



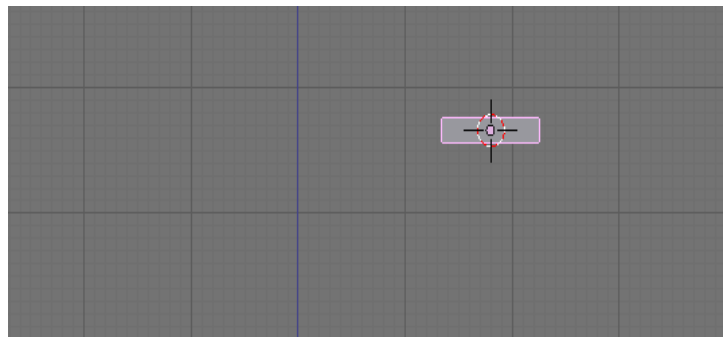
Physical Constraints. What can you do with those? What good are they? Sounds technical. I've been eager to try them out ever since I saw that 'rag-doll' demo. The things you can do with it are just about endless. A swinging sign outside your tavern, a morning star. Just use your imagination.

When I finally got around to playing with them, I noticed they've migrated from just python script to a nice panel. I was working with the Vehicle Physics, making an off road simulation, when I thought I'd try making a suspended bridge using the Physical Constraints. After playing with it a bit, it worked out very nice. You get that nice bouncy effect. Like the playground, when you jump on one end of the bridge, the other end bounces.

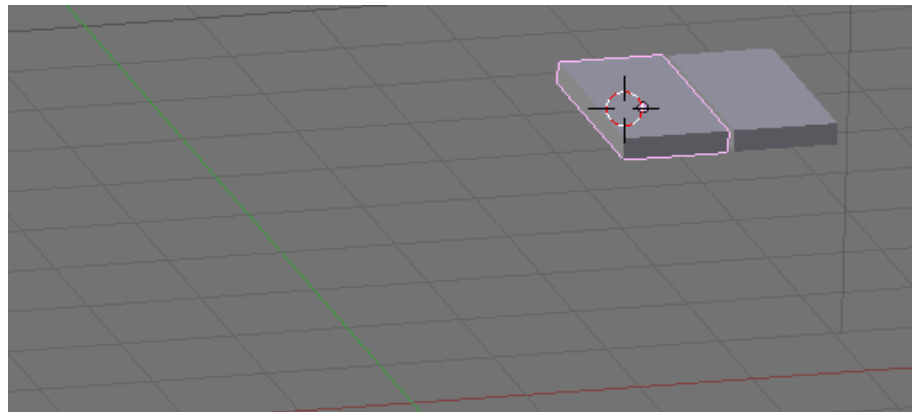


It's several different cubes linked together using physic constraints. Attached at each end to a fixed point. Let's see how I did it.

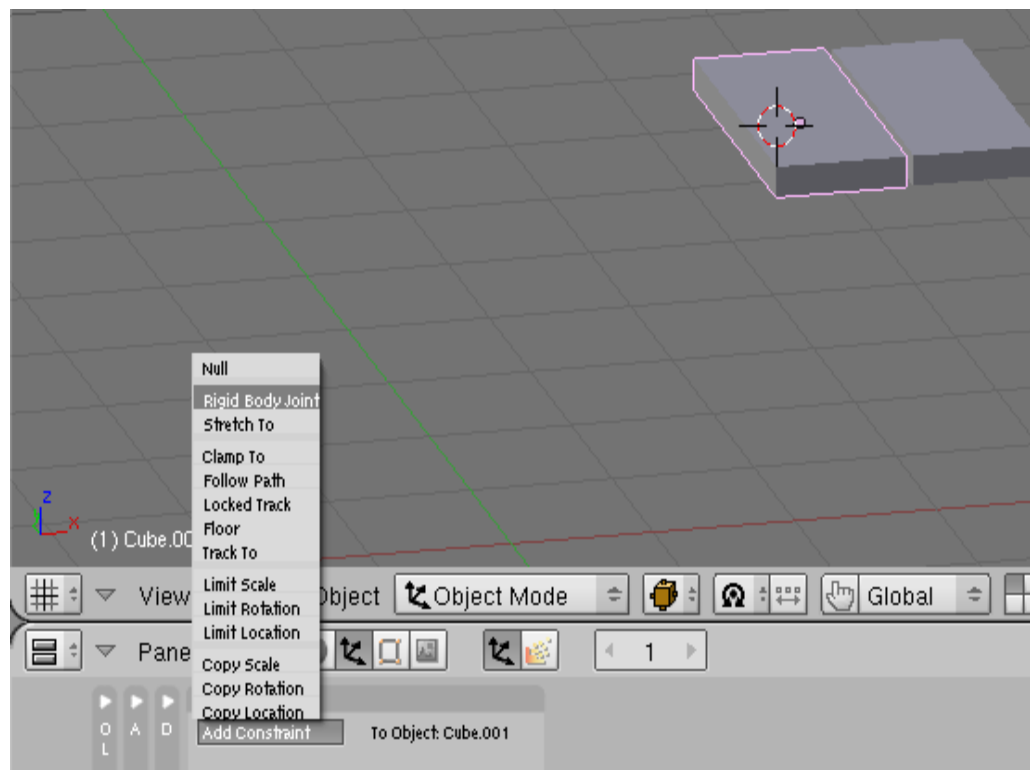
I started by adding a cube. I scaled it down so it resembles one plank of the bridge. This will be the first fixed panel that our bridge will hang from.



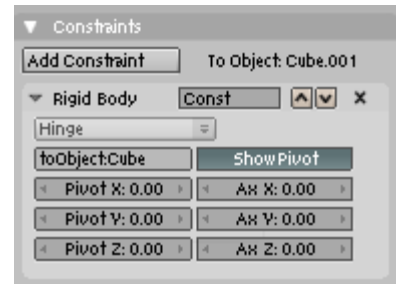
Let's add another panel. Press 'Shft-D' to duplicate our panel. Move this new panel just to the left of the first one, leaving a small gap between them for movement.



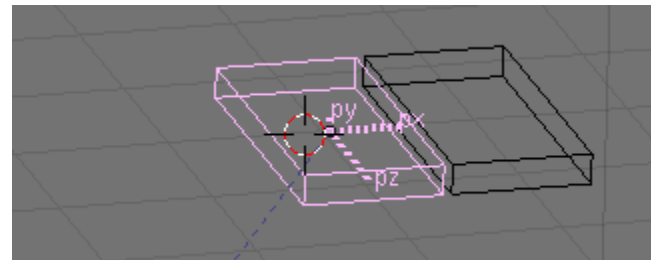
Let's make it stick. Under the 'Object Menu (F7)', under 'Constraints', click on 'Add Constraint', go up and select 'Rigid Body Joint'.



With the constraint turned on, we want to select “Hinge” for the type. Also, click on the 'Show Pivot' button. That will let us see exactly where the pivot point will be. In the 'toObject:' text field, type in the object name of your fixed panel. I left it at the default name when I created the cube, so for my example, my objects name it 'Cube'. When we pressed 'Shft-D' to duplicated it, Blender named our new object 'Cube.001'.



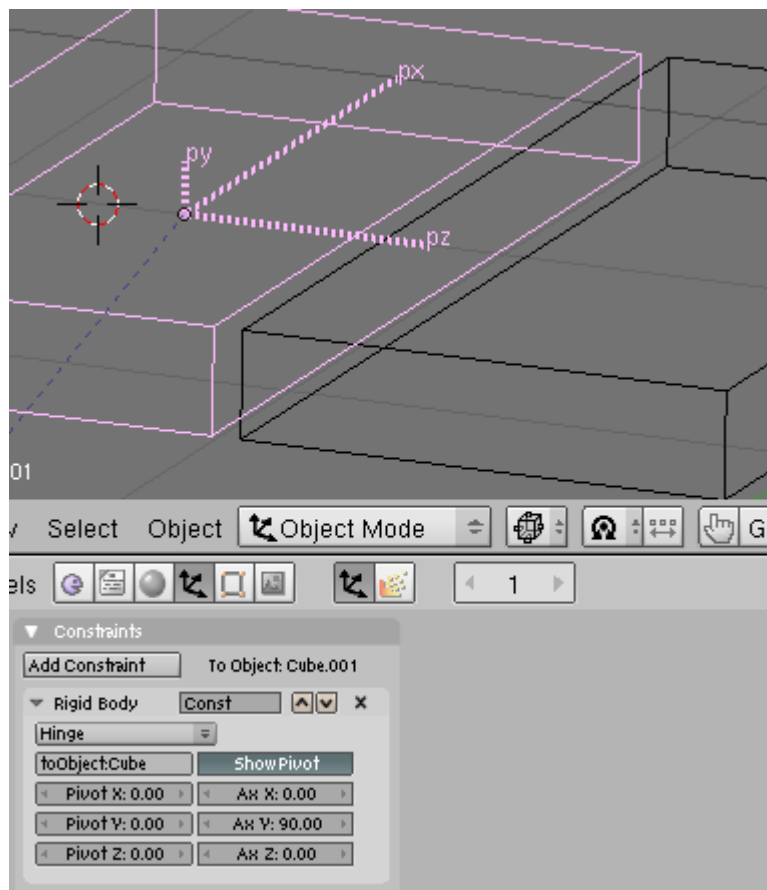
We're going to adjust its position so it's in between the two bridge panels. Here we can see our pivot point. Apparently, when we use the 'Hinge' type, the object will pivot on the 'PX' axis. So, in my example, I'll also need to rotate the pivot point so the PX axis is parallel to the panels.



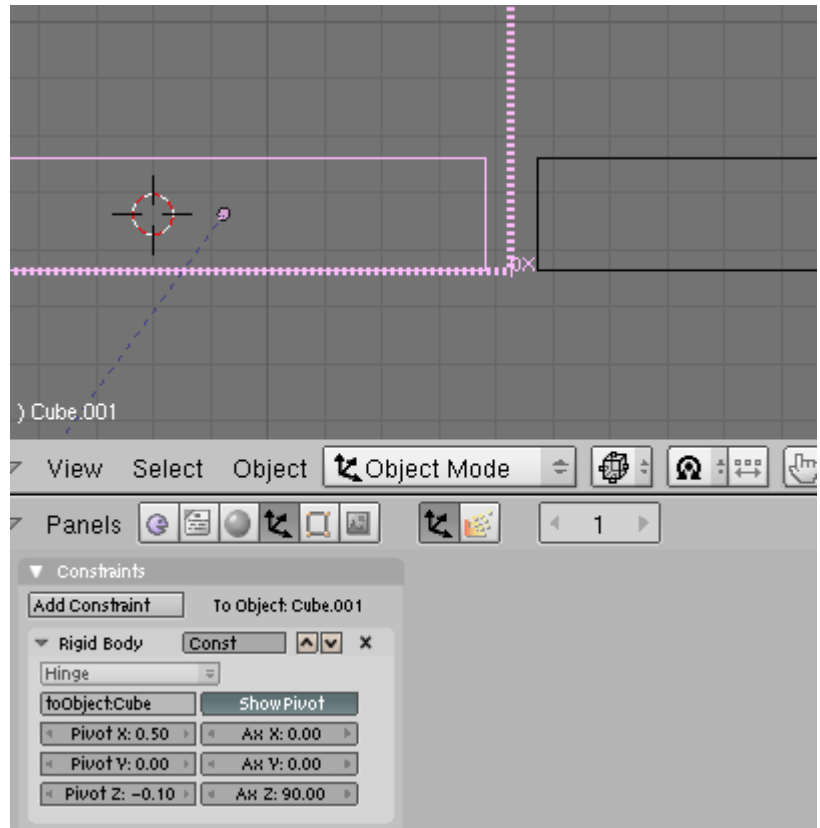
**Note:** Before we start adjusting our pivot point, press 'CTRL – A' to apply our scale and rotation. If you don't do this, the pivot point will be working off of some other ghost position/rotation that our cube was at before.

Here, I've rotate my pivot point so my PX axis is pointing in the right direction. This will be the line that our panel swivels on.

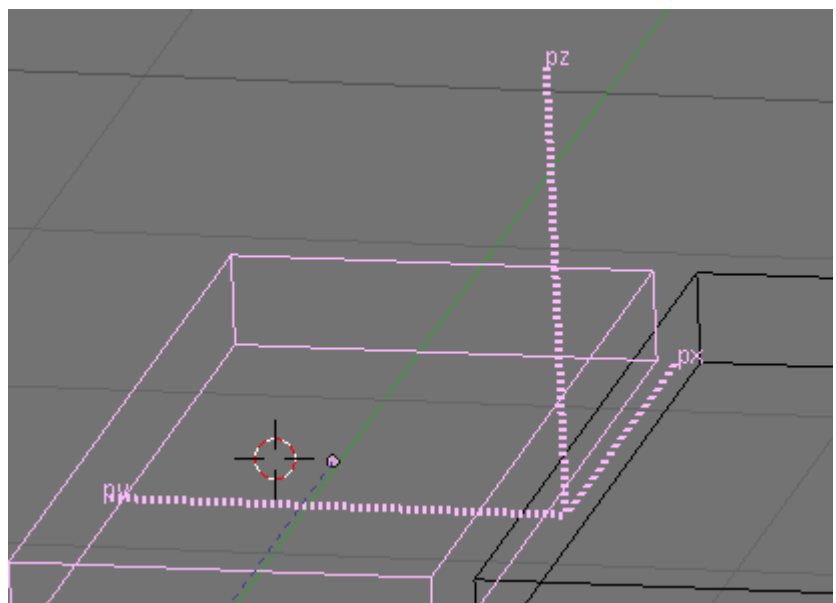
Like the pin in the hinge of a door.



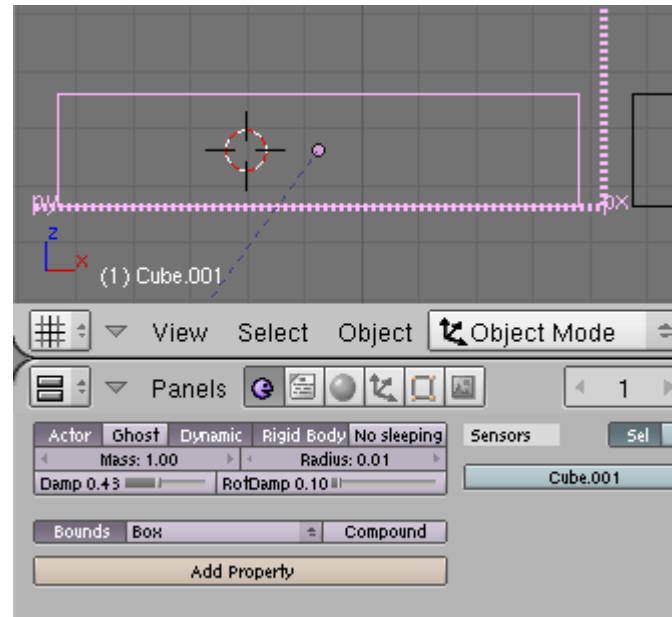
Here, I've used the Constraint panel to adjust the location of my pivot point so it lies in between my two panels. Since my bridge will flex downwards, I've adjusted the pivot down slight towards the bottom side of my panels.



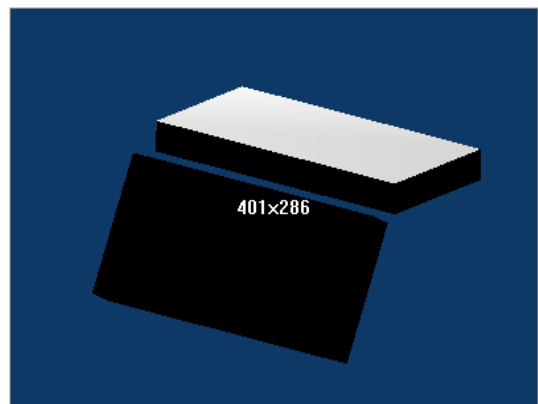
Here's a clear view of where you want your pivot point to be. Our PX Axis is lined up with our panels.



Let's give our panels some weight and see what happens. With our first moving panel selected, bring up the 'Logic (F4)' window. Click 'Actor', 'Dynamic' and 'Rigid Body' to turn our panel into a movable object. Click the 'Bounds' button and select 'Box' to have our panel's physics abide by the basic box shape. Apparently, the Radius does not have much of an effect. If you have some problem, turn the Radius way down. Turn the Damp(ing) up slightly so the bridge will come to rest after a short time.



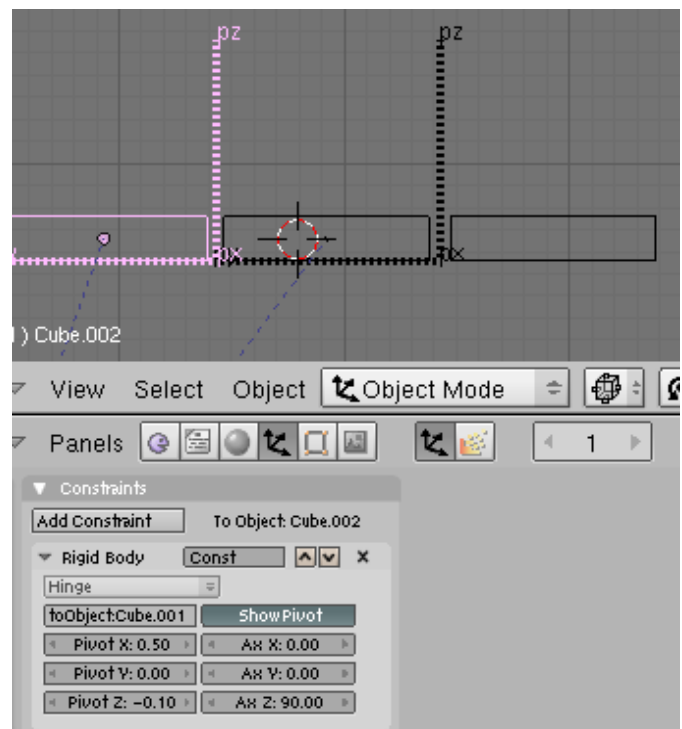
If you've set everything up correctly so far, you can press 'P' to start the game engine and see how our hinge is working so far. In my test, my swinging panel flops down and sways in the breeze just as I wanted to.

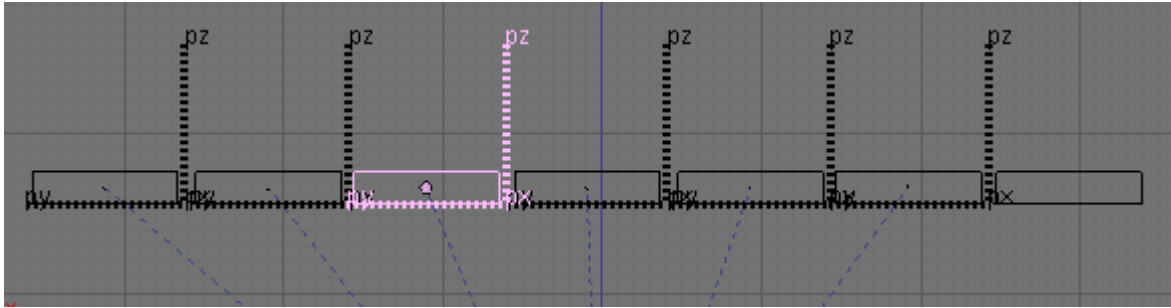


Let's go on to quickly add more panels and attach the bridge on the other side.

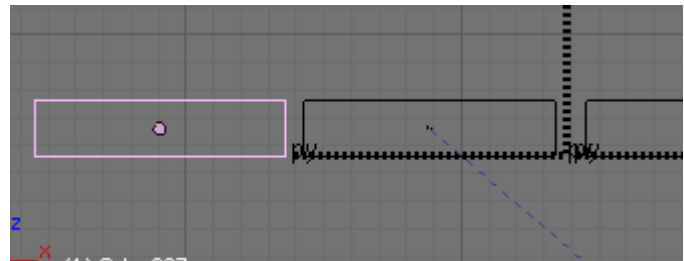
We can easily create another panel with the Constraint already set up. Just select your swinging panel and press 'SHFT-D' to duplicate our panel. The only thing we'll need to do is change the 'toObject' value on our new panel. Our second panel was named 'Cube.001' when we created it. Enter this name for the 'toObject' on our 3<sup>rd</sup> object.

In my photo.. I have Cube.002 selected, it is attached to Cube.001. Cube.001 is attached to our fixed panel, named Cube.





Continue to do this until you have about 6 more panels created. Keep changing the name so each panel is connected to the one created before. You can press 'P' to test your progress and make sure each panel is connected.



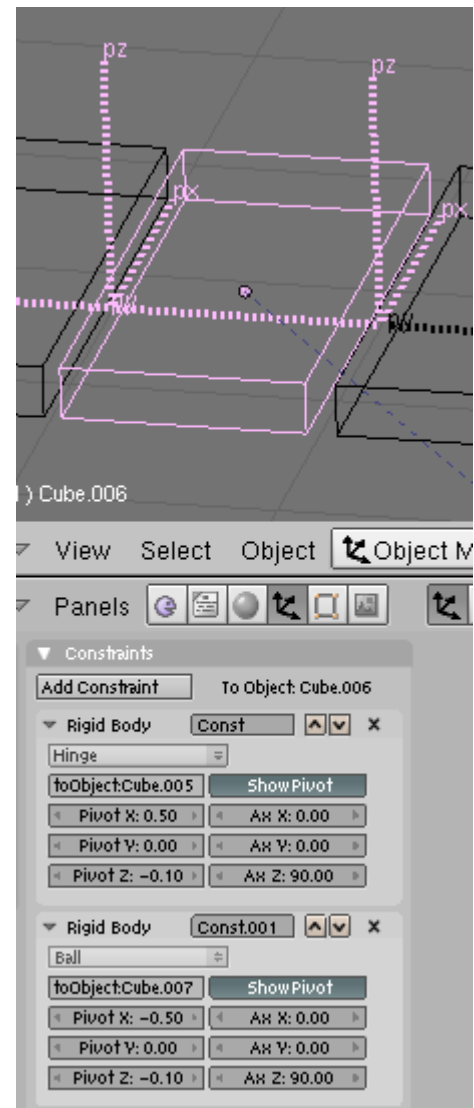
Duplicate your panel one more time. This one we will make into another fixed panel to support our bridge on the other side. Remove the 'Rigid Body Constraint' for this panel. Also, switch to Logic Mode (F4) and click the 'Actor' button to turn it off. This will prevent the panel from moving when we start the game engine.

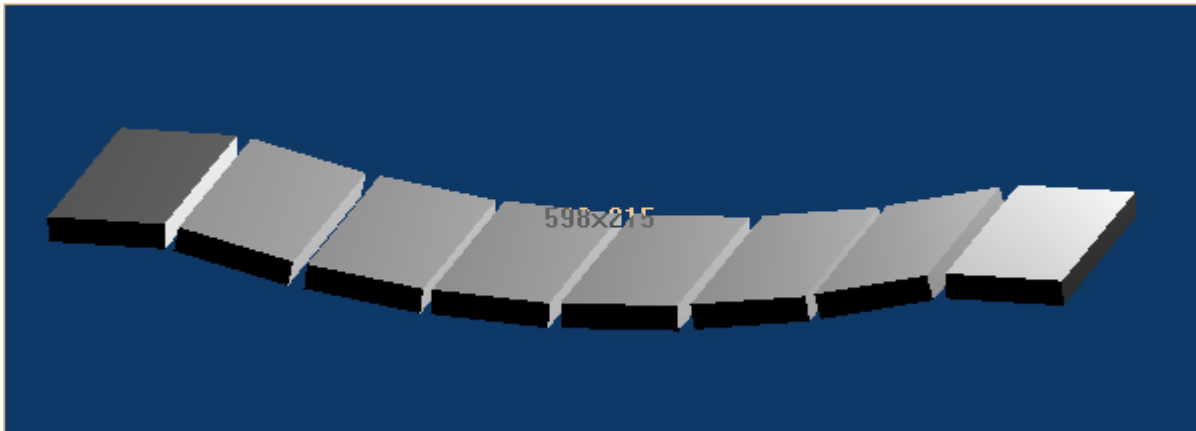
The last thing we need to do is add a second Rigid Body Constraint to the last moving panel. This time, we'll connect it to our fixed panel at the end of our bridge.

Add a second Rigid Body Constraint. Rotate it and adjust its location so it is in between the last moving panel and our last fixed panel.

Change the 'toObject' name to the name of our last fixed panel. In my case, it is Cube.007.

In this image, you can see this panel is connected to the moving panel before it, Cube.005 and the fixed panel at the end, Cube.007.





Pressing 'P' for my example, my bridge works great. I added an ICO sphere, just for fun directly above the bridge at one end. In Logic Mode for the sphere, click actor, dynamic and rigid body. Press 'P' and watch what happens when it drops down to your bridge.

Have fun.

Scott.

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