terrain to the sectors with the Streaming Tools script. See the chapter at the beginning of this guide for more information.
5. Open **Window > SECTR > Stream** and click "Export all Sectors". After that step has been performed your terrain should be gone, only placeholders should be left in the scene

6. Add a SECTR Loader component. I used a SECTR Neighbour Loader on a flying camera with the following settings:



And that's it already, when you press play the terrains should start to load / unload around your player as you move around in the scene.

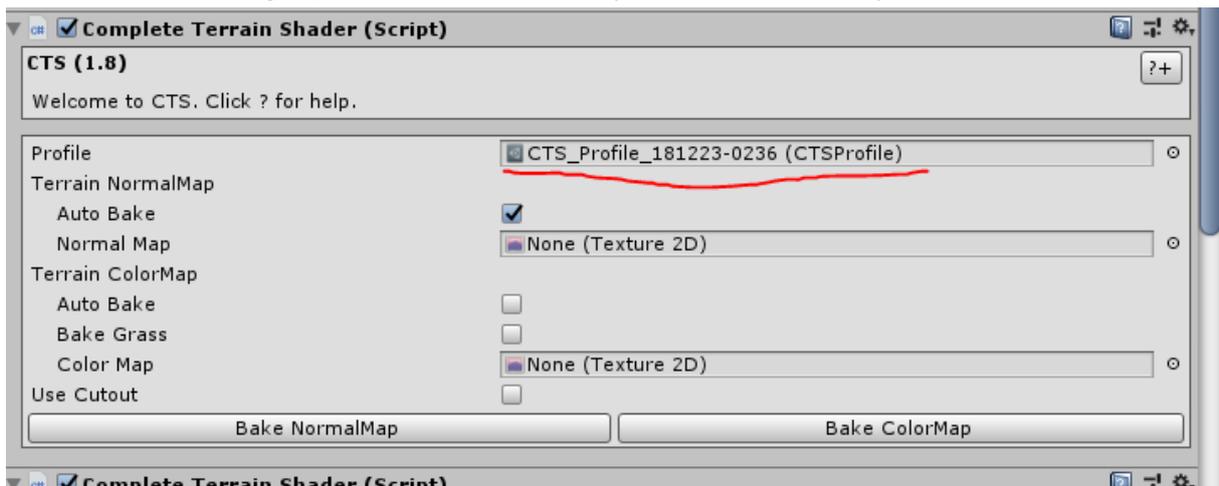
## CTS

To add CTS to a streaming scenario, you need to do the following:

1. Create the CTS profile you want to use. You can do this either on your origin Terrain, or on one of the smaller streaming terrains. As long as the terrain has the correct textures assigned in the Unity terrain inspector, you can create the profile from it. Select that terrain, And Select **Component > CTS > Add CTS to terrain.**

This adds the CTS Component to the terrain. Next go via **Windows > CTS > Create and Apply Profile,** and you got your profile created.

2. Select the terrain again, and double click on the profile in the CTS component

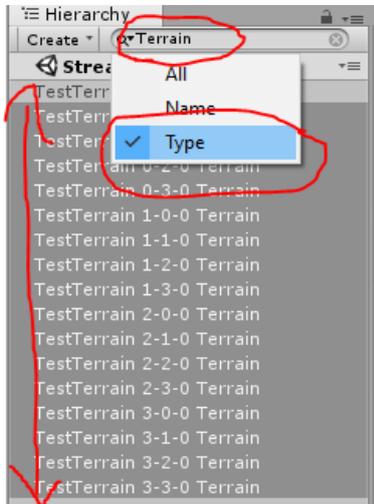


3. Select the desired Shader Type at the top, and click "Bake Textures" at the bottom to bake the textures from the profile.

4. After baking finished, you need to assign the CTS component and the profile to all streaming terrains. If you currently don't have them loaded in the scene, import them back in by going to **Window > SECTR > Streaming**

and import all sectors.

5. Once you have all terrains visible in the scene, filter the hierarchy by Type: "Terrain" and select all terrains this way:



6. Go via

**Components > CTS > Add CTS to terrain**

to add the CTS component to all selected terrains at once

7. Locate the CTS Profile you created earlier in the Asset Hierarchy. Select it, and click the "Apply Profile" button at the bottom. This will apply the CTS profile to all CTS components in the scene.

8. Export the Terrains back out into scenes via

**Window > SECTR > Stream > Export All Sectors.**

Now all your streaming terrains should be rendered with CTS, and listen to the CTS weather manager changes as well. Note that it does not matter as much when you perform these steps. You can either create the CTS profile at the very beginning and add CTS to all terrains before you export them for the first time, or you can add them to an existing streaming project later on. You just need to get the component and the profile on all terrains.

If you can't load in all terrains at the same time, you can perform these steps in "waves" as well where you load in only portions of the available terrains at a time.

# Vegetation Studio / Pro

Vegetation Studio Pro can be added at any time to the streaming setup. Regular Vegetation Studio (“without Pro”) can be used as well, but has a more difficult setup that I would cover in an extended version of this guide. If you have regular VS and want to give it a try anyways, you can add a single Vegetation System to each streaming terrain for a barebones example setup.

To add VS Pro to your streaming setup, follow these steps:

1. **Window > Awesome Technologies > Add Vegetation Studio Pro to the scene**

2. Create a new Vegetation package pro by right-clicking in the asset hierarchy and selecting **Create > Awesome Technologies > Vegetation Package Pro > No textures**

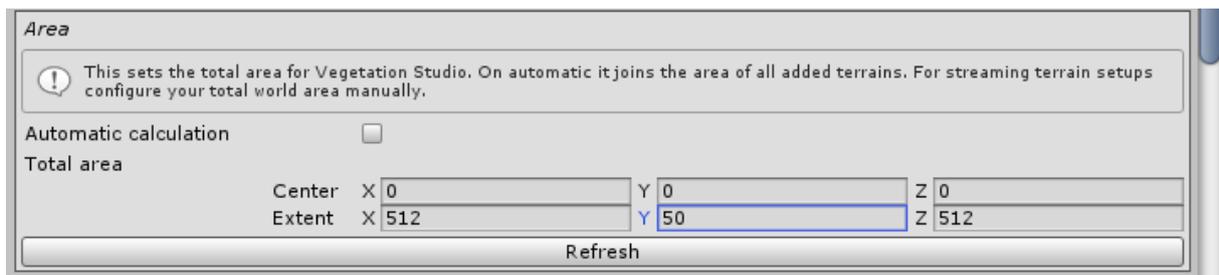
(You can use one of the variants with textures if you want to use the texture spawning functionality of VS Pro)

3. Open the Vegetation System in your scene and add the Vegetation Package under “Biomes”

4. Click on “Edit Biomes” and add some plants and trees to the System

5. Click on “Terrains” and remove all terrains. (we want them to be loaded in by streaming, not pre-defined.)

6. In the “Area” segment disable the checkbox for Automatic calculation and manually enter the center and extents of your terrain. If you have all streaming terrains loaded at this moment, the correct values are probably already filled in. For a 1024x1024 terrain with height 100 that is located at 0,0,0 the values would be:



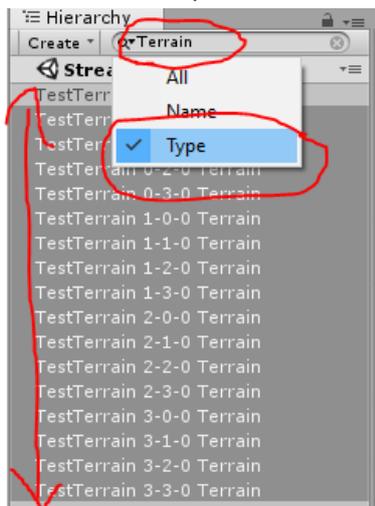
7. That is a barebones setup for the VS Pro Vegetation System, note that VS Pro comes with a lot of settings and additional functions not covered here, so you can optimize the vegetation rendering to your heart’s content.

8. Similar to CTS, you need to add a component to each streaming terrain. If you currently don’t have them loaded in the scene, import them back in by going to

**Window > SECTR > Streaming**

and import all sectors.

9. Once you have all terrains visible in the scene, filter the hierarchy by Type: "Terrain" and select all terrains this way:



10. When all terrains are selected, you can select „Add Component” in the unity inspector and add the Unity Terrain Component.



11. With all terrains still selected, enable the checkbox for "Add/Remove at Enable/Disable". Enabling "Disable Unity trees / details" is recommended as well.

12. Export the Terrains back out into scenes via **Window > SECTR > Stream > Export All Sectors.**

Now the vegetation on all your streaming terrains should be rendered with Vegetation Studio Pro when you press play. Note that it does not matter as much when you perform these steps. You can either create the Vegetation System at the very beginning and add the component to all terrains before you export them for the first time, or you can add VS Pro to an existing streaming project later on. You just need to get the component on all terrains and the VS Pro System set up in your main scene correctly.

If you can't load in all terrains at the same time, you can perform these steps in "waves" as well where you load in only portions of the available terrains at a time.