# General usage

Move, delete, duplicate, rotate, and scale deformations on Splines as you normally would with any GameObject. You can also move deformations/followers between Splines by re-parenting them to another Spline in the hierarchy menu. Unparenting them from a Spline will revert them to the original object. You can also deform prefabs, and prefabs that has hierarchy's within them.

Create deformation

Parent the object to any Spline or Spline Object. This will automatically generate a new mesh derived from the original mesh that the GameObject had in its Mesh Filter or/and Mesh Collider component.

Remember to have enough vertices on your meshes. Otherwise, they will not look smooth when deformed.
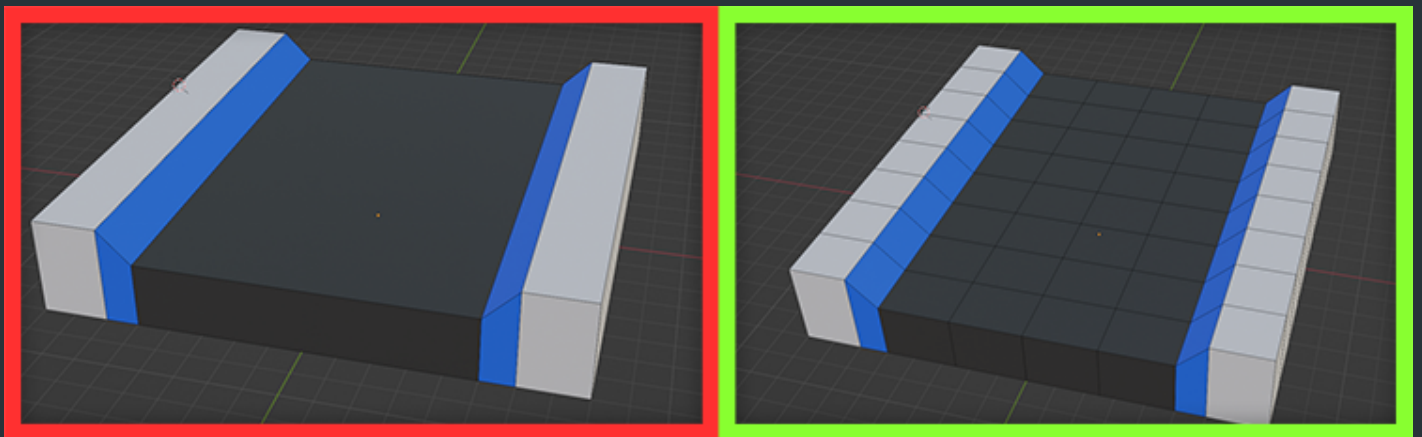

Create follower

Parent the object to an Spline or Spline Object. After that, select the Game Object and change type to Follower.

Animations

You can animate any deformation or follower using Unity's built in animations system or script your own behaviours. If you see the small orange icon in the upper left corner, you need to enable read/write access for that mesh (only for deformations). Otherwise, you can't animate it.
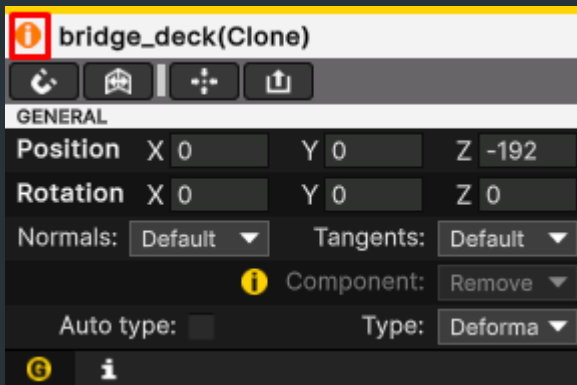
Find the mesh in your project folder --> check the Read/Write box --> press the apply button.
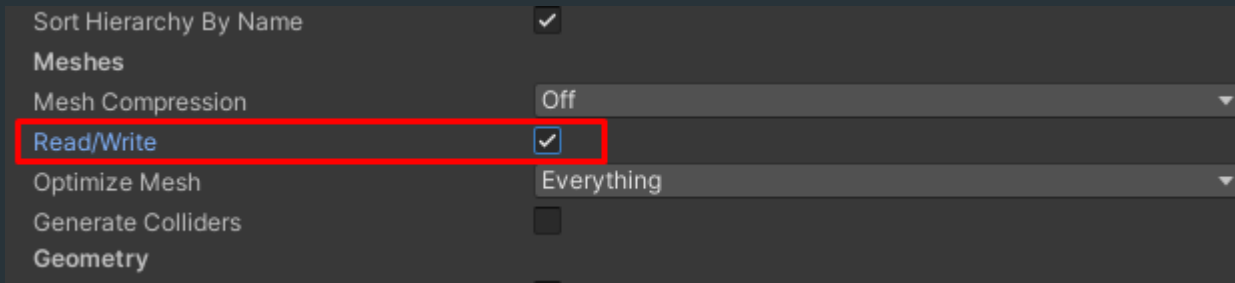
Children of Deformations

You can parent a deformation or follower to another deformation, and it will be updated and deformed within that deformation's local space. This can be useful for animating a train with different wagons. You can animate the train using Unity's built-in animation system or through scripting, and all the wagons will follow. Note: A deformation can be an empty GameObject.

Children of Followers

Parenting a deformation or follower to another follower will make the object behave like a normal GameObject that ignores the curve space.

Menus

Spline Architect has its own menu and selection system. You have different menus depending on what you have selected. Splines, control points and deformations all have their own with different submenus and settings. Toggle between submenus with the bottom buttons. Some menu items have yellow icons. You can hover over these icons to get information about the specific menu item.

All functions in Spline Architect can be found within these menus. We will try to explain each feature below by going through all the menus.

Main menu - general
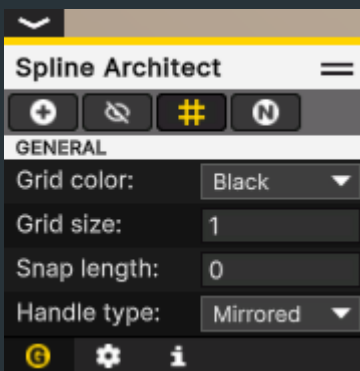
This is the main menu and will always be visible if you don't hide it with the "hide" button.

Top buttons:

- **Create mode** | lets you create new splines or control points on the selected spline.
- **Hide Splines** | Has 3 modes: show all splines (default), hide all none selected splines, hide all none selected splines and occlude the selected spline. Disabling gizmos will hide all splines, even the selected spline.
- **Enable grid** | Enable or disable the grid. Snap control points to the grid to create perfect 90°, 180°, 270° loops, and more.
- **Show normals** | Toggle normals on or off.

General:

- **Grid color** | Change the color of the grid.
- **Grid size** | The size of the grid, visible only when the grid is enabled.
- **Snap length** | The snap length for objects attached to an Spline.
- **Handle type** | Change handle movement type from Continuous, Mirrored and Broken.

Main menu - settings
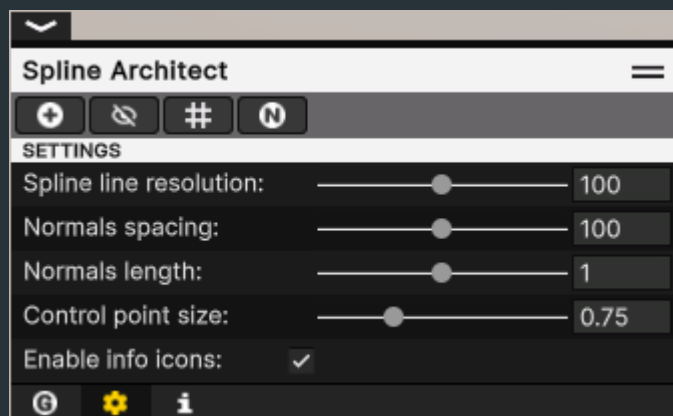
Settings:

- **Spline line resolution** | The resolution on all lines that draws splines.
- **Normal spacing** | How many normals will be drawn for every 100 meters of a spline.
- **Normal length** | The length of the normals displayed along the spline.
- **Control point size** | Change the size of all control points on splines.
- **Enable info icons** | Turn on/off info icons (yellow (i) icons).

Main menu - info
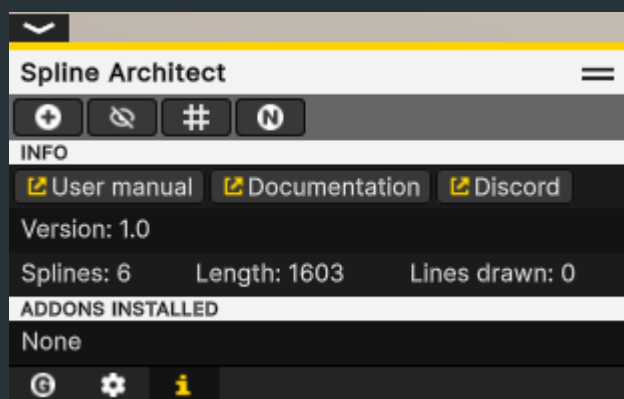
General info about Spline Architect.

Spline menu - deformation
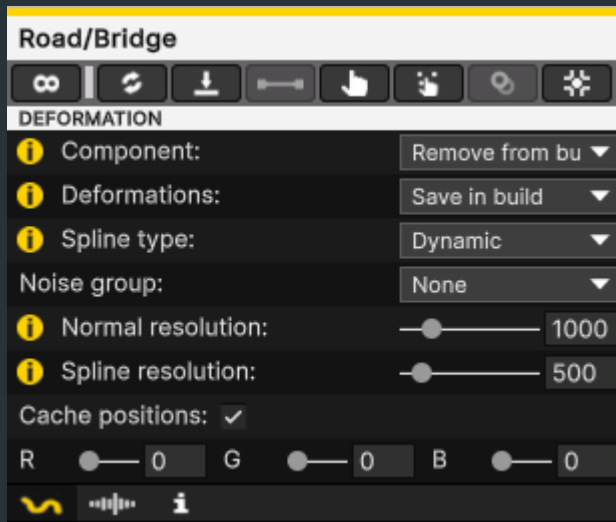
This panel appears when a Spline is selected, allowing you to configure various settings related to the splines mesh deformation feature.

Top buttons:

- **Toggle loop** | Toggle loop for the selected Spline.
- **Reverse control points** | Reverses the order of all control points.
- **Flatten control points** | Flatten all control points to the same Y value.
- **Align control points** | Aligns all selected control points so it becomes a straight line.
- **Select and center Spline transform** | Selects the Spline's transform and centers it to the center of all control points.
- **Select all anchors** | Selects all the anchors of the Spline.
- **Join selected Splines** | Joins all currently selected Splines.
- **Align grid for selected Splines** | Visible only when "Grid" is enabled. Aligns the grid for all selected Splines so you can work on the same grid across multiple Splines. If only one spline is selected it will center the grid to the center of all control points instead.

Deformation:

- **Components** | How to handle the Spline and SplineObject components during runtime. You can set them **Active**, **Inactive** or **Remove from build**. If set to **Active** you can use both the Spline and Spline Object for various animations or other logic, no spline data will be removed. Setting the spline to **Inactive** will keep the components in your build but removes all spline data after the start function is executed on the Spline component. Good choose if you want to generate meshes during scene load. Note: If you remove the component from build you can't generate any meshes during runtime for that spline! You need to save all meshes directly in the build or in the scene file instead.
- **Deformations** | How to handle all deformations of the specific spline. You can generate them during runtime, saved them in the scene file or save them only in your build. Saving the meshes in your build will reduce the size of all the scene files in your project. Because all the meshes will be generated at editor startup (same with all other settings except "Save in scene").

- **Spline Type** | Change between static and dynamic spline type. Static splines do not use cached normals and thus consume less memory, their normals remain fixed.
- **Noise group** | The noise group you want to be applied to mesh deformations and animations. Dynamic splines support more advanced shapes (like loops) at the cost of using cached normals.
- **Normal resolution** | The resolution of cached normals. Only used by dynamic splines.
- **Spline resolution** | The resolution of the spline. If you're working with very long splines you might need to increase this value.
- **Cache positions** | Enabling this option improves overall performance, but the spline will use more memory. In most cases, the memory usage is so small that you don't need to worry about it.
- **R, G, B** | Change the color of the spline's control points and unselected line. The selected spline will always display with a yellow line.

Spline menu - noise
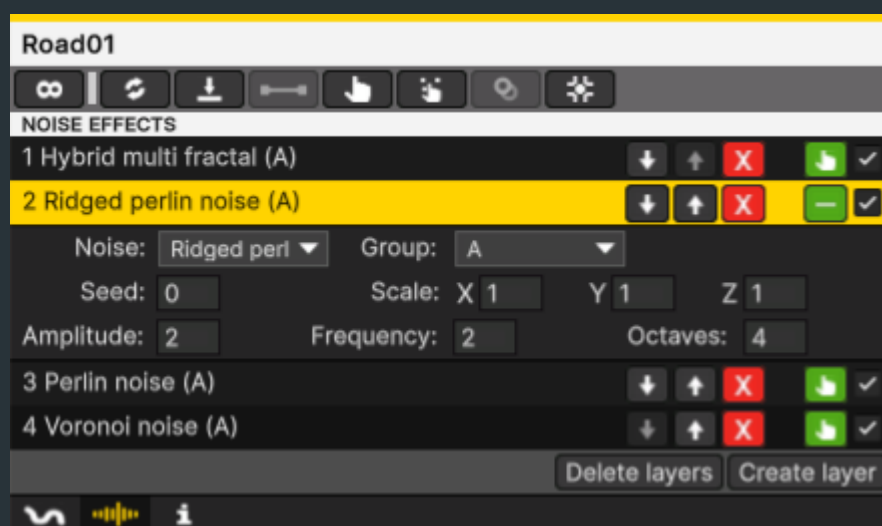
Will appear when an Architect curve is selected and you have pressed the bottom noise button. Displays all the noise settings that will change the behaviour on mesh deformations and animations.
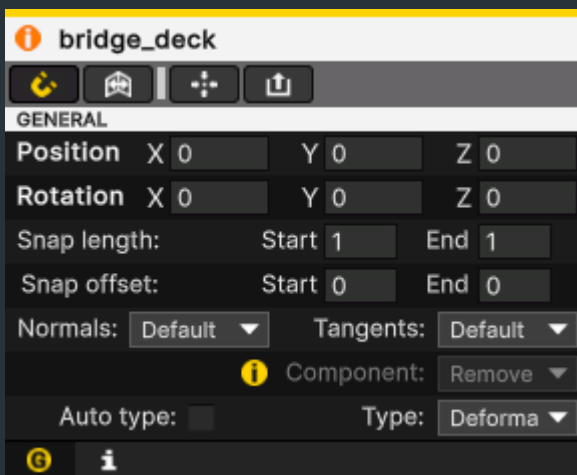
- **Noise** | Choose between 8 different noise effects.
- **Group** | Set the group for the noise layer. You can use the same group for multiple layers and stack noise layers together to create various effects.

Spline menu - info
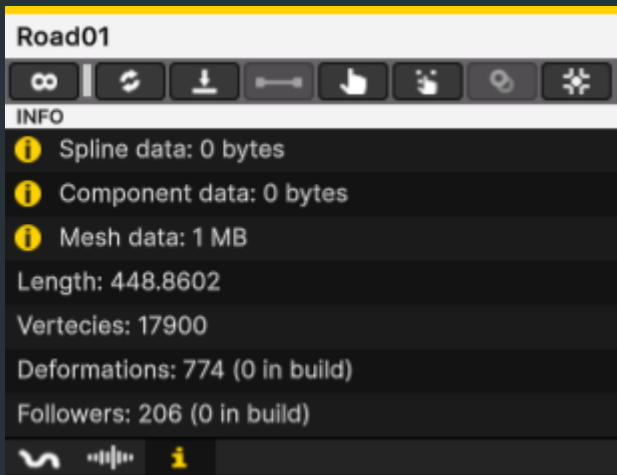
General info about the Spline, size in memory, length, and so on.

Spline object menu - general

This menu appears when a Spline Object is selected, providing controls for deformation mirroring, centring, and general transformation settings.
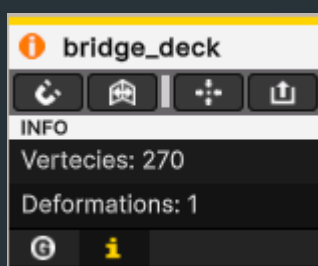
Top buttons:

- **Snap** | You can snap your deformations to other objects or the control points on the spline. It has 3 modes: disabled, snap to control points, snap to objects.
- **Mirror deformation** | You can achieve the same deformation effect by scaling negatively, but this approach may cause collision issues in some physics systems. Using the mirror function ensures compatibility across all physics systems without any collision problems.
- **To center** | Reset the object's X and Y position to 0 and its Euler rotation to (0, 0, 0).
- **Export mesh** | Export meshes for all selected Spline Objects.

General:

- **Position** | Set the object's position in spline space.
- **Rotation** | Set the object's rotation in spline space.

- **Snap length** | How long the deformations start and end points can snap to a control point or object on the spline.
- **Snap Offset** | Offset the snapping position for the start or end of the deformation.
- **Normals** | Choose between Smooth normals, Default normals, or disable normal calculations. Smooth normals can resolve lighting issues on broken meshes.
- **Tangent** | Enable or disable tangent calculations.
- **Auto type** | Will automatically switch type between deformation and follower. For example, if you have a road where parts of it is a straight line. All deformations on that straight line will switch to type follower instead and not be deformed. This works really well with the "Align control points" feature and is also very good for performance and memory usage.
- **Type** | Change between Deformation, Follower and None. "None" objects will behave as normal objects and don't interact with the Spline. Followers will just follow the spline and not be deformed. Deformations will be deformed if it has a mesh inside the mesh filter or mesh collider.
- **Component** | How to handle the SplineObject component during runtime. **Note:** You can only change this setting if the Spline Component setting is set to Active.

Spline object menu - info

General info about the Spline Object.

Control point menu - general
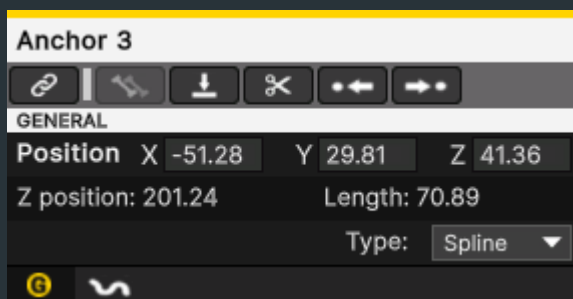
This menu appears when a control point is selected.

Top buttons:

- **Link to closest control point** | Links the selected control point to the closest control point on the same Spline or another Spline.
- **Next control point** | Move selection to the next control point.
- **Prev control point** | Move selection to the previous control point.

- **Flatten control points** | Flatten only the selected control segment.
- **Split spline** | Split the Spline into two at the selected control point.

General:

- **Position** | World position for the selected control point.
- **Z position** | The control points position on the spline. The z position is also equivalent to the spline length at that specific point.
- **Length** | The length of the segment.
- **Type** | Change between Spline and Line type. Creating new control points will have the type of the closest control point.

Control point menu - deformation

Will appear when a control point is selected and the bottom deformation sub menu button has been pressed. Has different effects that can be applied to deformations.

Other features

Snap/Move control points on object surfaces - Select a control point, hold down Shift + Ctrl, and then click the control point again to activate surface snapping. Now, as you move the control point, it will snap to and follow the surface of any object with a collider, allowing precise positioning along that surface.

Create control points using the nearest splines direction - Holding ctrl while creating control points will automatically align the new control point with the closest spline.

Shortcuts

Spline Architect has different shortcuts that can be changed in Unitys shortcut menu. Edit -->
Shortcuts...

Components

Spline
Add this component to any GameObject to create an Spline.

Spline Object
This component is handled automatically while working in the editor. You don't need to remove or
add it.

Spline Connector
You can then connect a splines control point to the GameObject that has this component. This is
useful for animating splines using Unity's animation system or for creating road intersections.

Mesh pooling

Spline Architect tracks all deformed meshes. For example, if a Mesh Filter and a Mesh Collider on
the same Game Object use the same original mesh, only one mesh will be created and used. If you
have two different meshes on a collider and mesh filter it will pool two different meshes.