Huge Texture

Version 1.1

Infinity Code, 2020

https://infinity-code.com/

General information

Huge Texture allows you to import and use textures larger than 8192x8192px.

When importing, Huge Texture splits the texture into pages and saves it as a Texture Array.

Texture Array is combined on the shader side, which does not create extra draw calls and has almost no effect on performance.

Requirements

Not all platforms support Texture2D Arrays.

The list of supported platforms is here:

https://docs.unity3d.com/Manual/SL-TextureArrays.html

To use the recommended display methods, the field must accept Texture (not Texture2D), and the component must be able to specify a custom material or shader.

For example, Huge Texture can be used in Mesh Renderer, Raw Image, etc.

The maximum size of the imported texture:

- PNG and JPG up to 16384x16384 pixels;
- RAW up to 2GB (2 147 483 648 bytes).
  This refers to the final size of Texture2D Array, where without transparency the pixel size is 3 bytes, and 4 bytes with transparency.
  For square textures, the maximum size is 26624x26624 pixels without transparency, and 23040x23040 with transparency.
  If your texture is not square, then you can calculate the size using the formula - width * height * pixel size.

Import texture

Select «Assets / Import Huge Texture» menu item, and select the image file (supported extensions: png, jpg, jpeg, raw) to be imported.

Huge Texture will copy it to Assets folder of your project, with the huge + original extension, for example - hugepng.

Changing the resolution is necessary so that you can have regular textures and huge textures in the project at the same time.

Import process:

- Huge Texture will read the texture.
- If the side is not equal to page size * N, then the texture side will be scaled to the size of page size * N, where the final side is less than or equal to the original side.
  For example, you import a texture of 16000x10240, with page size = 1024:
  Huge Texture scales the image to 15360x10240.
  texture width = floor (16000 / 1024) * 1024 = 15360;
  texture height = floor (10240 / 1024) * 1024 = 10240;
  Tip: To avoid scaling, use an image size equal to page size * N.
- The texture will be divided into pages and saved as Texture2DArray.
  The maximum number of pages is 2048.

Import RAW files

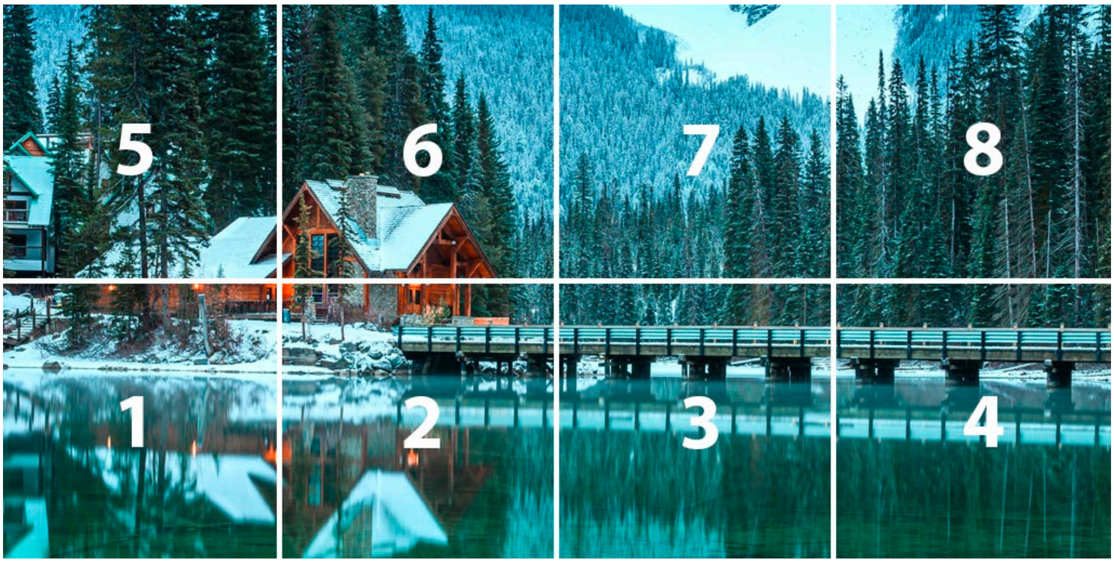
Huge Texture supports importing RAW files without a header, with a color depth of 8 and 16 bits, and byte order of Windows and Mac.

Importing RAW files is similar to importing PNG and JPG, but it has several differences that you should keep in mind:

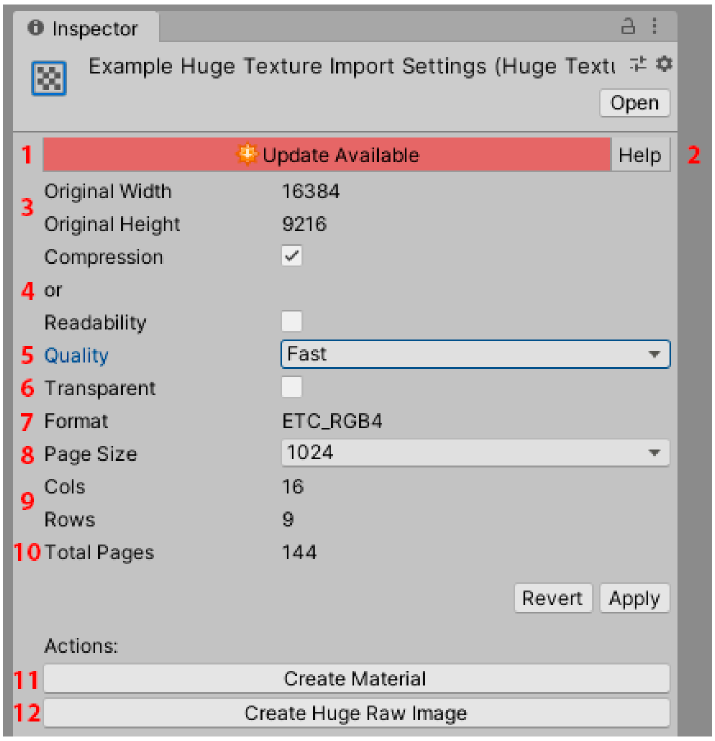
- The import fields are initially empty, and for the RAW to be imported you need to fill them with the correct values and click Apply.
- RAW files are not automatically scaled, and you need to import the texture with the size of the side multiple to the page size.
  For example, with a page size of 1024 - 10,240, this is a valid value, 16,000 is an invalid value.
- The final size of Texture2D Array should be up to 2GB (2 147 483 648 bytes), where without transparency the pixel size is 3 bytes, and 4 bytes with transparency.
  For square textures, the maximum size is 26624x26624 pixels without transparency, and 23040x23040 with transparency.
  If your texture is not square, then you can calculate the size using the formula - width * height * pixel size.

Page Order

Pages are stored in Texture Array in rows, starting from the bottom left.



Description of importer fields



Example Huge Texture Import Settings (Huge Textu

Original Width 16384

Original Height 9216

Compression ☑

or

Readability ☐

Quality Fast

Transparent ☐

Format ETC_RGB4

Page Size 1024

Cols 16

Rows 9

Total Pages 144

Actions:

1. Indicates that a new version is available. Click to open the built-in update system.
2. Documentation, API Reference, support, forum, etc.
3. Original image size.
4. Do you need compression or readability?
5. (Only when compression) Image quality.
6. Transparency.
7. Texture format.
8. Page size (2^N >= 256).
9. The number of columns and rows. **These values are used in materials and shaders.**
10. The total number of pages.
11. Creates new material for this texture, and sets the texture and number of rows and columns.
    If Scriptable Render Pipeline is used, Shader Graphs / HugeTexturePBR shader will be used.
    If Scriptable Render Pipeline is not used, Huge Texture / Diffuse Array shader will be used.
12. Creates new material for this texture, and sets the number of rows and columns. In the scene, creates a Huge Raw Image object, and sets the material and texture.

Texture Formats

If compression is disabled, then RGB24 will be used for textures without transparency, and ARGB32 for textures with transparency.

If compression is enabled, then the following formats will be used:

Platform	Without transparency	With transparency
Android	ETC_RGB4	ETC2_RGBA8
iOS	PVRTC_RGB4	PVRTC_RGBA4
tvOS	ASTC_RGB_4x4	ASTC_RGBA_4x4
Other (PC, Mac, Linux, WebGL, UWP, PS4, XBox)	DTX1	DTX5

Color space

Huge Texture supports Linear and Gamma Color Spaces.

If you change the color space after importing the Huge Texture, then you can see that the texture has become too dark or light. To fix the problem, right-click on an item in the project and select Reimport.

Display Sources

Built-in display methods imply that Texture Array will be combined on the shader side, which requires two things:

1. The field must accept Texture (not Texture2D) to set Texture Array.
2. The component must have a field for the material or shader.

This method is very fast, does not produce extra draw calls, and Huge Texture will be displayed as if it were a regular texture.

Mesh

To show Huge Texture on a mesh, create a new material with a shader that supports Texture Array. For example: Huge Texture / Diffuse Array.

Important: if you are using Scriptable Render Pipeline, you must use Shader Graphs / HugeTexturePBR shader or your own shader for Huge Texture.

Select a texture and specify the number of rows and columns from the importer.

Set the material to Mesh Renderer component.

Tip: The easiest way to create material correctly is click Create Material in the importer.

UI

Raw Image may display Huge Texture, but due to a bug in Unity 2019.3, this will constantly show an error in the console.

To work around this error, use Huge Raw Image component.

Create a new material with Huge Texture / UI Array shader, and specify the number of rows and columns from the importer.

In Huge Raw Image, set the texture and material.

Tip: The easiest way to create Huge Raw Image with a texture is click Create Huge Raw Image in the importer.

Texture2D fields

Sometimes you are forced to use Huge Texture on fields that accept only Texture2D, or there is absolutely no way to specify a shader or material.

Important: if there is the slightest chance to display Huge Texture using a shader, use it. This method is very slow and produces a lot of memory allocation.

Add Huge Texture Bridge component, set the Texture Array, the number of rows and columns, the component and the field where you want to set Huge Texture.

At the start of the scene, Huge Texture will be converted to Texture2D, and set to the specified field.

Shaders

Built-in Shaders

We provide several shaders so that you can start using Huge Texture immediately after import.

Huge Texture / Diffuse Array – version of Legacy / Diffuse shader with Huge Textures support. The main shader for meshes, without using Scriptable Render Pipeline.

Huge Texture / Unlit Array – version of Unlit / Texture shader with Huge Textures support. Shader for meshes, without using Scriptable Render Pipeline.

Shader Graphs / HugeTexturePBR – the main shader for meshes, when using Scriptable Render Pipeline. The shader can be modified using Shader Graph.

Huge Texture / UI Array – version of UI / Default shader with support for Huge Textures. The main shader for UI elements.

Creating Cg / HLSL Shader

Most existing shaders can be adapted to use Huge Texture instead of Texture.

How to adapt the shader:

1. In Properties block, replace
   _MainTex ("Albedo (RGB)", **2D**) = "white" {}
   to
   _MainTex ("Albedo (RGB)", **2DArray**) = "white" {}
2. Declare properties for the number of rows and columns:
   _Cols ("Cols", Int) = 1
   _Rows ("Rows", Int) = 1
3. After CGPROGRAM, declare the directives:
   #pragma target 3.5
   #pragma require 2darray
4. In SubShader block, replace
   sampler2D _MainTex;
   to
   UNITY_DECLARE_TEX2DARRAY(_MainTex);
5. Declare variables for the number of rows and columns:
   half _Cols;
   half _Rows;
6. 6. In the surf or frag method, convert texture UV to 2DArray UV:
   float uvx = IN.texcoord.x * _Cols;
   float uvy = IN.texcoord.y * _Rows;

```
float uvz = floor(uvy) * _Cols + floor(uvx);
uvx = uvx - floor(uvx);
uvy = uvy - floor(uvy);
```

7. Replace
   tex2D(_MainTex, IN.texcoord)
   to
   UNITY_SAMPLE_TEX2DARRAY(_MainTex, float3(uvx, uvy, uvz))

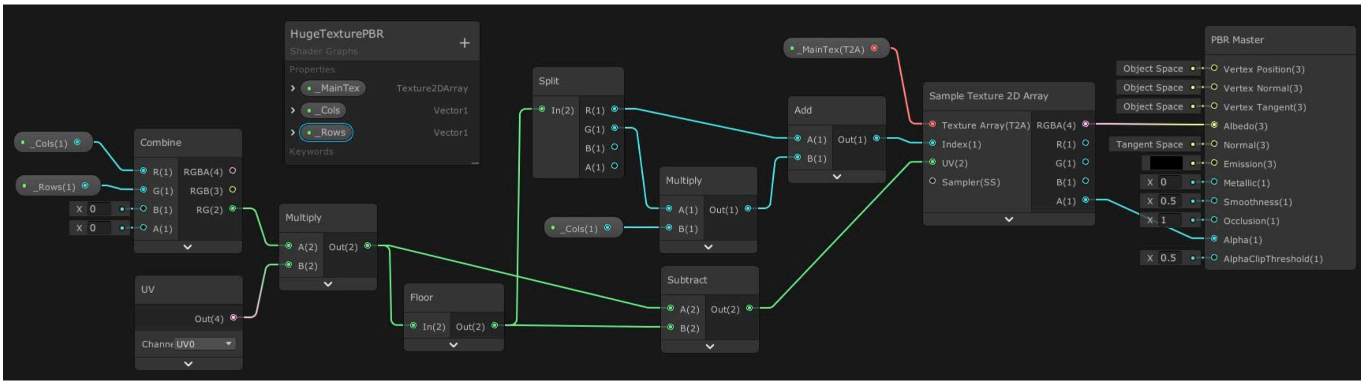
Of course, this sequence is very simplified, and can be very different for the shader you want to adapt.

As examples, you can use the built-in shaders.

Create a shader using Shader Graph, Amplify Shader Editor, etc.

You can create shaders for Huge Texture using visual shader editors such as Shader Graph and Amplify Shader Editor.

Example from Shader Graph:



Updating asset

We send to Unity Asset Store only stable versions.

Huge Texture has a built-in update system, using which you can download the latest versions of Huge Texture and get early access to all versions and updates.

Important: Always back up before updating assets.

Select «Window / Infinity Code / Huge Texture / Check Updates», to open the updater window. Enter your Invoice Number or Order Number, select the update channel and click «Check New Versions».

You can find your Invoice Number in Unity Asset Store order confirmation email, or on the orders page in Unity Asset Store:

https://assetstore.unity.com/orders

If more than 10 updates were released in the selected channel from the current version, only the last 10 updates will be shown.

If updates are available, you can read the list of changes and download the update.

If you have problems installing the update, then:

1. Remove «Plugins / Infinity Code / Huge Texture» folder.

2. Import the new version of Huge Texture into the project.

If you want to return to the previous version of Huge Texture, then select the channel «Stable Previous». Using this channel you can get 10 previous stable versions.

Huge Texture automatically checks for updates every 24 hours. If the new version is available, you will see an icon in the Actions. Clicking on this action will open the updater window.

Automatic update check does not require an Invoice Number, and works on a previously selected update channel. If you did not select the update channel, then only stable versions will be checked.

Support

We provide support using email (support@infinity-code.com) in English and Russian, or forum (https://forum.infinity-code.com) in English.

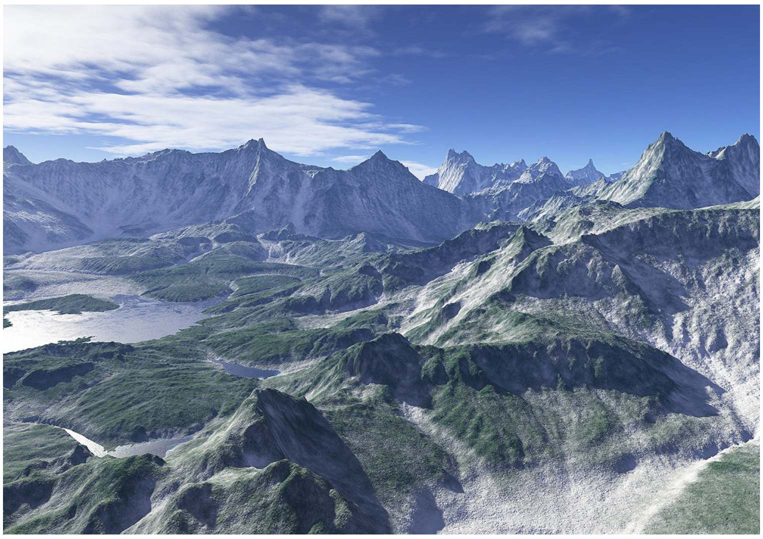
If something does not work for you, you have found a bug, or you have a suggestion, please contact to us.

When contacting, please specify your OS, the version of Unity Editor and the version of Huge Texture.

We try to respond to all request to the support within 24 hours.

Other Infinity Code assets

Mesh to Terrain



https://assetstore.unity.com/packages/tools/terrain/mesh-to-terrain-7271

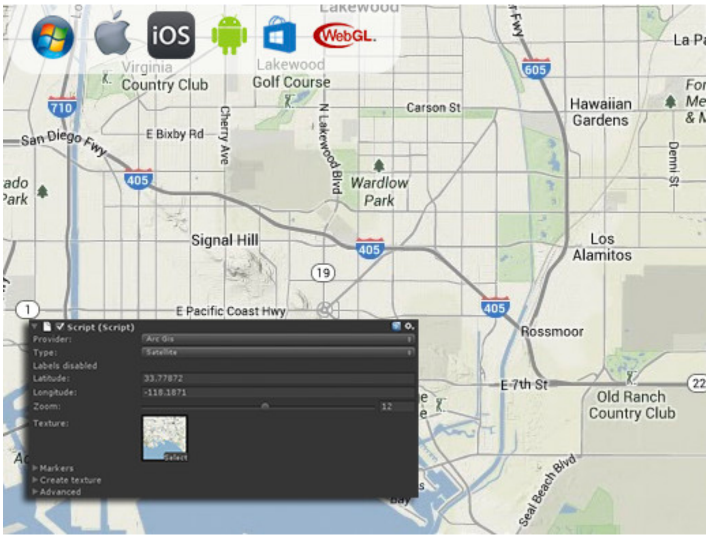
Mesh to Terrain is a tool for easily and quickly converting a 3D terrain model created in 3ds Max, Terragen or any other editor to Unity Terrains.

Mesh to Terrain can convert textures to SplatPrototypes (Terrain Layers), generate terrain from several models and split the model into several terrains.

Features:

- Supports Unity v5.6 - Unity 2019.x;
- Unlimited number of models and terrains used in the component;
- Terrains are created in the same place where the meshes;
- Convert the textures of models to textures of terrain;
- Seamless result, when working with multiple terrains;
- Manually adding models or automatic detection of all models in the layer;
- No need to manually add the components of physics;
- Works with Relief Terrain Pack (optional);
- Built-in update system.

Online Maps


Script (Script)
Provider: Arc Gis
Type: Satellite
Labels disabled
Latitude: 33.77872
Longitude: -118.1871
Zoom: 12
Texture:

https://assetstore.unity.com/packages/tools/integration/online-maps-v3-138509

Online Maps is a universal multi-platform mapping solution for your 2D, 3D, AR / VR and mobile applications and games.

Fully customizable, incredibly easy to learn and use, and at the same time is one of the most powerful and flexible solutions in the industry.

Supports a huge number of services for any mapping needs, and has integration with the best Asset Store assets.

The package contains the complete source code without dependencies, and if you want to add or change some feature, you can easily do it.

Don't have programming experience or don't know C# - Online Maps supports visual scripting using Bolt and Playmaker.

All the features to create any map in Unity in one asset.

Features:

- Unity 2017.1 - 2019.x;
- Standalone, Android, iOS, Windows Store, WebGL;
- Online and offline maps;
- 2D maps and 3D maps with elevation;
- 2D, 3D, billboard and custom markers;
- You can display the map anywhere: on UI, in a scene, or draw into texture;
- Huge number of predefined tile sources: Google Maps, Mapbox, ArcGIS, Nokia Maps, Bing Maps, Open Street Maps, and many others (16 providers, 88 map types);
- Ability to create your own map style or use your own source of tiles (e.g. WMS);
- Multilingual map with or without labels;

- **Support Google API web services**: Direction API, Elevation API, Geocode API, Places API, Places Autocomplete API, Roads API;
- Other web services: AMap Search, Bing Maps Elevation API, Bing Maps Location API, HERE Routing API, Open Route Service Directions, Open Route Service Geocoding, Open Street Map Nominatim, Open Street Map Overpass API, QQ Search, What 3 Words;
- Show Google Street View using uPano;
- Additional Features: GPS (with emulator), cache, traffic, Overlays, Drawing API, runtime 3D buildings;
- Integration with: Bolt, Curved UI, EasyTouch, Fingers - Touch Gestures, NGUI, Playmaker, Real World Terrain, TouchScript, uContext, uPano;
- Easy-to-use and powerful API. Large number of examples of using is attached. Atlas of Examples;
- Built-in update system.

Real World Terrain

San Francisco, USA

https://assetstore.unity.com/packages/tools/terrain/real-world-terrain-8752

Real World Terrain is a tool for automatically creating high-quality terrains, meshes, Gaia stamps and RAW files based on real-world data with global coverage.

Incredibly fast and easy to use, and allows you to create high-quality terrains in a couple of clicks.
In addition, Real World Terrain can create buildings, roads, trees, grass, and rivers based on Open Street Map data.

Real World Terrain is incredibly powerful and flexible. It has a powerful Editor API to automate the generation of terrains, and Runtime API positioning objects by coordinates, etc.

Real World Terrain has integration with the best assets of the Asset Store, which gives almost unlimited possibilities in the generation of terrains.

Features:

- Unity v5.6 - Unity 2019.x;
- Elevation Heightmaps:
    - ArcGIS resolution of max 10 meter per pixel;
    - Bing Maps resolution of max 10 meter per pixel;
    - Mapbox;
    - SRTM v4.1 resolution of 90 meters per pixel;
    - SRTM30 resolution of 30 meters per pixel.
- Texture providers: ArcGIS, DigitalGlobe, Map Quest, Mapbox, Mapy.CZ, Nokia Maps (here.com), Virtual Earth (Bing Maps), Open Street Map + ability to download tiles from custom url;
- Satellite images resolution of max 0.25 meter per pixel;
- Can create: Unity Terrains, Meshes, Gaia stamps, RAW files;
- Can create objects based on Open Street Map:
    - Editable roads for EasyRoads 3D v3 and Road Architect;
    - Editable buildings for BuildR2 (editable) or built-in building engine;
    - Rivers;
    - Trees;
    - Grass.
- A tool to select area directly on Google Maps;
- A lot of extra tools for working with coordinates, objects and postprocessing;
- Unlimited number of generated terrains;
- Integration (optional): BuildR2, EasyRoads 3D v3, Gaia, Online Maps, Playmaker, Relief Terrain Pack, Road Architect, uContext, Vegetation Studio, Vegetation Studio Pro, VolumeGrass, WorldStreamer.

Terrain Quality Manager

https://assetstore.unity.com/packages/tools/terrain/terrain-quality-manager-28949

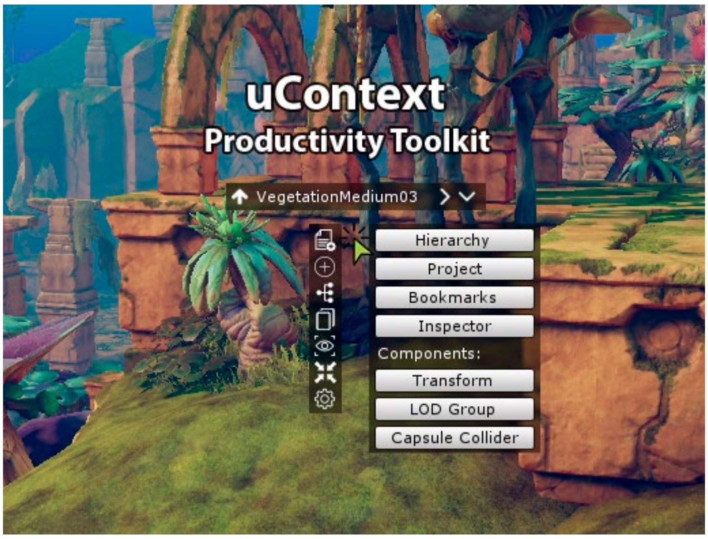
Terrain Quality Manager allows you to change the resolution of Heightmap, Detailmap, Alphamap and Basemap, **without losing data**.

If you need to increase the quality of terrain, or optimize terrain for better performance, with this tool you can do it.

Features:

- Unity v5.2 - Unity 2019.x;
- Allows you to change resolution of Heightmap, Detailmap, Alphamap, Basemap and Resolution Per Patch, without losing data;
- Works for single terrain, all terrains in scene, all terrains in project;
- Allows you to scale up and scale down terrain maps;
- Seamless result, when working with multiple terrains;
- Very easy to use.

uContext



https://assetstore.unity.com/packages/tools/utilities/ucontext-141831

uContext is a toolkit that take your workflow in Unity Editor to a next level, simplifies working with content, adds new features to the editor, corrects and improves the editor’s built-in behaviors.

A huge number of new and unique features in one toolkit, at the price of a small utility.

Make your usual actions with lightning speed with uContext.

Key features:

- The **context menu** allows you to quickly open the most useful windows, open components, create objects, add components, navigate and perform many more useful actions.

- **WAILA** (What Am I Looking At) + **Smart Selection**. WAILA displays one or all GameObjects under the cursor, and allows you to quickly find any object, even if it is hidden behind another object.
Smart Selection allows you to quickly select any object that WAILA shows.

- **Object Placer** allows you to easily and quickly create objects in the scene. Just point to the place where you want to create the object and press CTRL + SHIFT + Right Click.

- Ability to **open any component in a separate window**. The component will always be available, even if GameObject has lost focus.

- **View Gallery** - displaying images from all cameras in the scene and all View States, with the ability to set the view from the camera or View State with one click.

- **Bookmarks** for any objects in a scene or project, allow you to always keep your most needed objects at hand.

- **Smart search** for GameObjects and Components in the scene and Assets in the project.
Extra search features:
Camel Case Search: Enter uppercase character, for example, «EB» to search for Ellen_Body.
Search by type: Enter «:» and the type of object (in whole or in part) to search by type. For example, «wa:te» will find «08. Waila» texture in the project, or «DL:go» will find «Directional Light» GameObject in the scene.
Drag and Drop: You can drag and drop objects from search results into a scene or inspector.

- **Preview of cameras** in Scene View, shows the image from any camera in Scene View. Allows you to quickly view the scene from different angles, and adjust the scene view in one click.

- **Selection History** - uContext stores a history of object selections in the scene and project, and you can quickly switch between entries.

Improves the built-in behavior of the Unity Editor:
- Drag and drop objects onto Canvas;
- Add Component by shortcut;
- Change the size of the brush Terrain Editor using the mouse wheel;
- Maximize Game View in playmode by SHIFT + Space;
- Maximize any window by F11.

Additional features:
- Hierarchy Icons;
- Grouping GameObjects by CTRL + G;
- Fast switching between Scene View and Game View (CTRL + SHIFT + TAB);
- Temporary objects. Allows you to create temporary objects that will be destroyed at start the scene;
- Fast zoom in / out scene view;
- Rename GameObjects in Scene View by F2;
- Integration with Copy-Paste Between Projects, Online Maps, Real World Terrain;
- Built-in update system.

uContext is fully customizable. If a feature does not fit your workflow, you can adjust or disable this feature.

uPano

https://assetstore.unity.com/packages/tools/integration/upano-126396

uPano (Unity Panoramic Framework) is a universal solution for displaying dynamic and static panoramas, and creating virtual tours.

uPano is very easy to learn and use, and is great for people who do not have programming experience.
Visual Tour Maker lets you create virtual tours in minutes.

In most usage scenarios, you can make interactive panoramas without creating your own scripts.
If you have some very specific purpose, uPano has a powerful and easy-to-use API that will allow you to implement any behavior.

Most of the existing types of panoramas are supported: spherical, cylindrical, cubic panoramas on single or six images, cubemap.

Supports Unity 2017.4 LTS - 2019.x.
Supported platforms: Standalone, iOS, Android (including Google VR), Universal Windows Platform, WebGL.
Other platforms have not been tested, but most likely uPano will work well.

Additional features:

- Visual Tour Maker;
- Interactive elements (Hot Spots, Directions) + Visual Editor;
- Lots of built-in actions for HotSpots and Directions;
- Compound transitions;
- Download Google Street View panoramas by ID or location;
- Video panoramas;

- Control with: mouse, touch, keyboard, gyro, compass, UI buttons, UI compass, UI joystick;
- Plugins: Auto Rotate, Downloader, Limits, Multi Camera, Orthographic Camera, Timed Gaze;
- (optional) Integration with Online Maps, Playmaker;
- Built-in update system.

Final words

We sincerely hope that you enjoy using Huge Texture.

If you have any questions or problems, please contact us.

We will try to help you as quickly as possible.

Please don't forget to rate Huge Texture in the Unity Asset Store.

It is very important for us to have feedback to make our assets better.

For other users, this is also very important to make the right understanding quality and features of the asset.

Links

Product page: https://infinity-code.com/assets/huge-texture

API Reference: https://infinity-code.com/docs/api/huge-texture/

Support: support@infinity-code.com

Forum: https://forum.infinity-code.com

YouTube: https://www.youtube.com/channel/UCxCID3jp7RXKGqiCGpjPuOg

Vimeo: https://vimeo.com/infinitycode

Twitter: https://twitter.com/InfinityCodeCom