Virtual Reality - Lab Class

Object Dragging

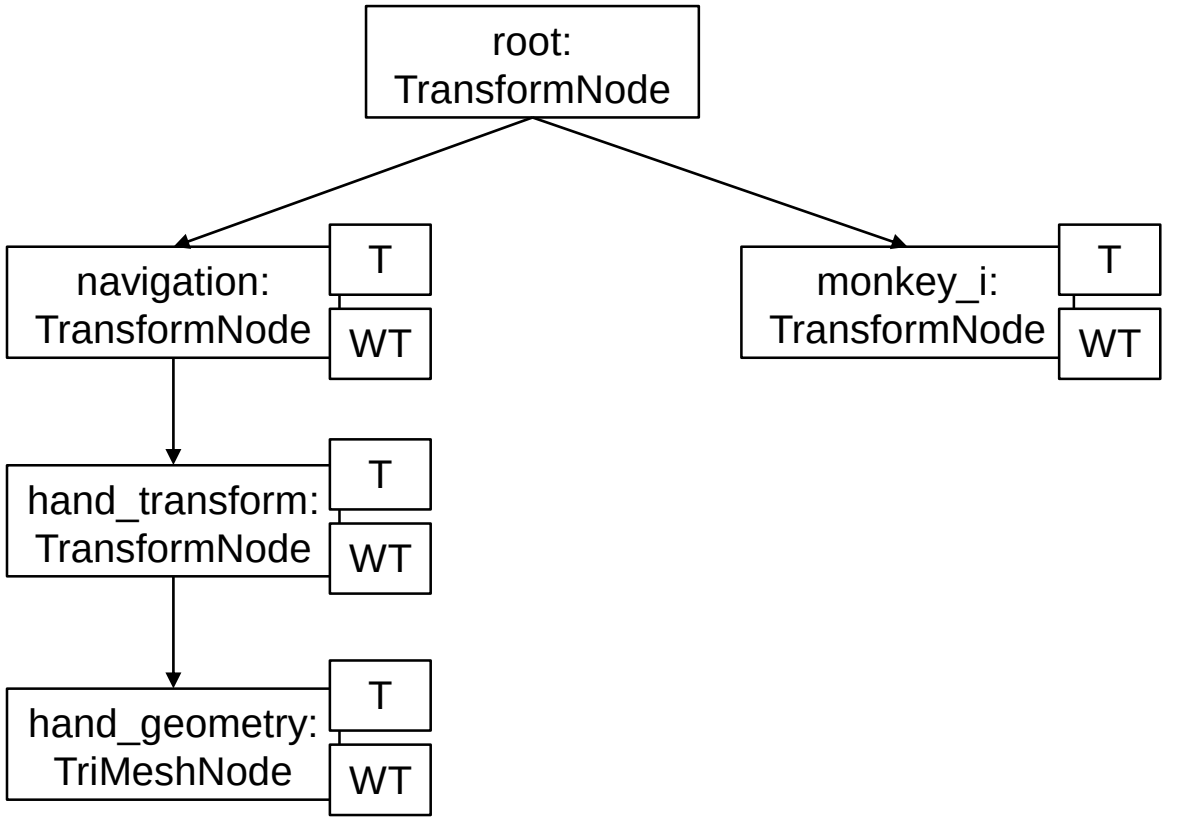
André Kunert and Tim Weißker


40
20
0

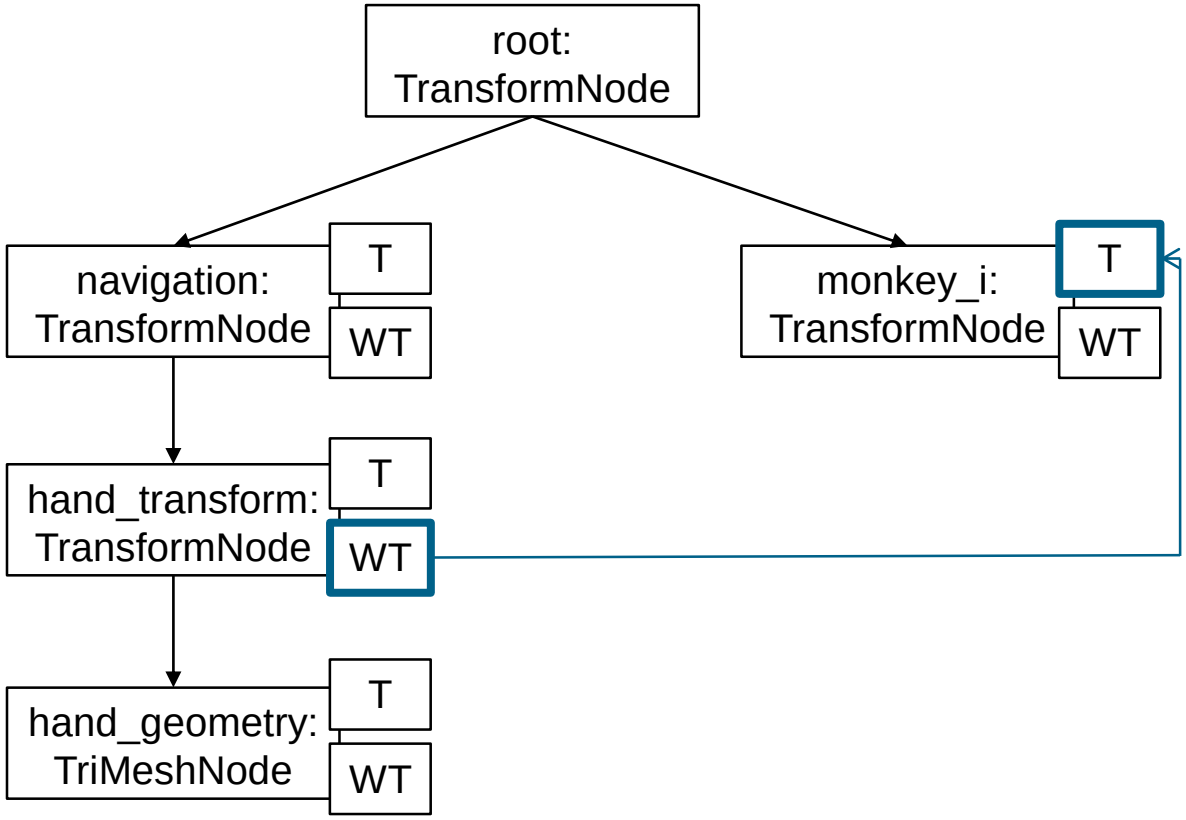

40
20
0


40
20
0

Scenegraph Structure

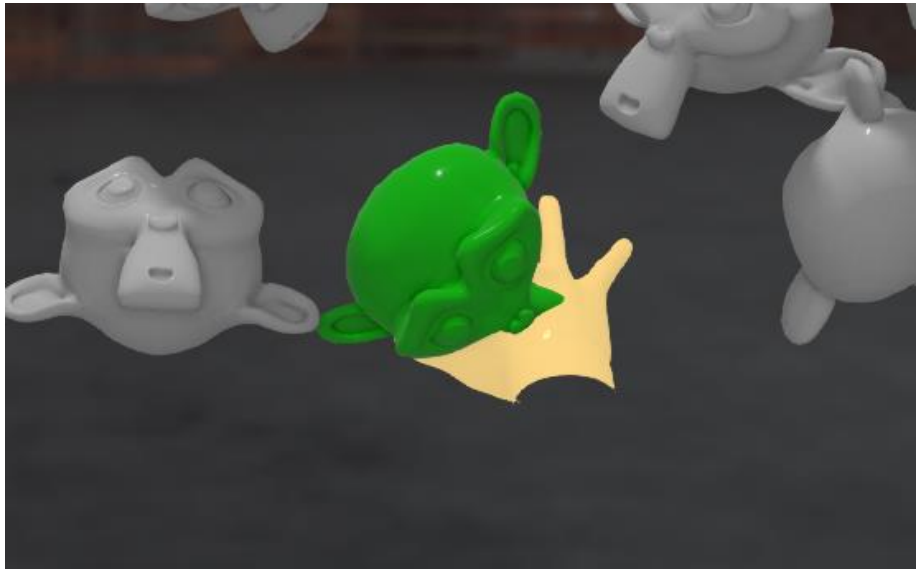


Naïve dragging




40
20
0

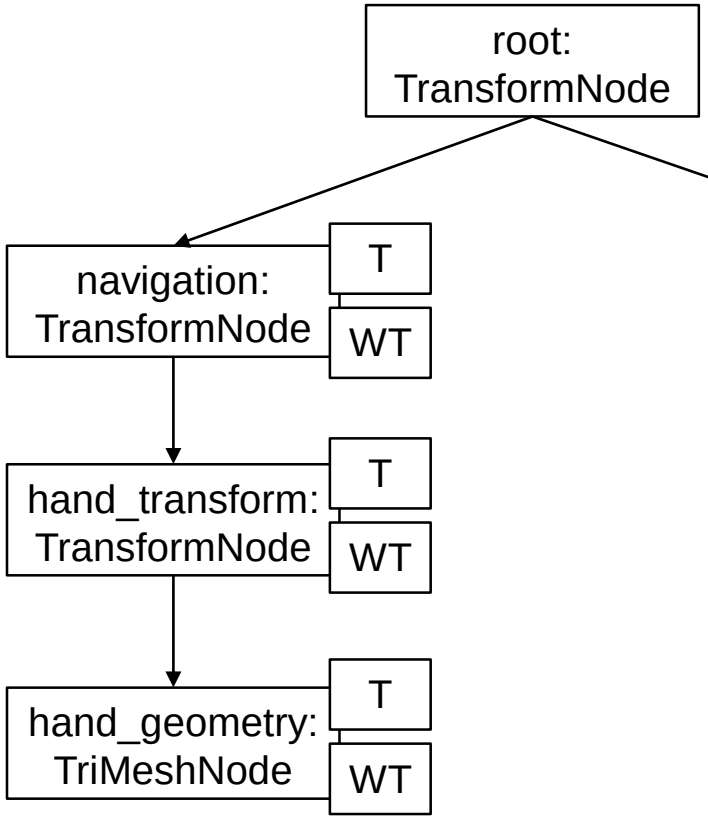
Hand-Monkey Offset



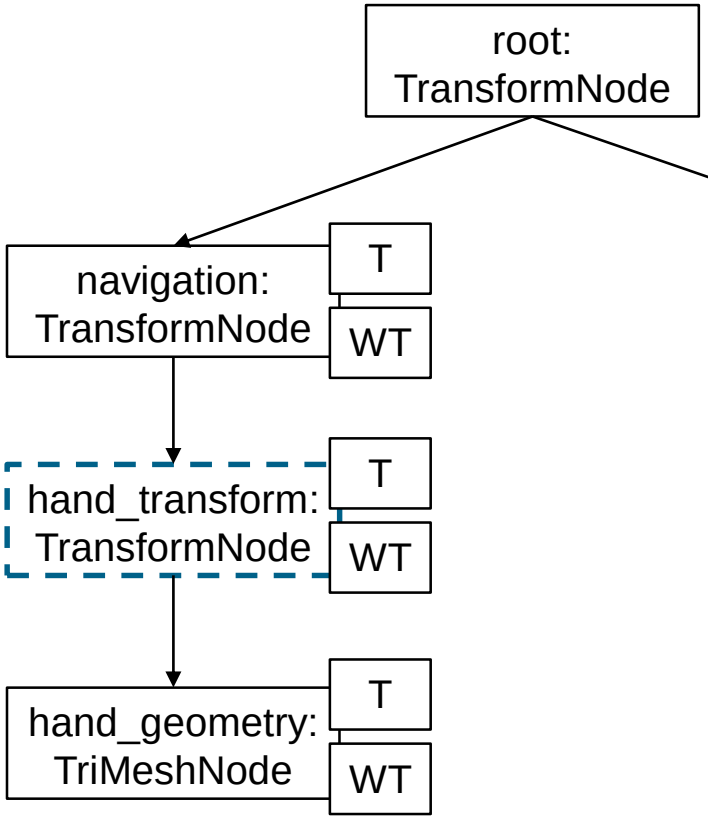
We want to keep the offset between the hand and the monkey during dragging!

How do we compute it?

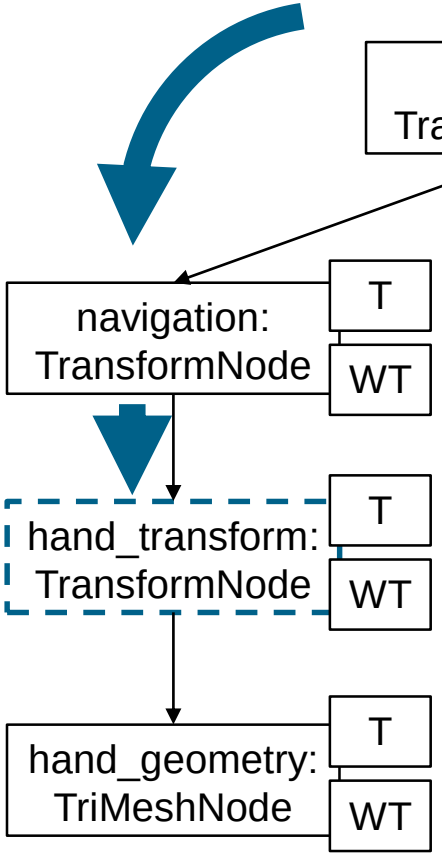
Hand-Monkey Offset



Hand-Monkey Offset

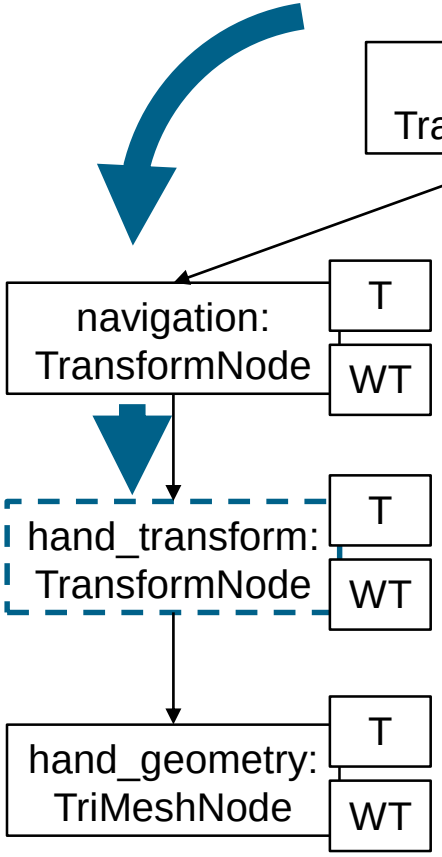


Hand-Monkey Offset



$$offset =$$

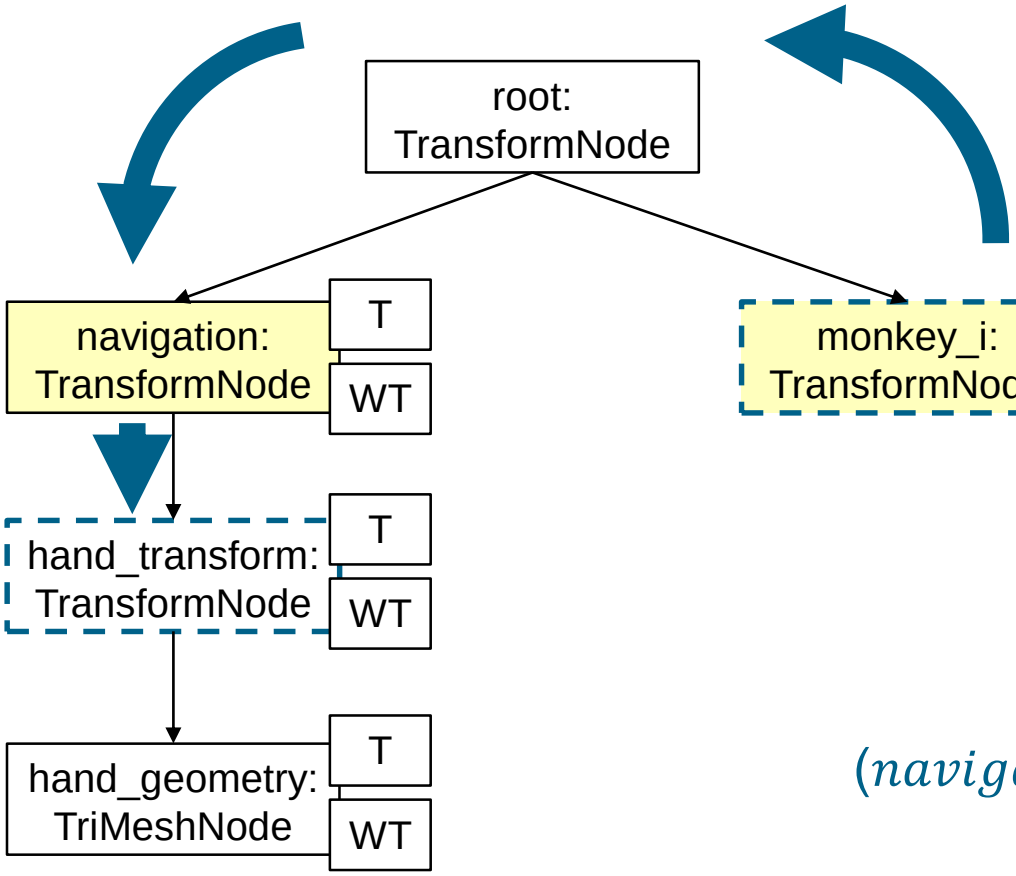
Hand-Monkey Offset



$$offset =$$

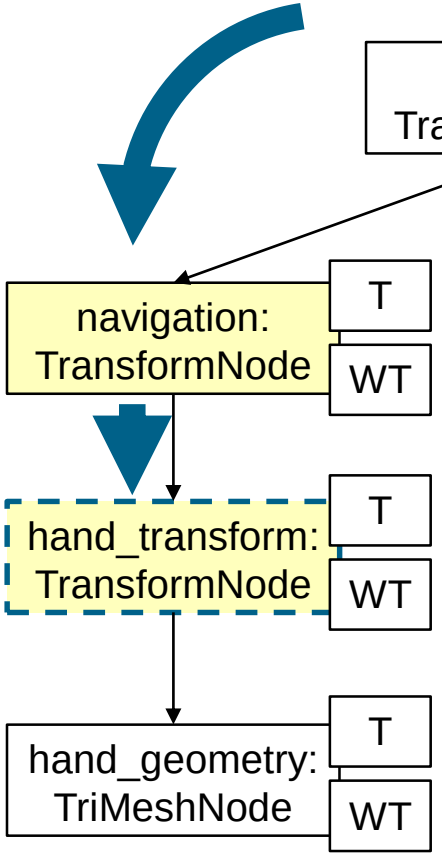
$$monkey\_i.T$$

Hand-Monkey Offset



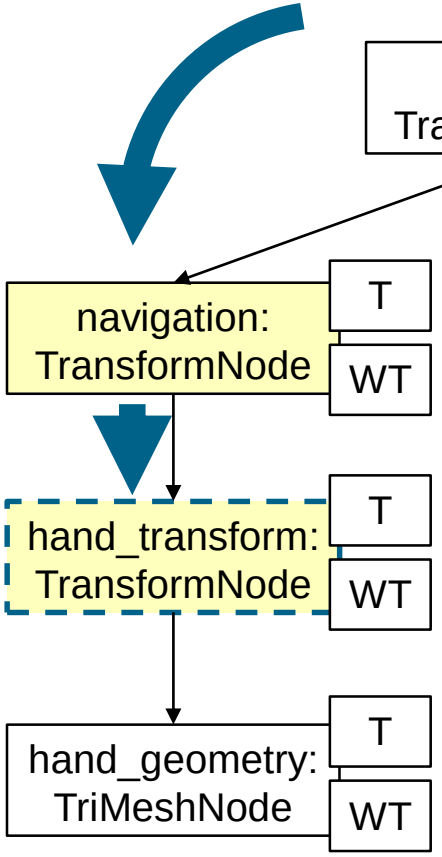
$$offset = (navigation\_node.T)^{-1} \cdot monkey\_i.T$$

Hand-Monkey Offset



$$offset = (hand\_transform.T)^{-1} \cdot (navigation\_node.T)^{-1} \cdot monkey\_i.T$$

Hand-Monkey Offset

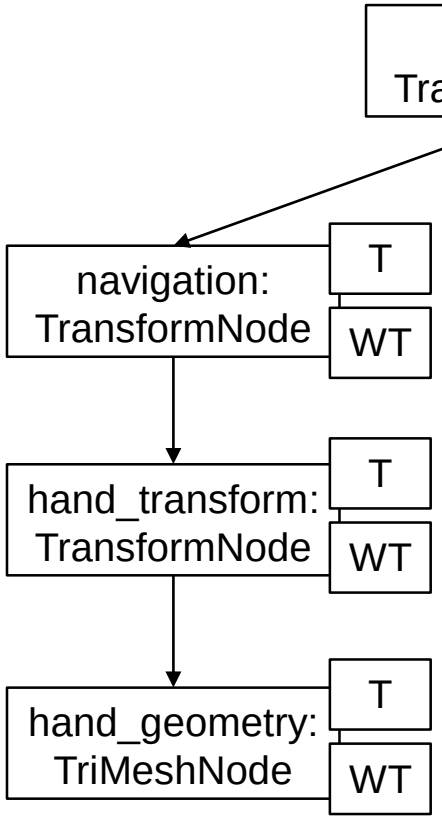


$$offset = (hand\_transform.WT)^{-1} \cdot monkey\_i.T$$

Dragging Strategy 1

Dragging Strategy 1

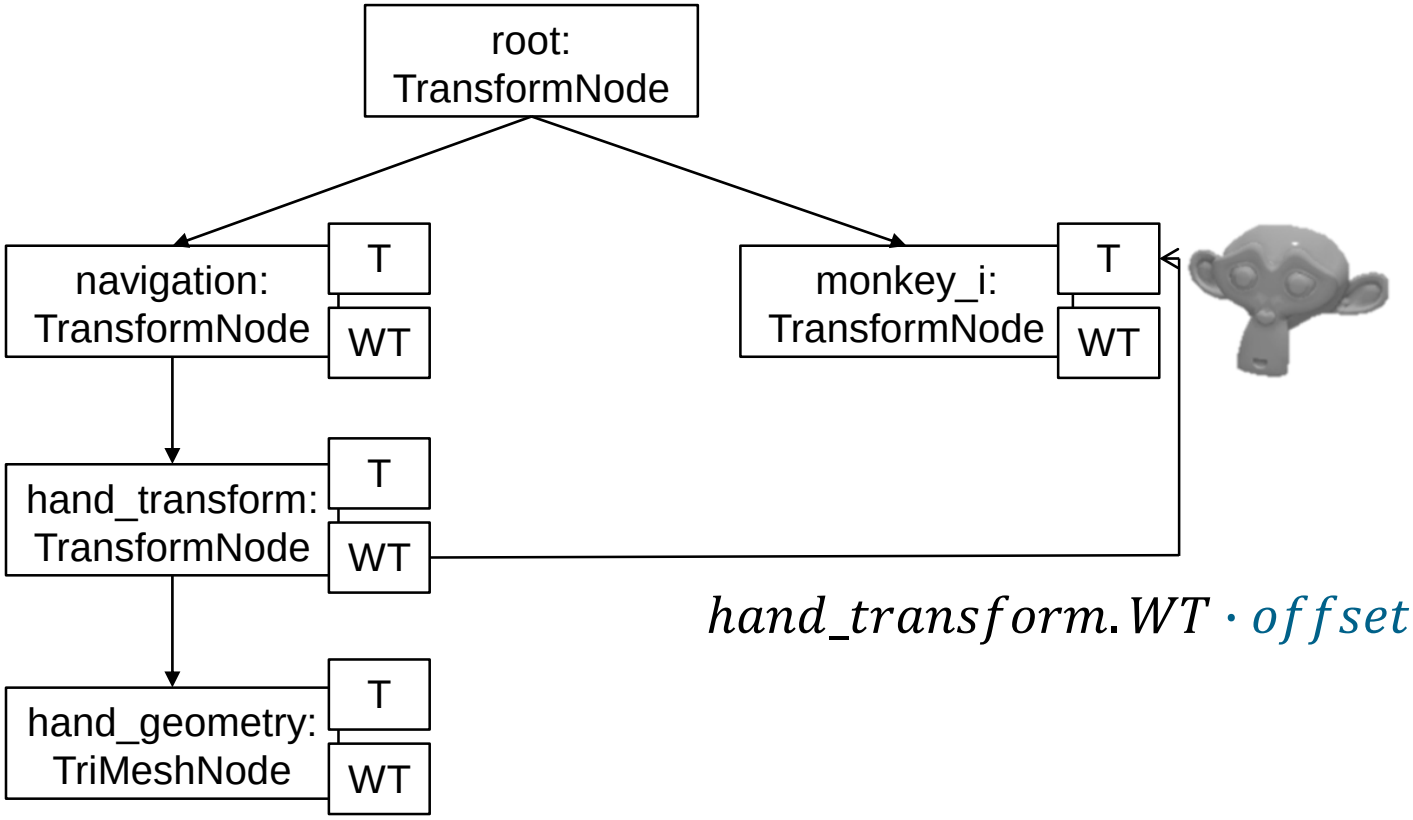
Dragging Strategy 1



To which value do we need to set $monkey\_i.T$ when moving the node back?

Dragging Strategy 2

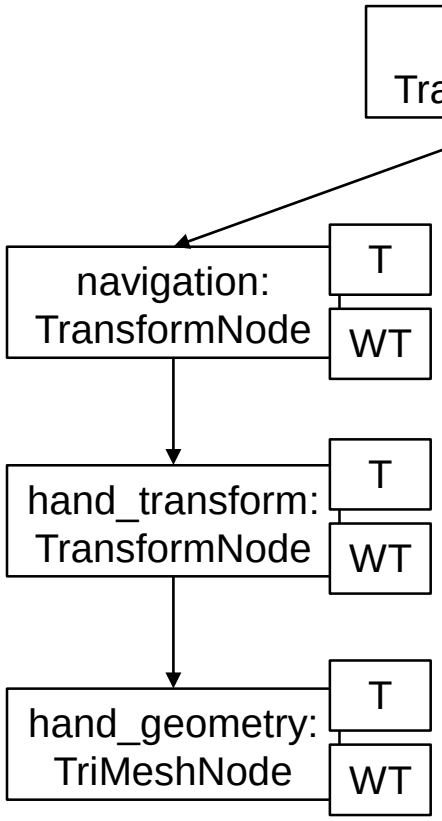
Dragging Strategy 2



$$hand\_transform.WT \cdot offset$$

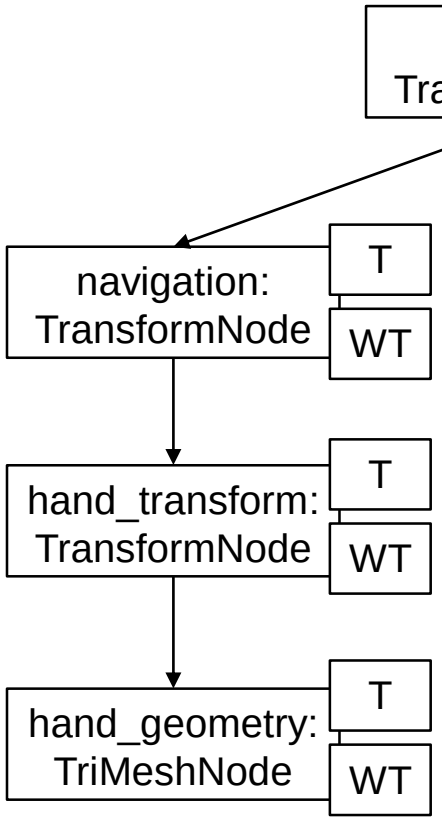
Dragging Strategy 3

Dragging Strategy 3



Store $hand\_transform.WT$
of last frame

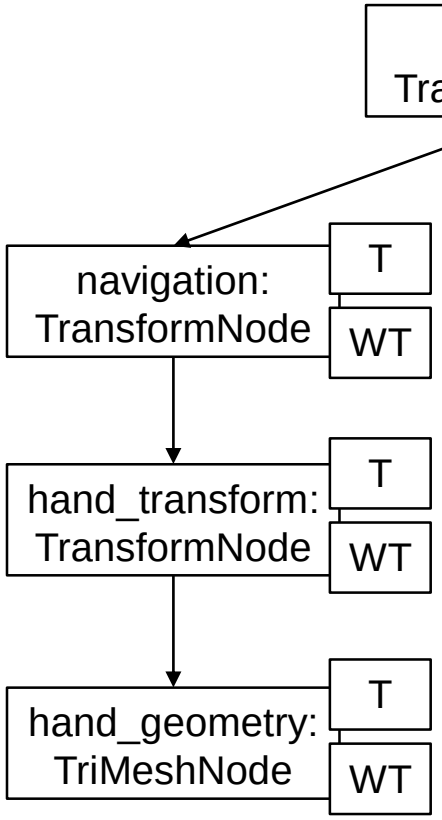
Dragging Strategy 3



Store $hand\_transform.WT$ of last frame

$$diff\_mat = (last\_frame\_mat)^{-1} \cdot hand\_transform.WT$$

Dragging Strategy 3



$$monkey\_i.T = diff\_mat \cdot monkey\_i.T$$

$$diff\_mat = (last\_frame\_mat)^{-1} \cdot hand\_transform.WT$$

Implementation Hints

Dragging Methods

```
class ManipulationManager(avango.script.Script):

  def start_dragging(self):
    #...

  def object_dragging(self):
    #...

  def stop_dragging(self):
    #...
```

Comparison

	Strategy 1	Strategy 2	Strategy 3
`start_dragging()`	• change node order in scenegraph • set node transformation	• compute offset	• store tool matrix
`object_dragging()`		• compute and set transformation	• compute and apply diff matrix • store tool matrix
`stop_dragging()`	• change node order in scenegraph • set node transformation		