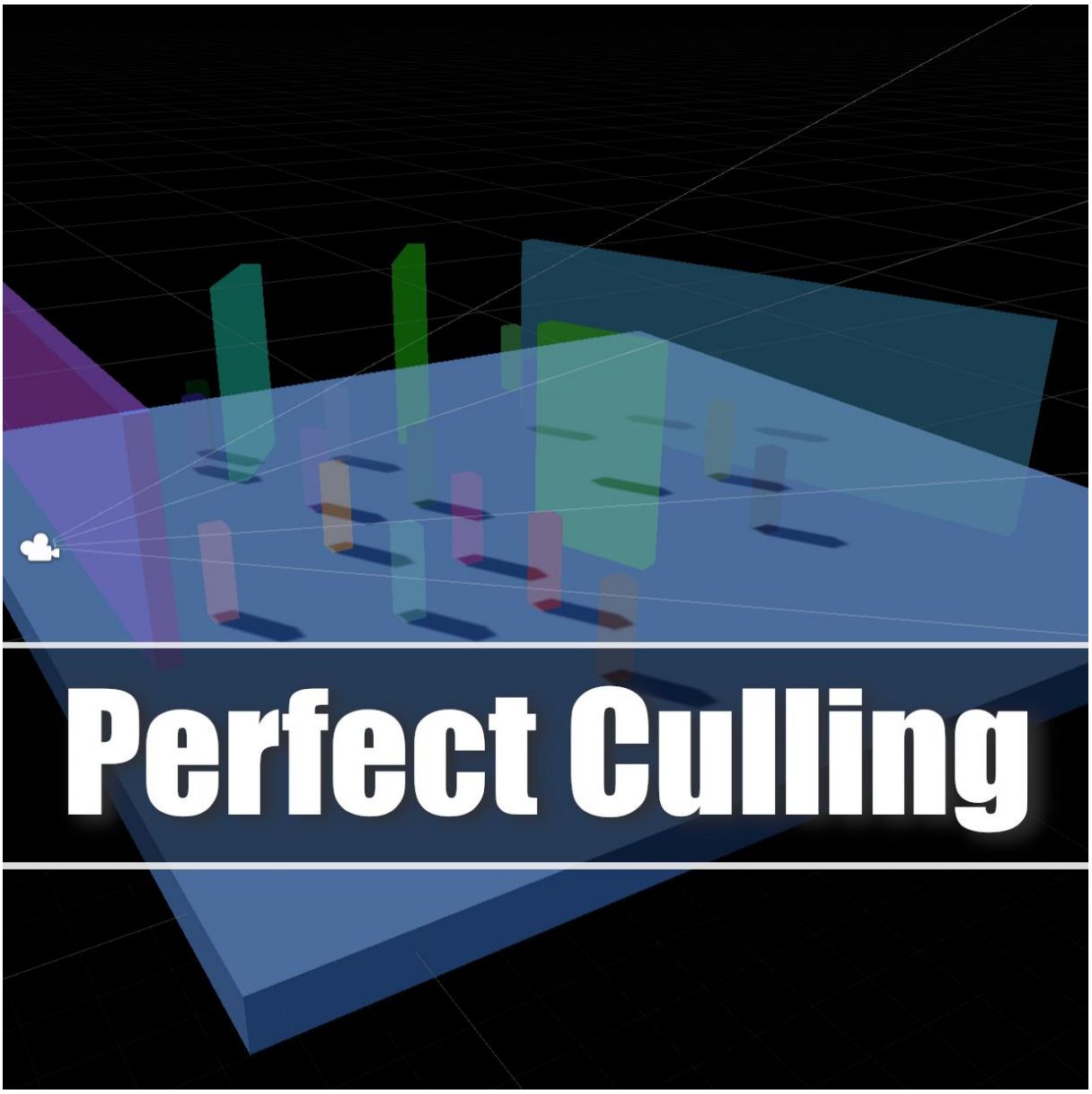


Exclude cells using Sampling Providers

In order to reduce your bake time and memory usage you want to reduce the number of cells as much as possible. However, the number of cells also impacts the quality of your bake (for instance a single cell would probably be insufficient for everything but an immovable camera).

Fortunately, there is usually many opportunities to exclude cells from your bake because a player is unable to reach them. There is two options how you can exclude cells. The first one is to place an Exclude Volume. The more flexible option is to use the built-in Sampling Providers. Sampling Providers tell the asset whether a position should be baked or not. You can also write a custom Sampling Provider if you need something more specialized. The main advantage is that they will automatically adapt to scene changes whereas a volume you might need to manually adjust.

The following Sampling Providers are built-in:

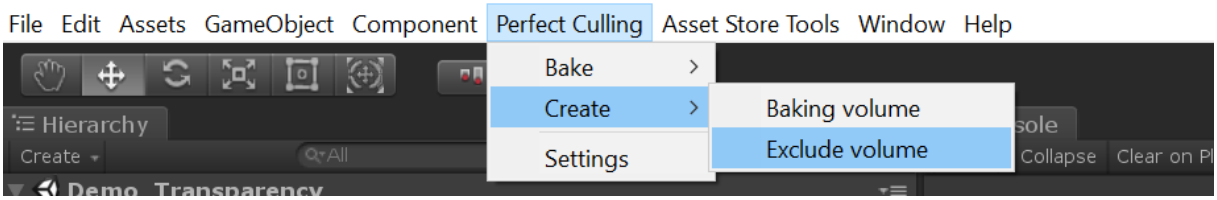
- **ExcludeBelowColliderArraySamplingProvider** allows you to exclude cells that are below a specified collision volume. This is determined by performing a raycast upwards.
- **ExcludeFloatingSamplingProvider** allows you to exclude cells that are floating. This is determined by performing a raycast downwards. The distance can be adjusted.

- **ExcludeTooFarFromNavMeshSamplingProvider** allows to exclude cells that are too far away from the navigation mesh. The distance can be adjusted.
- **ExcludeInsideCollidersSamplingProvider** allows to exclude cells that are inside collision volumes and thus unlikely to be reached by the player.

The source is included and rather straight-forward. So, consider writing your own Sampling Provider. Some are also used in the demo scene called **Demo_Custom_ExcludeSamplingProvider.**

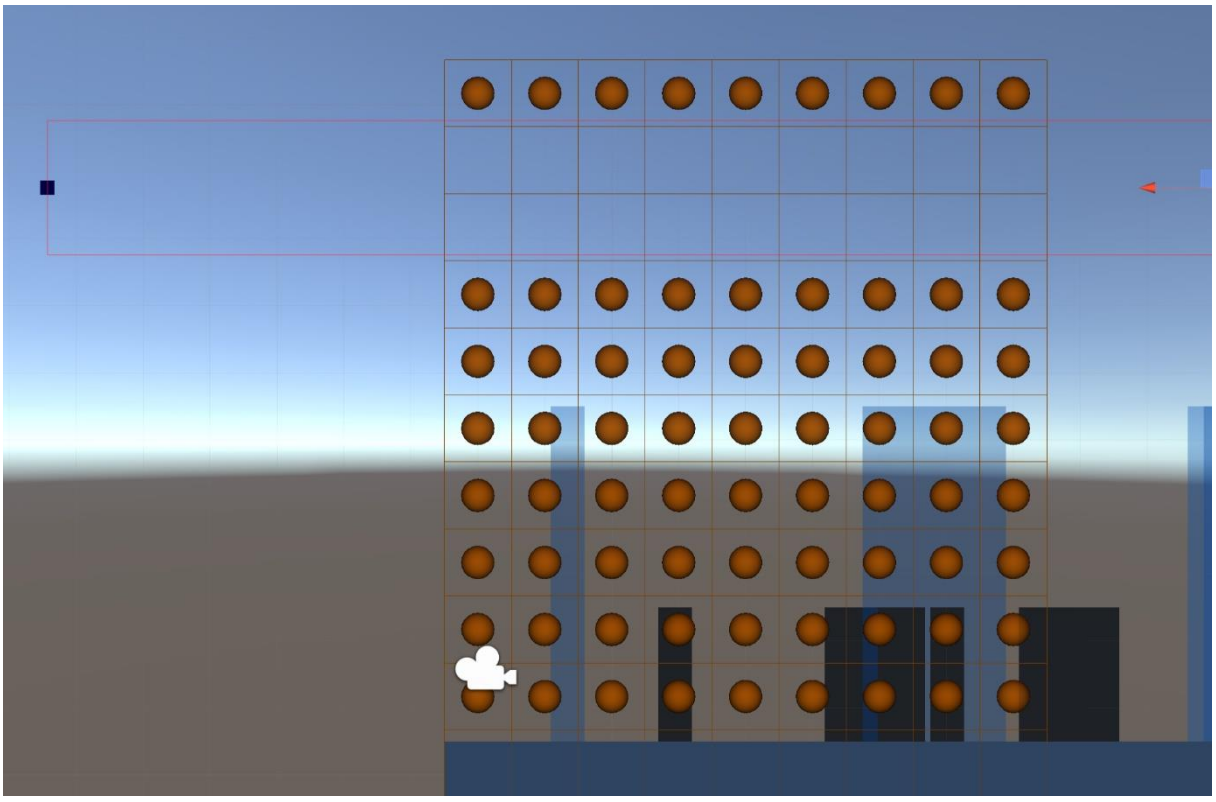
*Notice: When you decide to implement custom SamplingProviders make sure not to miss adding the **ExecuteAlways** attribute to ensure that it works correctly in edit mode.*

Option 1: PerfectCullingExcludeVolume:



This spawns a volume that you can place freely in your scene to exclude cells from the bake.

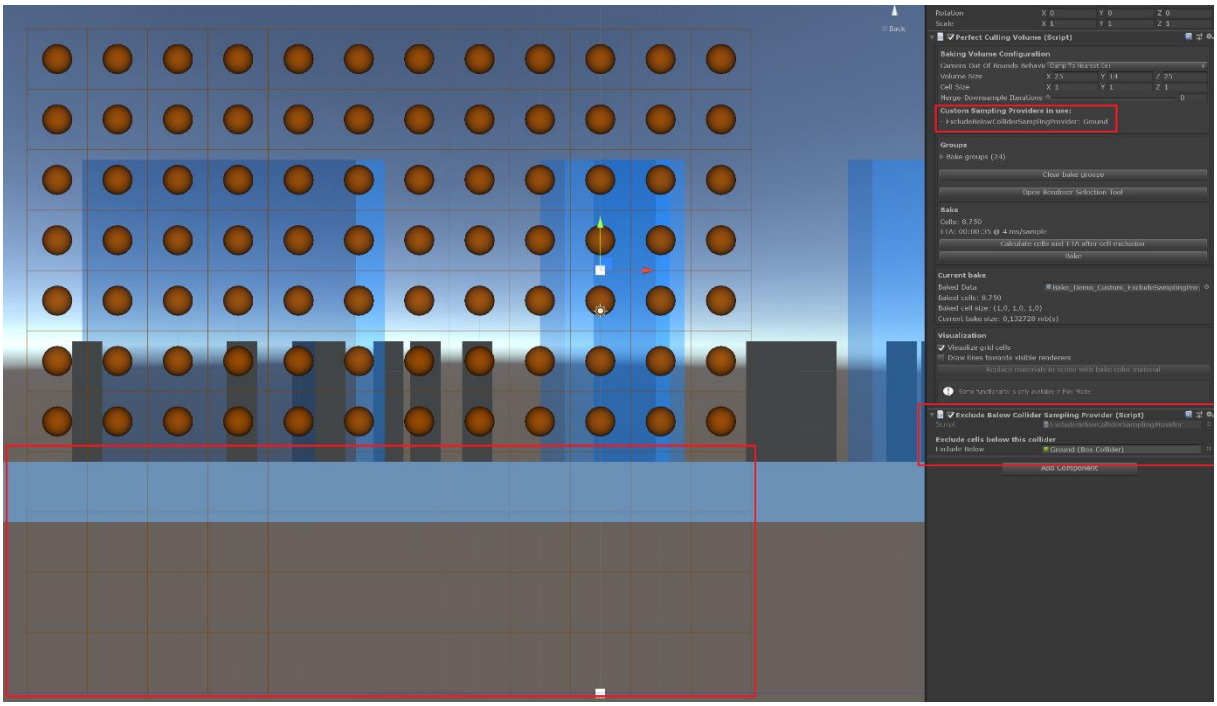
Using the Visualization feature on the **PerfectCullingVolume** you can see its effect:



PerfectCullingExcludeVolume (red) – the grid cells are still visible but the probes located inside it disappeared and will be excluded from the bake.

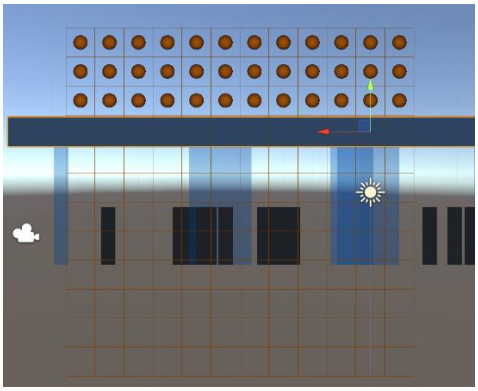
Option 2: SamplingProvider

Just select your PerfectCullingVolume and add the desired Sampling Provider component.



Here you can see **the built-in ExcludeBelowColliderSamplingProvider** in use. Cells below the Ground collision volume are excluded from the bake.

Since this is driven in code moving the Ground will automatically exclude the cells that are below it:



Cells have been excluded automatically after the Ground was moved.

Performance

All this code is only executed in the Unity Editor and does not impact run-time performance. For custom sampling providers keep in mind that very extensive calculations might impact editor performance.

Furthermore, it is important to understand that the cell is just excluded from the bake but it still exists within the grid and thus consumes memory for existing as an empty cell. An empty cell consumes about 8 bytes (500,000 empty cells would consume 4 megabyte).

Concluding that at some point it might be more memory efficient to use an additional **PerfectCullingVolume** to avoid too much empty space. Of course, additional volumes require more lookups and will come at a higher CPU cost.

All of this greatly depends on your use-case so make sure to profile!

For performance reason the stats window does not automatically deduct excluded cells. If you want to see how many cells are actually going into the bake press **Calculate cells and ETA after cell exclusion.**