For **Install & Use** instructions please go to **page 2**.

The technique is the one used by **CryEngine** real-time shadows, with extra adaptive penumbra size that changes based on receiver distance to light source. This technique removes aliasing and banding on extremely tiny shadowmaps textures. It requires less sampling to smooth/AA out shadows while being faster than any other similar solutions on the Asset Store. Plus, it works on any platforms where Unity support shadows.

Two variations at your disposal: A full PCSS filtering for spot/point shadows and a cheaper variant that simulates PCSS (requires less samples). Both techniques automatically changes penumbra size based on distance between receiver/caster and light positions. They are both visually similar but the PCSS is more physically correct.

The package comes with few files and the installation is only a quick two steps setup. No need to do anything with your shaders or scripts, it will work with anything that uses Unity shadows. The shadow smoothness and type can be tweaked using Unity built-in lights properties such as **Shadows Strength** and **Shadows Type**.

Installation (Spot/Point shadows):

It's quite simple, you just need to replace the file **UnityShadowLibrary.cginc** located inside the **Data\CGIncludes** folder (where Unity is installed) and replace with the one provided in this package. Here's how to:

1. Close the Unity Editor.
2. Go to the directory where you Installed Unity, default location on Windows: **"C:\Program Files\Unity5\Editor"** on Mac: **"/Applications/Unity5/"**
3. Navigate to the folder **"Data\CGIncludes"** and backup the file **UnityShadowLibrary.cginc** inside that folder (rename it to **UnityShadowLibraryBAK.cginc** or something else).
4. Replace the file **UnityShadowLibrary.cginc** with the one provided in this package (you'll need administration rights to replace the file). Open Unity, select any lights with shadows and try to change the **Strength** value. If you see the new shadows on any of your lights you can **skip step 5**. Otherwise **step 5** is mandatory!
5. Delete your **ShaderCache** folder on any project you want to use this shadow system in order to force Unity re-import NGSS library. To do it, simply navigate to your project folder, open the Library folder and delete the **ShaderCache** folder (on large projects this can take a while the first time you delete it, it's OK afterwards).

Note: The install process must be done every time you install Unity (as Unity overwrites **UnityShadowLibrary.cginc** upon install). Project's folder **ShaderCache** must be deleted only if you are installing a different/new version of NGSS. Deleting **ShaderCache** folder may take some time if your project is big and you've been upgrading it for few major versions on Unity on the same system. Afterwards it's done instantaneously. In the future there will be a cleaner way to install NGSS on your projects, but as of now it must be this way.

Shadow tweaks:

Select any light with shadows, to change shadowing filters and smoothness:

- Set Shadows Type to **Soft Shadows** to enable PCSS filtering or set it to **Hard Shadows** to enable the PCSS approximated variant filtering (PCSS currently unavailable on Spot Lights). Performance between the filters aren't that much noticeable but keep in mind that PCSS requires twice the amount of samplers than the approximated variant.
- To tweak shadow softness change the **Shadow Strength** on the Light. Keep in mind by default NGSS penumbra is very soft, so lower the **Strength** value to make it harder.

Installation (Directional shadows):

1 – Open your Graphics Settings window (**Edit/Project Settings/Graphics**)

2 – Go to Built-in shader settings. On **Screen Space Shadows** select **Custom shader** and browse to the provided **Internal-ScreenSpaceShadows** shader file (located in the NGSS folder).

3 - Save your project, close it and reload it.

4 – Select any Directional light and set the **Shadow type** to **Soft-Shadows** (Hard-Shadows will enable Default Unity soft-shadows on Directional light).

5- **Shadow Strength** value will let you tweak the amount of softness.

6- **Contact Shadows** (Optional) Adding **NGSS_ContactShadows** to your Main Camera to enable raymatched screen space shadows (Similar to Unreal Engine Contact Shadows).

Note: Right now, NGSS Directional shadows works better with **Close Fit Projection** (**Edit/Project Settings/Quality**). It provides better cascade blending and seams are almost unnoticeable. Also try to crank up **Normal-Bias** up to 3 to get the most of bias correction if needed.

Bonus: You can try disabling cascades to speed up rendering or try rising shadowmap distance (larger than 150) with no cascades at all, I promise, shadows will still look better than default ones. :)

IMPORTANT: If you have a custom shader (such as pre-integrated skin shading) or any other shader framework that internally access to **_LightShadowData.r**, override that value to 1.0 in that shader. Otherwise your NGSS shadows will become transparent when you lower the **Shadow Strength** value. NGSS internally uses **_LightShadowData.r** to tweak the penumbra size of shadows which correspond to the **Shadow Strength** value of Unity built-in lights. Shadow opacity must be tweaked within scene overall ambient and lighting contribution to get the most natural light and shadow combination.

Current Shadow Features:
- Point Light PCSS + Approximation filters

- Spot Light Approximation filters

- Directional Light Approximation filters

- Directional Light Contact Shadows

Upcoming Shadow Features (v1.4):
- Spot Light PCSS filtering

- Directional Light PCSS filtering

- Shadow quality sets for all lights and new bias algorithms for Point/Spot lights.

Email Support: support@psychozinteractive.com

Unity Forum: https://forum.unity3d.com/threads/next-gen-soft-shadows-custom-shadows-filters-for-unity-lights-with-adaptive-penumbra-size.440088/