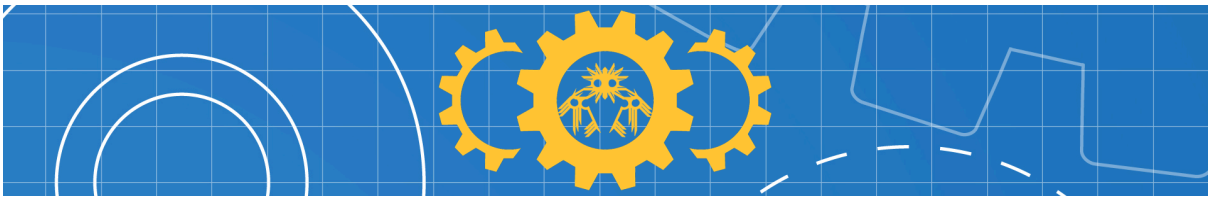
Optimization Debug Tool



What is the system capable of:

Textures:

- Compression of textures with multiple options
- Resolution change
- Texture visual changes

Meshes:

- Static meshes LOD creation with multiple options
- Allowing CPU access
- Nanite enabling and Nanite optimization settings
- Remove LODs
- Create simple collisions
- Create Convex collisions
- Remove collisions
- Skeletal meshes LOD creation
- Create and assign physics assets
- Change socket names

Quality:

- Change quality settings
- Change max FPS
- Option to control the use of all post-process effects
- Pool size settings
- Adding an optimization tool into the world that will affect in-game
- Control every quality setting manually

Debug:

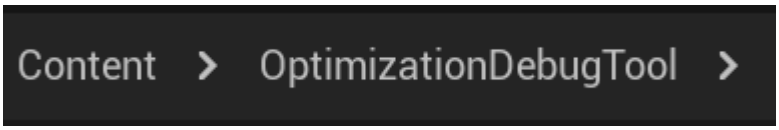
- Help option
- Hide/Show screen messages option
- Favorite option to save main used debug tools
- Statistics of the game
- View modes
- Buffer visualization
- Nanite Visualization

Additional:

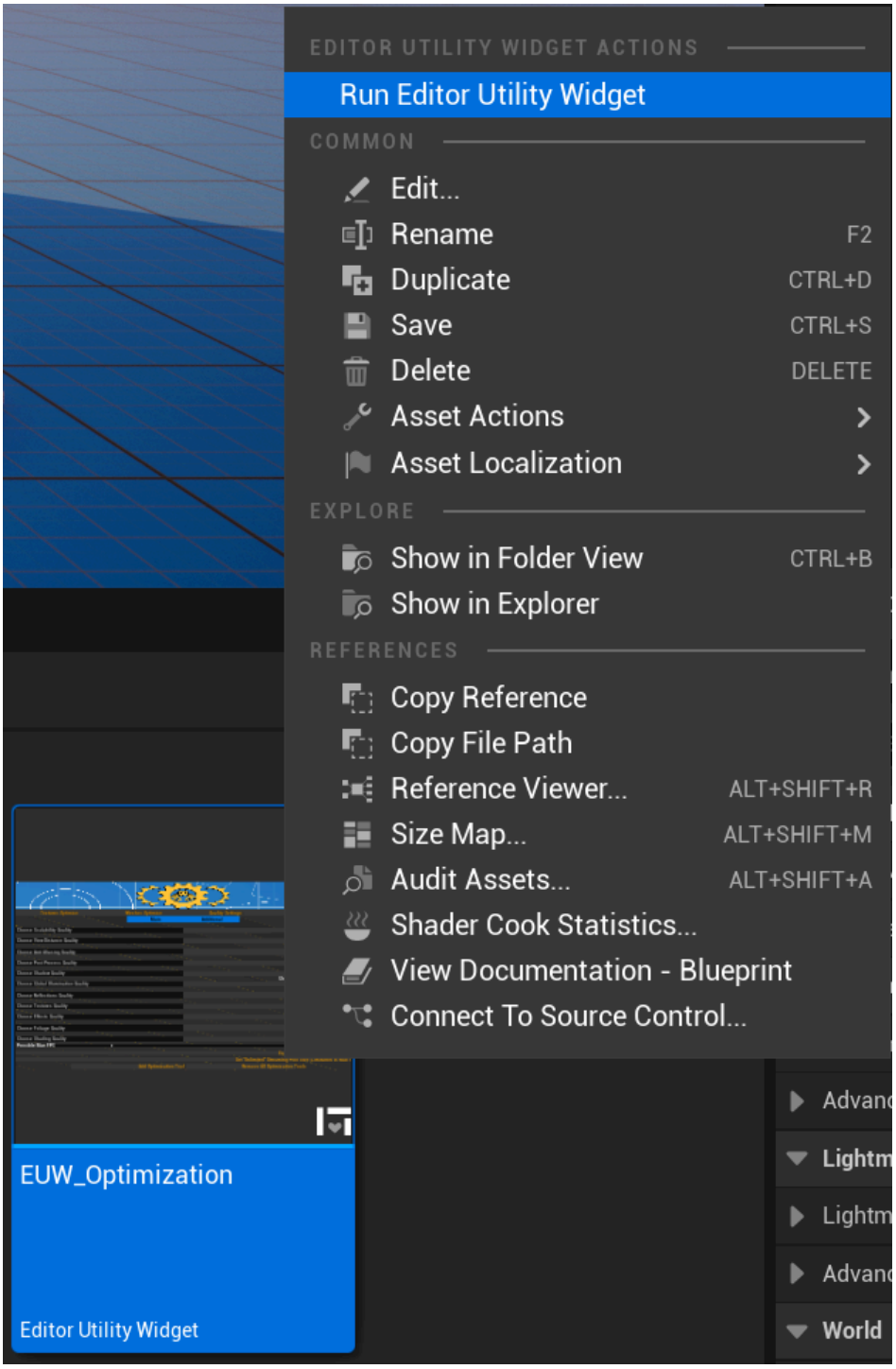
- All settings are saved and reproduced in-game using data tables
- The tool automatically opens after the first use
- Tooltips are available on almost all debug buttons to clarify what they are doing

Activation

1) Go to the next location

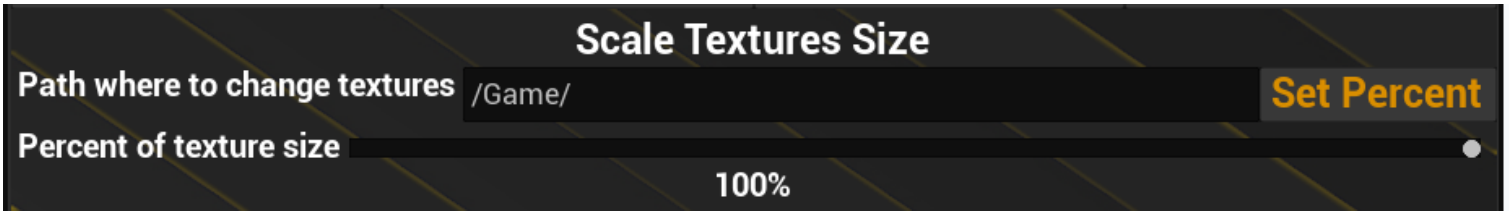


2) To activate the utility please right-click on “EUW_Optimization” and run the utility by clicking on “Run Editor Utility Widget”

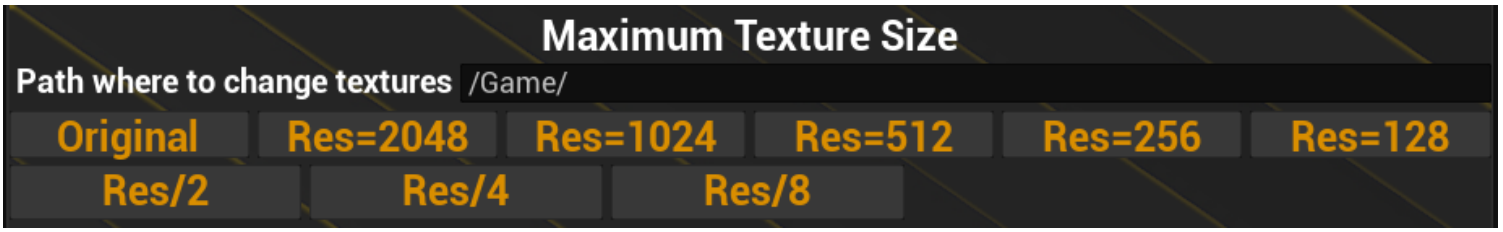


Textures

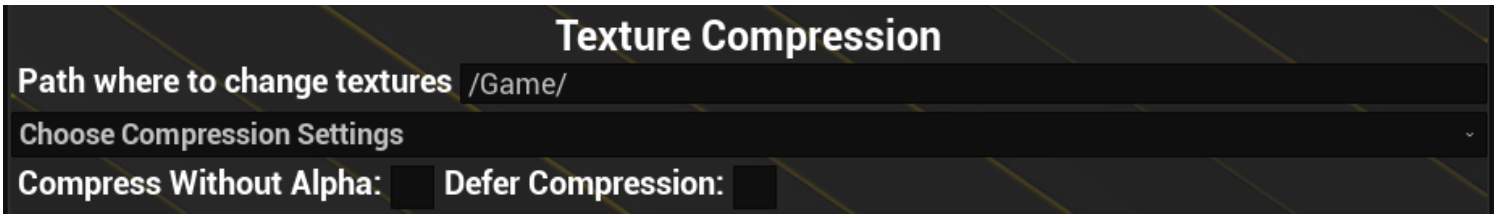
The first part of texture optimization is setting the necessary texture resolution percent based on the defined path.
By selecting the path, we can change all the texture's resolution percent in this path, and by pressing the button Set Percent, we apply the changes.



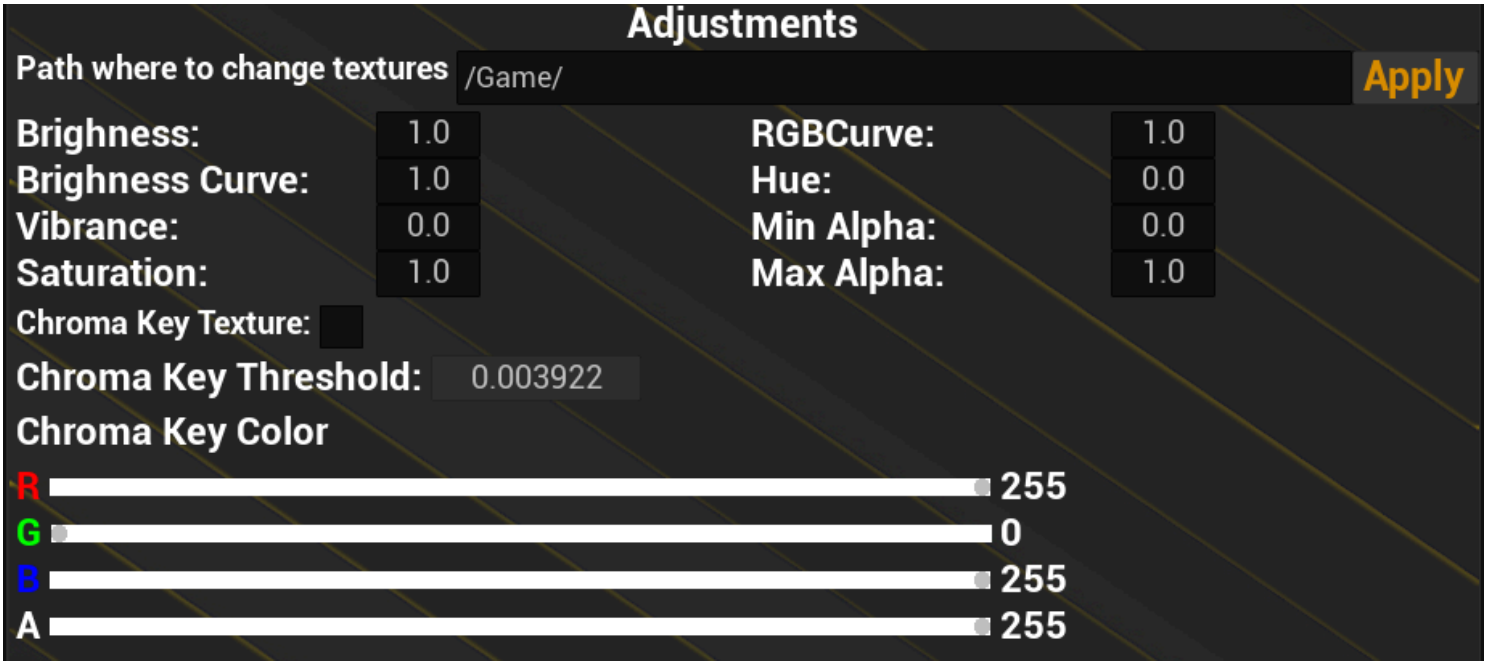
Another way to change the maximum texture size is by selecting one of the buttons to set the resolution, divide it, or set it to the original size in the chosen path for all the textures in this path.



The texture compression method is in use when selecting an option. After the moment of the selection, the system automatically applies the new settings for all the textures in the current path.

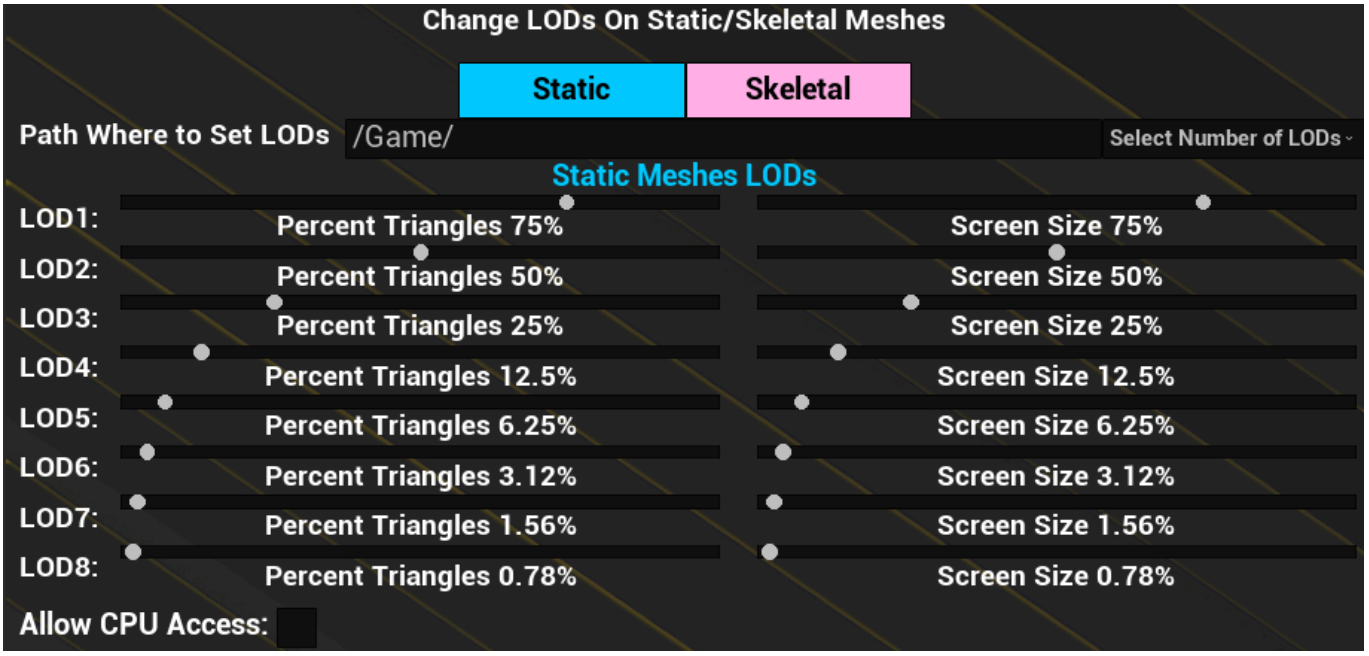


The textures can be modified a little in the engine using adjustments, so by selecting the settings and pressing on apply, we can enable the new look of the textures inside the current path.

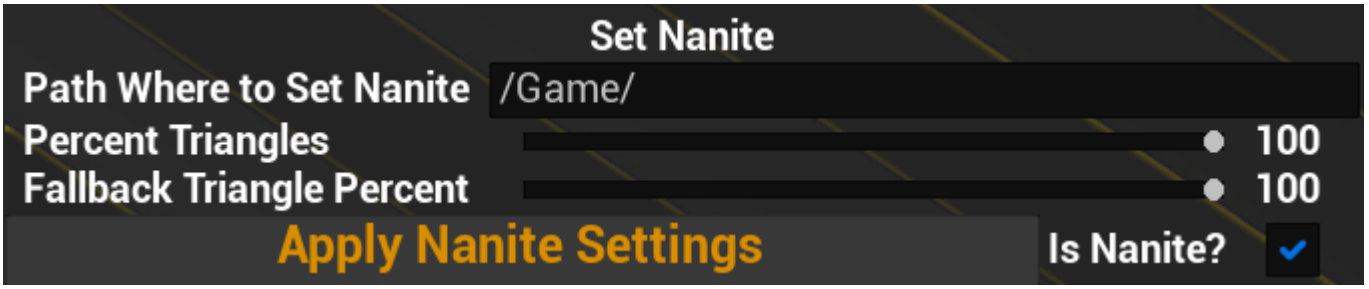


Static Meshes

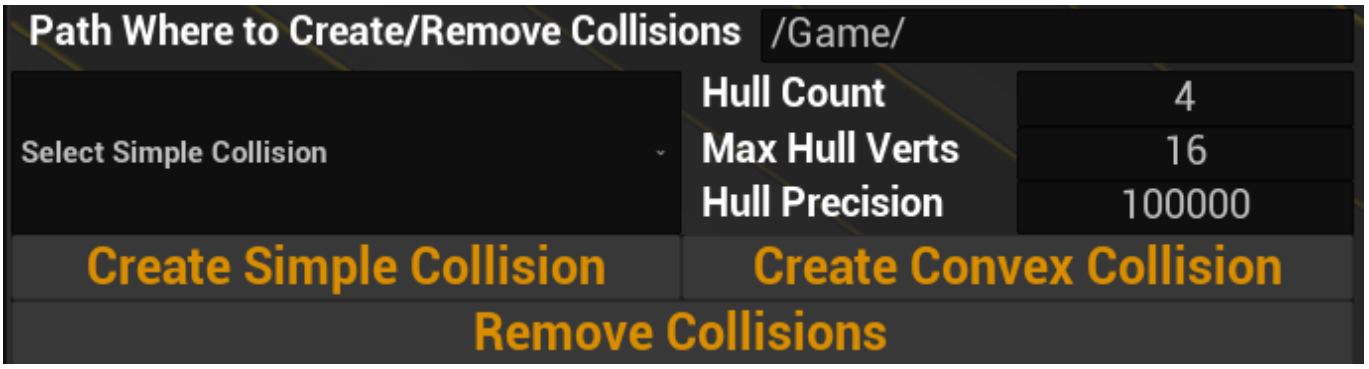
To set the number of LODs for multiple static meshes, we need to set the path where to do the change and Select the Number of LODs to create for those static meshes.
After the selection, we can stay with the default values provided or change them based on our needs, and we can use the CPU for those LODs and enable or disable this option.
When all the settings are selected, static meshes in the path will be changed just need to press Set LODs at the bottom.



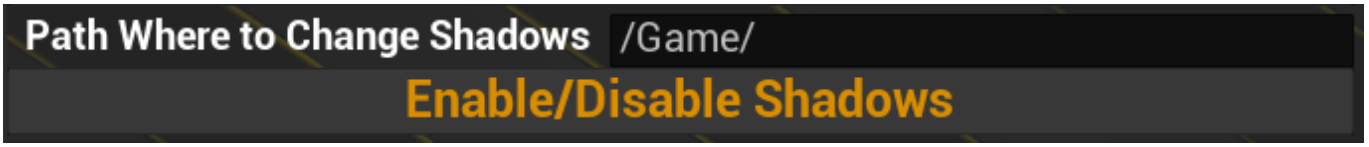
The Nanite section helps to enable or disable the functionality of Nanite and related settings in the provided path.



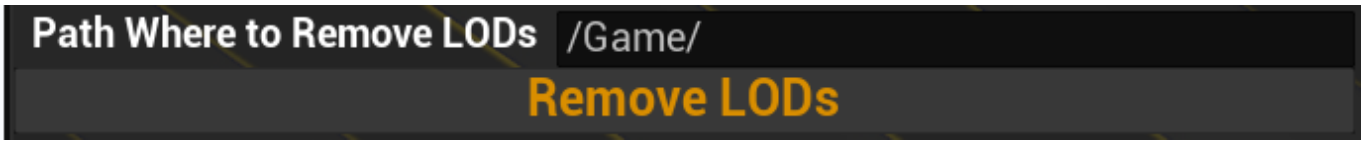
Create simple, convex collisions or remove collisions for multiple static meshes in the selected path.



By pressing the button, the shadows on static meshes will be enabled or disabled in the selected path.

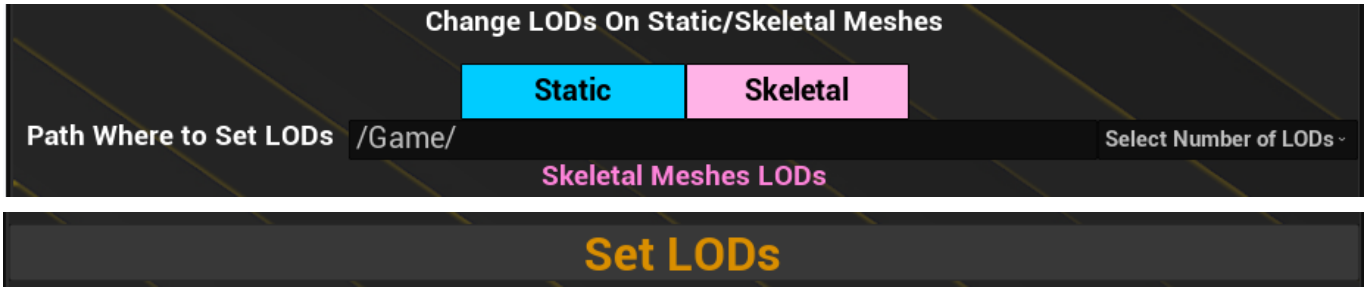


By pressing the button, LODs will removed from the selected path.

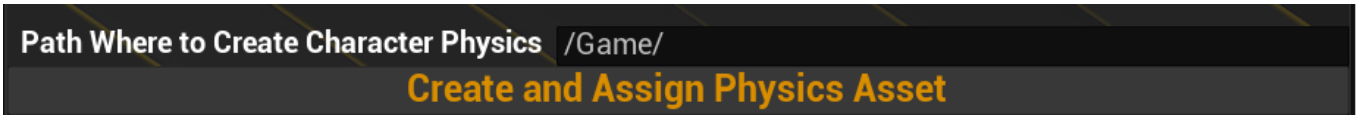


Skeletal Meshes

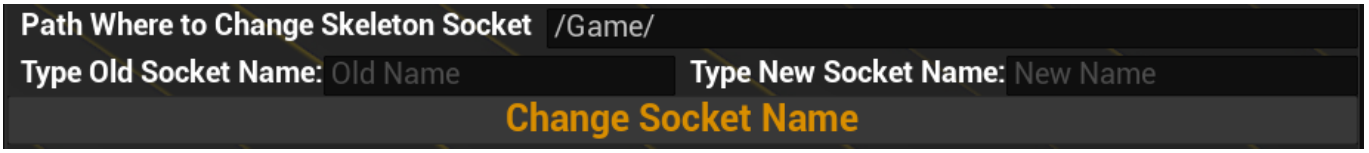
To set the number of LODs for multiple skeletal meshes, we need to set the path, where to do the change, and Select the Number of LODs to create for those skeletal meshes.
When the settings are selected, skeletal meshes in the path will be changed just need to press Set LODs at the bottom.



By pressing the button, the system will create a physics asset and assign it to the characters that the system will find in the selected path.



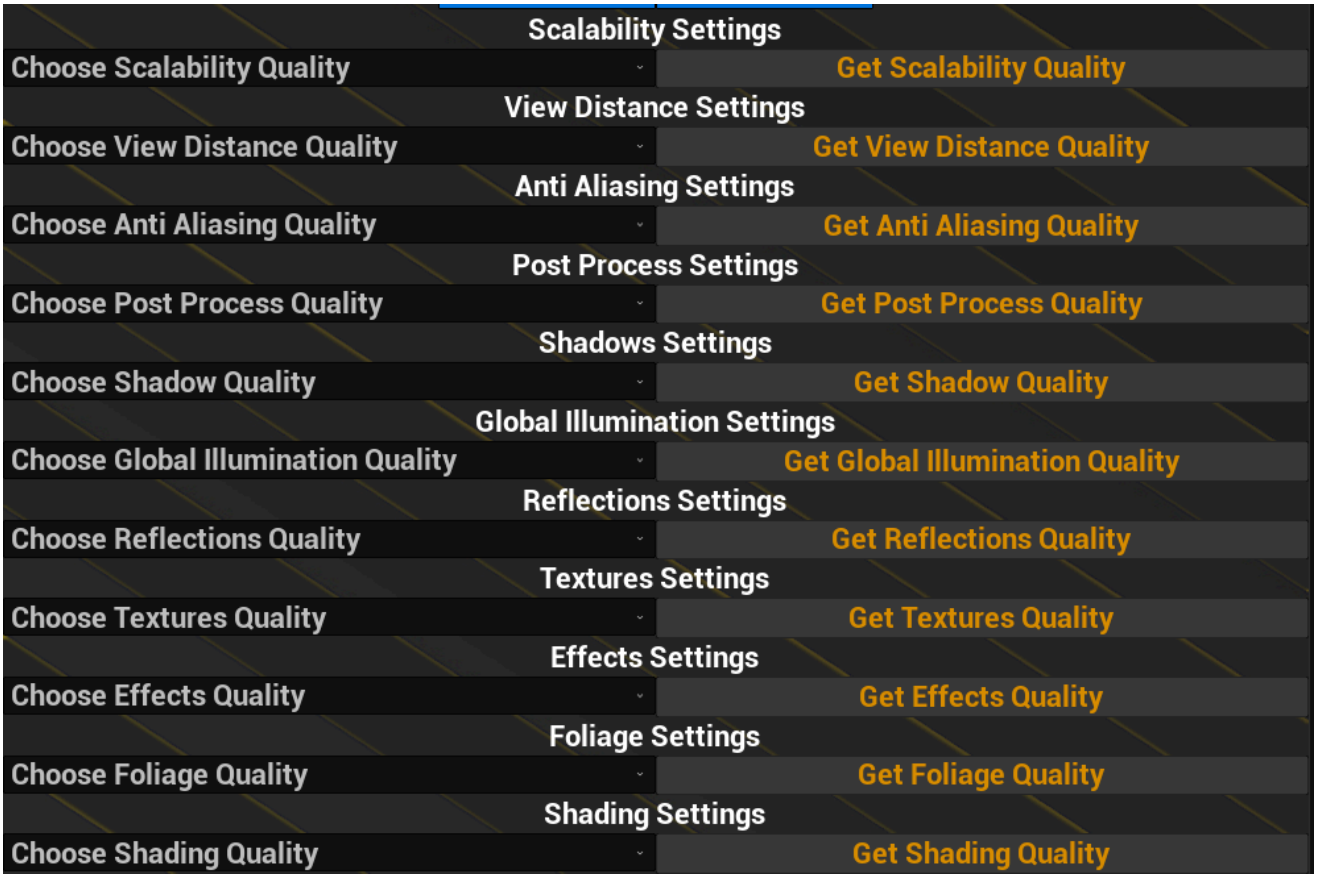
By entering the old socket name, we can replace the old name with a new chosen one.
The system will find skeletons in the selected path and replace the socket name inside them with the new socket name if the old name exists inside.



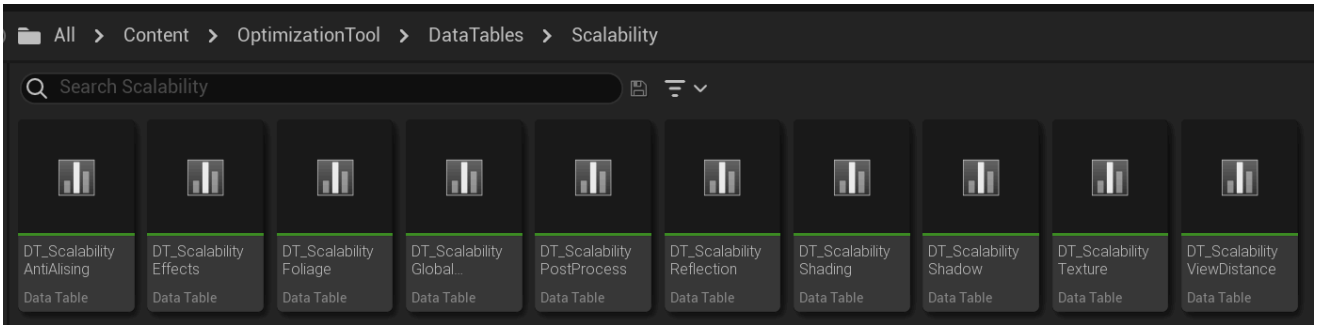
Quality

Main:

Change main quality settings by selecting a quality in the dropdown on the left side. On the right side, we can find a button on every quality setting that represents the quality of the setting at the moment.

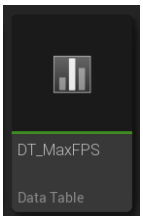


The main quality settings save the information in the shown data tables and restore it in-game.



By moving the scroll bar, we set the default possible max FPS.

The max FPS saves the information inside the data table and enables the setting in-game.

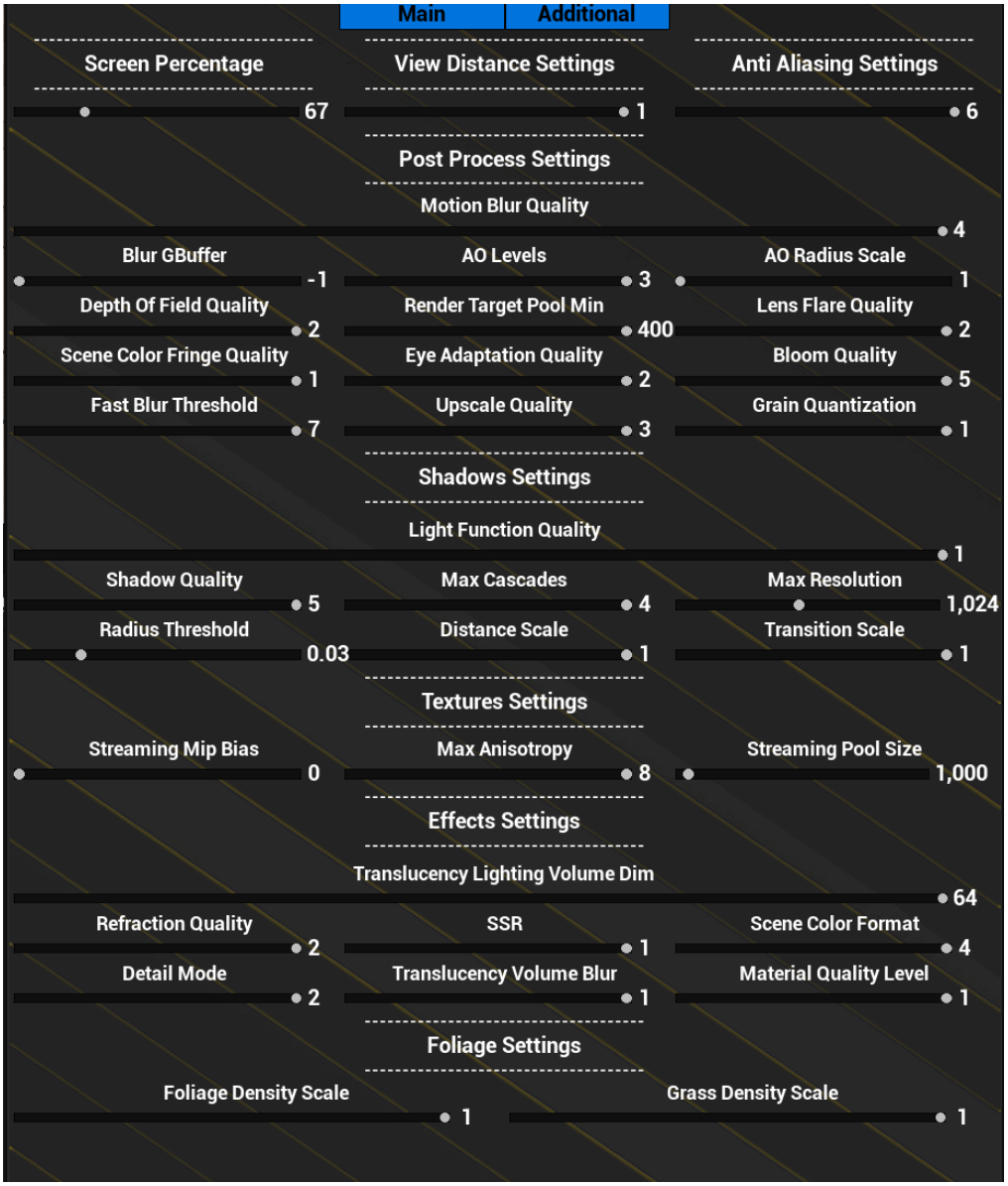


We can enable or disable the work of all post-process volumes inside the level by pressing the button.

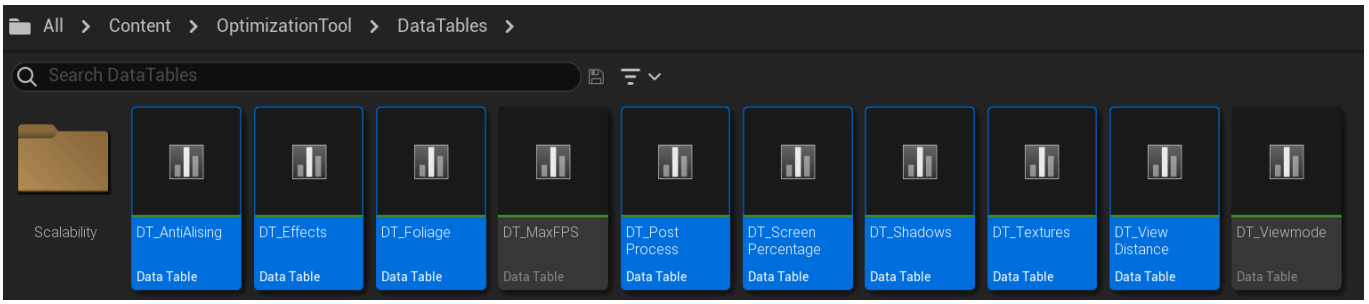
In case we don’t want to set a default value for streaming pool size, we can press the button for “unlimited” pool size. The pool size does not actually have an unlimited option, and the limitation will be the maximum amount of VRAM.

If we want the system to take action in-game, we can add to our level the Blueprint that restores all the data we changed in the quality section by pressing the Add Optimization Tool.
If we want the settings in-game to be annihilated, the best way will be to remove the Blueprint from the level by pressing the Remove All Optimization Tools.

Additional settings are created for more control over the quality settings and can used in-game using data tables.

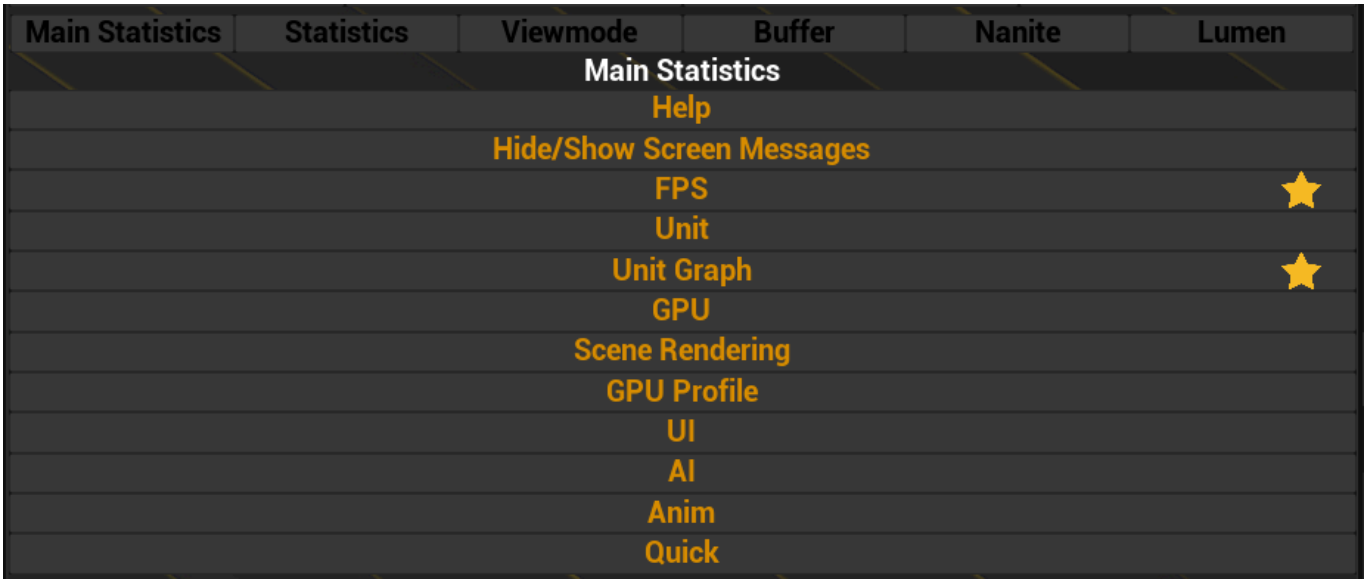


Those data tables are related to the additional settings.



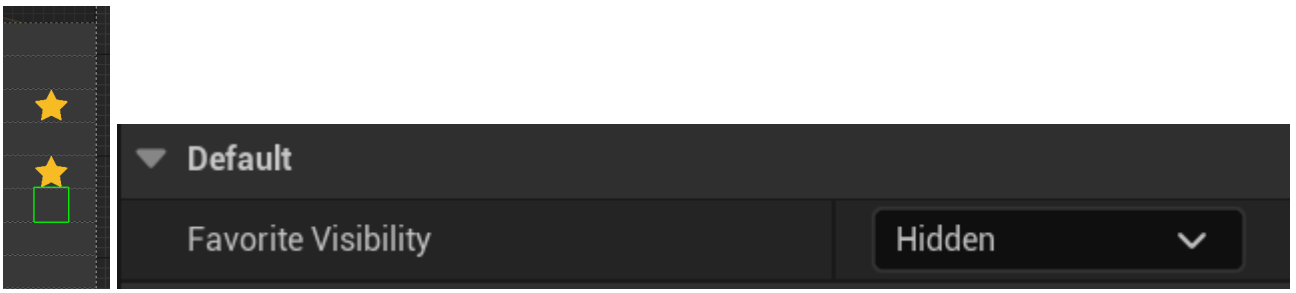
Debug

In main statistics, we find the most commonly used commands in game development when debugging.
The first command opens the browser and shows the list of possible commands with explanations.
The second command shows screen messages related to prints on the screen or potential errors on the screen in-game.
Other commands are more useful and related to debugging and show information in-game.

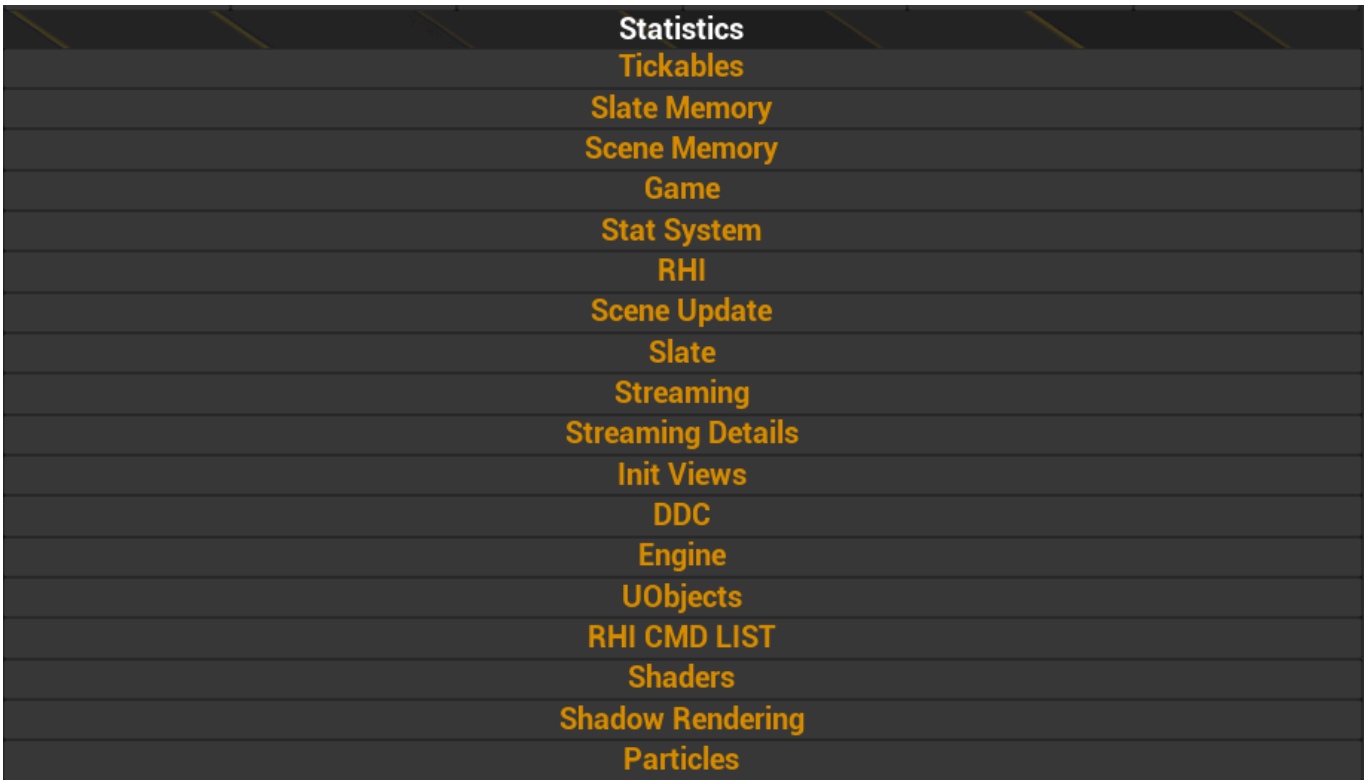


The star shows a chosen favorite command.

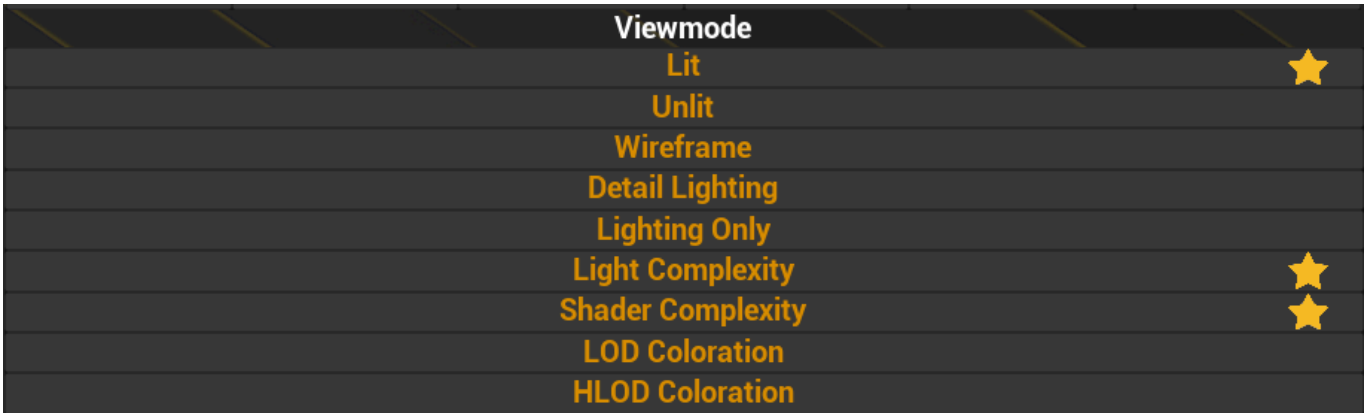
To choose your favorite command, press the utility widget designer on the empty space on the right side of the screen, and you will find an empty cube.
In the detail panel, you change the setting from hidden to visible, which will do the trick.



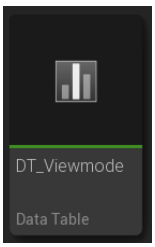
In the statistics tab, can be found additional debug statistics.



In the view mode tab, we can find the view options that help debug the quality of multiple settings. The settings from this tab apply only in-game and are committed to the data table.



The view mode saves the information inside the data table and enables the setting in-game.



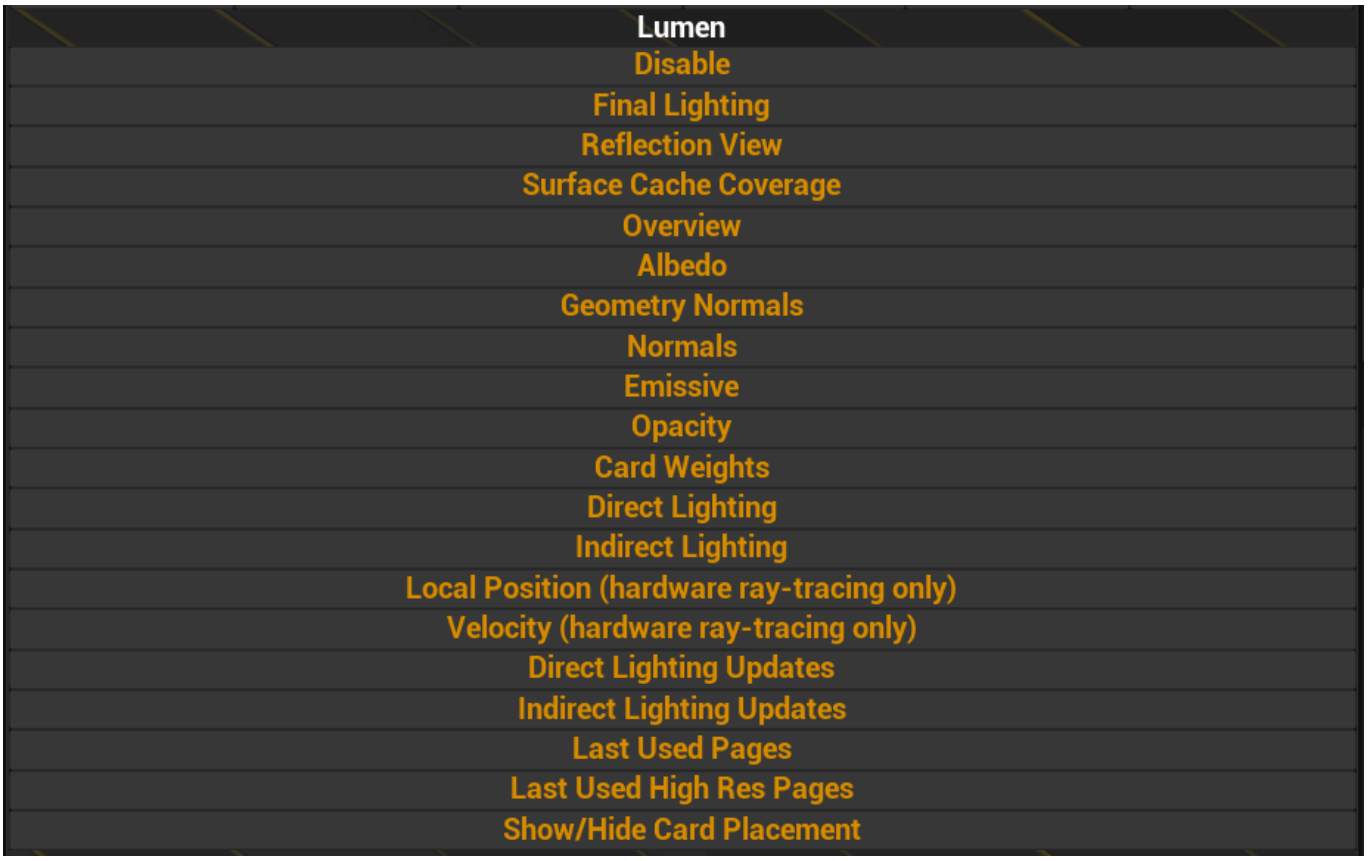
The buffer tab shows additional view mode information.
This information can be displayed in-game using the previous data table.

Buffer
Buffer Overview
Base Color
Custom Depth
Custom Stencil
Final Image
Shading Model
Material AO
Metallic
Opacity
Roughness
Anisotropy
Scene Color
Scene Depth
Separate Translucency RGB
Separate Translucency A
Specular
Subsurface Color
World Normal
World Tangent
Ambient Occlusion
Custom Depth World Units
Scene Depth World Units
Velocity
Pre Tonemap HDR Color
Post Tonemap HDR Color

The Nanite tab represents the debugging view modes for the Nanite system.
This information can be displayed in-game using the previous data table.

Nanite	
None	★
Overview	
Triangles	★
Clusters	
Primitives	
Instances	
Overdraw	
Material Complexity	
Material ID	
Lightmap UV	
Nanite Stats (To Remove Stats Need Engine Restart)	

The Lumen tab represents the debugging view modes for the Lumen system.



Notes:

- Known bug In UE 5.0, the texture size/resolution works, but with some visual defects on textures that are not the power of 2. The known bug from UE 5.0 was partially fixed in UE 5.1 and there is no need to use the power of 2 functions or only the power of 2 textures (It's working automatically) and the resolution is a bit more controllable.
- A possible engine crash can occur if we are not saving changes on modified skeletal meshes and try to do modifications on those skeletal meshes again.
- Most of the view modes are working when starting the game.
- Many Additional Settings work only in a Standalone game or the Build.
- All the quality settings are from the Unreal Engine official website, and not all give a visual effect in the output.
- When changing location, it always starts with **/Game/<The folder where doing the changes>/** for example **/Game/Megascans/3D_Assets/**
- Some platforms, like mobile devices, will have partial support, such as those that don't work with Nanite and Lumen. These platforms will have full support except for the systems mentioned that won't take effect at the end**.**
- By using the tool and running it. It will replace previous quality settings(related to scalability), it's important to save the settings and set them inside the tool.
- The Utility plugin is enabled by default, in case it's not the utility won't work.
- To enable Lumen if it's disabled please follow the official documentation.