Extrood Manual V1.0

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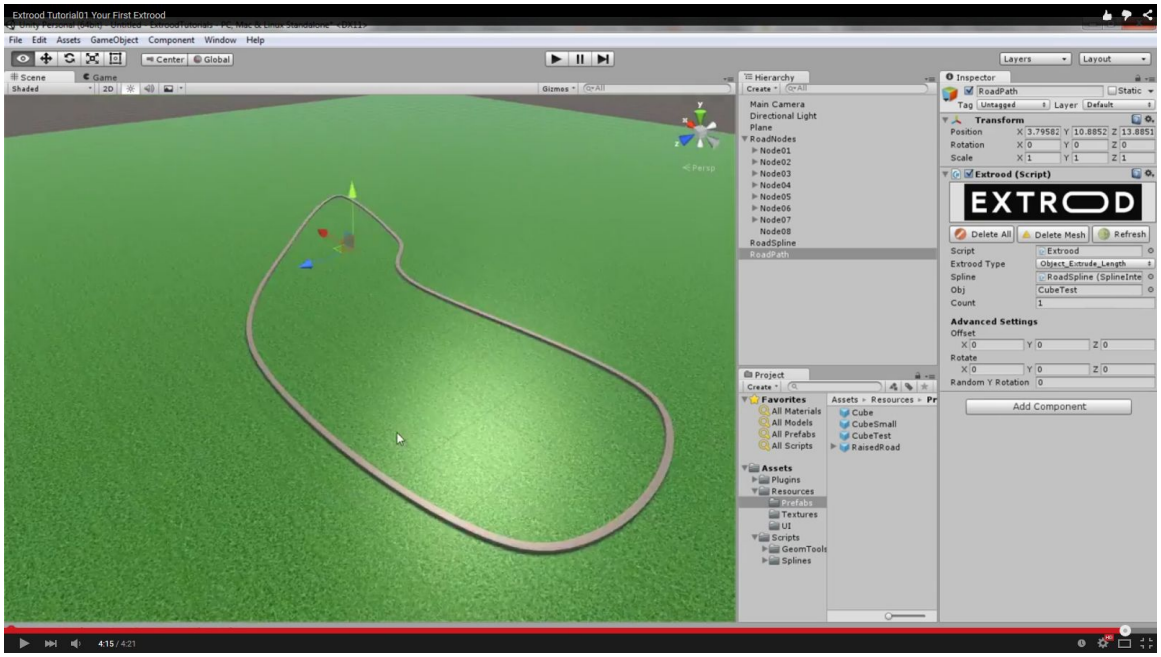
Overview

Extrood is a component built in Unity that provides the ability to extrude objects along a spline. Extrood has been developed to be flexible and easy to use.

Extrood is limited in its current capability, however improvements are being developed that will be provided to all customers free of charge. See the “Future Enhancements” section for more details on this.

If you have any problems with Extrood then please email: support@gagagames.com and we will get back to you as soon as possible.

Quick Start



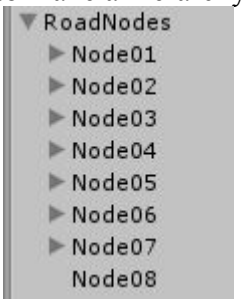
The easiest way to learn to use Extrood is by trying it out right away.
Tutorial01-Your First Extrood
Tutorial02-Smoothing and Modifying Nodes
Tutorial03-Compound Objects
Tutorial04-Multi Object Repeat
Tutorial05-Segment Modifiers

Requirements:

1. The Extrood package installed.:
http://docs.unity3d.com/Manual/HOWTO-exportpackage.html
2. An object you would like to extrude along a spline (either prefab or gameobject).
3. A terrain or surface to put your extrusion on (optional).

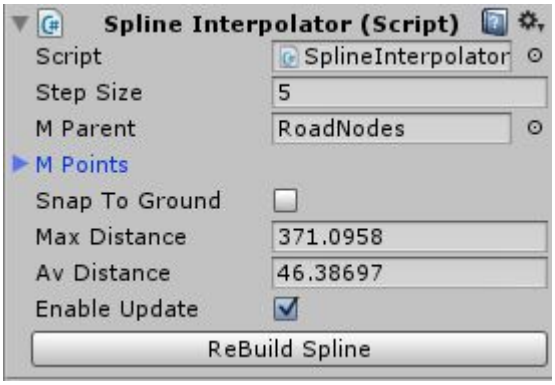
Create a spline

Firstly build a spline by creating an empty GameObject (this is our Main Parent) and then create multiple child GameObjects to make a hierarchy structure like so:



Each child GameObject (NodeXX) represents a node in the spline. Child nodes can be placed into a rough shape of the intended spline.

Create a new GameObject which will be the Spline object. The new spline control GameObject then needs to have a "SplineInterpolator" component added to it. The SplineInterpolator component must set the M Parent property to the Main Parent object created previously.



Initially the M Points array will be empty.

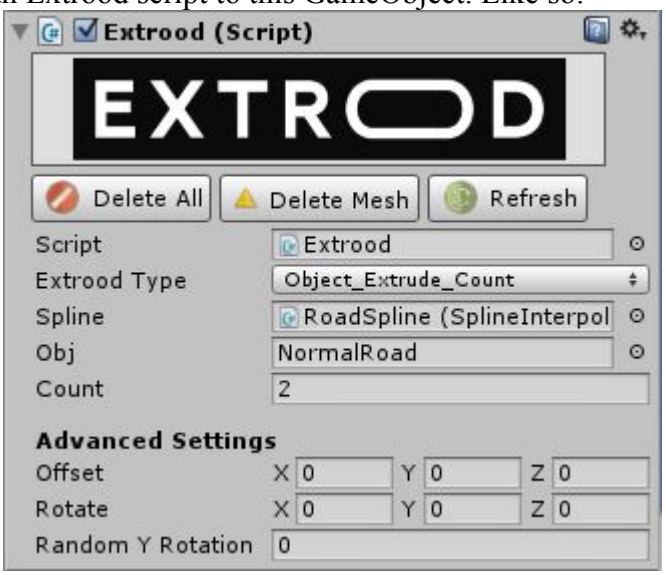
Press the "ReBuild Spline" button and the M Points array will be filled with the transforms of all the child objects.
Note: *It is perfectly fine to manually add or remove these transforms but when you press ReBuild Spline they will be regenerated from the original M Parent children.*

At this point the user should look at designing how the spline should look. When the child transforms are moved a blue line will appear connecting the points and showing what the spline looks likes. Move these transform points around until they appear suitable. Pressing the "ReBuild Spline" may be necessary for the blue line to appear.

Note: *Nodes 01 and 08 (or the last node) need to have the same transform if the spline should need to 'loop' around. Moving them separately makes a single non-looping spline.*

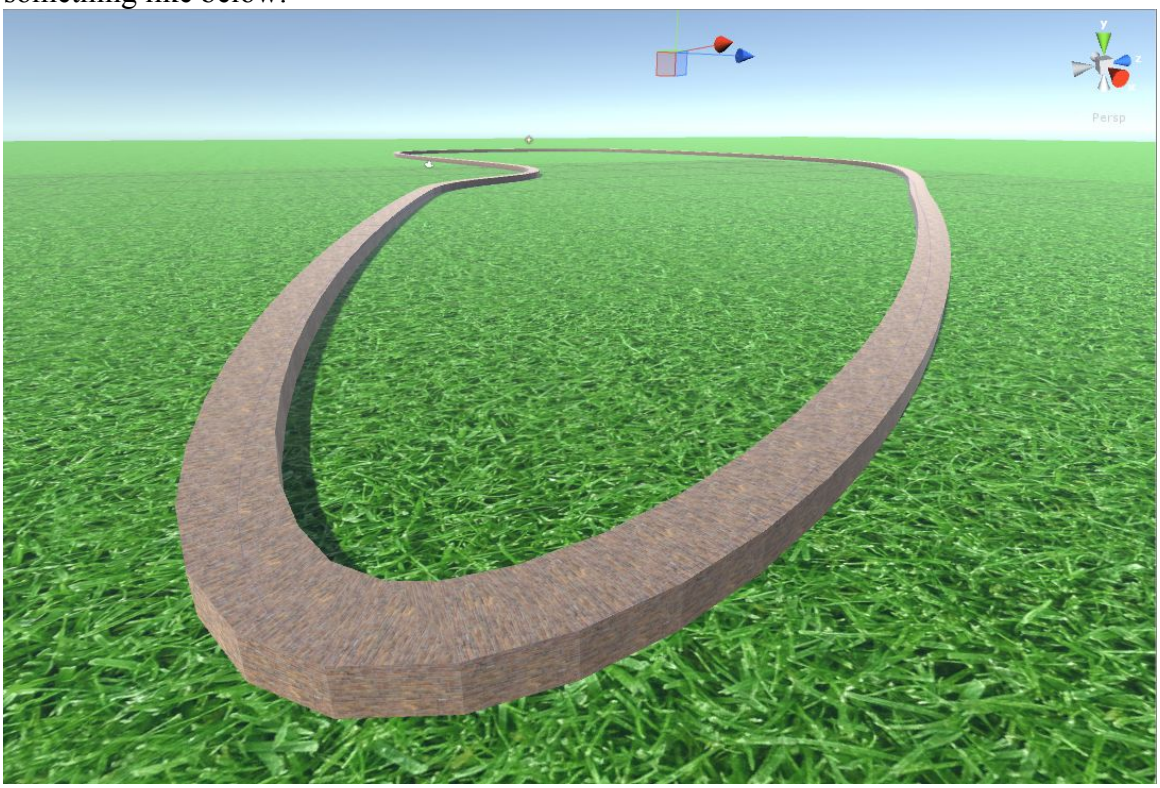
Making a Path

Finally create a new GameObject that will become the container for Extrood path components. Add an Extrood script to this GameObject. Like so:



- Assign the Spline property to the previously created spline objects.
- Place the object to extrude along the spline into the Obj property box.
- Press the Refresh button to build the path object.

Depending on the object or the spline shape the generated mesh path should look something like below:



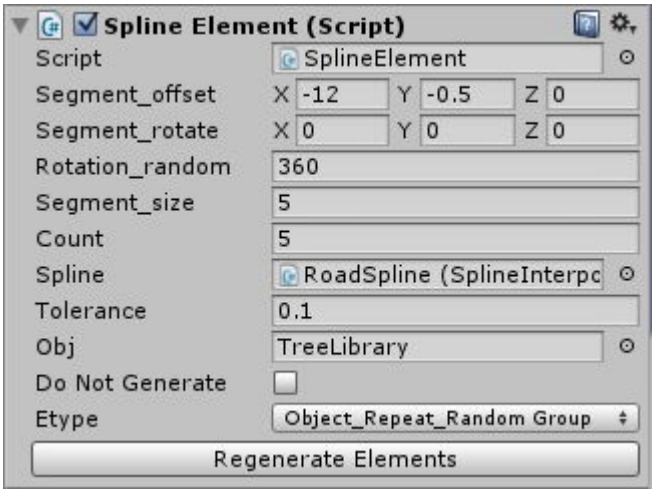
Extrood Components

The components used with the Extrood component are described in detail under each sub-section heading.

Spline Element Component

The Spline Element Component is a generated component for use in the generation of a spline node-to-node mesh.

Spline Elements can be applied on any node in a node array, with a spline reference that uses this array.



The properties:

Property	**Description**
Segment_offset	The offset from the pivot position the object should be moved.
Segment_rotate	A rotation applied to the object before applying the extrusion operation.
Rotation_random	The amount of degrees to select a random rotation from. If set to 0 then no random rotation is applied.
Segment_size	The determined size of the segment based on the size of the object and the type of element extrusion being applied.
Count	The number of repeats to apply along this node segment.
Spline	The associated spline interpolator that contains other nodes in the same spline.
Tolerance	The accuracy which the ends of an object are collected for extruding. This is more important when extruding groups of objects.
Obj	The object or parent object (or prefab) that is to be extruded or repeated along a spline segment.
Do Not Generate	Tells this spline element not to regenerate if the Extrood "Refresh" button is pressed. Useful when needing specific segment features.
EType	The Element Extrusion method Type which are: **Object_Extrude_Length -** Extrude the object using its default size and fit as best possible.

	Object_Extrude_Count - Use the count property and fit that many objects within a segment. **Object_Repeat_Random_Group** - The Obj property is a parent of a group of objects to place along the spline based on the Count property. The Objects placed will be randomly selected from the children. **Object_Repeat** - The object in the Obj property is repeated Count number of times along the segment. If the count is 1, then only 1 object will be placed for each node segment.

Objects

Be wary of using highly complex objects for extruding. More work is being done to support higher complexity, but it is limited at the moment.

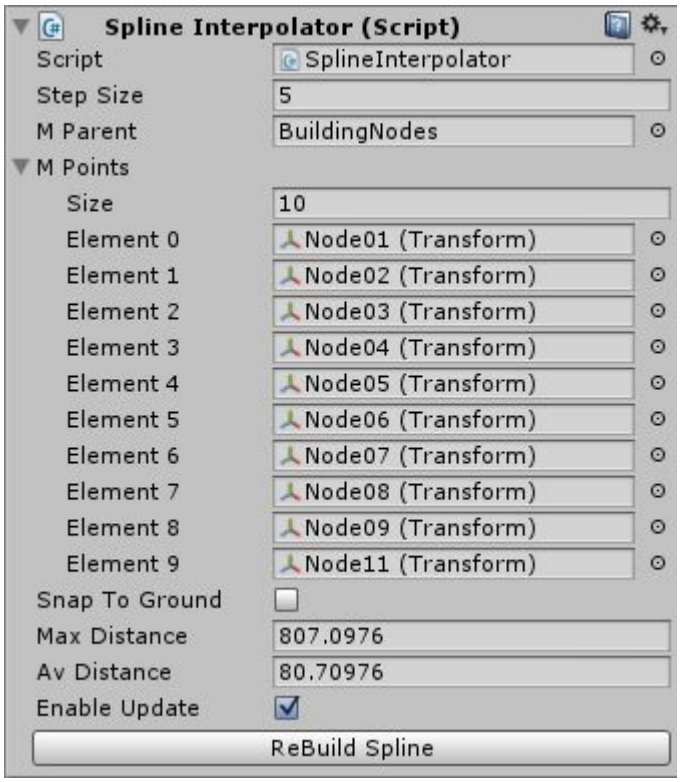
For best performance use single material compound objects. Every segment generates at a minimum 1 more new mesh with the same material, so a high density spline can generate a large amount of new meshes.

Notes

When using individual Spline Elements within a set of nodes already being used in a Spline, make sure to clear any meshes it might own before modifying it and disabling the generation. Mesh children can be safely deleted, just be sure to tick the “Do Not Generate” toggle to make sure they dont get regenerated again.

Spline Interpolator

The spline interpolator manages the mapping between node children transforms and the Extrood component itself. Spline Interpolators usually generate their node transform list from a parent node and its children. If the parent node is set to ‘None’ then the list can be manually filled out.



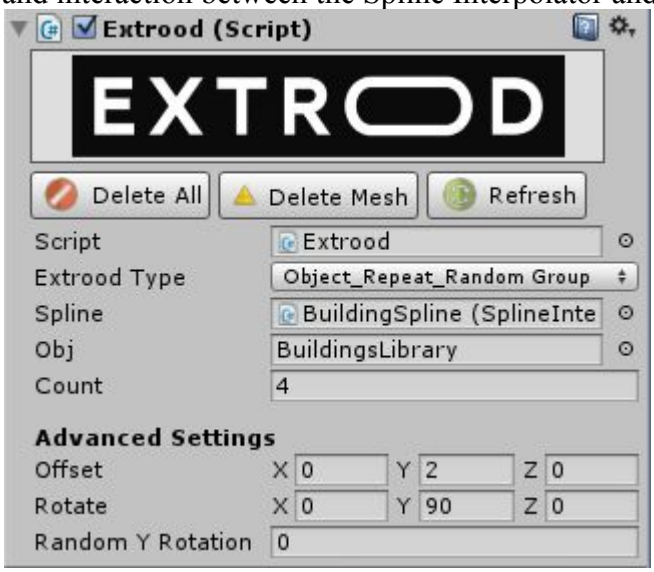
The properties:

Property	**Description**
Step Size	Not currently in use - will allow the density of the spline to be set
M Parent	The parent object that provides the children nodes for the spline nodes.
M Points	The list of the node transforms collected from the M Parent or manually set if M Parent is set to 'None'.
Snap To Ground	Force the nodes to raycast downwards and set their height to the surface hit (works with terrain or colliders).
Max Distance	The maximum calculated distance the spline covers.
Av Distance	The maximum distance divided by the number of nodes. If the nodes are evenly spaced then this provides an approximation of a segment length.
Enable Update	On large complex splines the visual update of the spline path rendering all the Extrood elements can be slow. Uncheck this box to manually update Extrood objects.

Currently the Spline Interpolator uses iTween Path methods to execute its interpolation system. This is likely to change.

Extrood Component

The Extrood component is a high level controller that is responsible for the management of Spline Elements and interaction between the Spline Interpolator and Spline Elements.



The properties:

Properties	**Description**
Extrood Type	The Element Extrusion method Type which are: **Object_Extrude_Length** - Extrude the object using its default size and fit as best possible. **Object_Extrude_Count** - Use the count property and fit that many objects within a segment. **Object_Repeat_Random_Group** - The Obj property is a parent of a group of objects to place along the spline based on the Count property. The Objects placed will be randomly selected from the children. **Object_Repeat** - The object in the Obj property is repeated Count number of times along the segment. If the count is 1, then only 1 object will be placed for each node segment.
Spline	The spline to extrude or repeat along
Obj	The object to extrude or repeat, or a parent object of a ‘set’ of objects to randomly repeat along the spline.
Count	In repeat use the number of times an object should appear on each spline segment (node-to-node).
Offset	The offset of the object from the pivot - node on the spline.
Rotate	Before extruding or repeating rotate the object this amount (degrees) on each axis.
Random Y Rotation	The amount of degrees to random select from when repeating along a spline - it is only applied to the Y axis. If the value is 0 then no random rotation occurs.

Future Enhancements

There are a number of current limitations with the Extrood component. Some of these are intended to be improved in the near future. These enhancements include:

- Transform directionality determines object directionality (raked roads)
- Verticality of an object can be maintained - an option will be added to maintain an objects ‘verticalness’. For example: fences and light poles.
- Meshes will be optimised more - reduce vertices and indices.
- Complex node intersections - A node will be able to define the strength of the tangents at the node point. This will allow sharp corners and much softer corners (as needed)
- Ability to weld a profile of an object to another object. The objects will need to have similar profiles though.
- Profile editing for the spline - removes the need for an explicit object for roads, only need material and profile.

If there is a feature that would be beneficial in Extrood, please email: support@gagagames.com and the request will be evaluated and feedback will be provided.