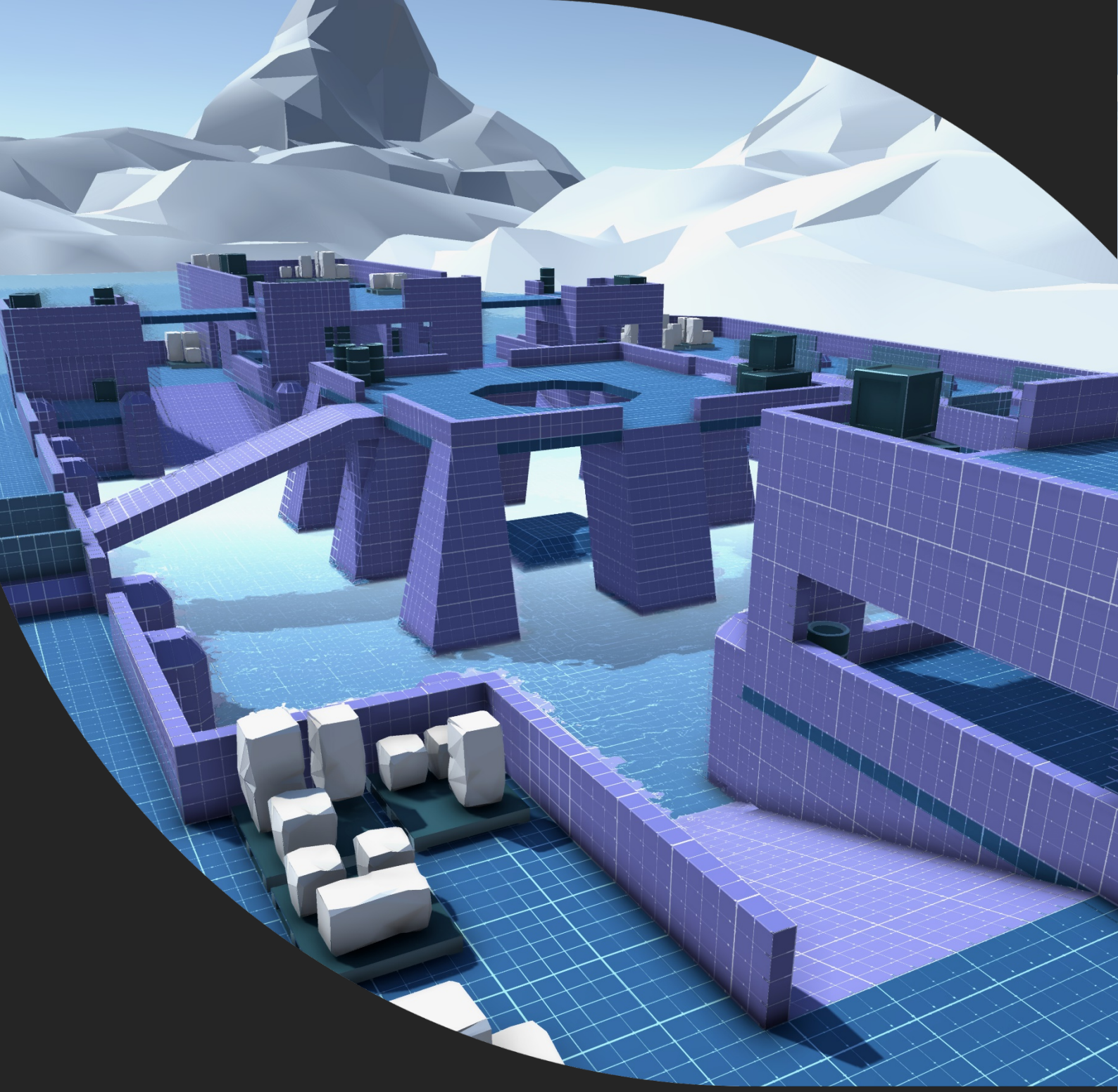

BLOCKOUT

USER GUIDE

RADICAL FORGE

Version 1.0.0

Made with unity

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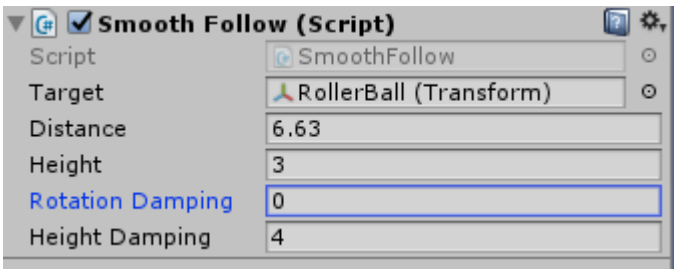
First off, thank you for purchasing Blockout! While you probably should read *at least* the Quick Start section of this document, you probably want to dive right in and that's fine (that's exactly what we would do). There should be tooltips around each section of the Blockout window to help clarify its function. Note this tool supports multi-scene editing.

Demo Scenes

The demo scenes can be found under "***Blockout* > Examples**". All the Demo Scenes require the Unity Standard Assets to be included in the project. This can be attained by right clicking in the **Project Window > *Import Package* > *Characters***. The All Assets scene showcases every model included in Blockout.

- The FPS scene requires the FPS character to be dropped anywhere in the level.
- The Rollerball scene requires the Rollerball character as well as a main camera with a Smooth Follow script with the following properties:



Quick Start

Compatibility

Unity Versions: 5.4.0f3 - 2017.1

Initialisation

The Blockout Editor can be opened by navigating to "***Window/Blockout/Editor***" or by pressing the keyboard shortcut defined below. When you create a new scene, the scene needs to be set up with the system before any of the assets of tools function as intended. The "***Auto Create Scene Hierarchy***" does this for the currently active scene.

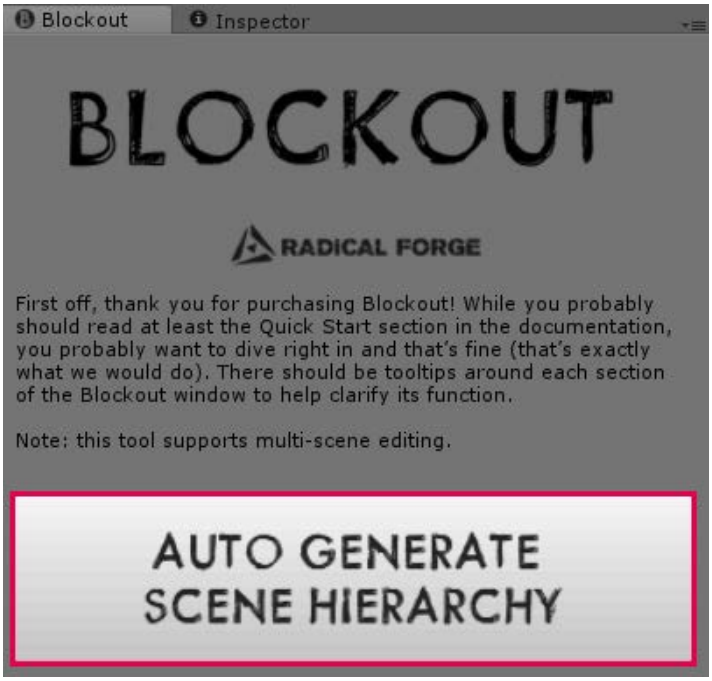


Figure 1 Initialisation Step 1: Blockout Hierarchy

If there is already a part of a blockout hierarchy in the scene, but it is incomplete then the button will switch to "***Refresh Hierarchy To Fix Missing Links***". This will create the other transforms the system requires to function.

Creation

Once there is a blockout hierarchy, you will be free to start putting the pieces together to create a blockout of your environment. There are 2 main ways to do this:

- Premade assets (Prefabs)
- Scalable Assets

Premade Assets (Prefabs)

At the top of the blockout editor window, there are 6 'Jump to Folder' buttons to help get you started with level creation: Blocks, Walls, Floors, Dynamic Objects, Foliage & Particle Systems.

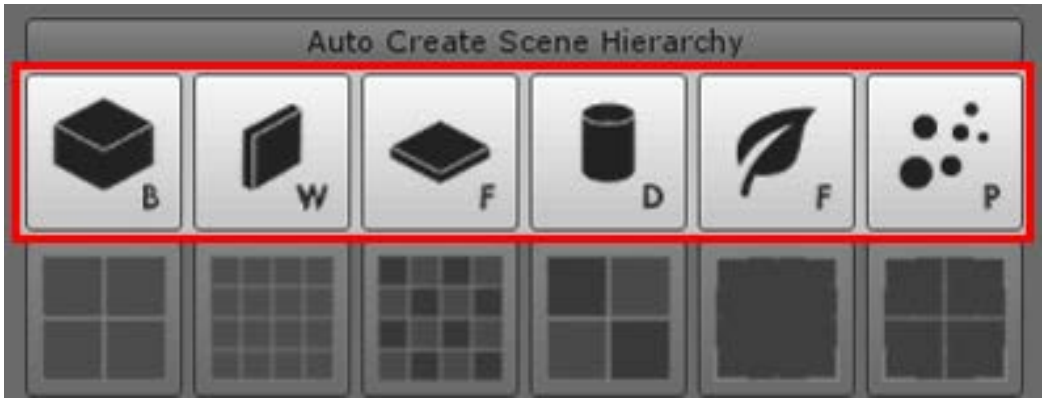


Figure 2 Jump to Folder

When these assets are placed in a scene view, they automatically get parented to the sections of the blockout hierarchy that corresponds to their asset type(s). It will then also apply the current colour pallet to the asset(s). There are more assets that count to several of these categories or none. Those assets can be found at '***Assets/Blockout/Prefabs***'.

Scalable Objects

There are 3 scalable assets that can be created: Scalable Walls, Scalable Floors and Scalable Trims. These differ from the premade asset versions because when these assets are scaled, their material adapts instead of stretching to the object. This is useful if there are parts of the level that require larger pieces of geometry and you don't want to place the same prefabs repeatedly. It also has the added benefit of being a lower poly count that the prefab variant. Like the prefabs versions, these also get auto parented to the hierarchy.

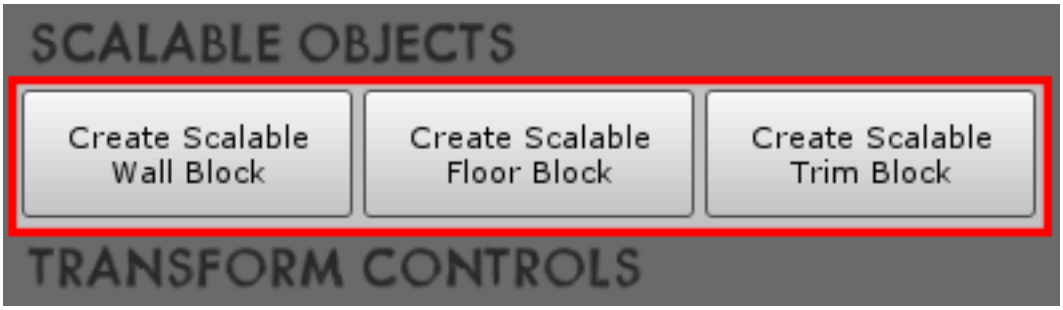


Figure 3 Create Scalable Objects

Styling

You can apply 6 different blockout textures and 7 different colour pallets to give the blockout level a look you are satisfied with. The first 6 are premade colour pallets but the 7th is a user made colour pallet. This pallet can be randomized to generate a different theme to what is already available.

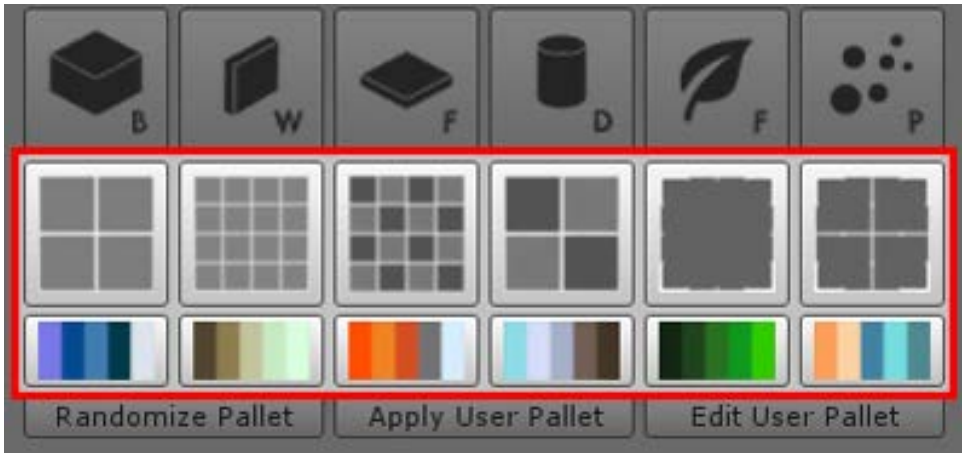


Figure 4 Basic Blockout Style Options

If you are still not satisfied with the colour options or have found a random pallet that is desirable but requires a few tweaks then you are able to edit the pallet. Locking the colour group will stop the pallet randomiser from altering that colour.

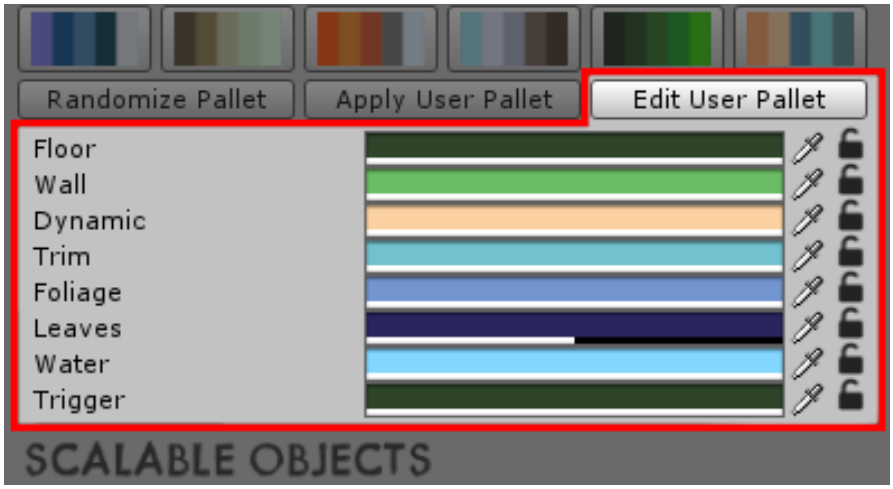


Figure 5 Editing the User Colour Pallet

Select Prefab

You can select the prefab of an object by clicking the Select button. This is useful if you have Blockout window over the inspector widow.

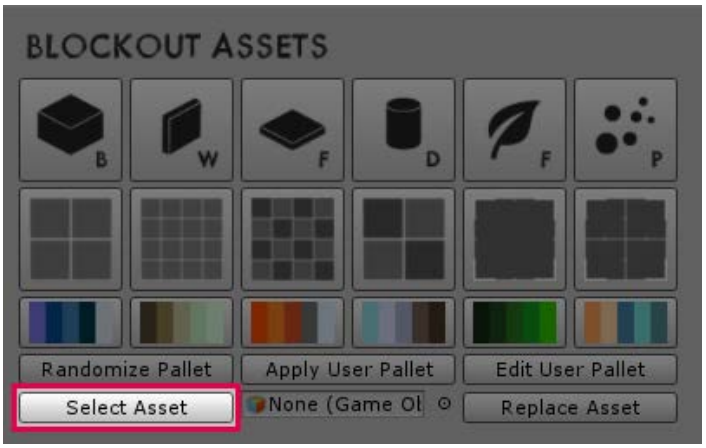


Figure 6 Select Asset In Project Window

Replace Assets

If you have multiple objects selected, you can replace the current object with another from the project window using this field. They will retain the transform of the object it is replacing.

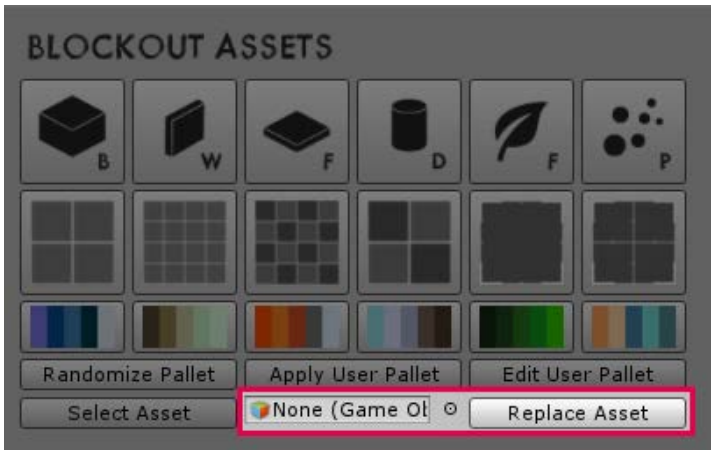


Figure 7 Replace Selection With Asset

Keyboard Shortcuts

Shortcut	Action
Ctrl + Alt + B	Show the Blockout window
Alt + S	Toggle Blockout Grid Snapping
Alt + C	Toggle Area Comments
Alt + Z	Decrease Grid Snapping Value
Alt + X	Increase Grid Snapping Value
End	Snap to ground (-Y)
G	Just To Selected Prefab In Project Window

Table 1 Keyboard Shortcuts

Assets

There are 7 main categories of premade assets that come with this pack:

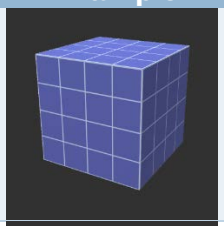
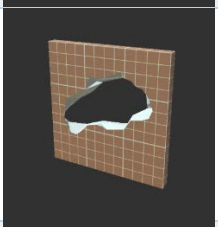
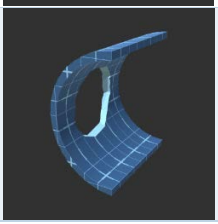
Type	Example	Assets
Blocks x 221		51 x Basic, 12x Alt, 36x Caps, 15x Inner Corners, 40x Corners, 35 Pillars, 11 Bent Walls, 21x Bent
Walls x 61		15x Basic, 16x Bend, 20x Destroyed, 10x Windows / Doors
Floors x 100		36 x Basic, 37x Slopes, 27x Terrains (Mesh), 4x Backgrounds (Mesh)
Dynamic x 15		2x Barrels, 3x Barricades, 3x Cones, 4x Crates, 2x Pallets, 1x Shipping Container
Foliage x 50		3x Bushes, 6x Trees, 4x Vines, 37x Rocks
Particles x 7		3x Dust, 3x Fire, 1x Rain, 1x Water Drip, 1x Sparks, 1x Jump Pad, 1x Snow, 1x Sparks
Trim x 57		18x Pipes, 17x Tubes, 15x Pyramids, 7x Abstract

Table 2 Asset List

These assets can be found either through the quick jump menu at the top of the Blockout window or by navigating to '***Assets/Blockout/Prefabs***'.

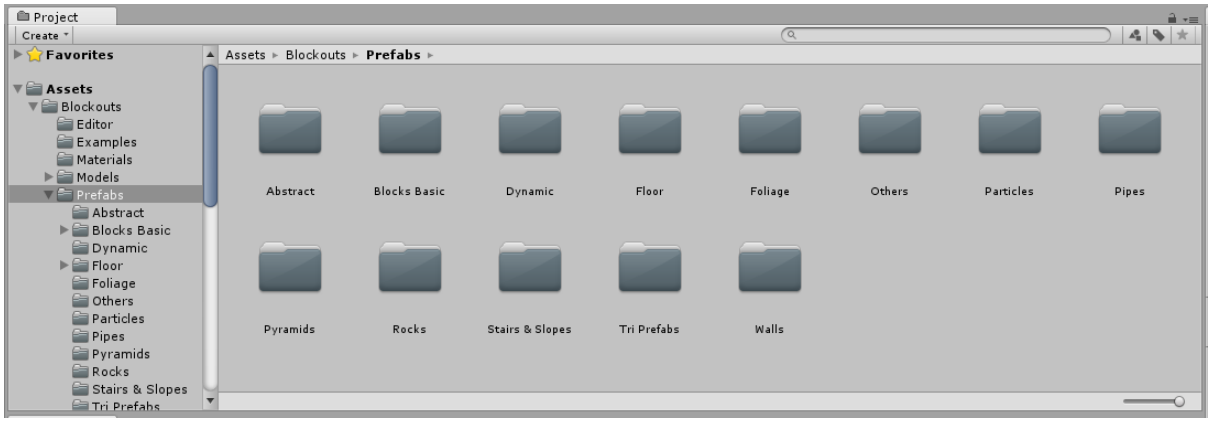


Figure 8 Blockout prefabs in Project window.

The assets are named in a specific style to easily show the size of the asset along with any additional information:

AAA_BBB_XX_YY_ZZ

Key	Description
AAA	Asset Type
BBB	Additional Description
XX	Asset Width in Unity units. (Note: 05 = 0.5)
YY	Asset Height
ZZ	Asset Depth

Table 3 Naming Convention Breakdown

Blockout Editor Window

Overview

There are 3 overall sections to Blockout: ***Creation, Editing and Miscellaneous***. Within these sections are all the tools you'll need to create an environment with this system. The outline of the full window is shown below. All the editing and miscellaneous tools are described in later sections. Creation tools were described in the *Getting Started* section of this guide.

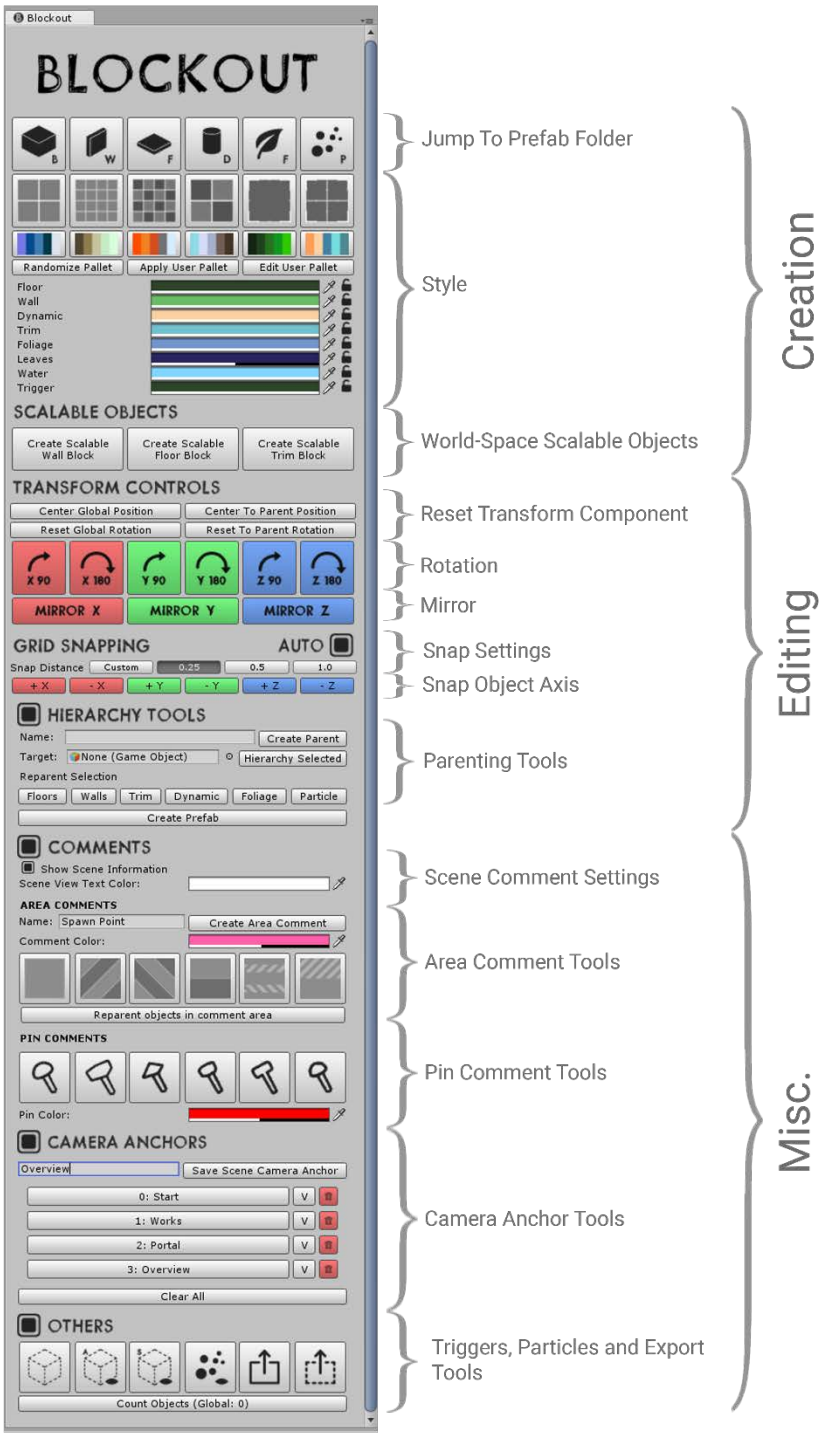


Figure 9 Blockout Editor Window Overview

Transform Controls

The main purpose of this section is to remove the need to interact with the default transform component. It consists of 3 sections: *Reset, Rotation & Mirror*.

Transform Reset Tools

These 4 tools reset a component of the selected transforms in either world or local space outlined below.

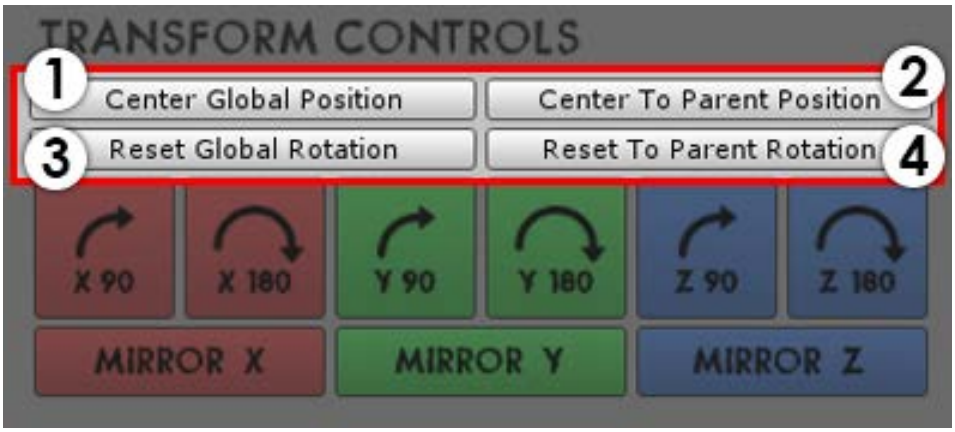


Figure 10 Transform Reset Tools

- **Center Global Position**
  Resets the world position of the selected transforms to (0, 0, 0). Effectively moving it to the center of the scene.
- **Center To Parent Position**
  Resets the local position of the selected transforms to (0, 0, 0). Effectively moving it to the pivot point of the parent transform.
- **Reset Global Rotation**
  Resets the global rotation of the selected transforms to (0, 0, 0) in world space.
- **Reset To Parent Rotation**
  Resets the local rotation of the selected transforms to (0, 0, 0) in local space. Effectively giving it the same rotation as the parent transform.

Rotation Tools

There are 2 rotation options (clockwise 90º and 180º) in all 3 axes: X (red), Y (green) & Z (blue). This occurs in world space.

Figure 11 Transform Rotation Tools

Mirror Tools

There are only 3 mirror tools – one for each axis: X (red), Y (green) & Z (blue). This occurs in local space. Effectively inverts the sign of the requested XYZ component of the local scale.

Figure 12 Transform Mirror Tools

Grid Snapping

The grid snapping section handles snapping both position and scale. (Automatic rotation snapping is planned for a future update).

Automatic Snapping

Auto snapping is toggled by using either the toggle button next to the word auto or by pressing '***Ctrl + K***'. It will however never scale snap to 0 on any axis. The lowest value it will scale snap to is the size of the snap distance in Unity units. Snapping will also only occur once an object has been placed in the scene. If you wish to use vertex snapping then it is recommended to turn off auto snapping as it could interfere with snapping to the desired vertex point.

Figure 13 Auto Grid Snapping

Snap Distance

There are 4 steps to snap distance. The default step is snapping to 0.25 Unity units. This is equivalent to using the 1st or 3rd blockout texture for grid reference. 1 step down is custom where you can specify your own snap distance. 0.5 is useful paired with the last grid texture and 1.0 is useful when paired with the penultimate grid texture.

Figure 14 Snap Distance Configuration

Hierarchy Tools

This is the first in supplementary tools which are collapsible in the editor window, and start hidden by default. This toggle collapses/expands the section. These tools all rely on manipulating GameObjects in relation to the blockout hierarchy.

Figure 15 Toggle Section Visibility

Reparent Tools

The next 3 tools help to group GameObjects in the blockout hierarchy. This is useful for organisation or for moving objects between blockout areas. When an objects parent is changed, it updates its theme to match the new parent theme if it moved between Blockout sections. E.g. moving a floor piece to the 'Trim' section would update its material to the Trim material for the current theme.

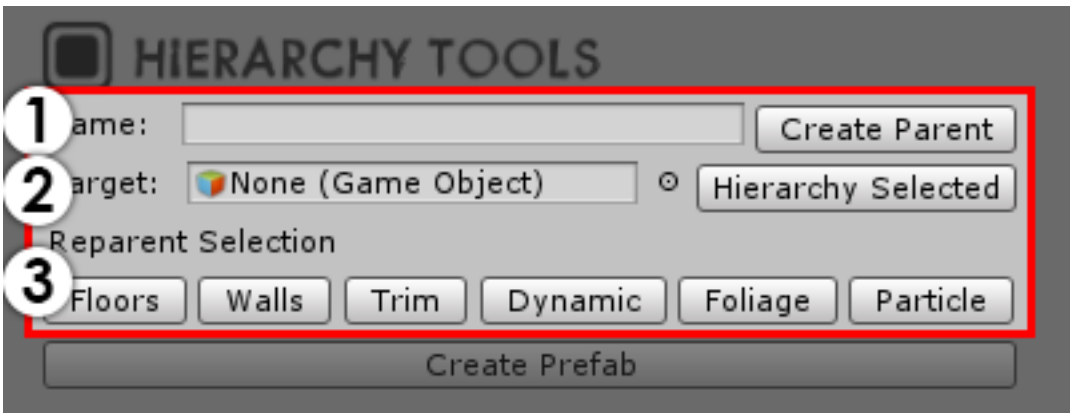


Figure 16 Reparent Tools

1. **Create Parent With Name**
   Using the existing selected GameObjects, creates a new GameObject with the desired name and reparents the selected GameObjects to it.
2. **Hierarchy Selected To Target**
   When a GameObject is assigned as the target, anything selected when the "***Hierarchy Selected***" button is pressed set the parent of those selected objects to the target GameObject.
3. **Reparent Selection To Blockout Section**
   The selected GameObjects get reparented to the target Blockout section of the active scene.

Create Prefabs from Selection

When a group of GameObjects are selected and the "***Create Prefab***" button is used, all the selected GameObjects get turned into prefabs located in '***Assets/Blockout/NewPrefabs/***' using the GameObjects name. ***Note****: Only the root of the wanted prefab should be selected. Otherwise the child gets created as a new separate prefab. (This should not be a thing in a subsequent releases).*

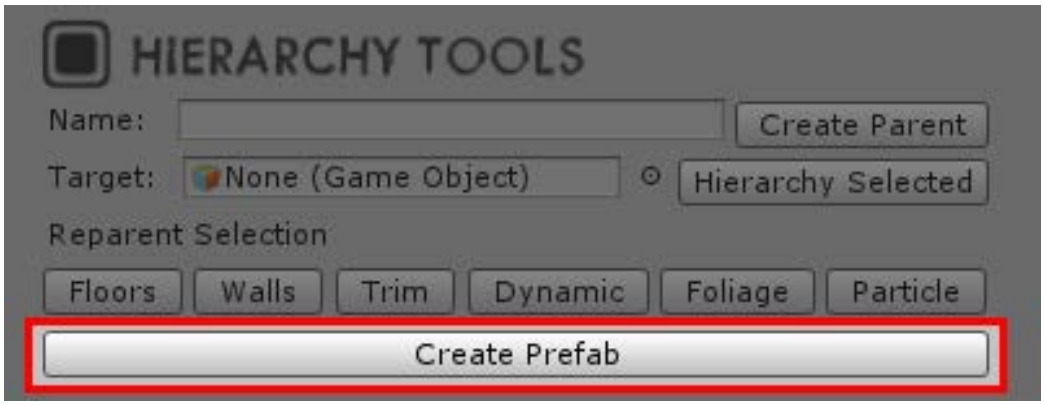


Figure 17 Create Prefabs from Selected GameObjects

Comments

There are 2 comment types in Blockout: Area Comments & Pin Comments. Both behave in a similar manor. They are automatically hidden and shown when this section of the Blockout window is visible. The Blockout editor also changes when a Blockout comment is selected.

1 Button & 3 Text Areas are added in this more specific view. The "***Return***" button brings you back to the main Blockout editor window and deselects the current comment. The 3 text areas are: ***General Notes***, ***TODO Notes*** & ***Other Notes***. These sections update to the current selected comment so you don't have to go into the inspector to change them. The ***Note Name*** text field also changes the name of the selected comment and GameObject pin. The updates made here are also reflected in the scene view if the "***Show Scene Information***" toggle is enabled.

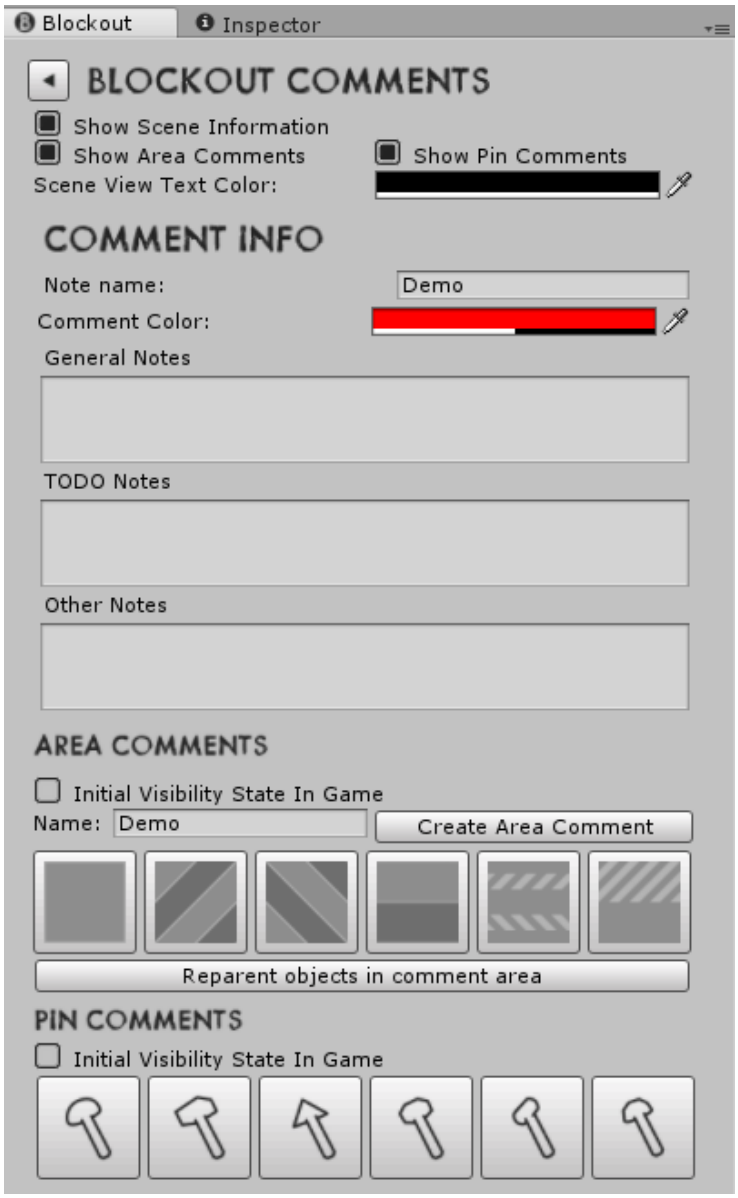


Figure 18 Custom Comment Editor

Scene View Helpers

When the comments are active, and the scene view camera is within an area comment, the name and the notes that are associated the comment is displayed in the bottom left hand corner of the scene view. The scene view camera position is also displayed in the bottom right hand corner of the scene view.

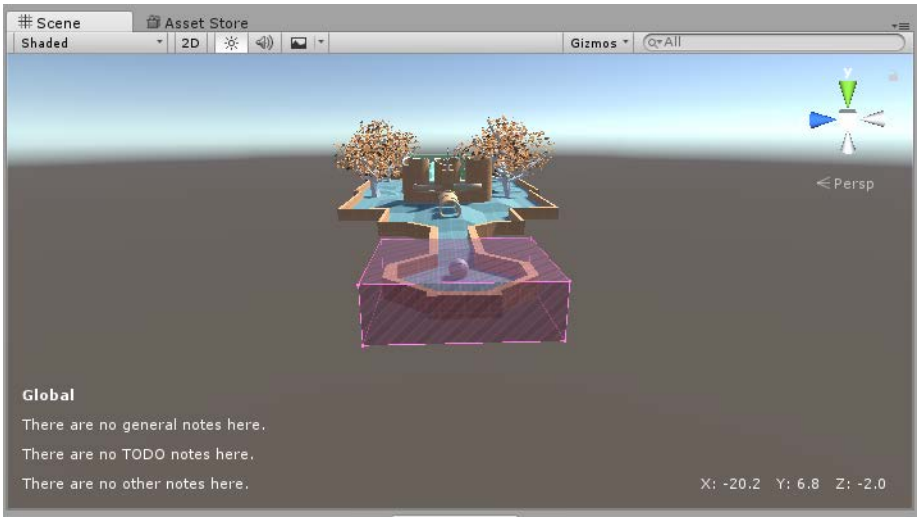


Figure 19 Area comment in scene view

If you don't want these helpers to be visible in the scene view then they can be disabled using the "***Show Scene Information***" toggle.

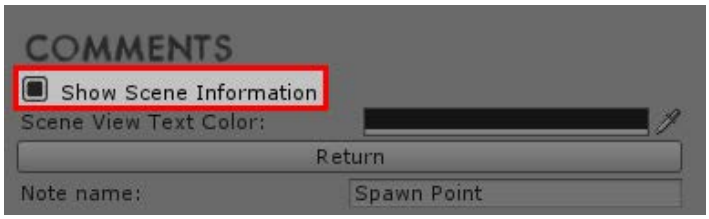


Figure 20 Scene view info toggle

Scene View Settings

The scene area comment overlay can be edited to suite your individual preference. The alpha of the text colour is used to control the opacity of the box background behind the text and the RGB values are used to alter the text colour.

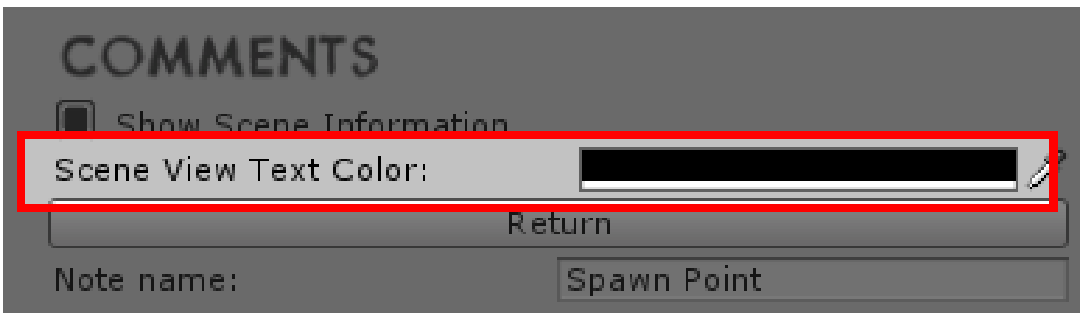


Figure 21 Scene View Settings (Colour)

Area Comments

Area comments are like UE4s Blueprint comments but in 3D space! When the scene camera enters the comment area, if scene helpers are enabled then the comment into will be updated in the bottom left hand corner of the scene view.

Area Comment Creation

When creating an area comment, **2 or more** need to be selected to determine the volume of the comment. The GameObject name is then set as the comment name. The volume the comment box encompasses will always be slightly larger than the volume of the colliders / renderers has in total in world space.

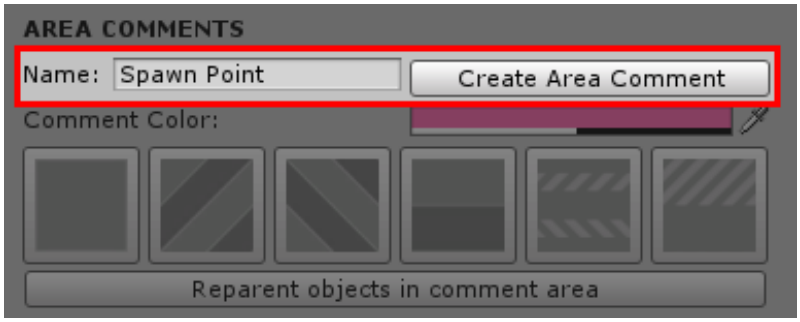


Figure 22 Area comment creation

Area Comment Style

You can alter the comment colour and opacity of the selected area comment. You are also able to switch between 6 different area comment textures to help differentiate various areas.

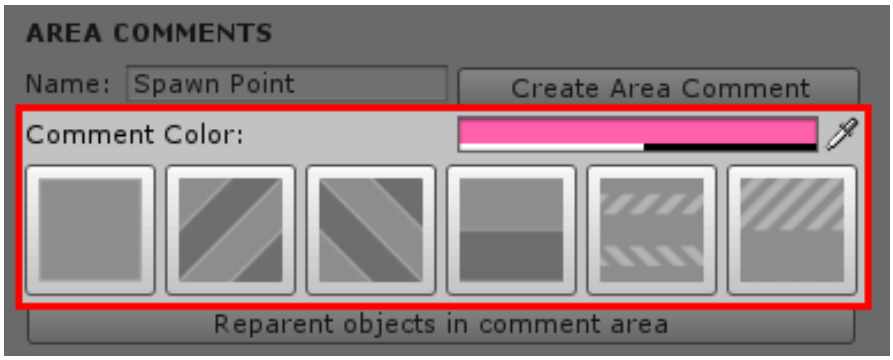


Figure 23 Area Comment Style

Reparent Objects Within Comment Area

Any objects completely within the area comment are reparented to the comment creating a separate blockout hierarchy within the comment if one doesn't exist.

Figure 24 Reparent objects in comment area

Pin Comments

Pin Comments differ from Area Comments as they only apply to a specific point. When the scene camera is within a 5 unit radius from the comment, then it is shown like an area comment. They can also be clicked / selected like area comments.

Pin Comment Creation

There are 6 different styles that area comments can be, shown by the 6 different buttons. When a style is clicked, the Blockout editor waits for a point in the scene view to be clicked. It will then place a new pin comment under the mouse cursor with a constrained rotation to 90º increments along the surface normal that the pin comment sits above.

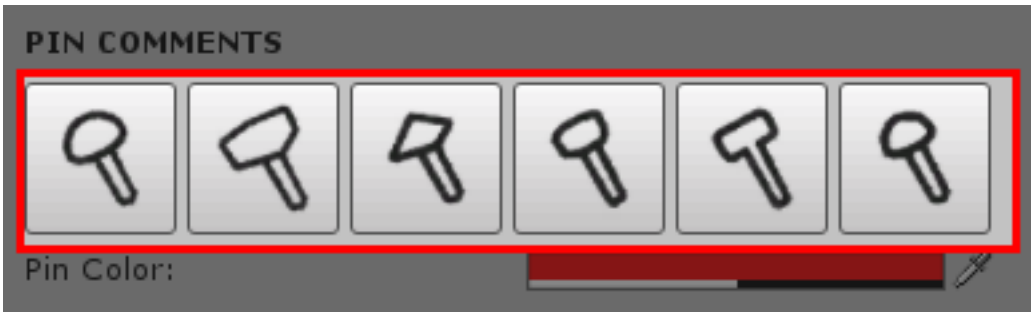


Figure 25 Pin Comment Tops (Creation)

Pin Comment Style

The only style property that is editable after placing is the colour. The pin will take the colour from the "**Pin Color"** colour fields RGB. The alpha of the colour determines how visible the pin outline is which will always be a few shades lighter than the main pin colour.

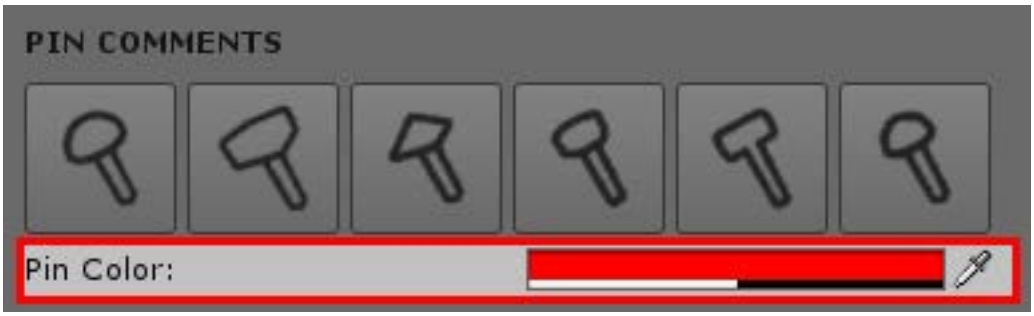


Figure 26 Pin Comment Style (Colour)

Comments in Game View

By default you can view comments in game view while the game is running by pressing ***F12***. The position the system takes is the one of the object tagged "***Player***". If one is not found it will then use the current rendering cameras position.

Camera Anchors

Camera anchors allow you to save the current view transform of the scene view camera, both to go back to it in the scene view later and as a gameplay camera. The gameplay camera is always disabled initially unless you enable it through its visibility button. They are always rendered with a depth of 100 so it will be show in the game view ***on top of*** other cameras, such as a player camera. These cameras can be found in the camera section in the Blockout Hierarchy which enables you to add custom post process effects (*such as Unity's new Post Processing Stack*) to see how that area will look without moving the player camera. If the camera doesn't exist then the anchor definition is deleted.

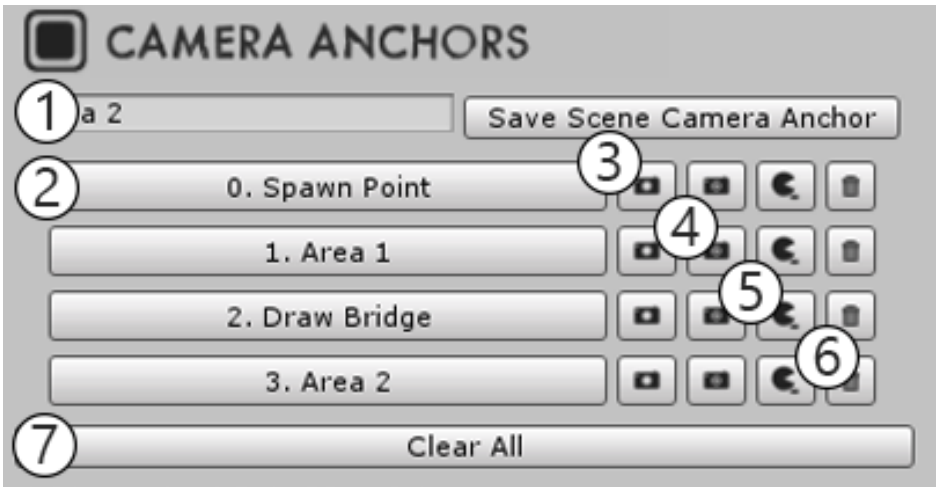


Figure 27 Camera Anchors

1. **Save Scene Camera Anchor**
   Saves the current scene view camera position and rotation with the requested name. It also creates a gameplay camera as described above.
2. **Move Scene Camera To Requested Anchor**
   Moves the scene camera to the requested anchor.
3. **Save "White" Screenshot**
   Saves the current view of the camera in a white mode at the resolution requested
4. **Save Normal Screenshot**
   Saves the current view of the camera at the resolution requested
5. **Toggle Camera Anchor In Game View**
   Enables / Disables the current gameplay camera anchor which is currently being drawn at a depth of 100 or enables the requested anchor to be drawn in the game view.
6. **Delete Camera Anchor**
   Deletes the gameplay camera associated with the camera anchor and removed the camera anchor from the Blockout scene definition.
7. **Clear All Camera Anchors From Scene**
   Deletes all Blockout gameplay cameras anchors from the scene as well as removes all camera anchors from the Blockout scene definition.

Other Tools

There are 7 miscellaneous tools here which help in general development but don't fall into the categories talked about before.

Blockout Trigger

The first set are tools related to trigger volumes. These are just an extension of the default trigger colliders for cubes. The style that the trigger volumes have is determined by the current material theme colour that's applied to the level.

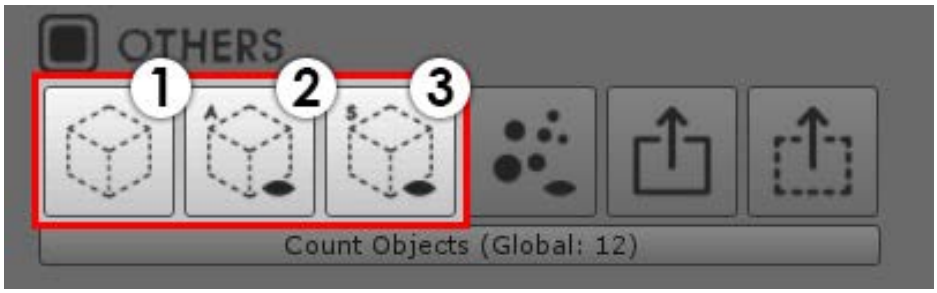


Figure 28 Trigger Volume Tools

8. **Create Trigger Volume**
   Creates a Blockout trigger volume (cube) in front of the camera. A *BlockoutTrigger* script gets added to it.
9. **Toggle Trigger Visibility All**
   Toggles the in-game visibility of every trigger volume to be the global visibility on/off. This change is only visible when the game is playing.
10. **Toggle Trigger Visibility Selected**
    Toggles the in-game visibility of the selected trigger volumes to be the opposite of what each of them were. The first selected triggers visibility is what is displayed as the current viability icon.

The Blockout Trigger script is mainly a helper script for the Blockout system to interact with. It does however also provide additional functionality for you. You can assign functions to the trigger events much like the '*On Click*' event on a UI button. The parameter they pass through is the collider of the other GameObject that has entered, stayed or exited the trigger volume.

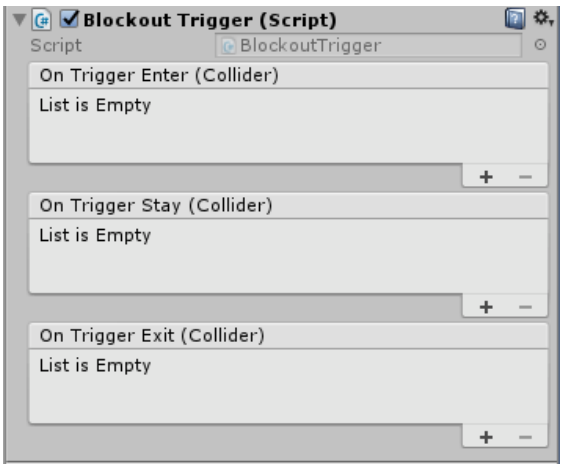


Figure 29 Blockout Trigger Script

Blockout Particle Systems

There is only 1 extra tool for blockout particle systems, that toggles the global visibility of all them in the scene view. This effectively plays all the particle systems that belong to the blockout system in editor. This can help you visualise what the final look of the environment will be.

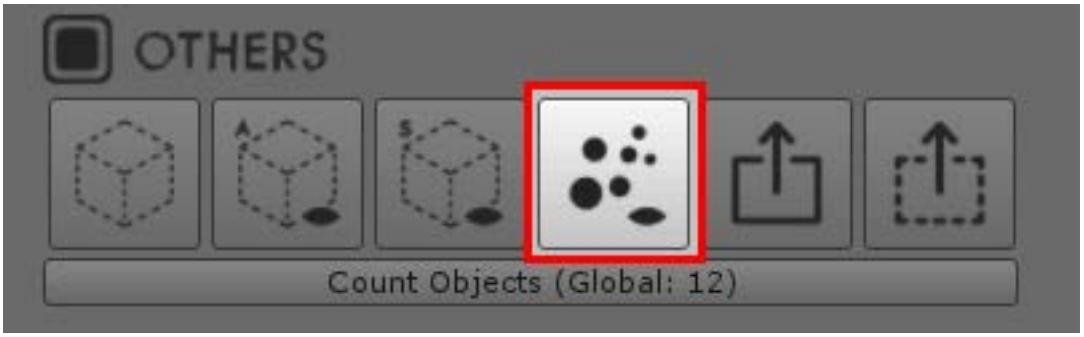


Figure 30 Toggle Particle System Visibility

Export Tools

There are 2 export tools that are available. Both of which exports a single Wavefront Obj file, a .mtl material library file and the current Blockout texture to a folder of your choosing.

Notes:

- The pivot point of the root object will always be the centre of the Unity scene.
- The hierarchy is not preserved at export.
- A custom export scale is pre-defined which was tested to be compliant with the default unity scale of 3DS Max.

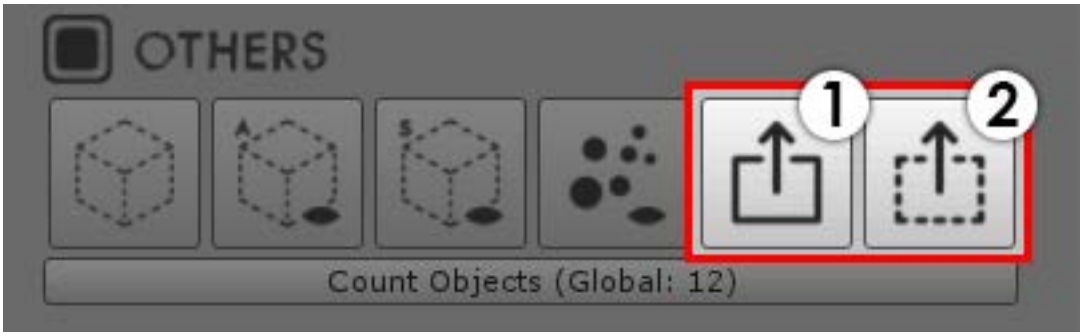


Figure 31 Wavefront Obj Export Tools

1. **Export the Entire Blockout Hierarchy**
   Exports the entire blockout hierarchy to a single .obj file which can then be taken into a modeling application such as 3DS Max, Maya or Blender etc.
2. **Export Selected Objects**
   Exports the selected GameObjects to a single .obj file which can then be taken into a modeling application such as 3DS Max, Maya or Blender etc.

Count GameObjects

The final tool is an object counter. If there are no objects selected, then is will display the total amount of GameObjects in the scene and displays it as '***Global***'. If there are objects selected, then it will display the amount of GameObjects within the selection as '***Selected***'.

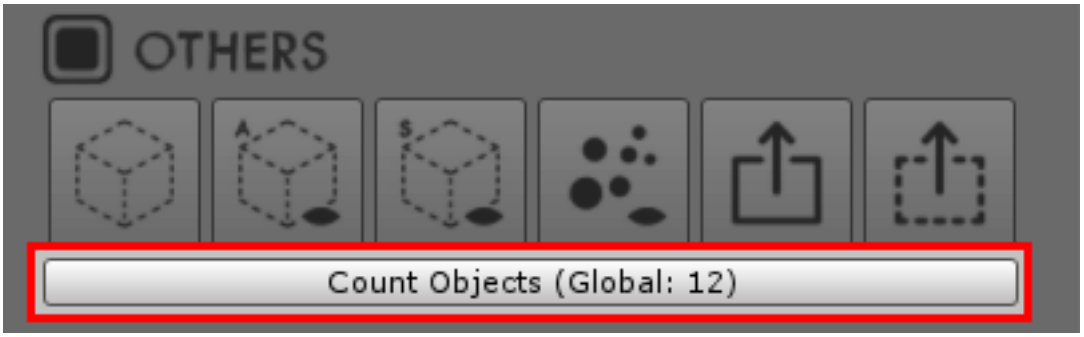


Figure 32 Count Objects Button

Asset Helper

The Blockout Asset Helper provides 2 useful features that can speed up your development. Suggested Assets and Scene Favourites. With both groups of assets, clicking on them will highlight them in the project window as well as showing its properties in the inspector. Dragging these previews into the scene view will spawn them either on the object the mouse is over or 50 units away from the mouse position in the view of the scene camera. The amount of assets displayed, will scale to the width of the window.

The Asset Helper window can be enabled by going to "***Window/Blockout/Asset Helper***". If the Blockout editor isn't shown, then one will be created and shown as it partly relies on the main Blockout editor.

If the preview image doesn't appear that's due to Unity generating the preview image internally. It will then only be displayed if an asset is dragged from the suggested assets list or the same asset is placed in the scene again from the project window. This doesn't occur if the asset preview has already been generated at least once.

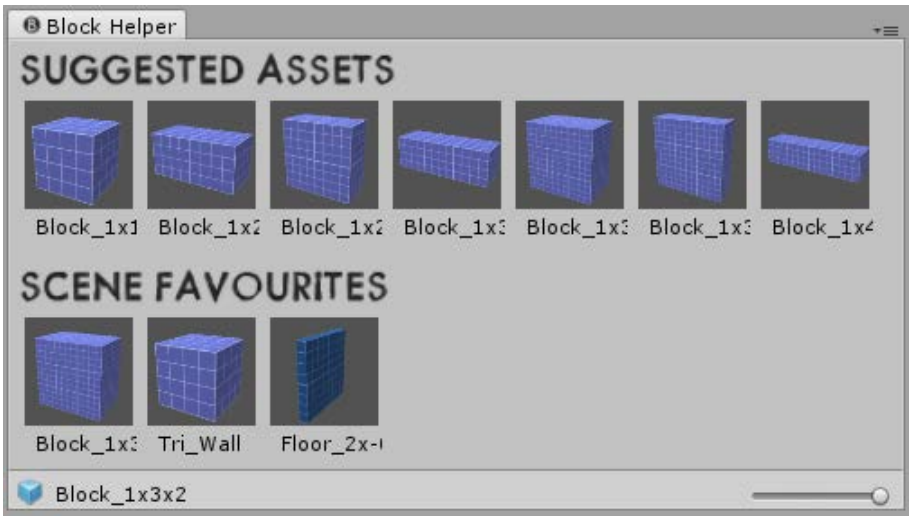


Figure 33 Asset Helper

Suggested Assets

This list of up to 6 assets are assets that have a similar name to the asset that was last placed / currently selected in the scene view.

Note: The method for suggesting assets is subject to change in future releases.

Scene Favourites

This list of up to 6 assets are the top 6 most used blockout assets that you have used within the current scene.

Asset Creation

You can create your own assets and make them into prefabs that integrate with the Blockout system. The steps to accomplish this are outlined below.

1. Set up the GameObject(s) in the scene with colliders, renderers etc.
2. Select all the assets to be made into a Blockout prefab
3. Open the '***Create Blockout Asset***" wizard by navigating to '***Window/Blockout/Create Blockout Assets***'.
4. Use the dropdown on the right next to each GameObject to determine which part of Blockout your new asset belongs.
5. After hitting create, your new Blockout prefabs will have auto-hierarchied to their designated section and the prefabs for those objects will be placed in '***Assets/Blockouts/NewPrefabs***'

Note: If you set the Blockout section to be of type ***Particles*** *then they will get an additional component that will enable the system to be played with every other particle system in the scene view.*

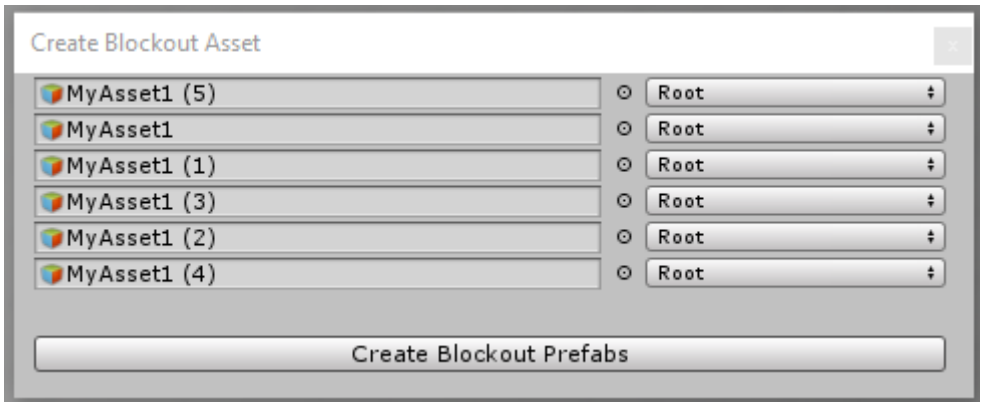


Figure 34 Create Blockout Asset Window

Credits

Radical Forge

- *Bruce Slater*
- *Frederic Babord*
- *Gerog Engerbakken*

Resources

- *EditorObjExporter by Keli Hlodversson*
  http://wiki.unity3d.com/index.php?title=ObjExporter#EditorObjExporter.cs

Testers

- *Oliver Walker*
- *Bob Makin*
- *Alex Cooper*
- *Sam Browne*
- *Aaron Pierce*

Changelog

Version 1.0.0

- Initial Release
  - Area & Pin Comments
  - Grid Snapping
  - Scalable Objects
  - Transform Controls
  - Blockout Asset Creation
  - Suggested Assets
  - Several prototyping & hierarchy tools

For future versions, what's planned and being worked on can be seen on this Trello board: https://trello.com/b/r8Lpg9DN/blockout

Licence

Blockout is licensed per-seat, as with all other editor extensions, according to Unity's EULA. This means that if a team wishes to use Blockout, everyone who wants to be able to use it, needs their own licence. If you finish and release a project where Blockout was used at some stage of development, we would appreciate a mention of Blockout in the credits and maybe some screenshots of levels / environments created with the aid of this tool.

Contact / Support

General Enquiries: contact@radicalforge.com
Technical Support / Bugs / Feature Requests: support@radicalforge.com re: Blockout
Website: http://blockout.radicalforge.com
Twitter: @radicalforge / #Blockout
Facebook: Radical Forge