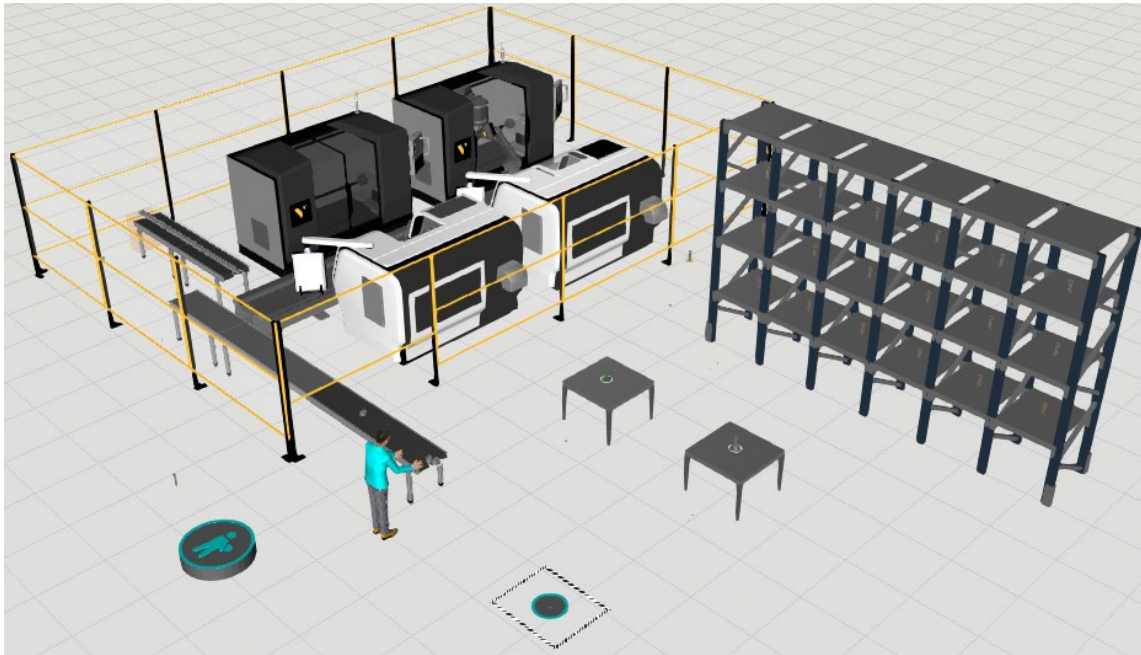


# Introduction to Layout Configuration

Visual Components 4.10 | Version: May 5th, 2025



In this tutorial you will create a layout that simulates a machine tending process and an assembly process involving a human.

This document includes the following topics:

- Create a layout using components from the eCatalog
- Creating dynamic components
- Process Modeling Flow and Process Statements
- Modifying component properties

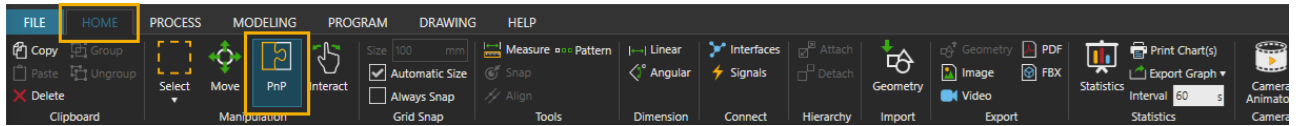
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Process Modeling .....	10
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## Create the basic layout

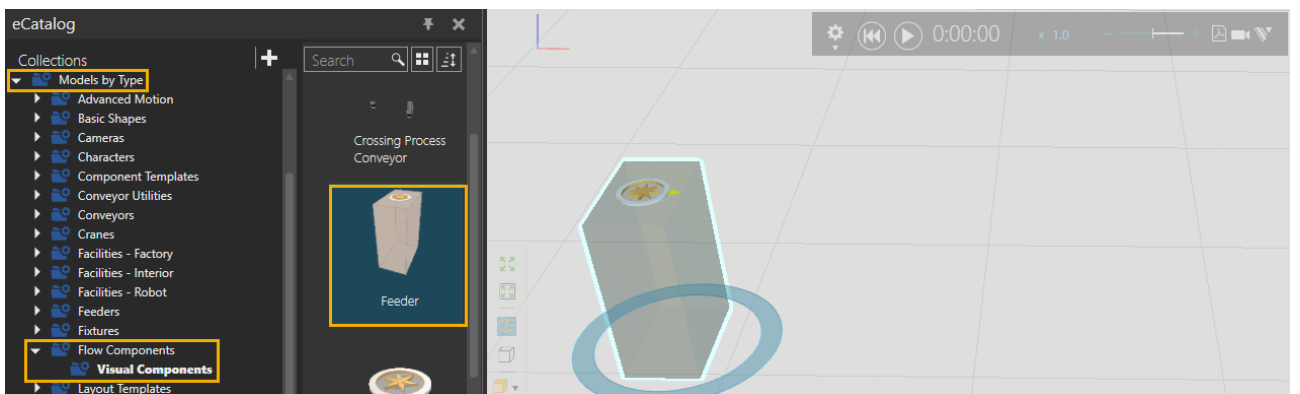
Install Visual Components and open the application. In this section, you will learn to create the basic layout.

1. We will start in the **HOME** tab and make sure to have the **PnP** (Plug and Play) tool selected.



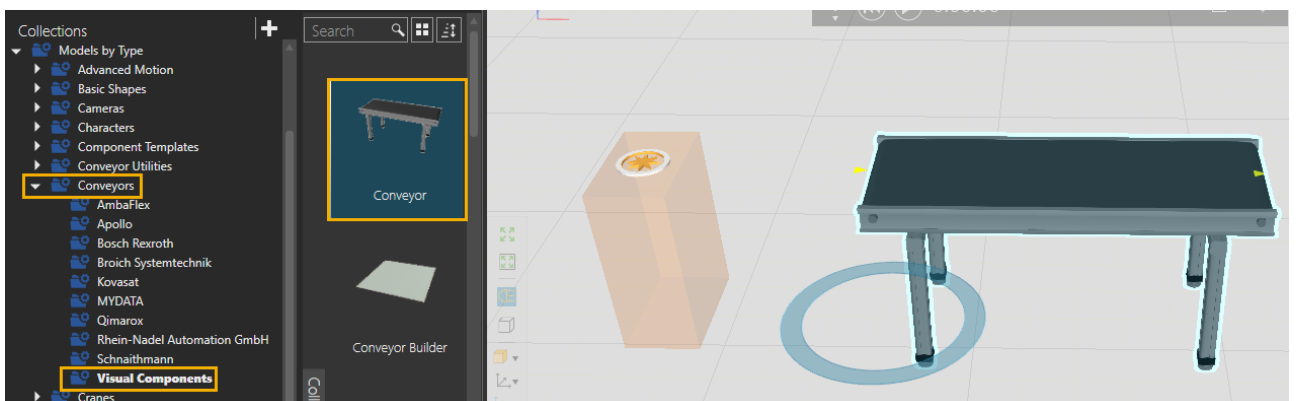
2. From the **eCatalog**, expand **Models by Type** and **Flow Components** and double-click or drag and drop a **Feeder** into the 3D world.

**Note:** When we double-click to add a component it will be placed at the world origin, so at the center of the 3D world.

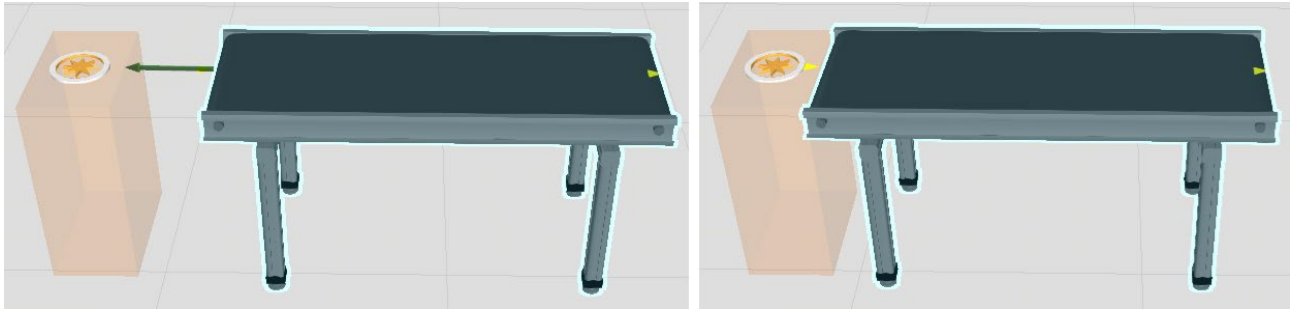


**Note:** The titles of the **Collections** as they appear in the **eCatalog** illustrated here are valid at the time of writing. As we continue to optimize the **eCatalog** for ease of use, the titles of some Collection Groups may change.

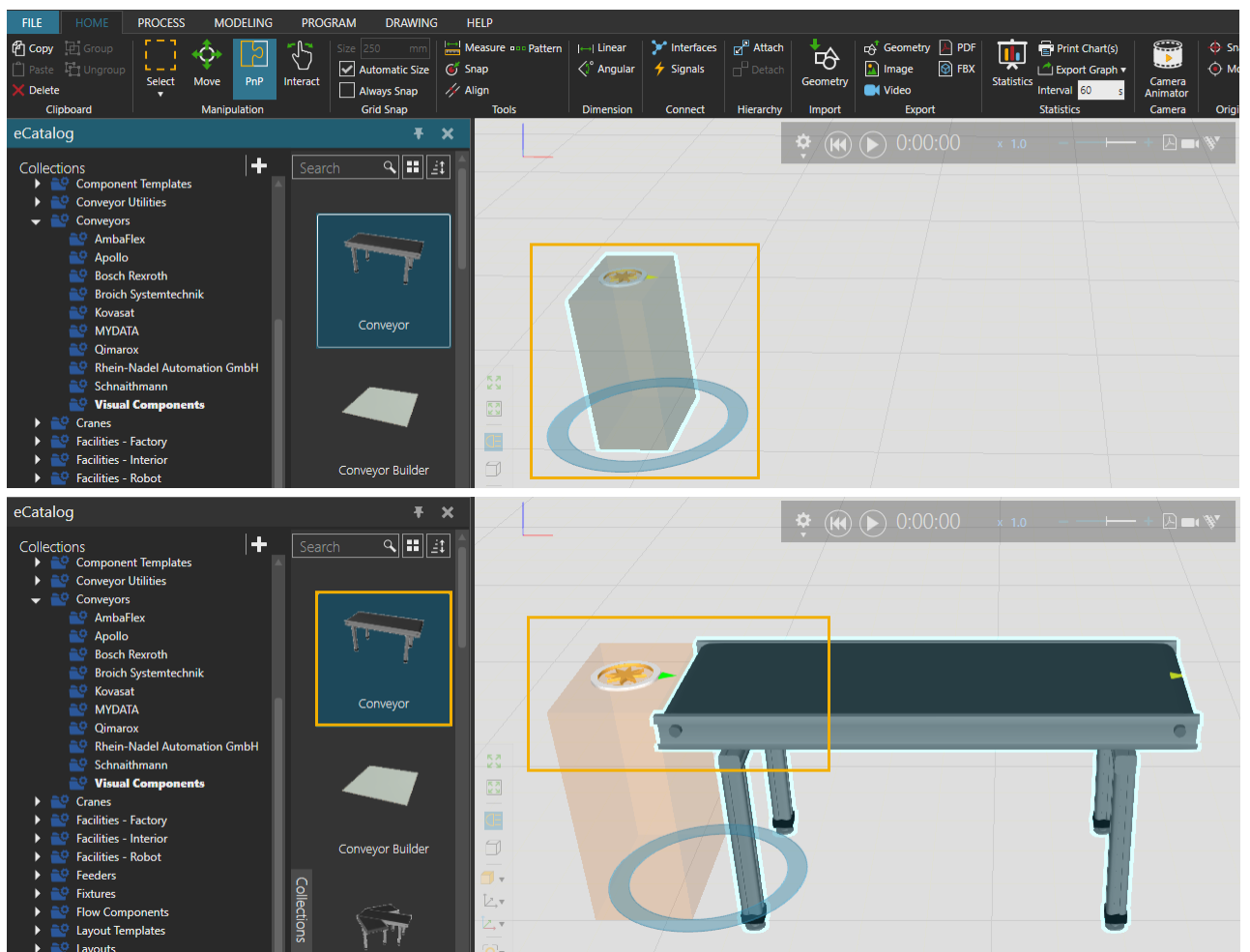
3. Expand **Conveyors** and **Visual Components** and double-click or drag and drop a **Conveyor** into the 3D world.



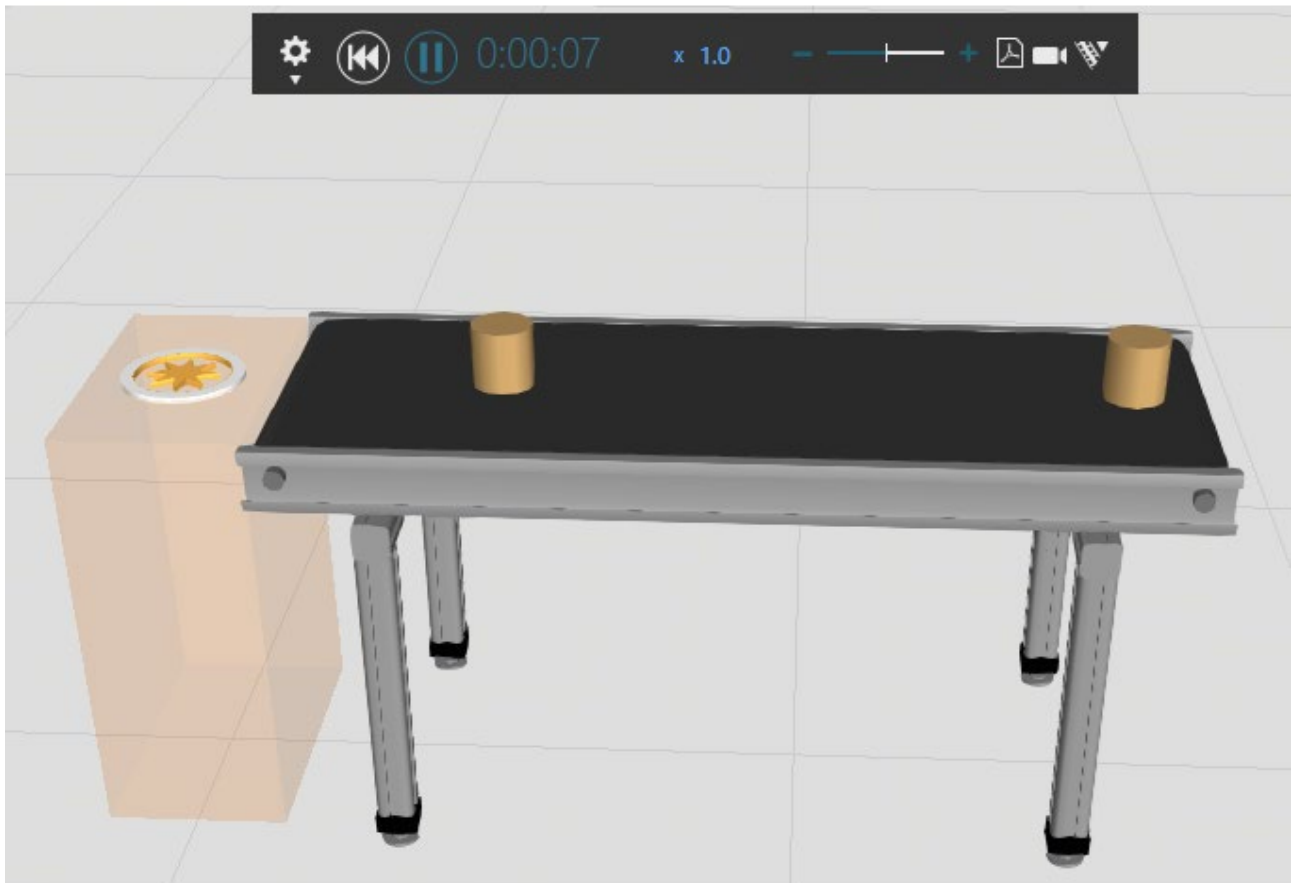
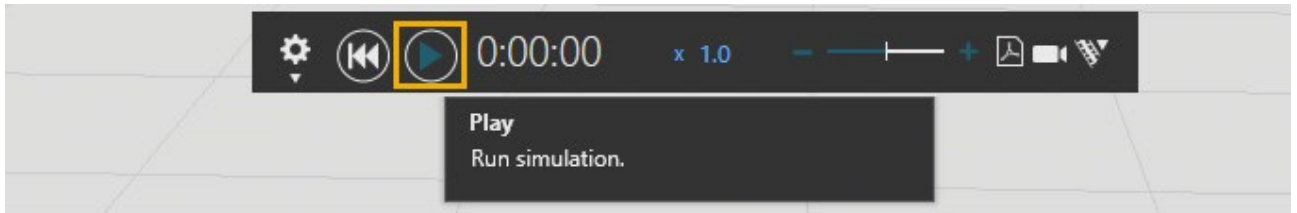
- In the 3D world using PnP (Plug and Play) drag the Conveyor to connect it to the Feeder. A green arrow appears, and the components will snap together.



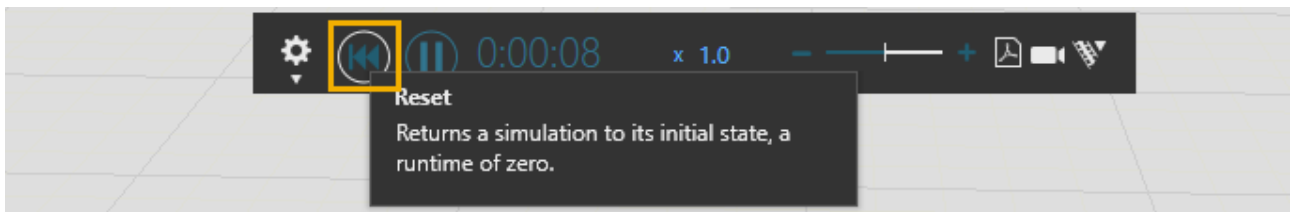
**Tip!** When the Feeder is selected in the 3D world, double-clicking on a **Conveyor** in the eCatalog will add it into the 3D drawing, attaching it directly to the Feeder using PnP.



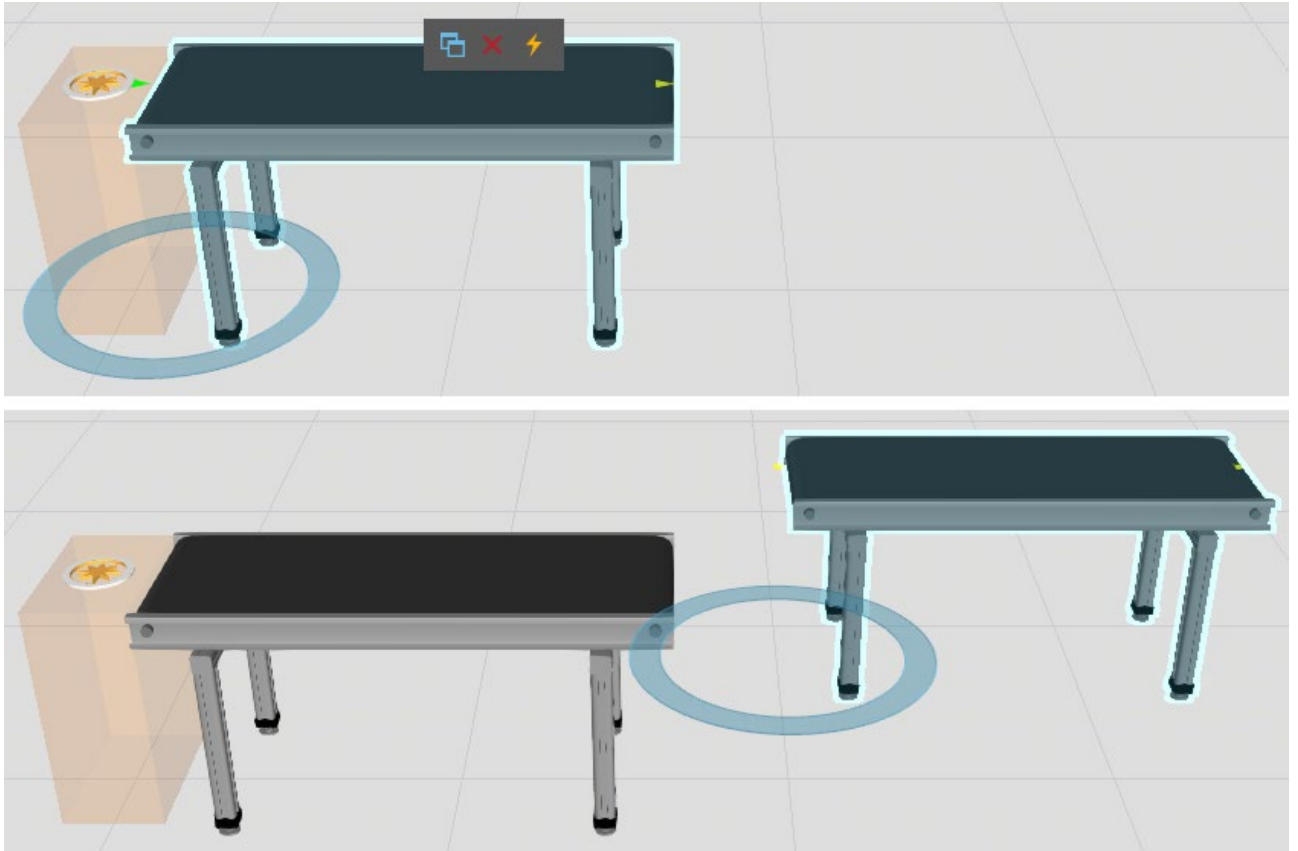
5. To test our simulation we can click the **Play** button from the simulation controls and the Feeder will feed its default product type to the Conveyor.



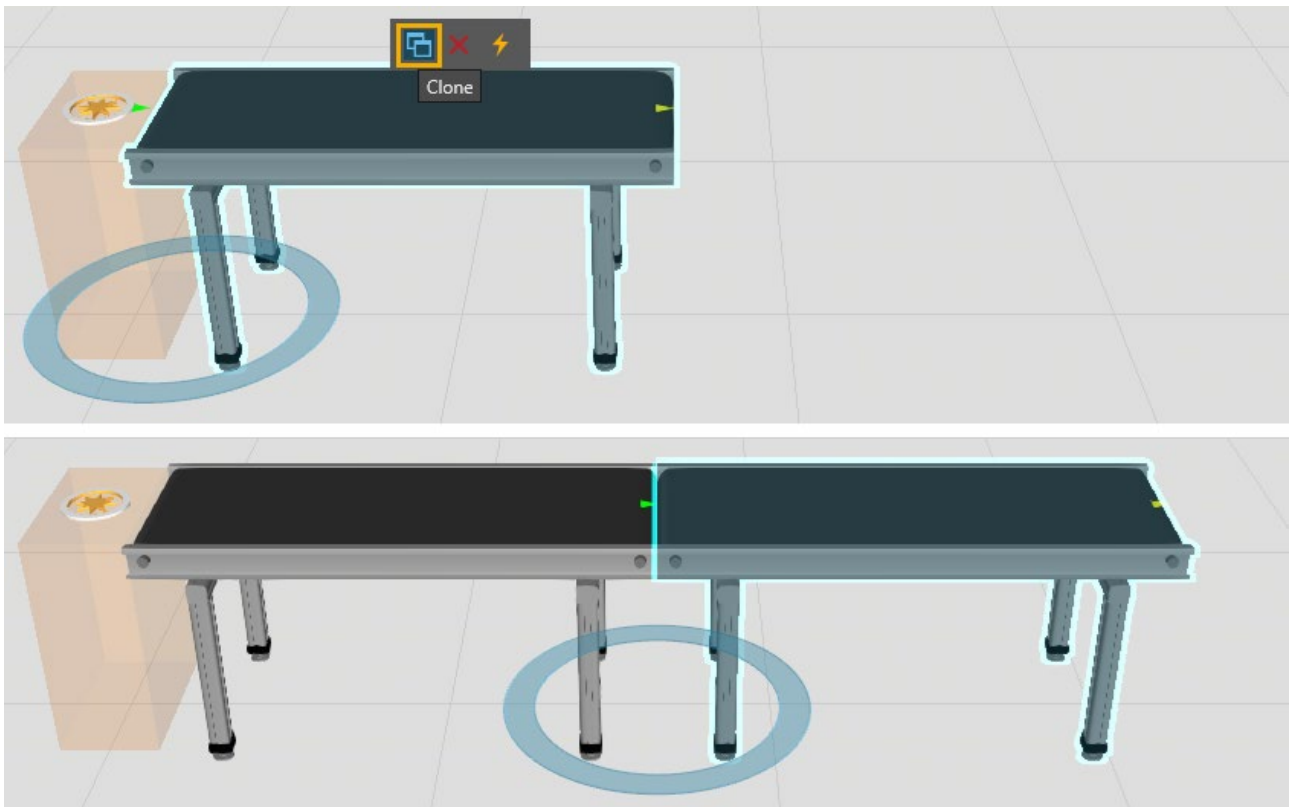
6. We are now going to add some more Conveyors, so let's first click **Reset** to reset the simulation.



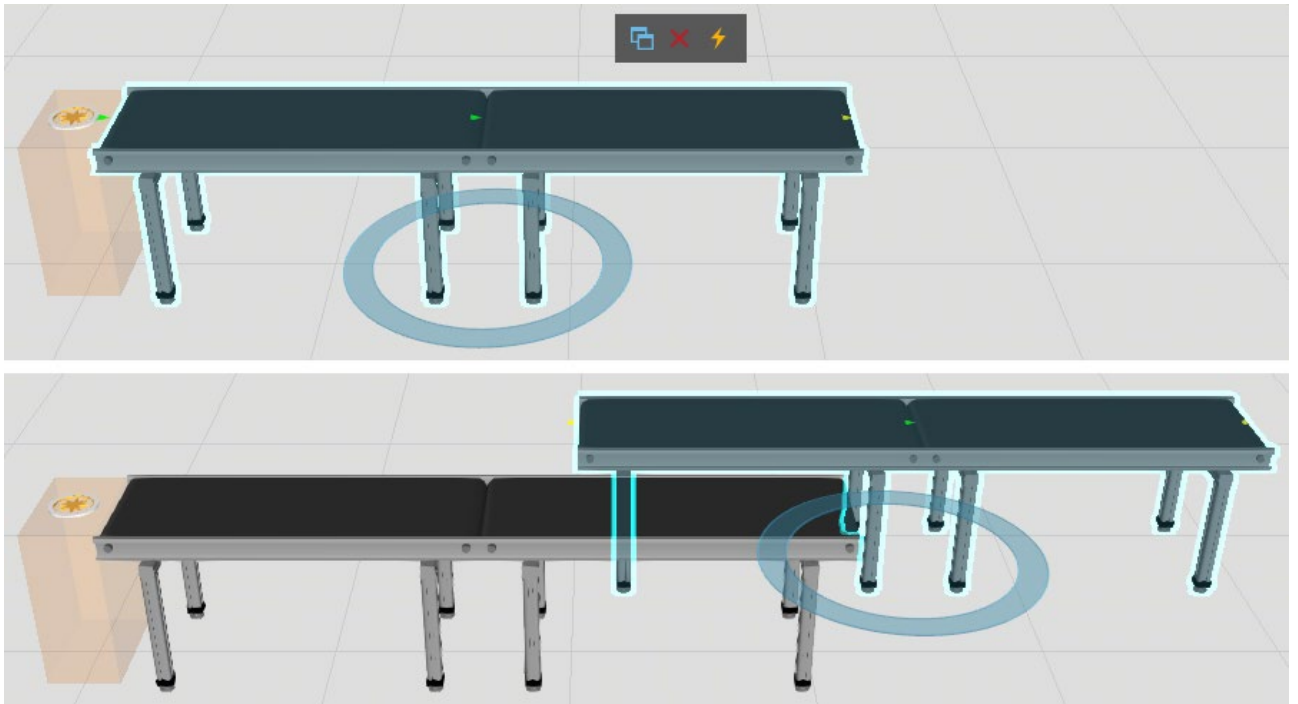
- To add another Conveyor to this line, one method is to first select the Conveyor and copy and paste it using CTRL+C and CTRL+V and then connect the Conveyors using PnP.



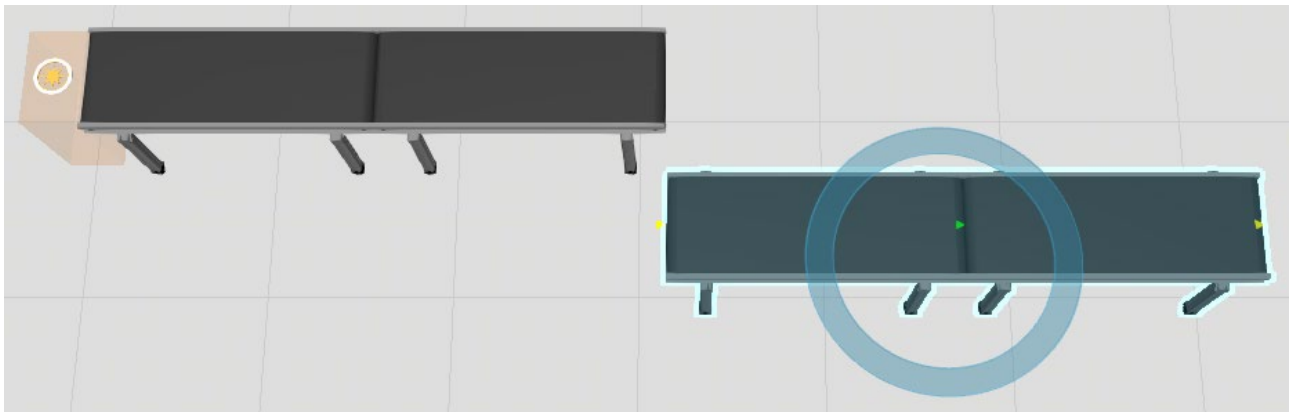
- Another method is to click **Clone** from the toolbar and the copy is automatically attached.



9. We want to have two Conveyor lines, so holding the CTRL key, click to multiselect both Conveyors and copy and paste them using CTRL+C and CTRL+V or click **Clone**.



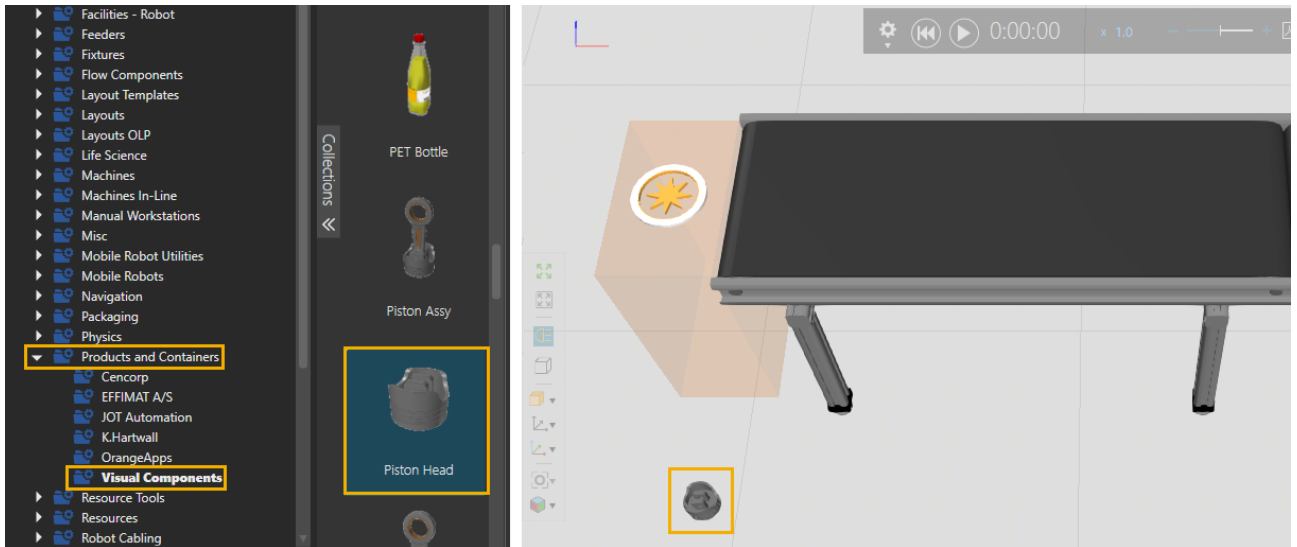
10. Again holding the CTRL key, click to multiselect both Conveyors in this new line and move them into position at the end of the first line of Conveyors.



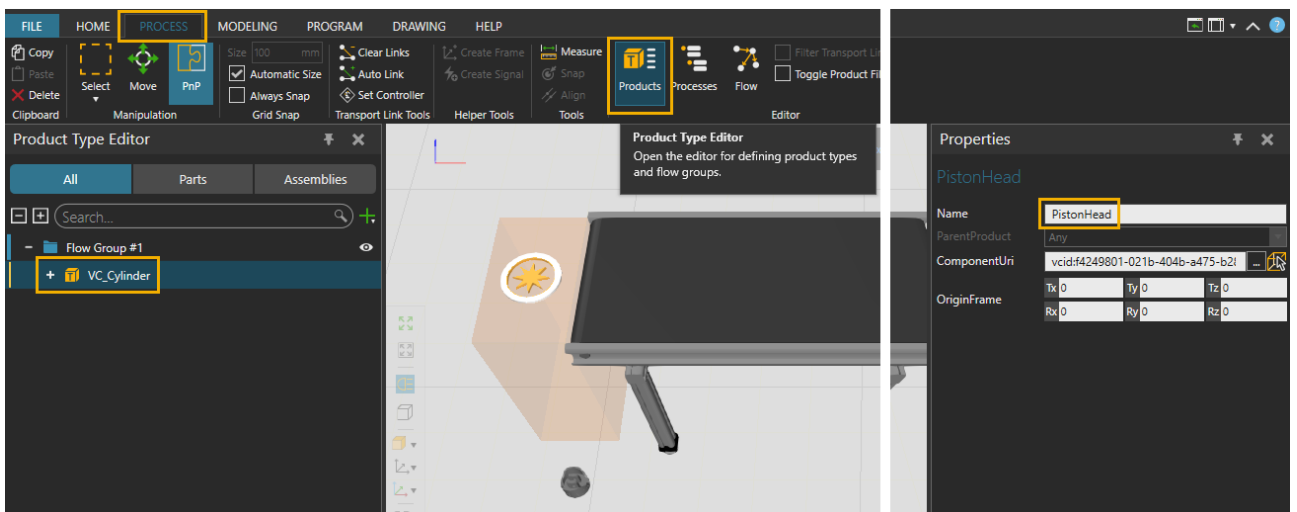
## Create components

A Feeder can create any product type that is attached to it, so let's add a component for the Feeder to create.

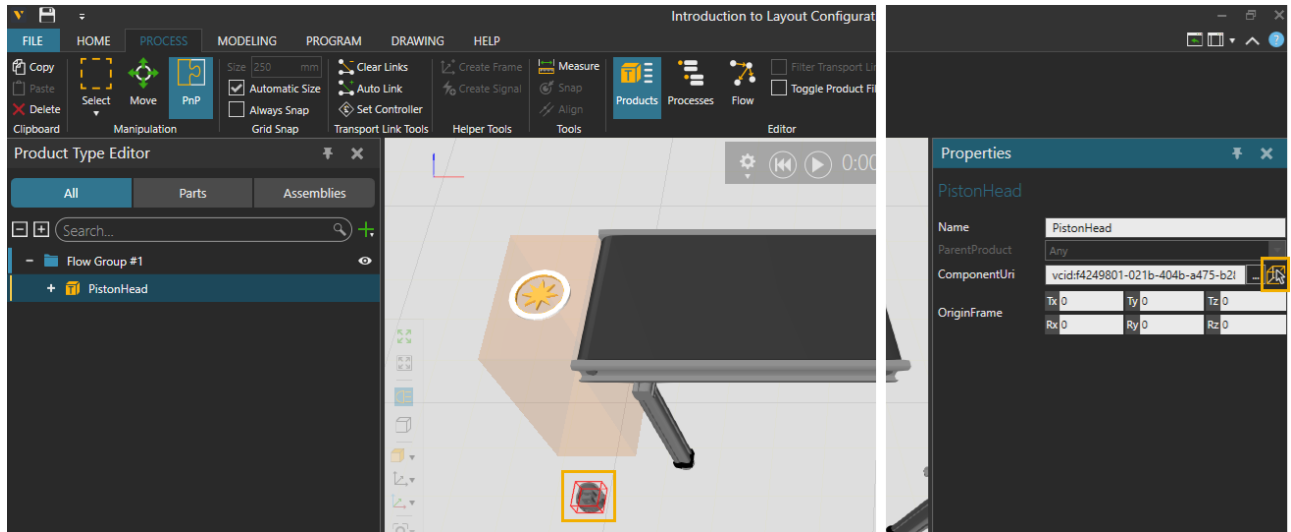
1. From the **eCatalog**, expand **Models by Type** and **Products and Containers** and from **Visual Components** drag and drop a **Piston Head** into the 3D world placing it for example beside the Feeder. This component will be a template for dynamic components the Feeder will create.



2. In the **PROCESS** tab, click on **Products** to access the **Product Type Editor**. And under **Flow Group #1** select **VC\_Cylinder** and from its **Properties** on the right change the **Name** to **PistonHead**.



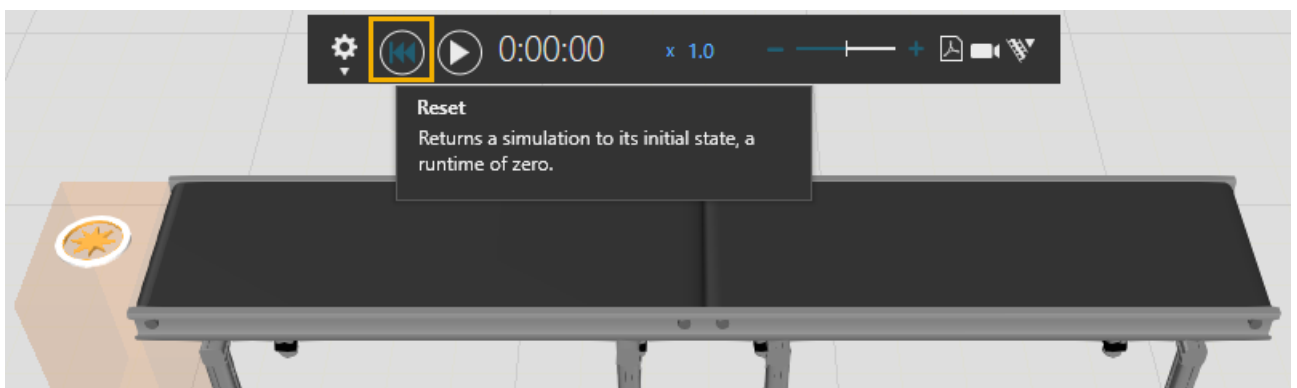
- Again from the **Properties** on the right, select the **ComponentUri** Pick Component tool and from the 3D world select the Piston Head component.



- To test that the Feeder is now creating Piston Heads, click **Play** from the simulation controls.



- Before we proceed to make more changes to the layout, we should always remember to click **Reset** to reset the simulation.

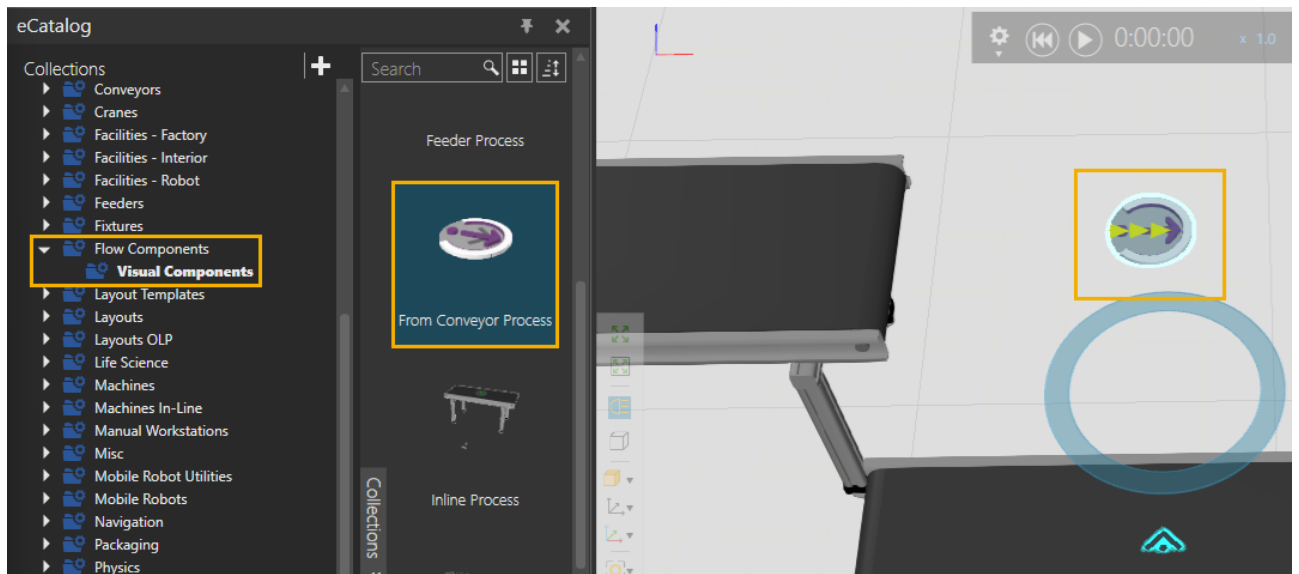


## Process Modeling

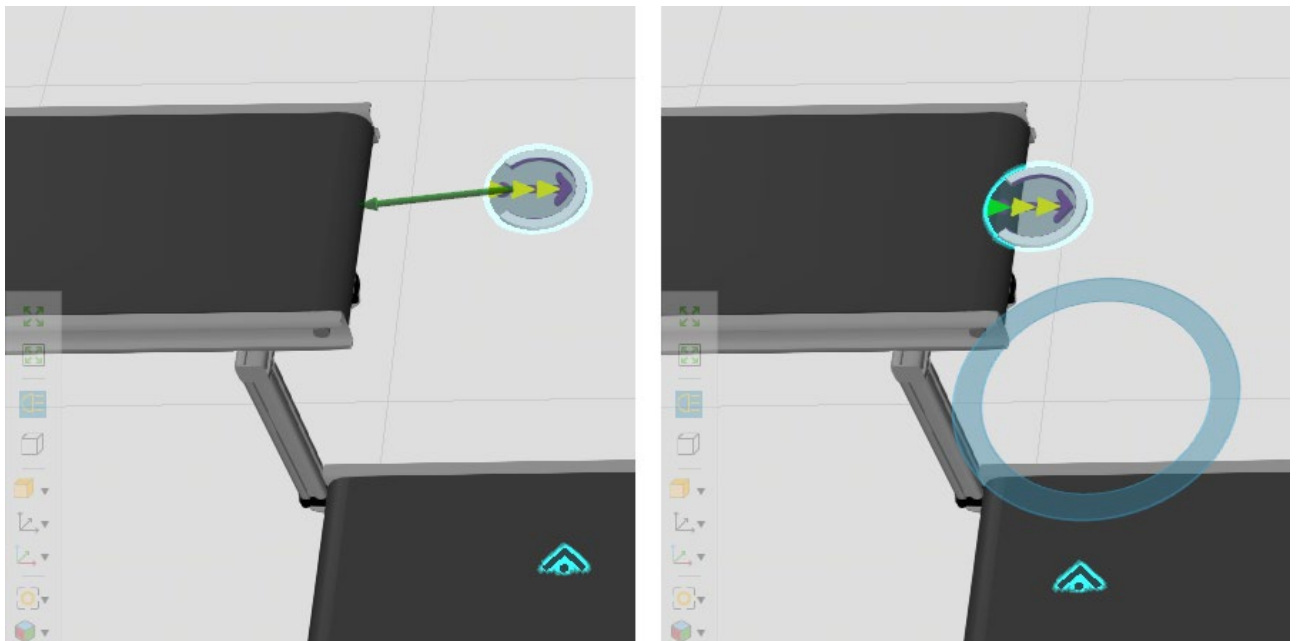
Process modeling streamlines layout planning by allowing you to quickly build and simulate machine tending applications using different resources and machines.

Next, let's create a machine tending cell. Let's start by getting the components we need from the eCatalog.

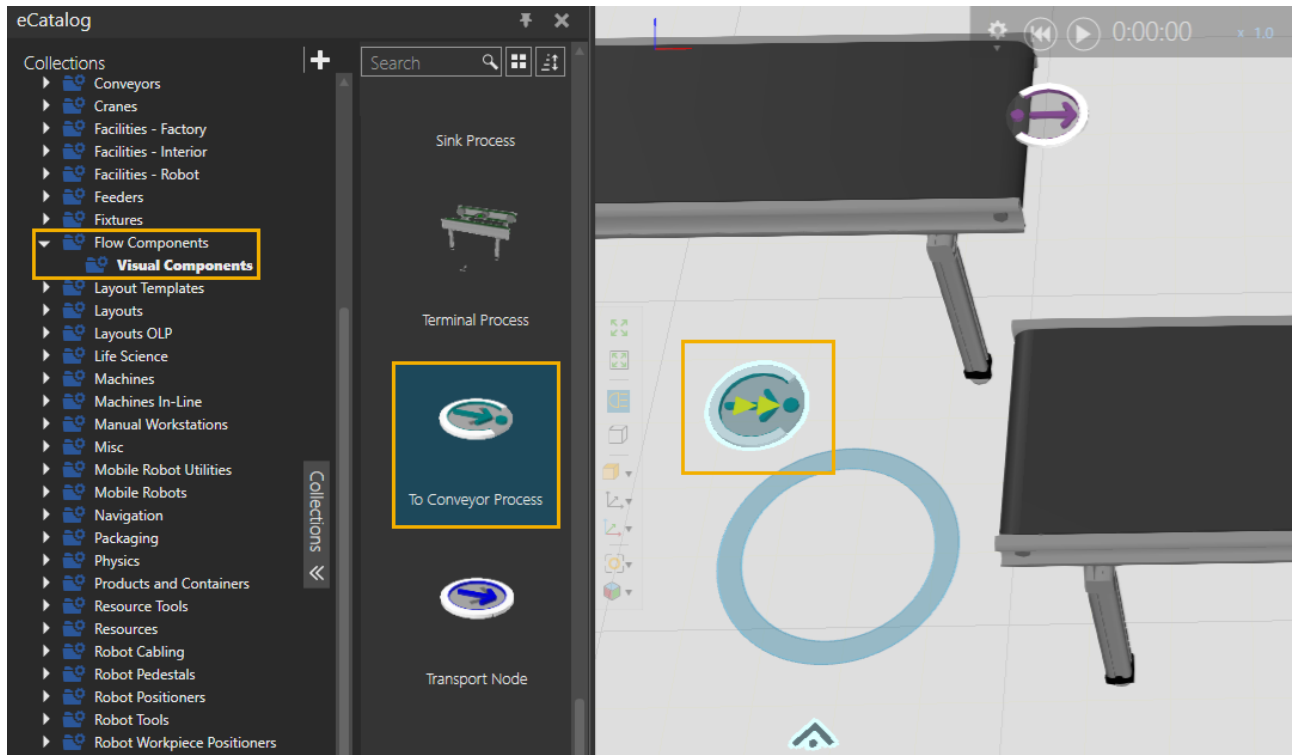
1. Returning to the **HOME** tab, from the **eCatalog**, expand **Models by Type** and **Flow Components** and drag and drop a **From Conveyor Process** into the 3D world placing it close to the end of the first Conveyor line.



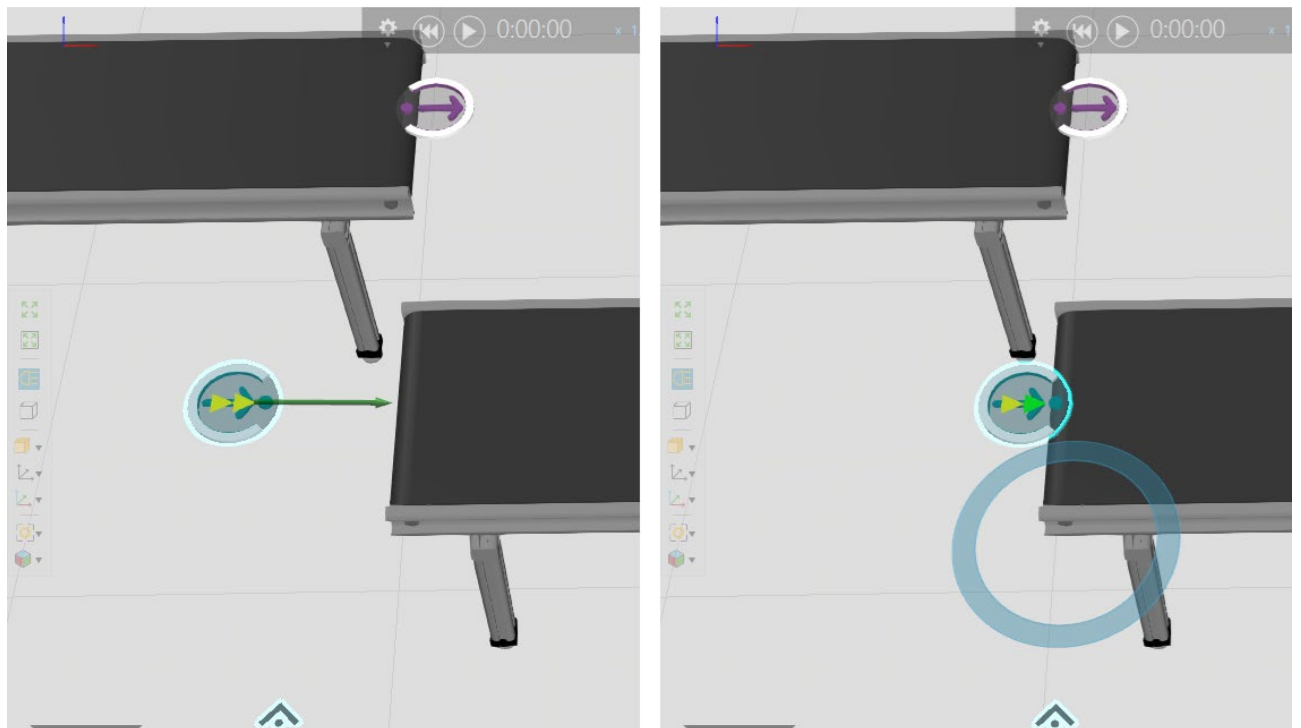
2. Attach it to the end of the first Conveyor line using PnP. In this case, the **From Conveyor Process** acts as an input or location for picking up products.



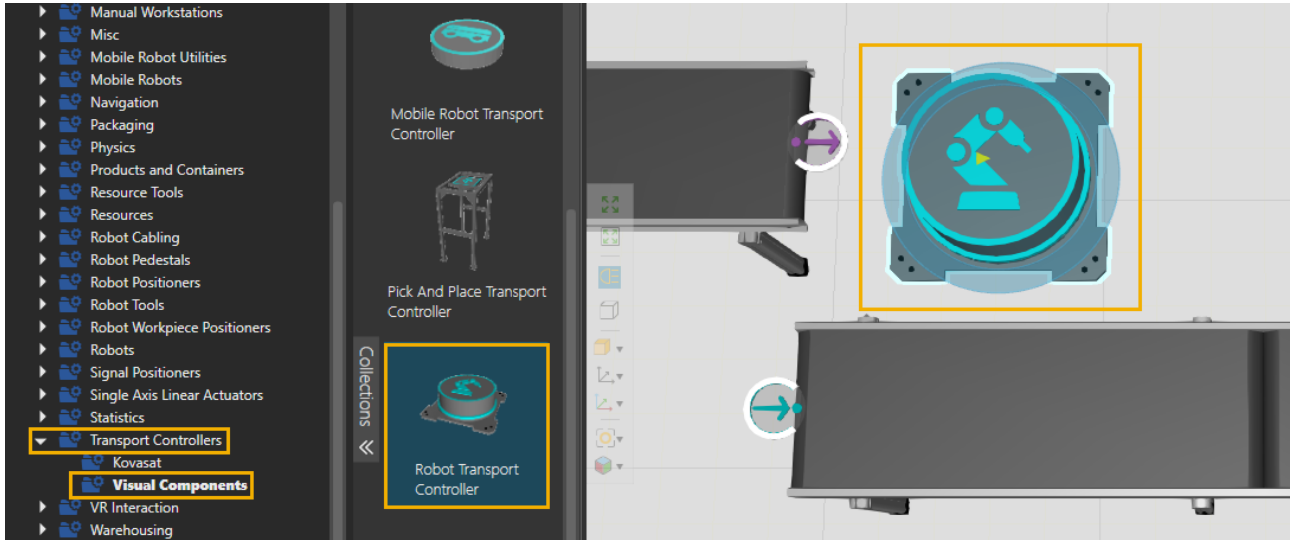
- From the same category, drag and drop a **To Conveyor Process** into the 3D world placing it close to the start of the second Conveyor line.



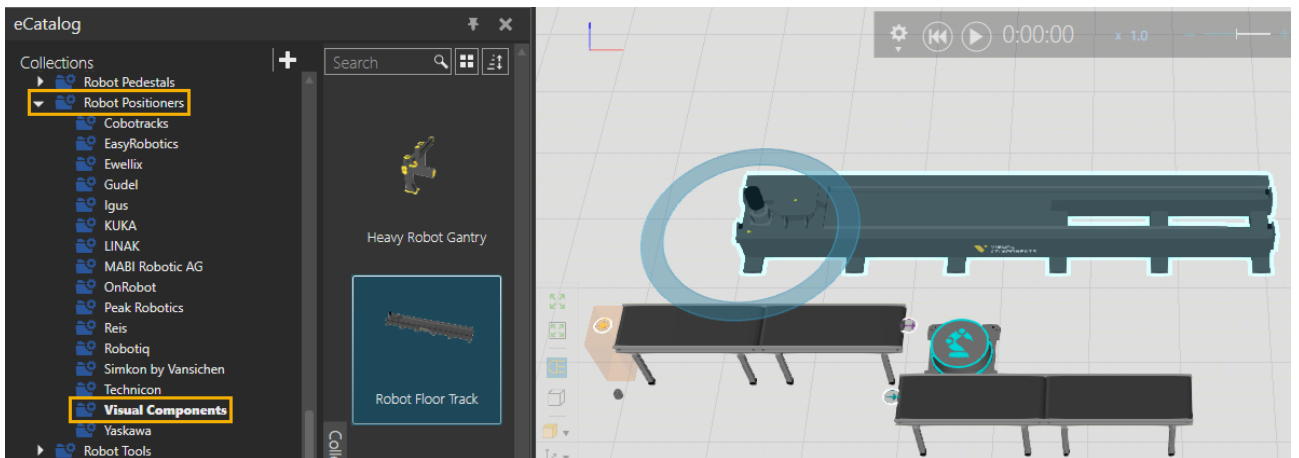
- Attach it to the start of the second Conveyor line using PnP. In this case the **To Conveyor Process** acts as an output or location for placing products.



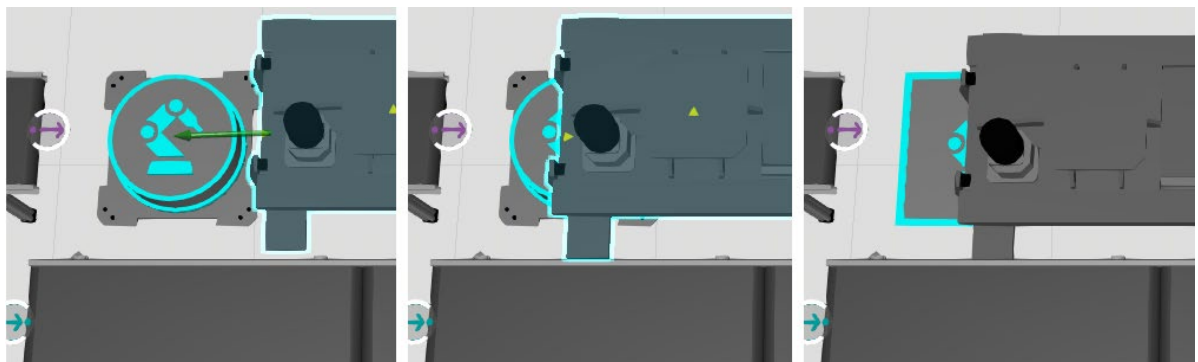
- Expand **Transport Controllers** and **Visual Components** and drag and drop a **Robot Transport Controller** into the 3D world placing it close to the From Conveyor Process at the end of the first Conveyor line. A **Robot Transport Controller** manages a robot that is used as a resource for picking and placing components in a machine tending process.



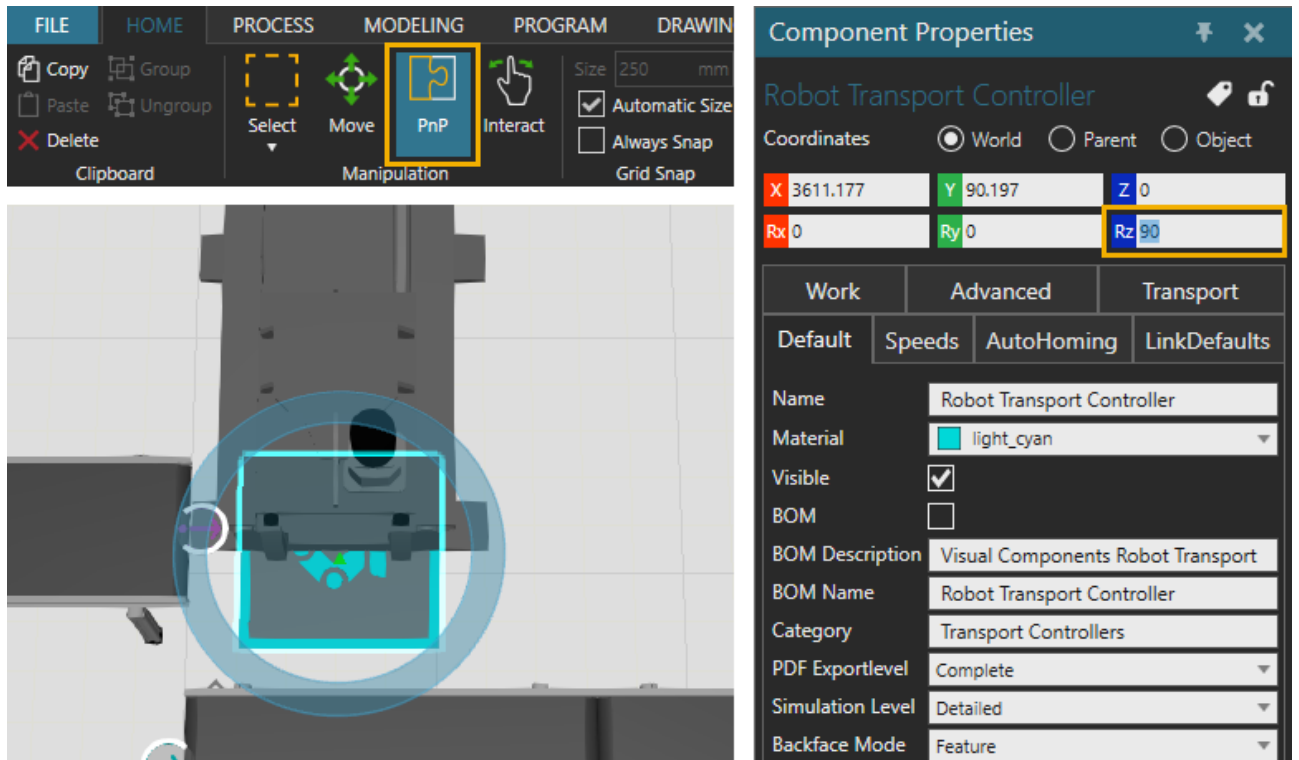
- From **Robot Positioners** and **Visual Components** drag and drop a **Robot Floor Track** into the 3D world.



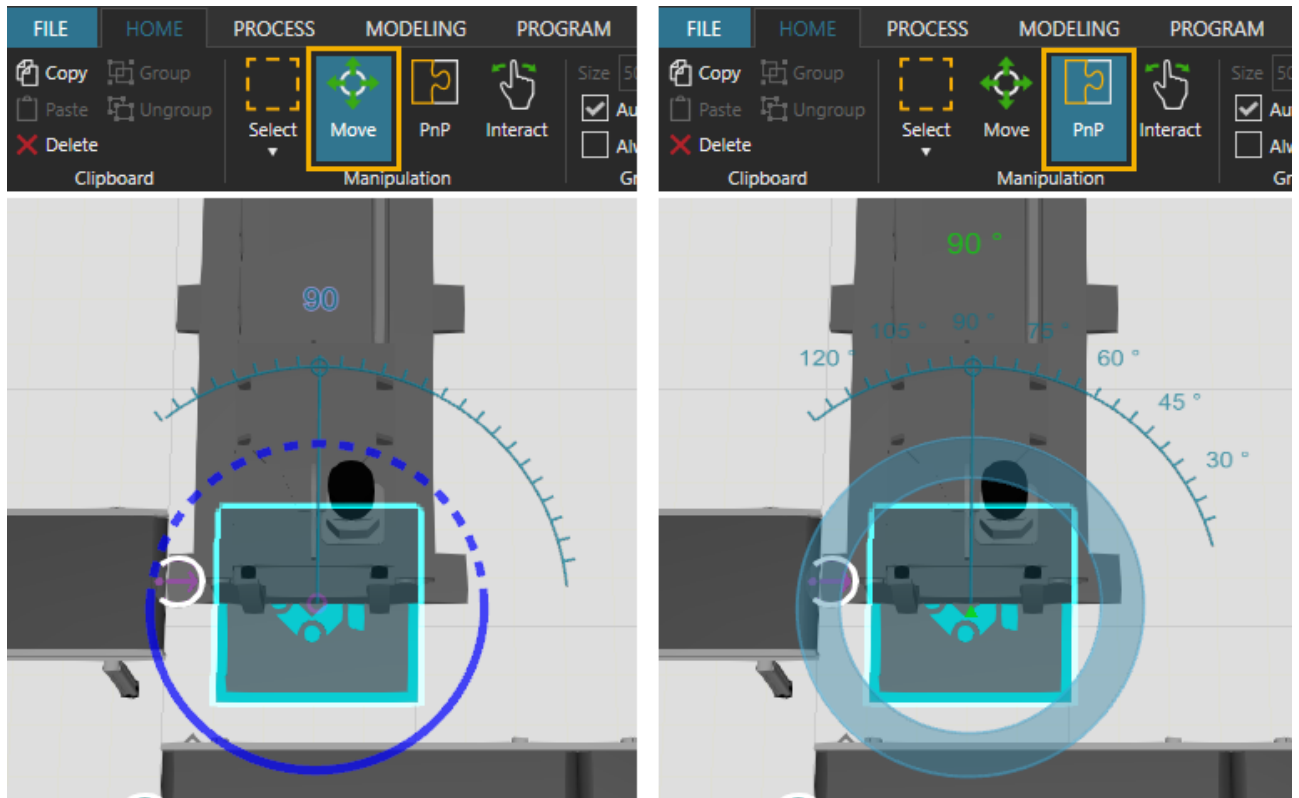
- Snap the **Robot Floor Track** to the Robot Transport Controller using PnP. **Tip!** The **PedestalHeight** of the Robot Transport Controller will become 0 mm so the **Robot Floor Track** can be placed at floor level.



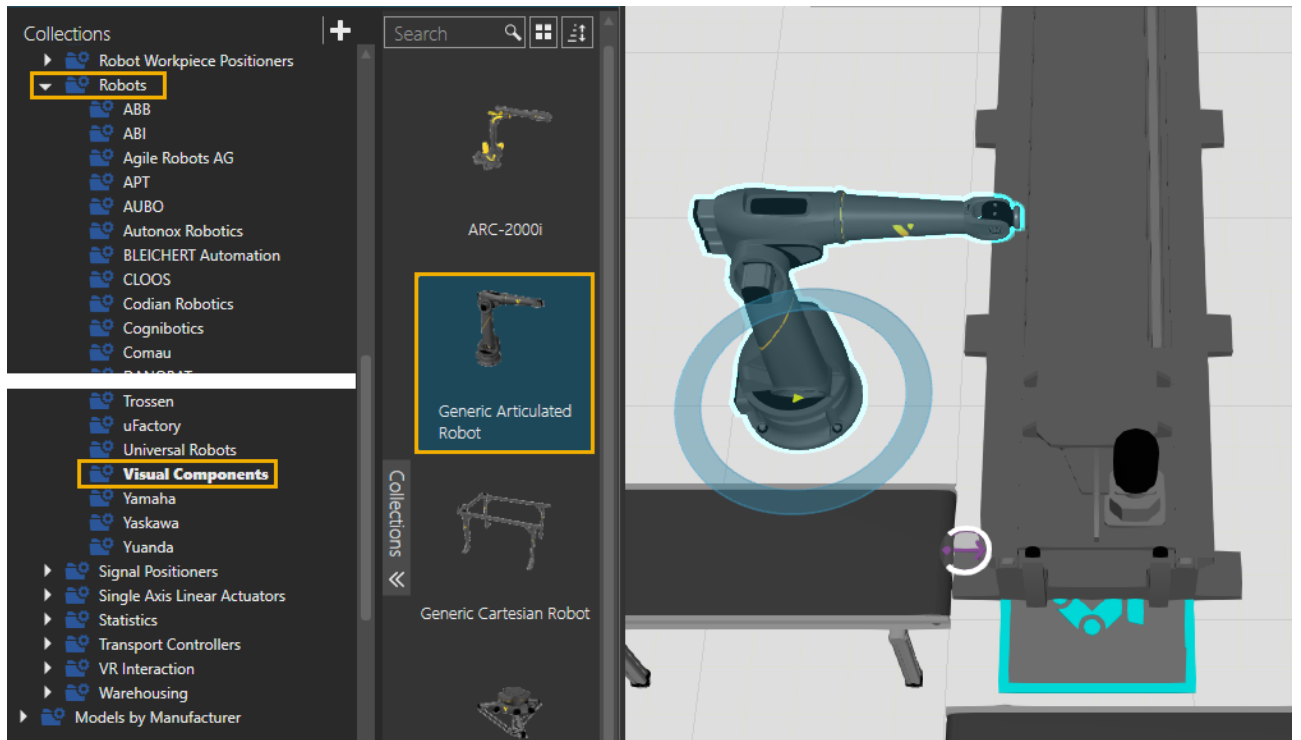
8. Selecting the Robot Transport Controller as the parent component, with the **Move** or **PnP** tools selected, in its **Component Properties** type 90 into the **Rz** rotational axis to rotate both the Robot Transport Controller and the Robot Floor Track by 90 degrees.



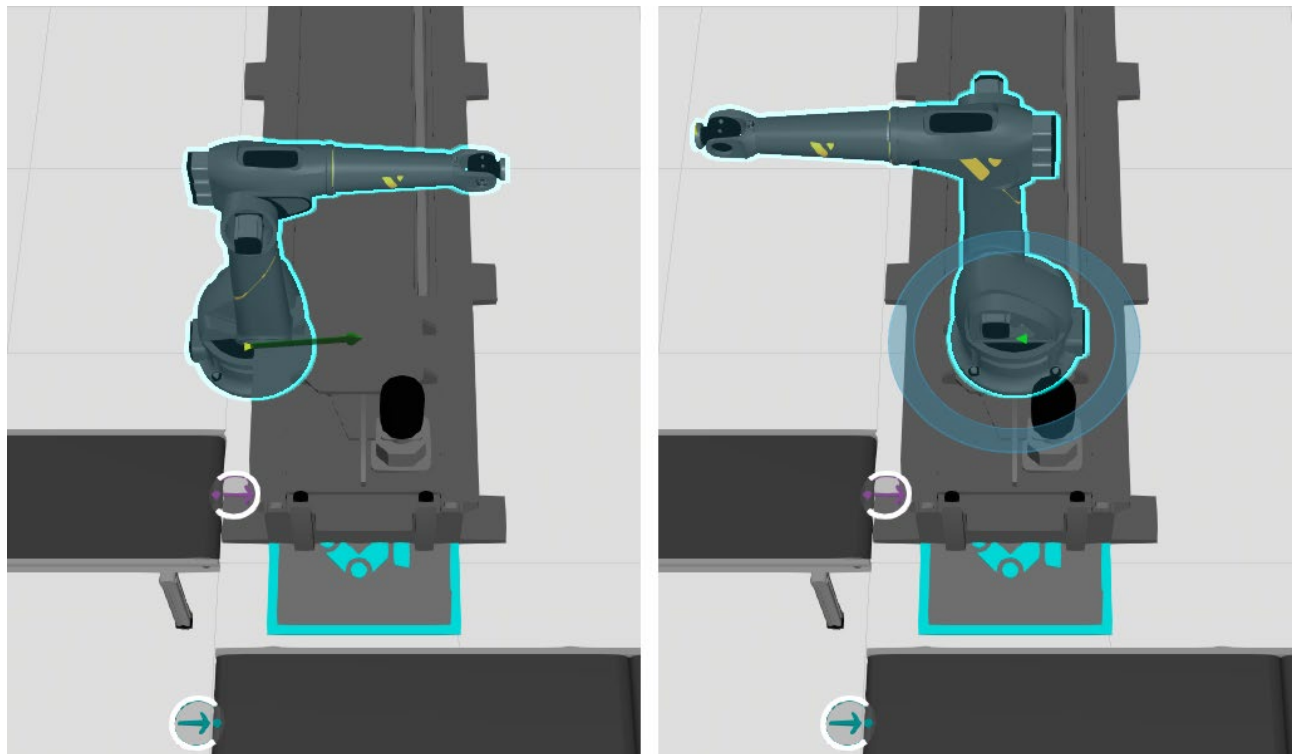
Or using the **Move** or **PnP** tools, rotate the Robot Transport Controller by 90 degrees.



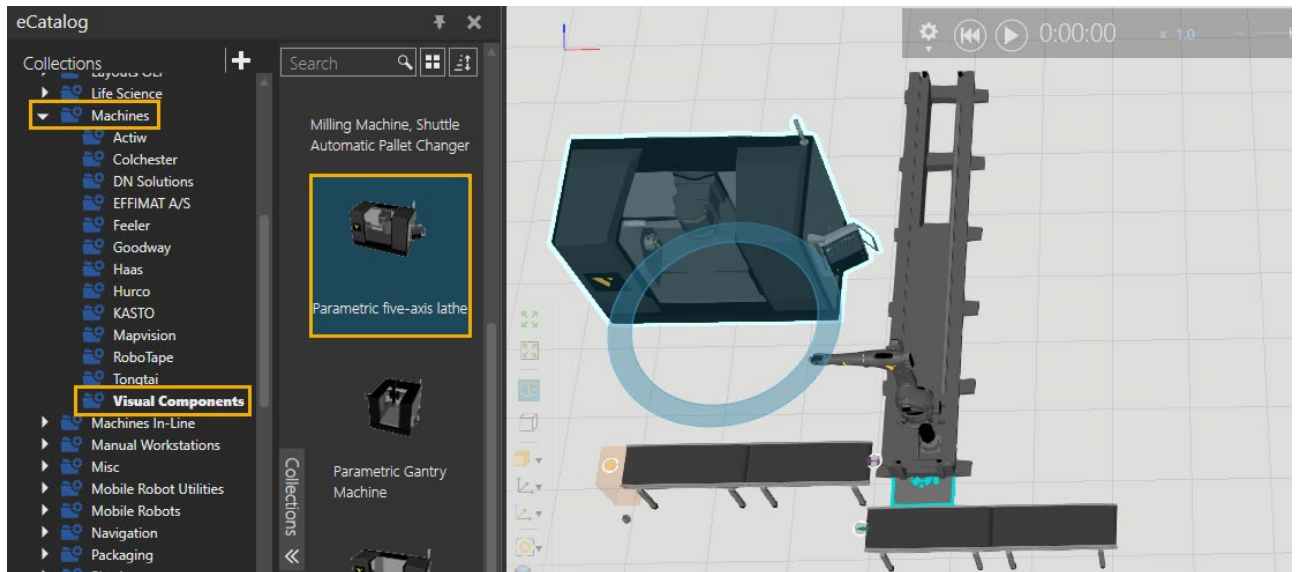
- Expand **Robots** and **Visual Components** and drag and drop a **Generic Articulated Robot** into the 3D world placing it close to the Robot Floor Track.



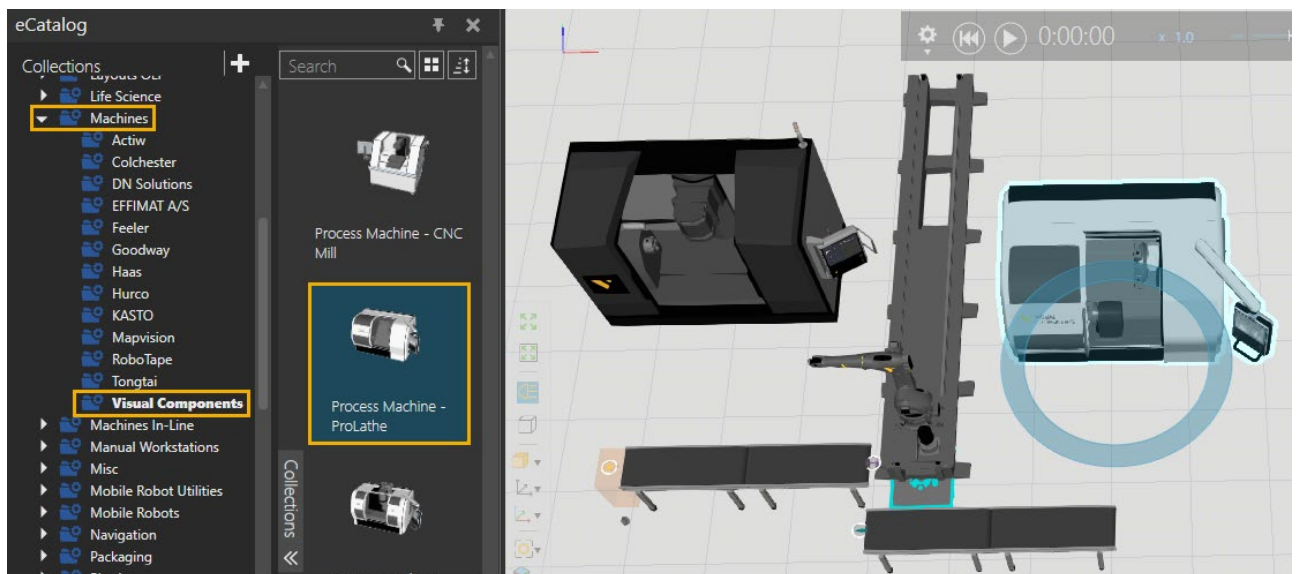
- Using PnP, attach the **Generic Articulated Robot** to the slide or carriage of the Robot Floor Track.



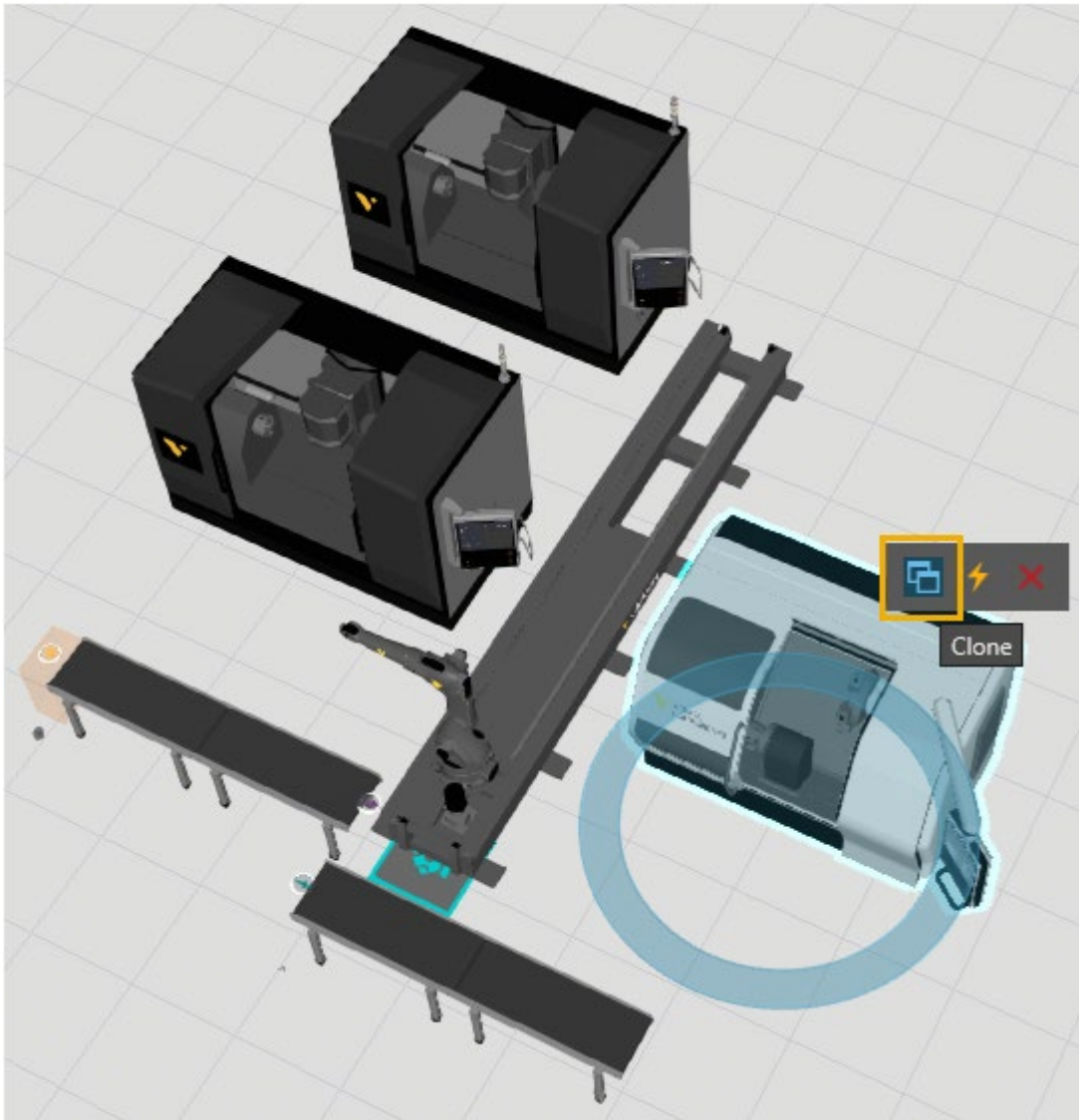
11. Expand **Machines** and **Visual Components** and drag and drop a **Parametric five-axis lathe** into the 3D world, placing it beside the Robot Floor Track on the side where we placed the first conveyor line.



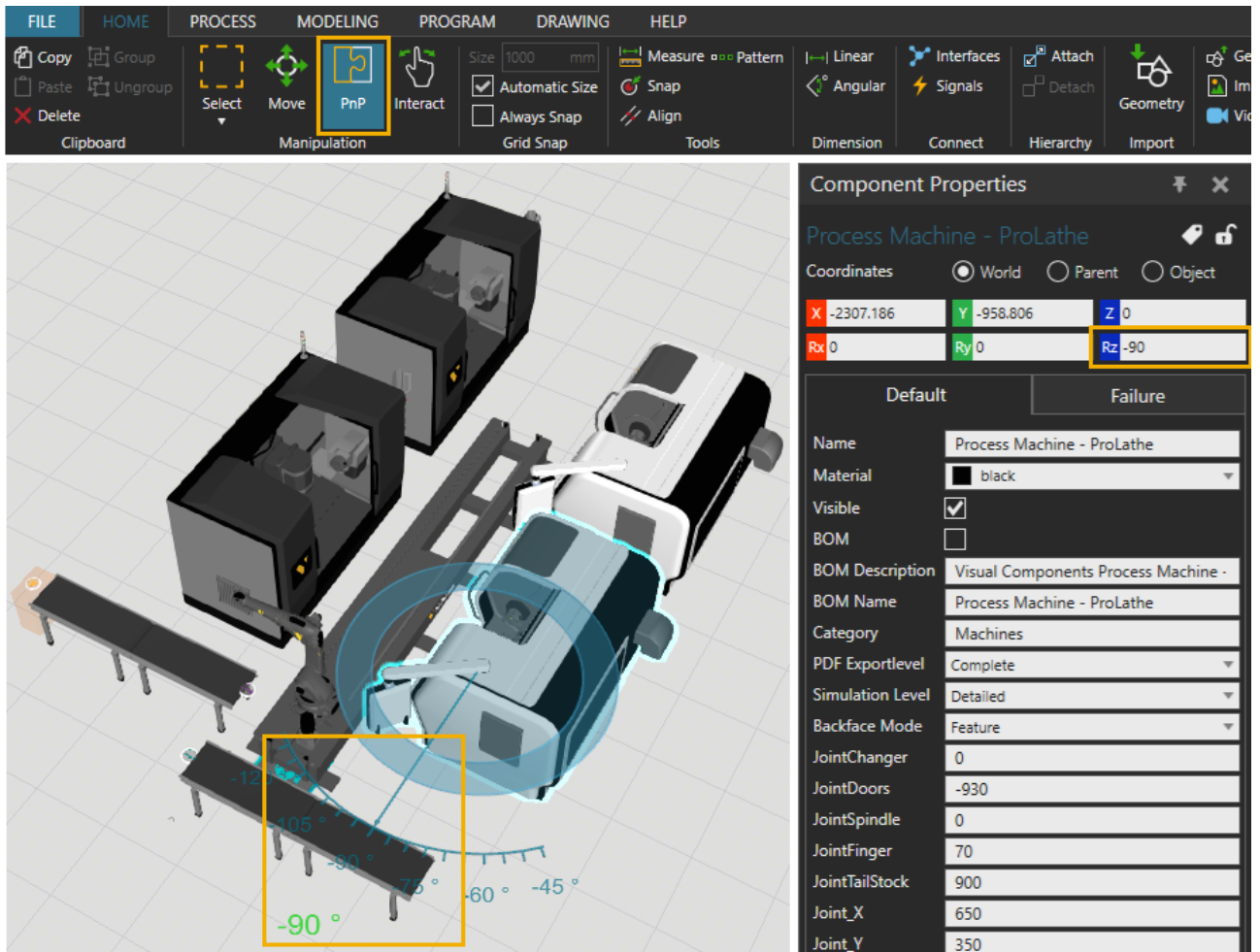
12. From the same category, drag and drop a **Process Machine - ProLathe** into the 3D world placing it on the other side of the Robot Floor Track.



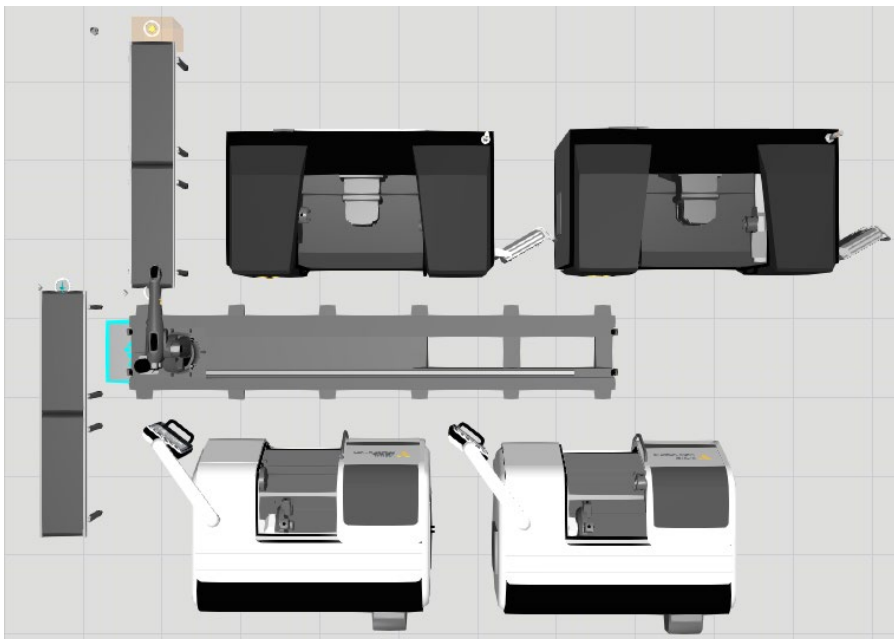
13. Since we will require four machines in total, using copy and paste or the **Clone** option, create a copy of each machine.



14. Using the rotation options, rotate each machine by 90 degrees so that the doors are facing the Generic Articulated Robot. And once we have our four machines in position alongside the Robot Floor Track, our layout should look something like the example illustrated below.

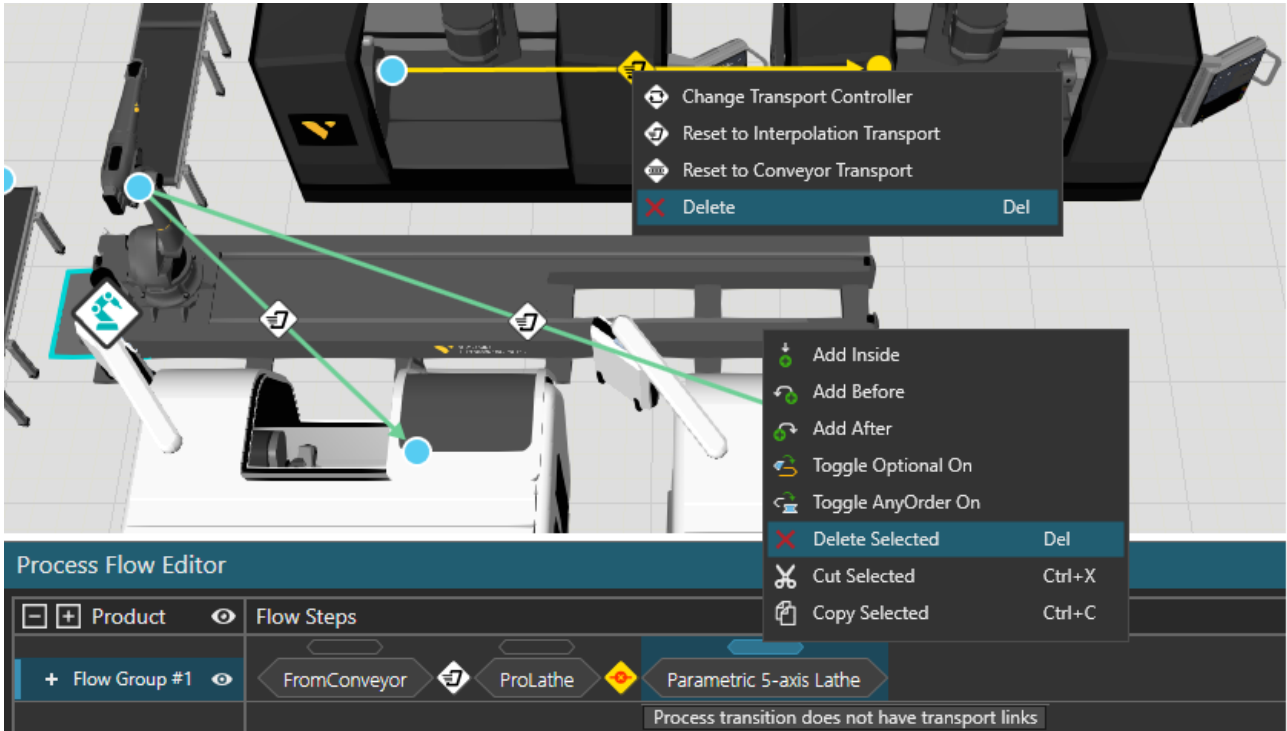


**Note:** Should you wish to follow the same layout, the position of the components looks like the example below. You may also refer to the layout in the lesson download.

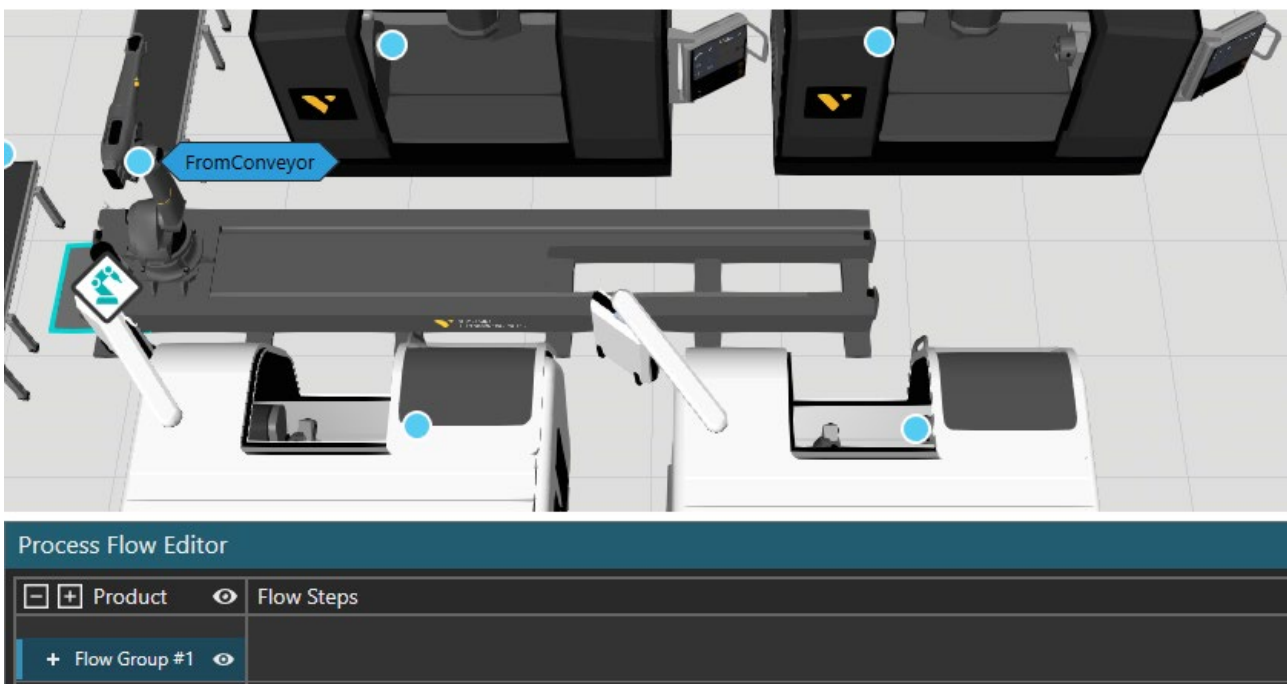


Next, let's create the Flow for the components.

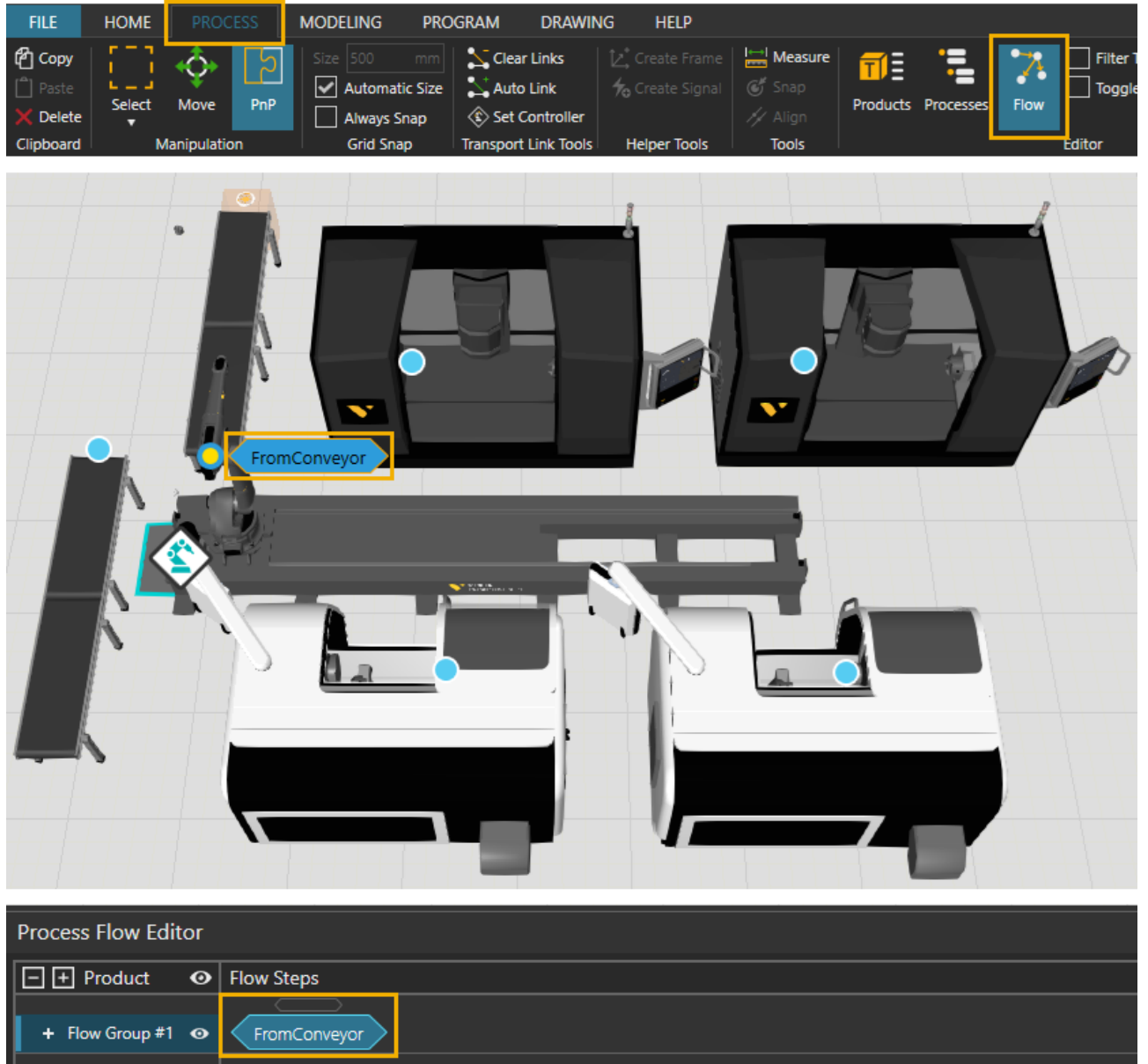
**Tip!** Before we proceed to create the Process Modeling Flow. If at any point you make a mistake, such as adding the wrong process or the wrong transport link type, then no problem! Simply delete any unwanted Flow steps in the **Process Flow Editor** and any unwanted transport links in the 3D world.



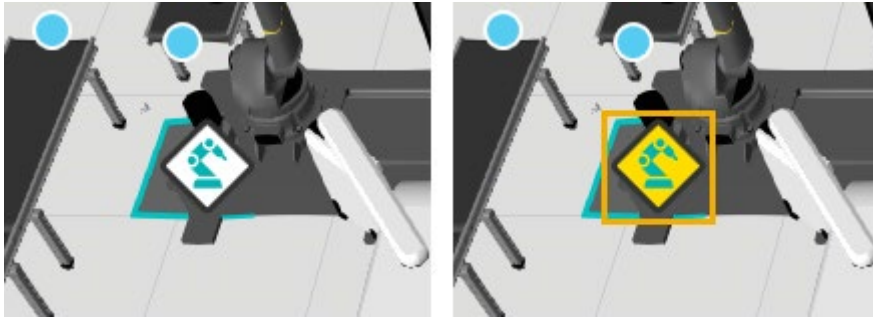
And then try creating the Flow steps again until you get it right.



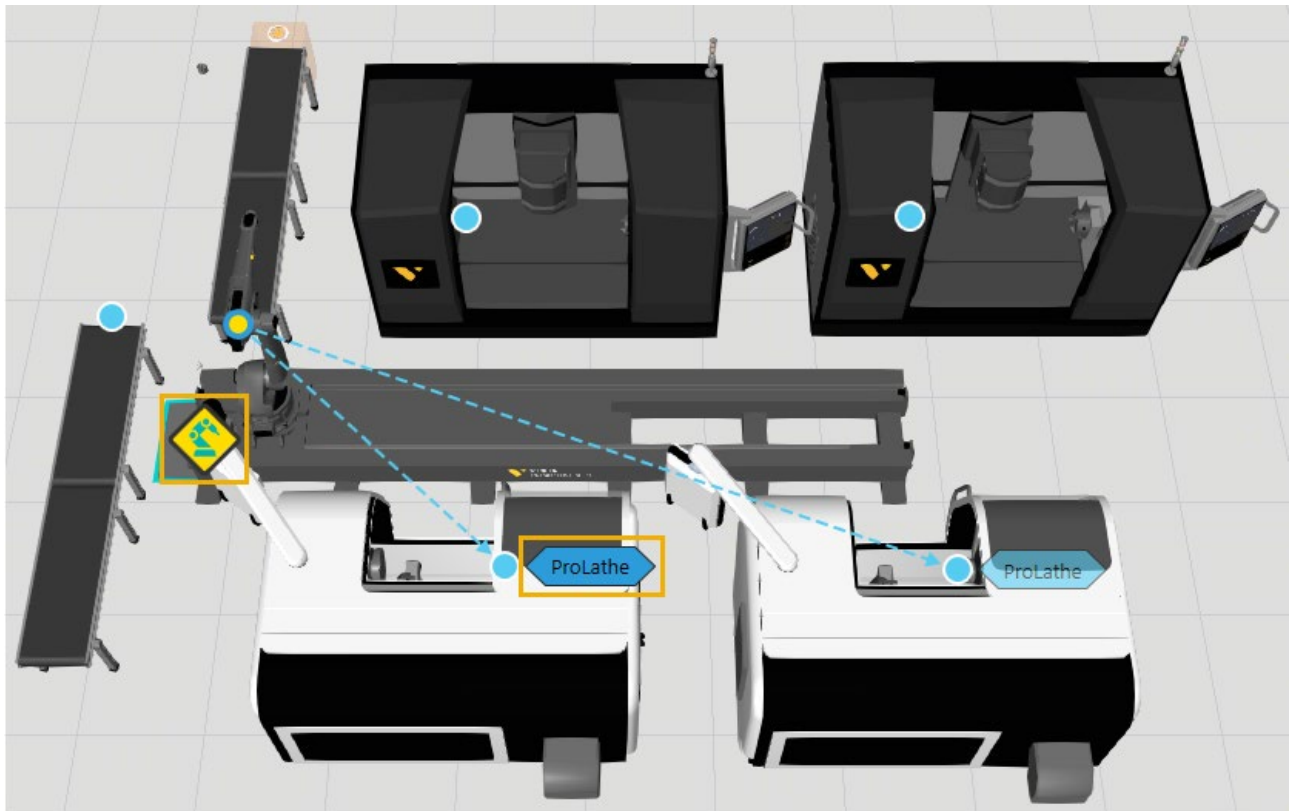
1. In the **PROCESS** tab click on **Flow**, and in the 3D world click on the **FromConveyor** label of the From Conveyor Process component at end of the first conveyor line. A process step for the **FromConveyor** process will be added to **Flow Group #1** in the **Process Flow Editor** below.



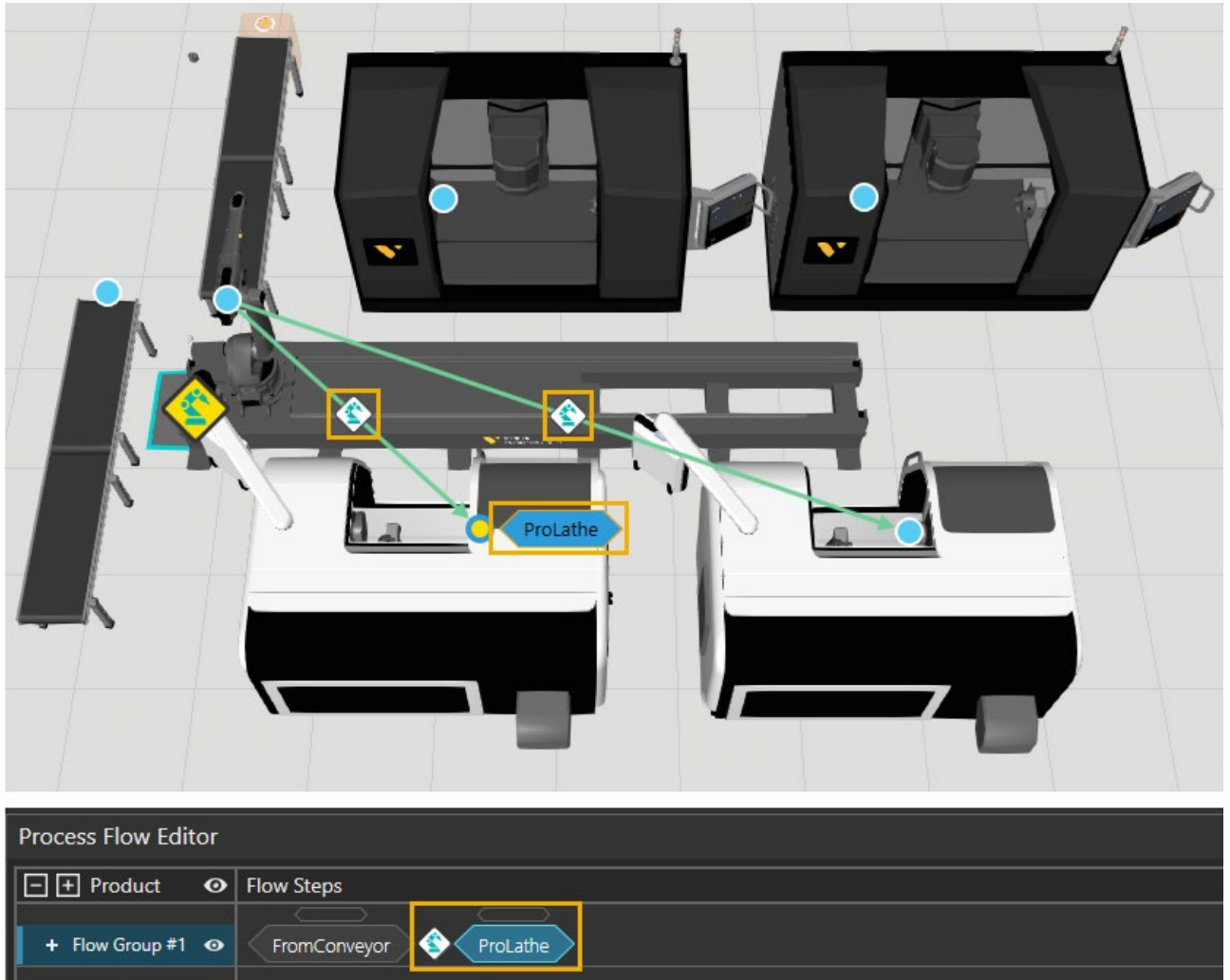
- To continue creating the Flow, we first need to select the Robot Transport Controller in the 3D world, and note how when selected the color changes to yellow.



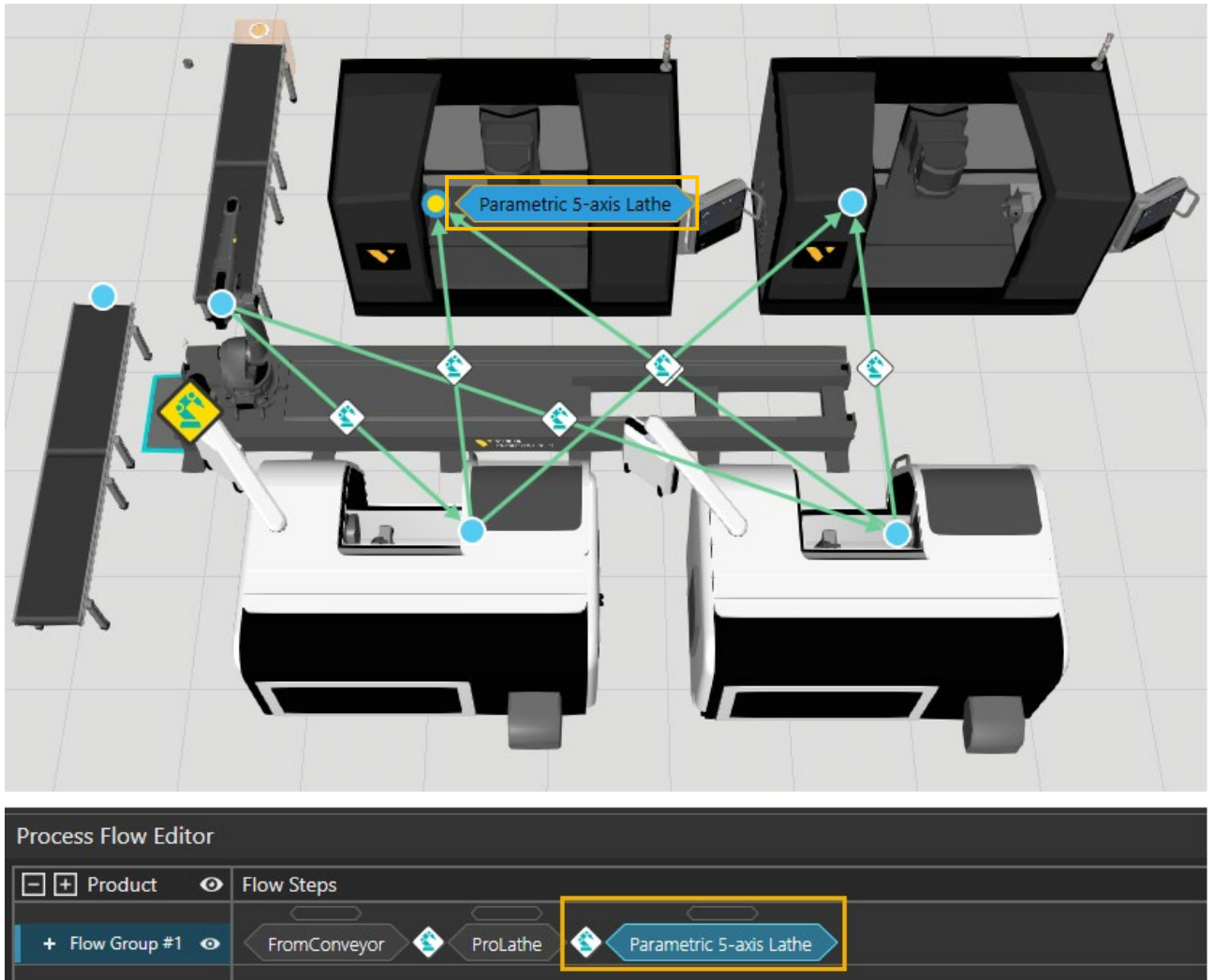
- With the Robot Transport Controller selected in the 3D world, move the mouse cursor over the **ProLathe** label of the Process Machine - ProLathe. We will see a preview of what will be added to the Flow, in this example both machines and their transport links.



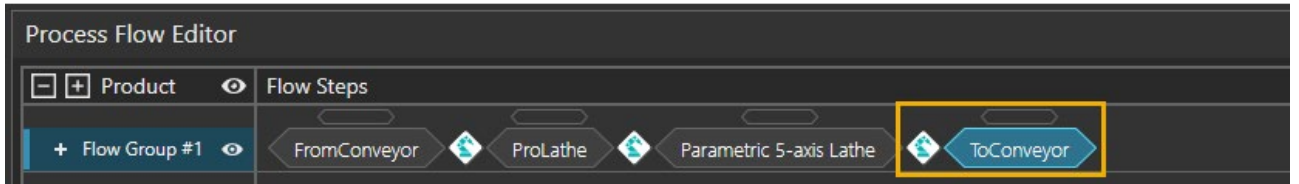
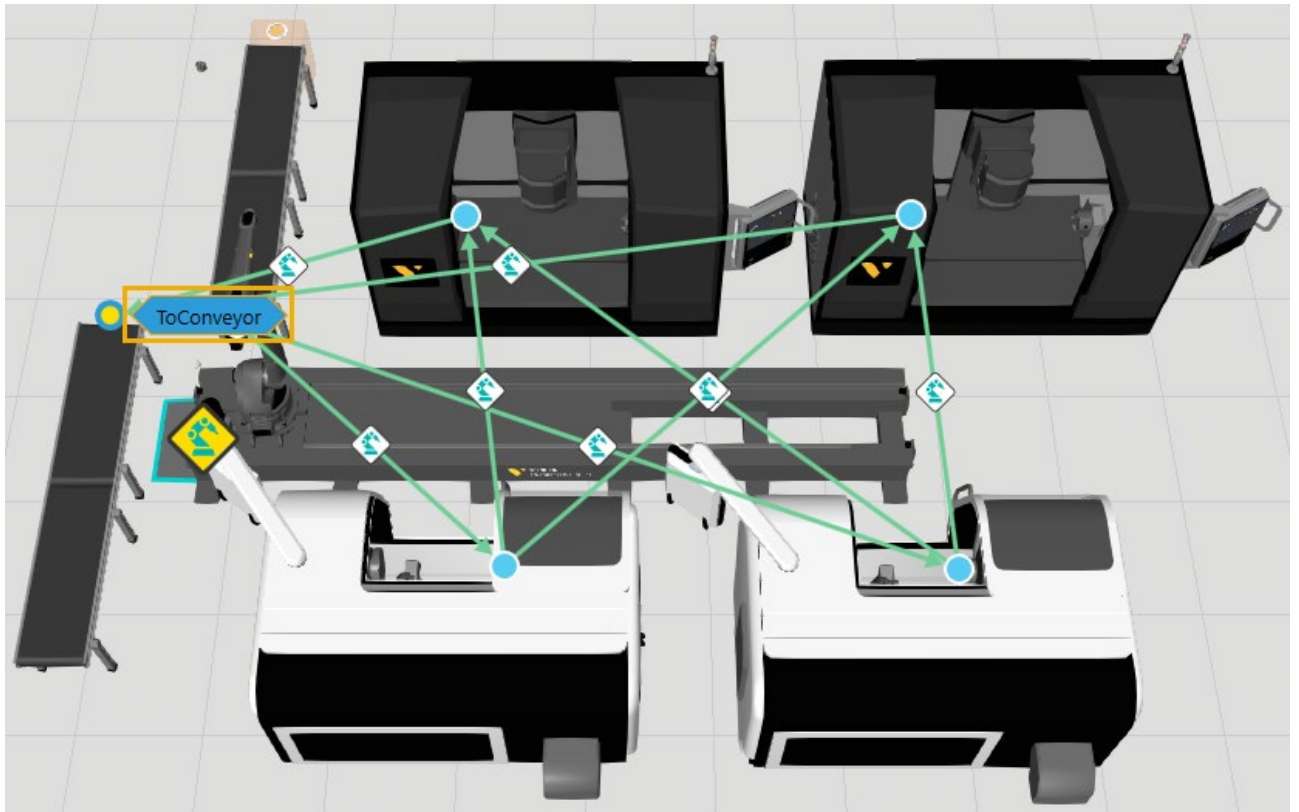
- Click on the **ProLathe** label of the Process Machine - ProLathe. The transport links for both machines are created in the 3D world, and a process step is added to **Flow Group #1** below. And we can see that the Implementer between the steps for both the transport links and the Flow is the Robot Transport Controller.



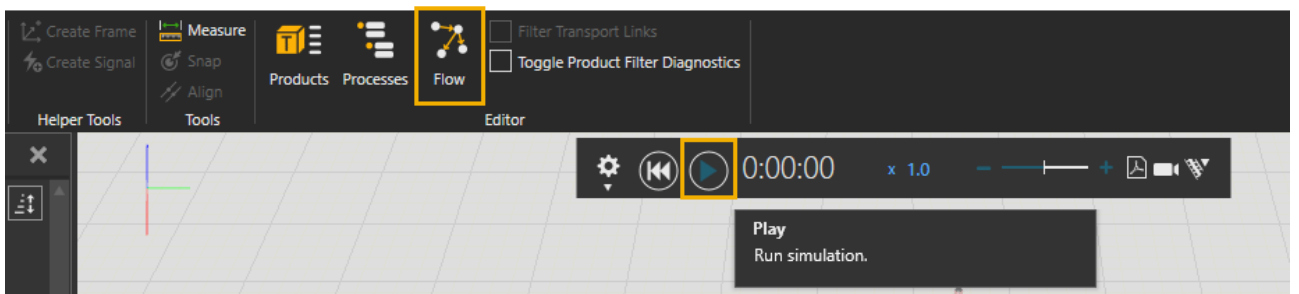
- 5. Continue by clicking on the **Parametric 5-axis lathe** label of the Parametric five-axis lathe in the 3D world. The transport links are created, and a step is added to the Flow below.



- Finally to complete this stage of the Flow, in the 3D world we click on the **ToConveyor** label of the To Conveyor Process.



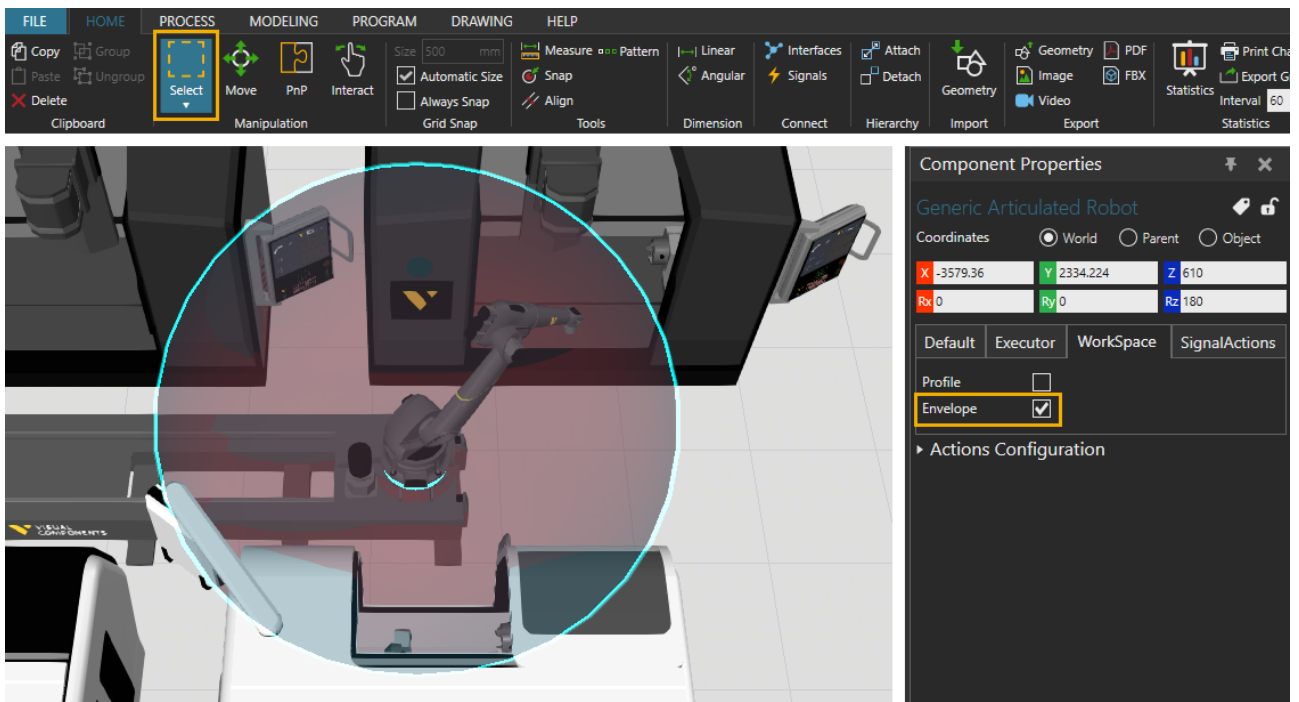
- We can now click on **Flow** to turn off the Process Flow Editor view, and click **Play** to test our simulation.



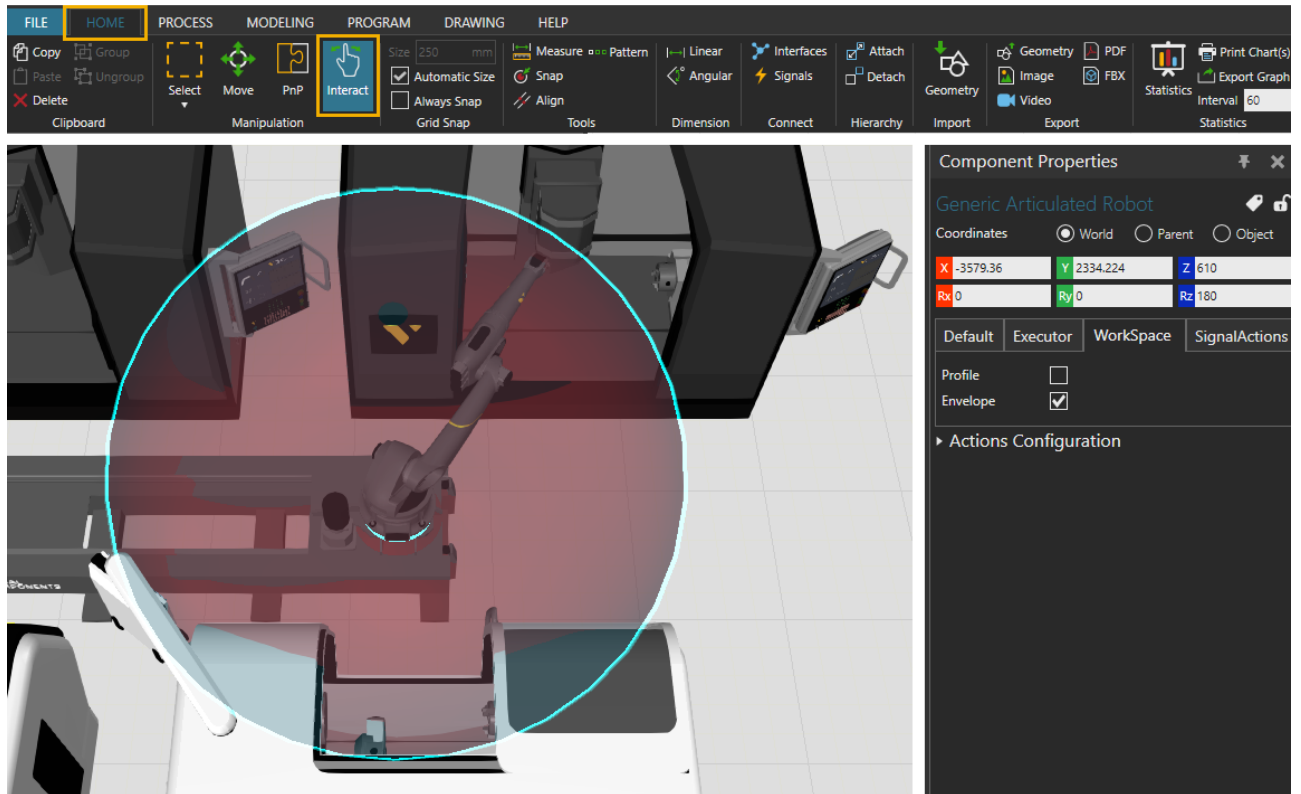
- The simulation starts, and when the robot tries to reach a Parametric 5-axis lathe, the simulation stops and we receive a message in the **Output** panel that the position of the robot is out of reach of the machine, so let's fix this.



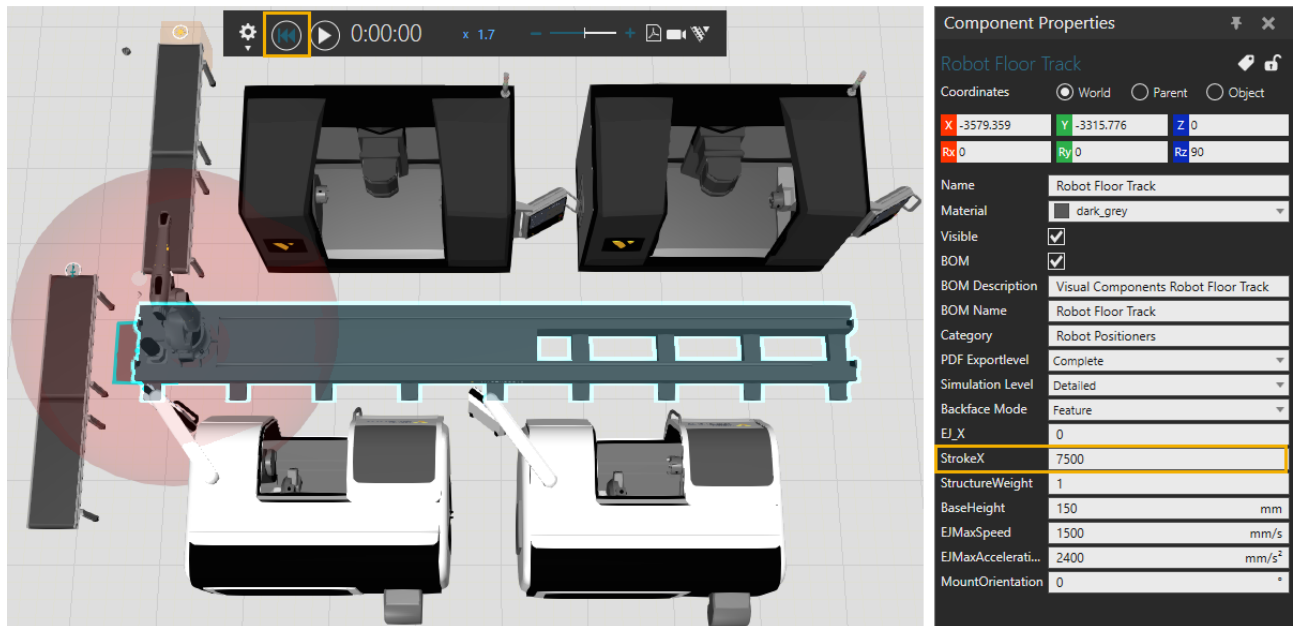
- Using the **Select** tool to select the robot, from its **Component Properties** in the **WorkSpace** tab enabling the **Envelope** will help us to identify the reach of the robot.



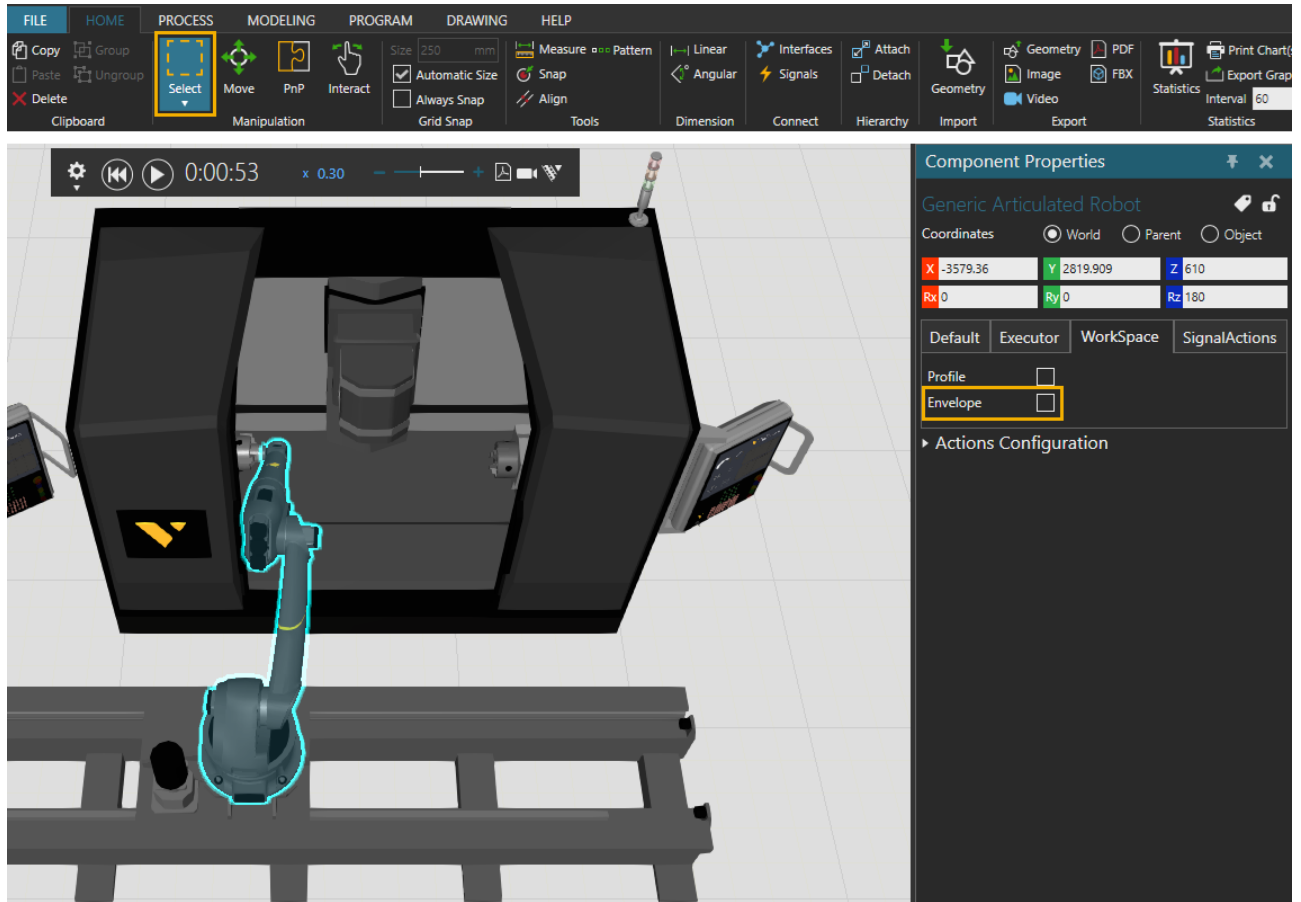
10. Going to the **HOME** tab, we can use the **Interact** tool to jog the robot and check its reachability, where we can see that from this position the machine is not reachable.



11. Clicking **Reset** to reset the simulation, one option would be to increase the length of the Robot Floor Track. Selecting the Robot Floor Track, from its **Component Properties** edit the **StrokeX** value from 5000 to 7500.



12. Clicking **Play** to run the simulation, the robot can now reach the machine. And selecting the robot, we can now disable the **Envelope** from its **Component Properties**.

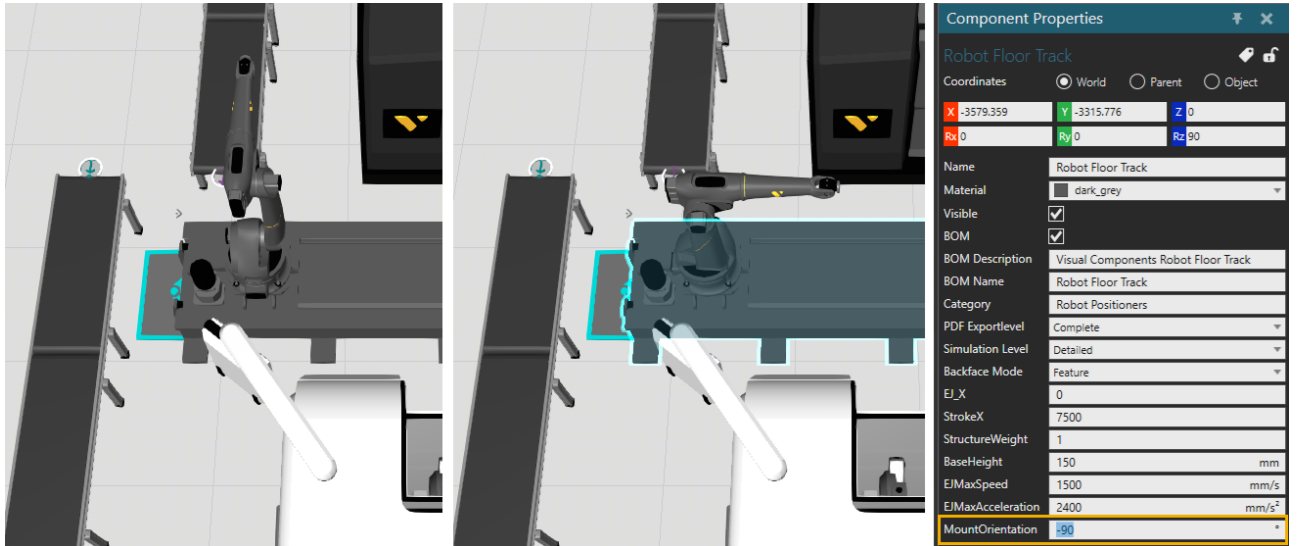


13. Resetting and running the simulation, we notice when the robot moves it is not rotating so it's parallel to the Robot Floor Track. So it passes through a machine, and when rotating to reach a Process Machine – ProLathe it requires too much rotation, so let's fix this too.



14. Resetting the simulation, select the Robot Floor Track and from its **Component Properties** edit the **MountOrientation** to -90 degrees to change the robot mount angle.

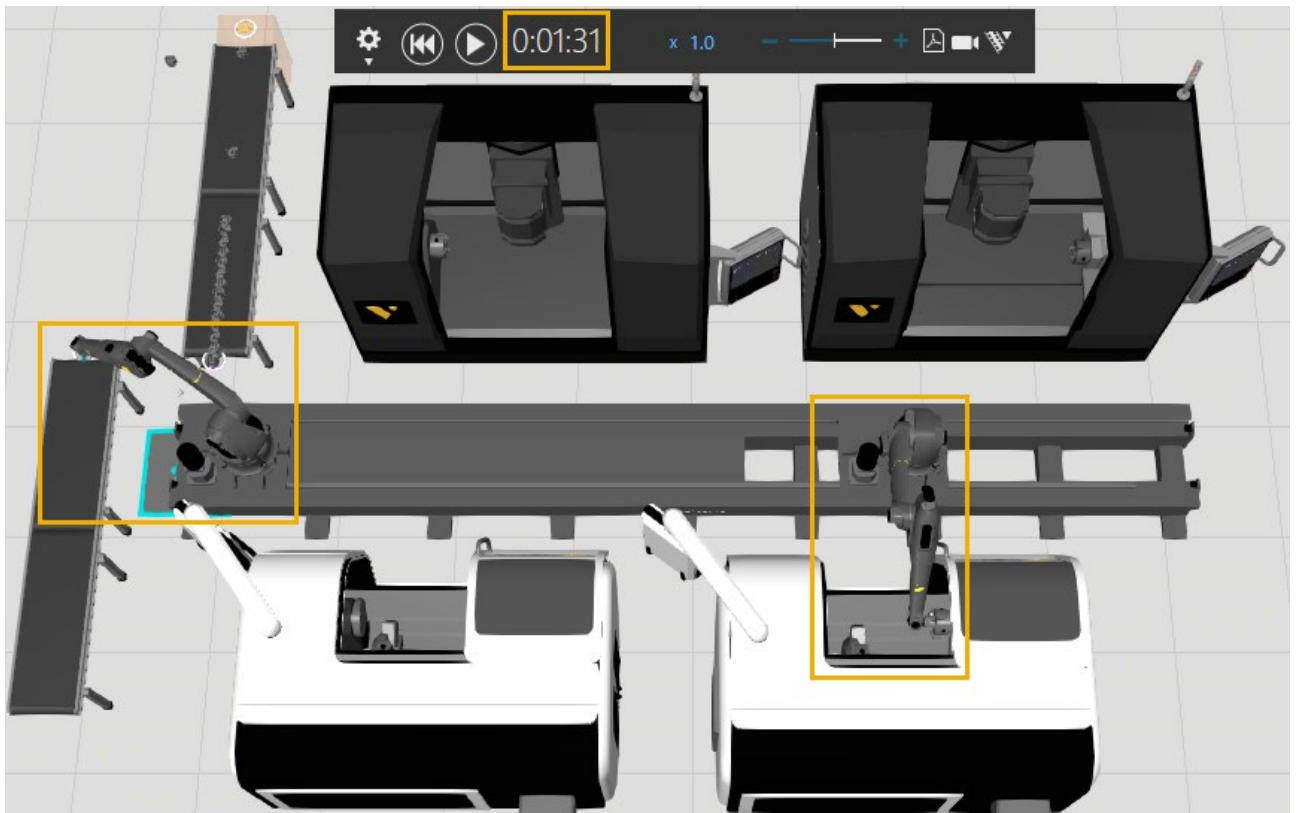
**Tip!** Since this change rotates the interface frame, if we later need to attach a robot again using PnP, it will be placed in the required position.



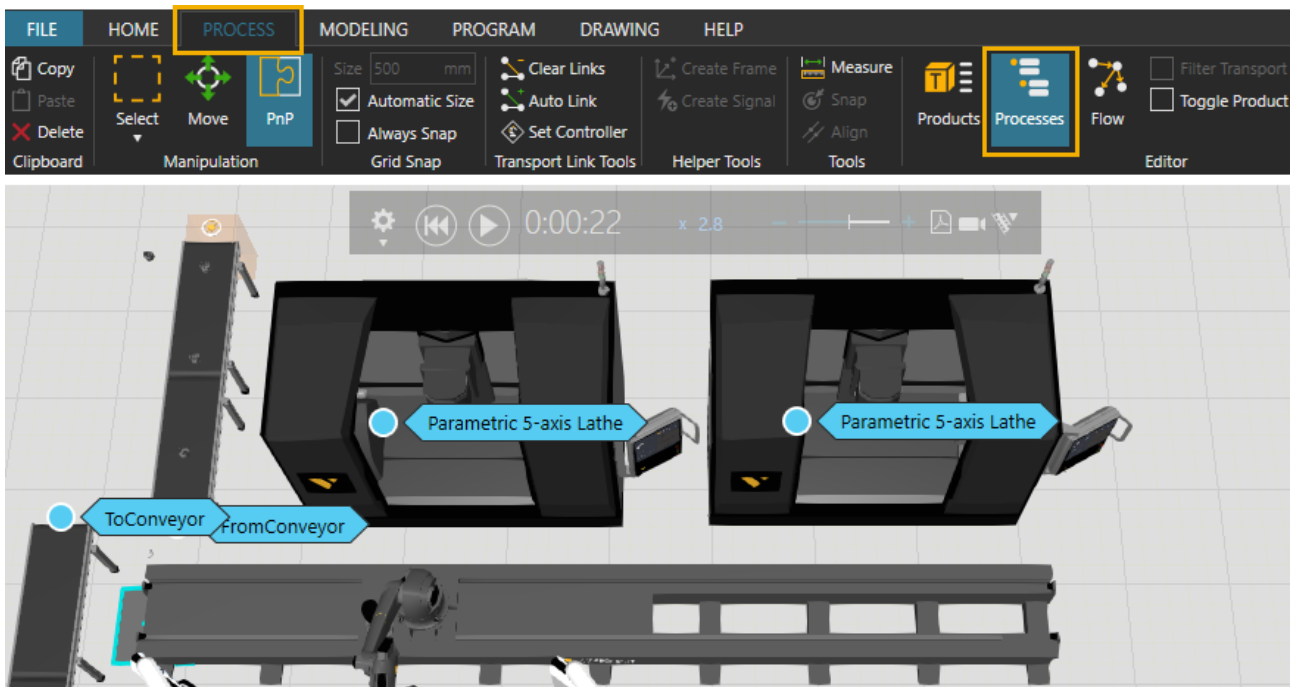
15. Now when we run the simulation, the robot moves parallel to the Robot Floor Track, so it no longer passes through a machine. And when rotating to reach a Process Machine – ProLathe it requires less rotation.



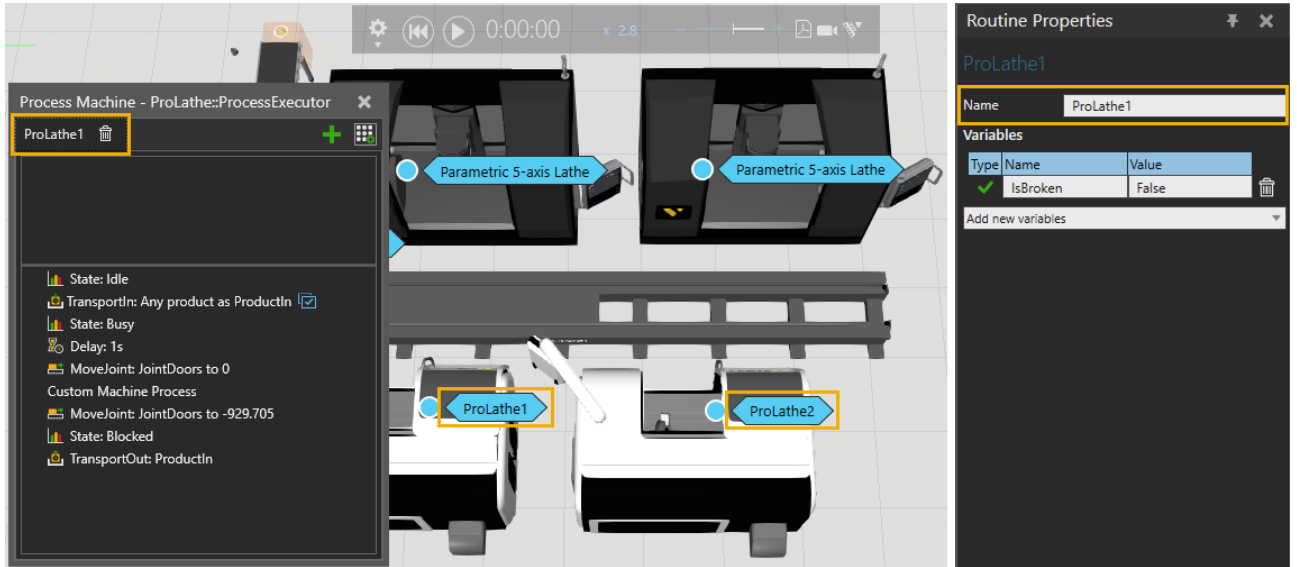
16. Before we continue adding some more components, running the simulation, the robot first approaches the Process Machine - ProLathe that is the furthest away, and it takes 01:31 to place the first processed product on the outgoing Conveyor. So let's try and improve this.



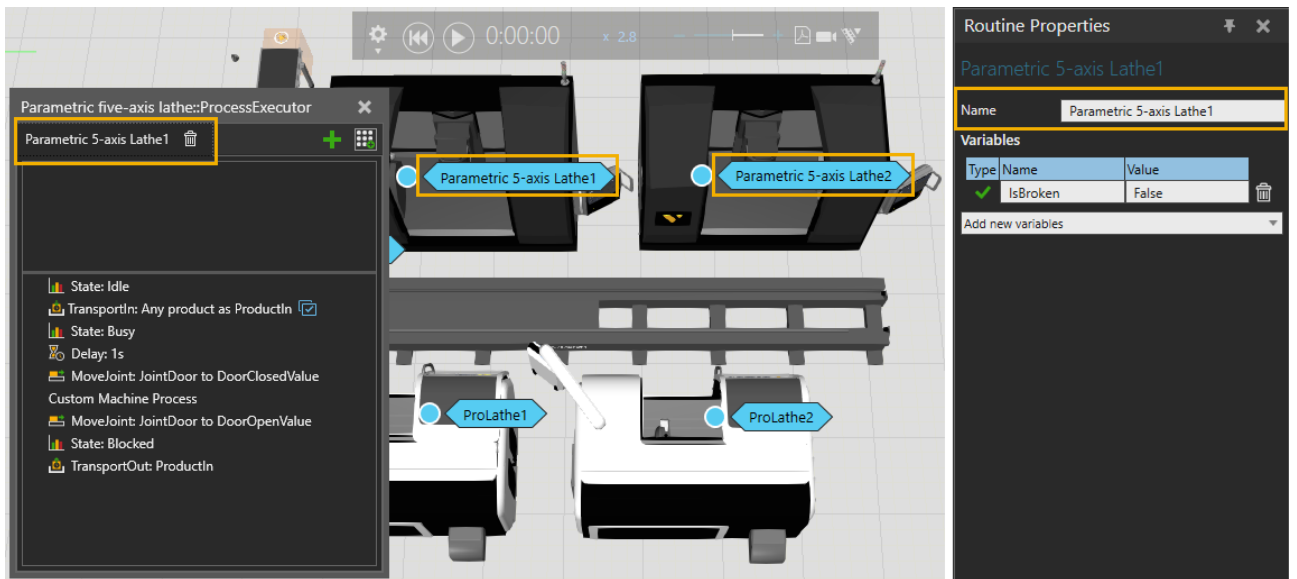
17. Resetting the simulation, in the **PROCESS** tab click on **Processes** so we can view the process labels of the machines.



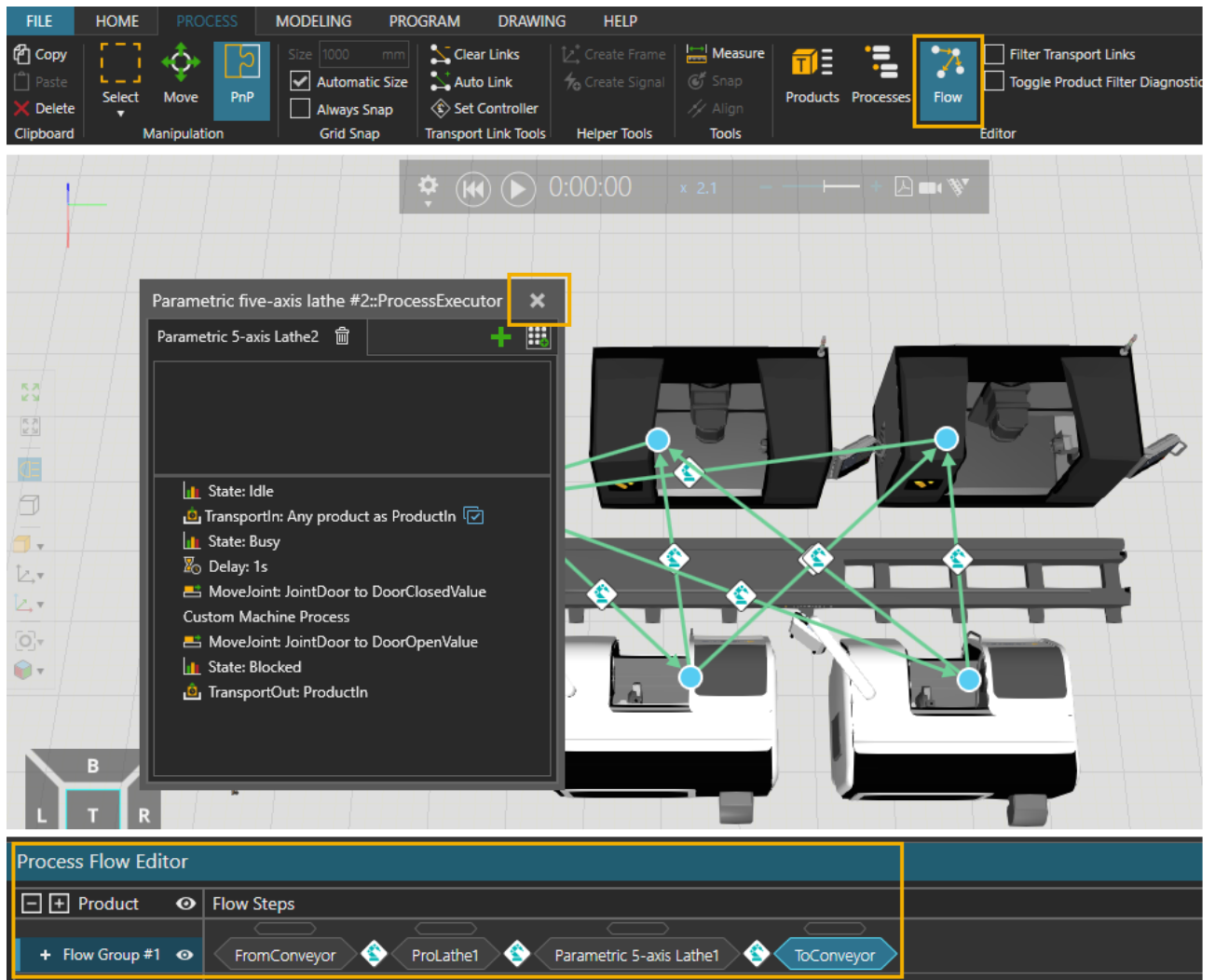
18. We are going to configure some parallel processes to optimize the machine usage and processing time. Click on the **ProLathe** process on the Conveyor side to open its **ProcessExecutor** panel, and in the **Routine Properties** rename it to **ProLathe1**. And do the same for the other **ProLathe** process, renaming it to **ProLathe2**.



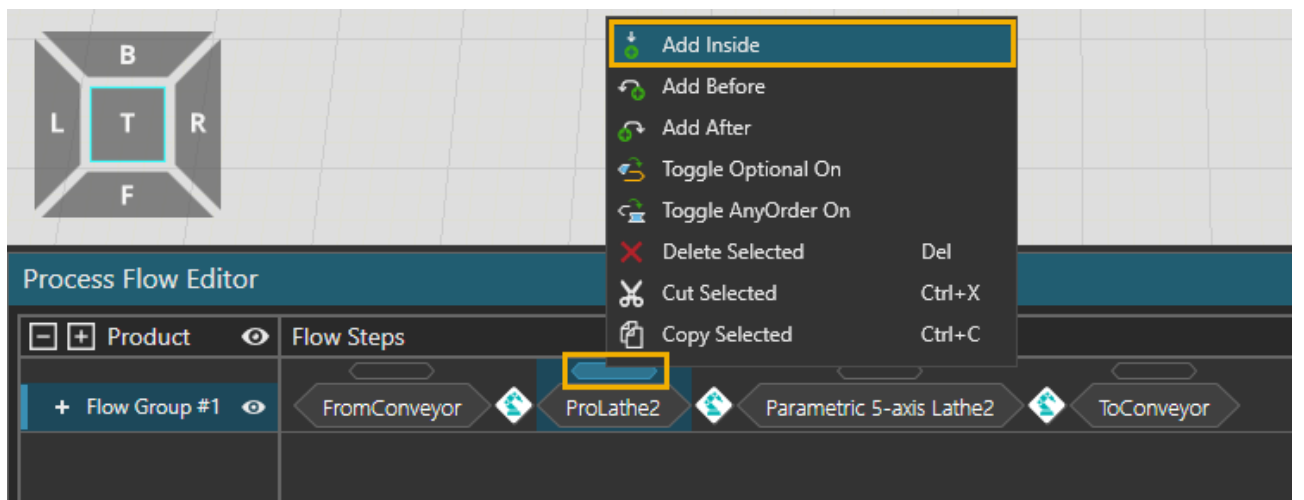
19. Repeat the same process for the **Parametric 5-axis Lathe** processes on the conveyor side. Rename it to **Parametric 5-axis Lathe1** and the other to **Parametric 5-axis Lathe2**.



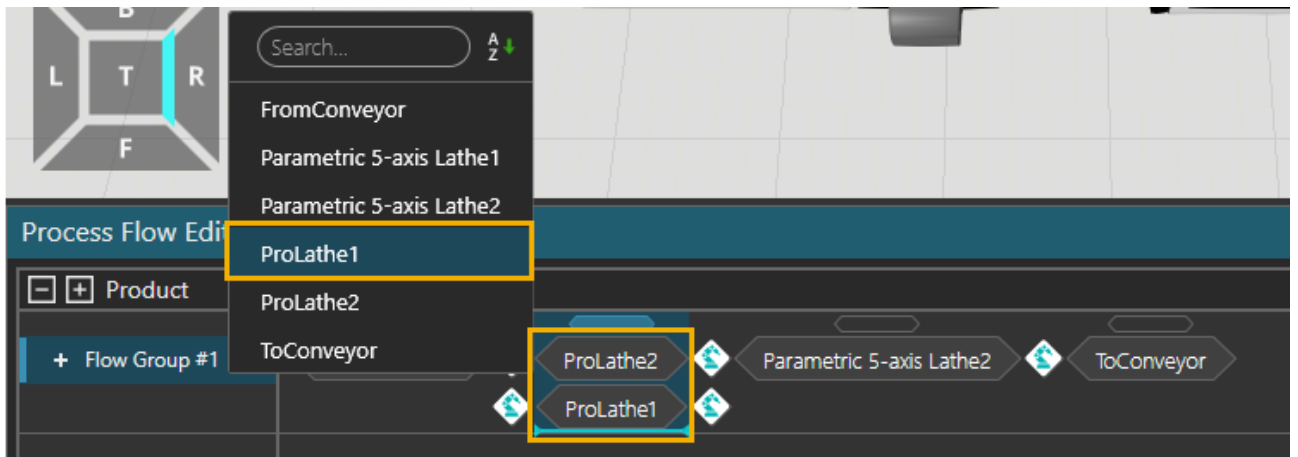
20. Close any open **ProcessExecutor** panels and click **Flow** to view the **Process Flow Editor**.



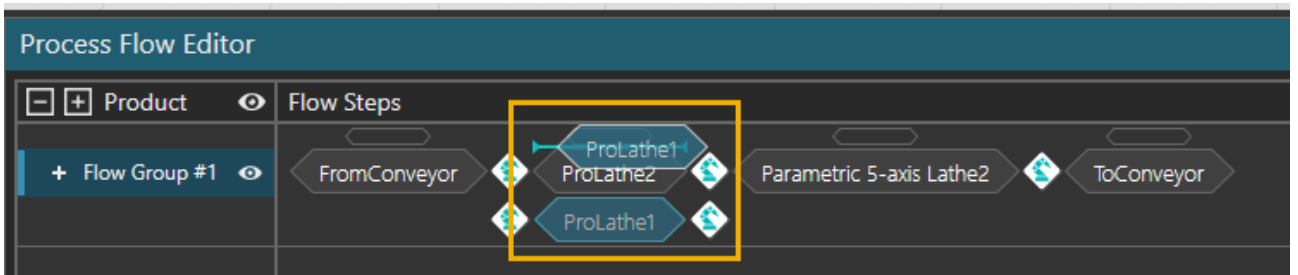
21. In the **Process Flow Editor**, right-click on the handle above the **ProLathe2** step and select **Add Inside**.



22. Select the step we want to add, in this example **ProLathe1**.



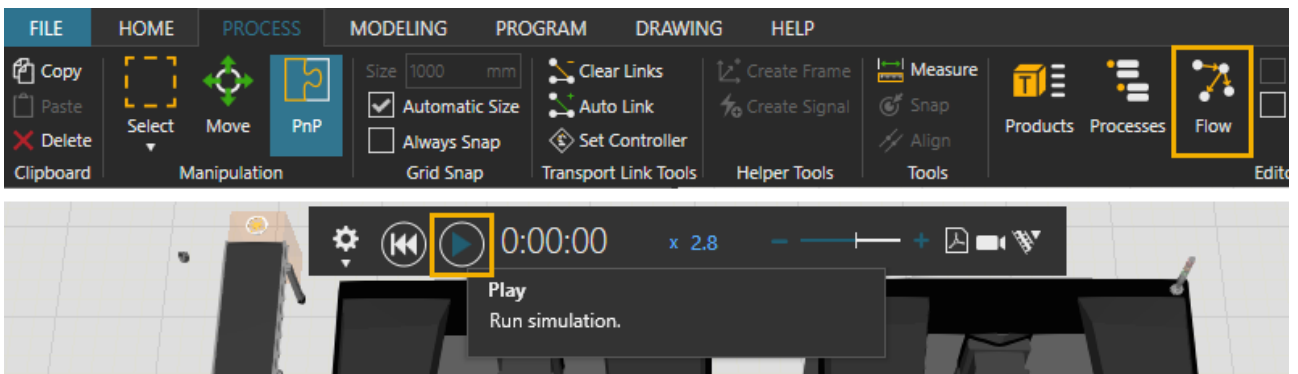
23. We want to prioritize **ProLathe1**, so let's click on this step and drag it above **ProLathe2**.



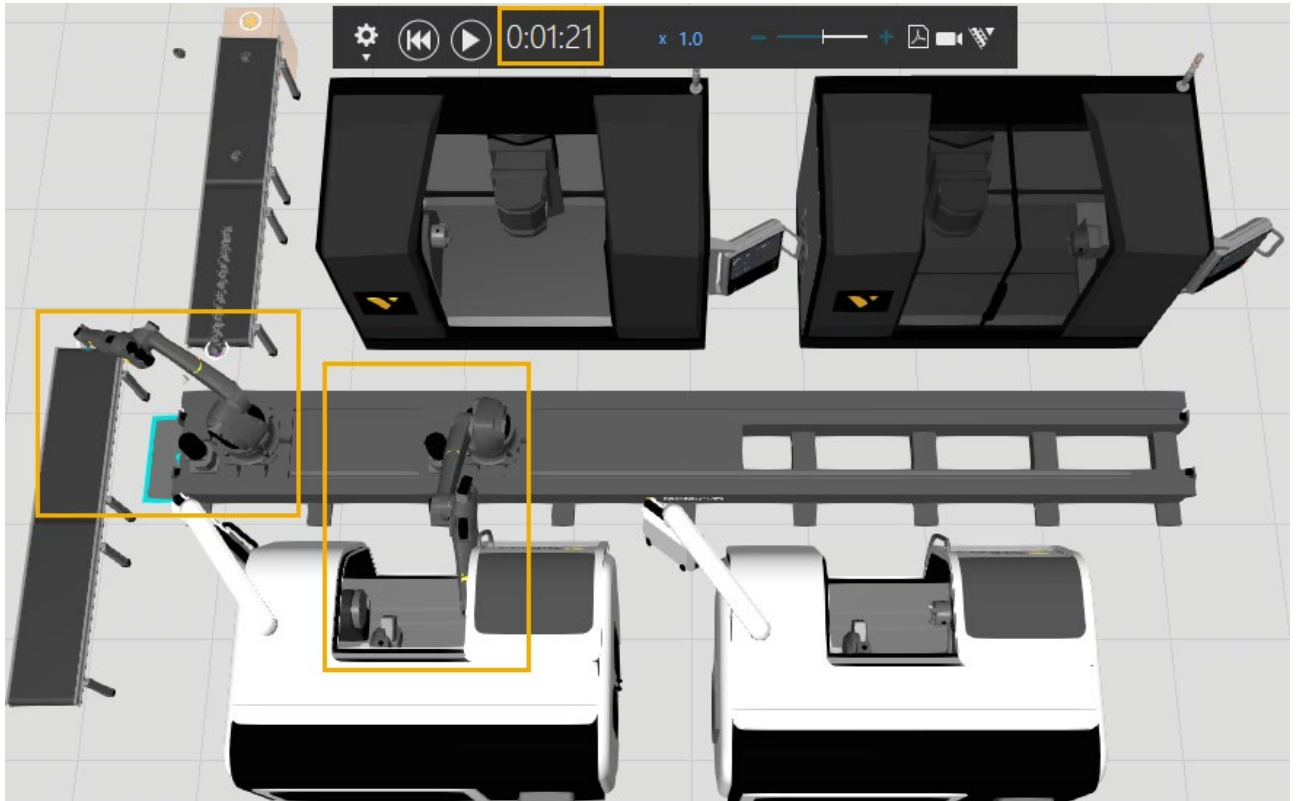
24. Repeat the process for the next step in the Flow. Right-click on the handle above the **Parametric 5-axis Lathe2** step and select **Add Inside**. Add **Parametric 5-axis Lathe1** inside the step and drag it above **Parametric 5-axis Lathe2**.



25. We can now click **Flow** to disable the Process Flow Editor and click **Play** to run the simulation.

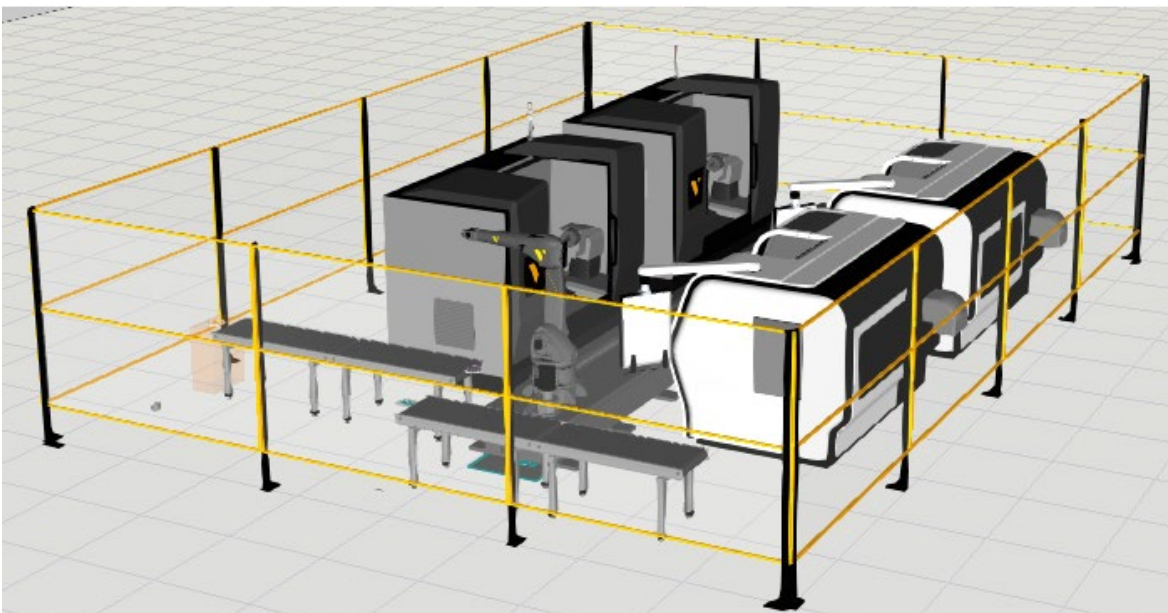


26. Running the simulation, the robot now first approaches the nearest Process Machine – ProLathe, and it takes an improved time of 01:21 to place the first product on the outgoing conveyor.

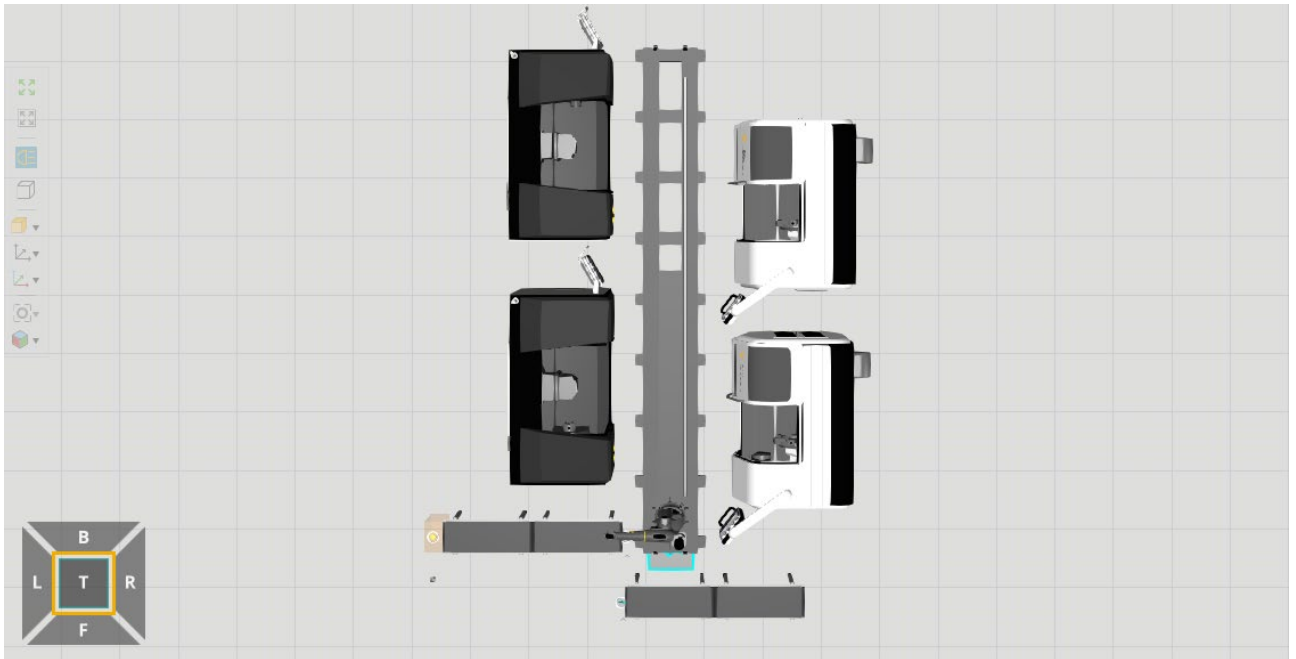


## Interior facilities

The eCatalog provides Interior and Factory Facilities libraries. These components are static components used for enriching the simulation environment with tables, fences, walls etc. We will start by adding a fence around our robot cell.

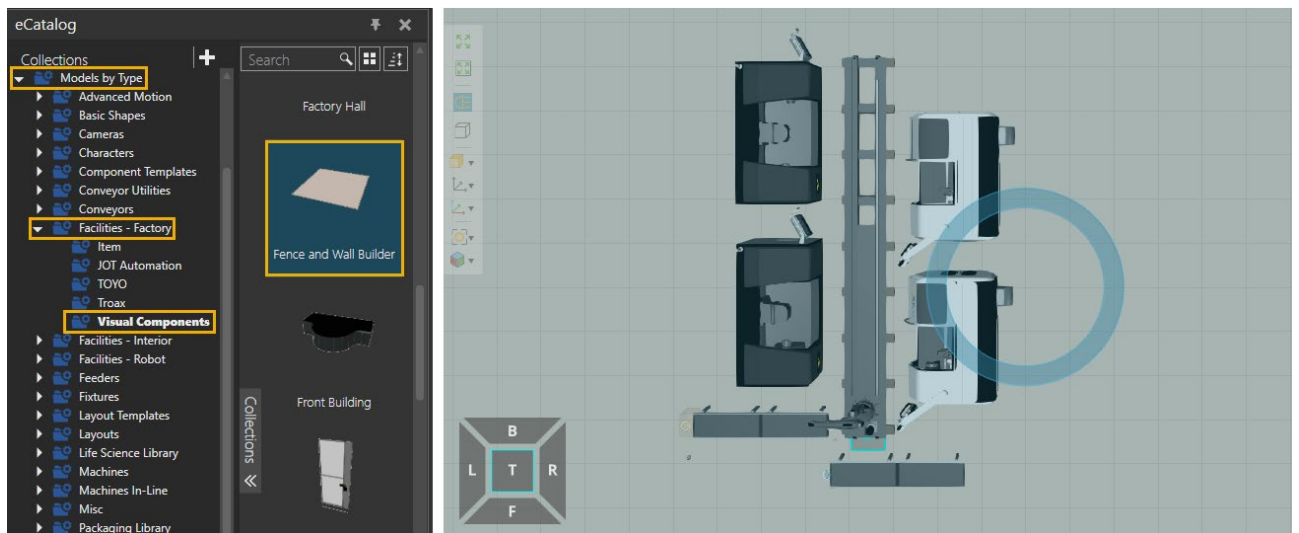


1. In the **HOME** tab, let's first zoom out our view and click the **T** (Top/Down) button on the View Selector until we get a view like the example illustrated below.



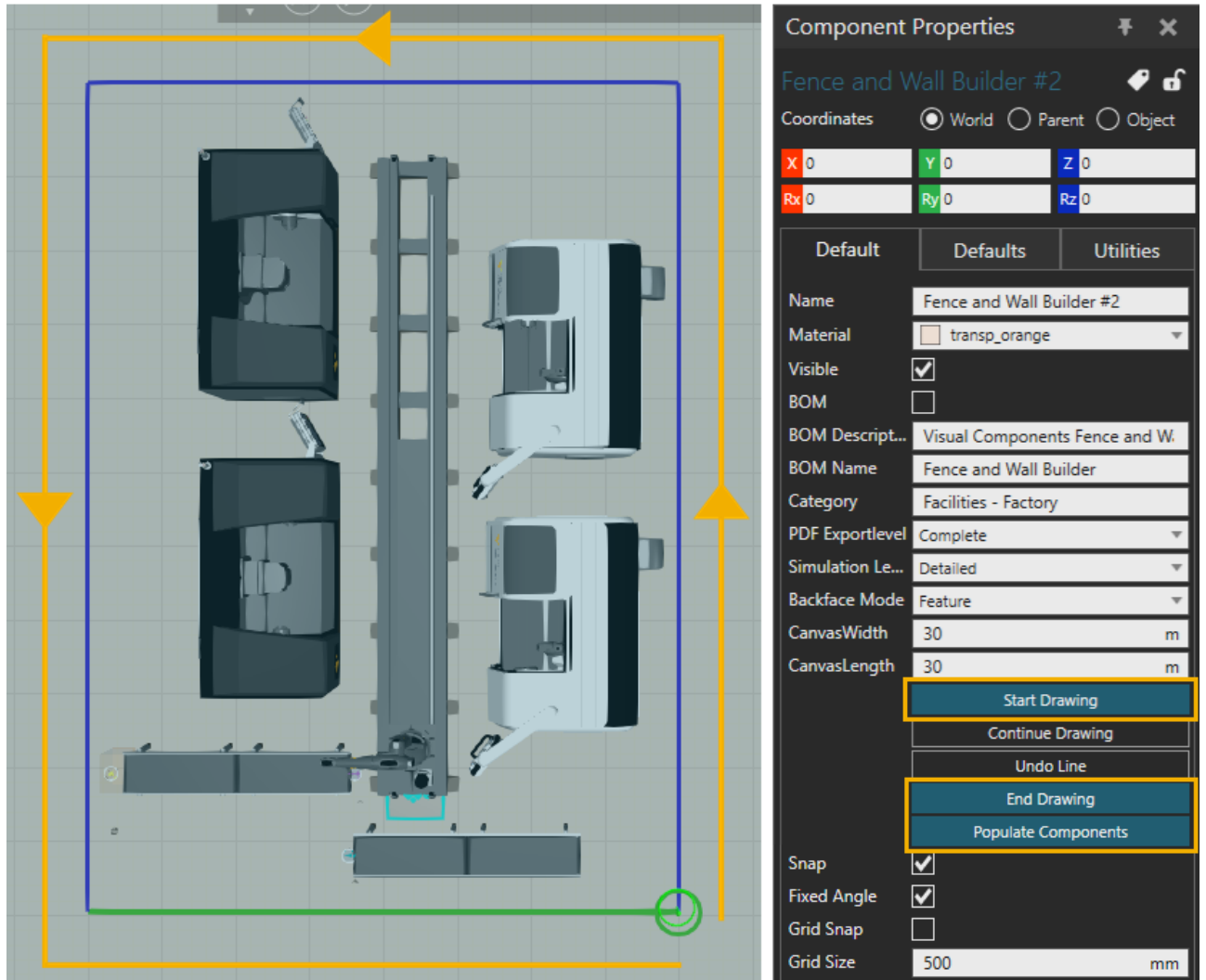
2. We are going to create a fence around our robot cell, so from the **eCatalog** expand **Models by Type** and **Facilities - Factory** and **Visual Components** and double-click to add a **Fence and Wall Builder** into the 3D world.

**Note:** The CanvasWidth and CanvasLength of the **Fence and Wall Builder** is by default 30 meters, so when adding it from the **eCatalog** it may completely fill the 3D world view.

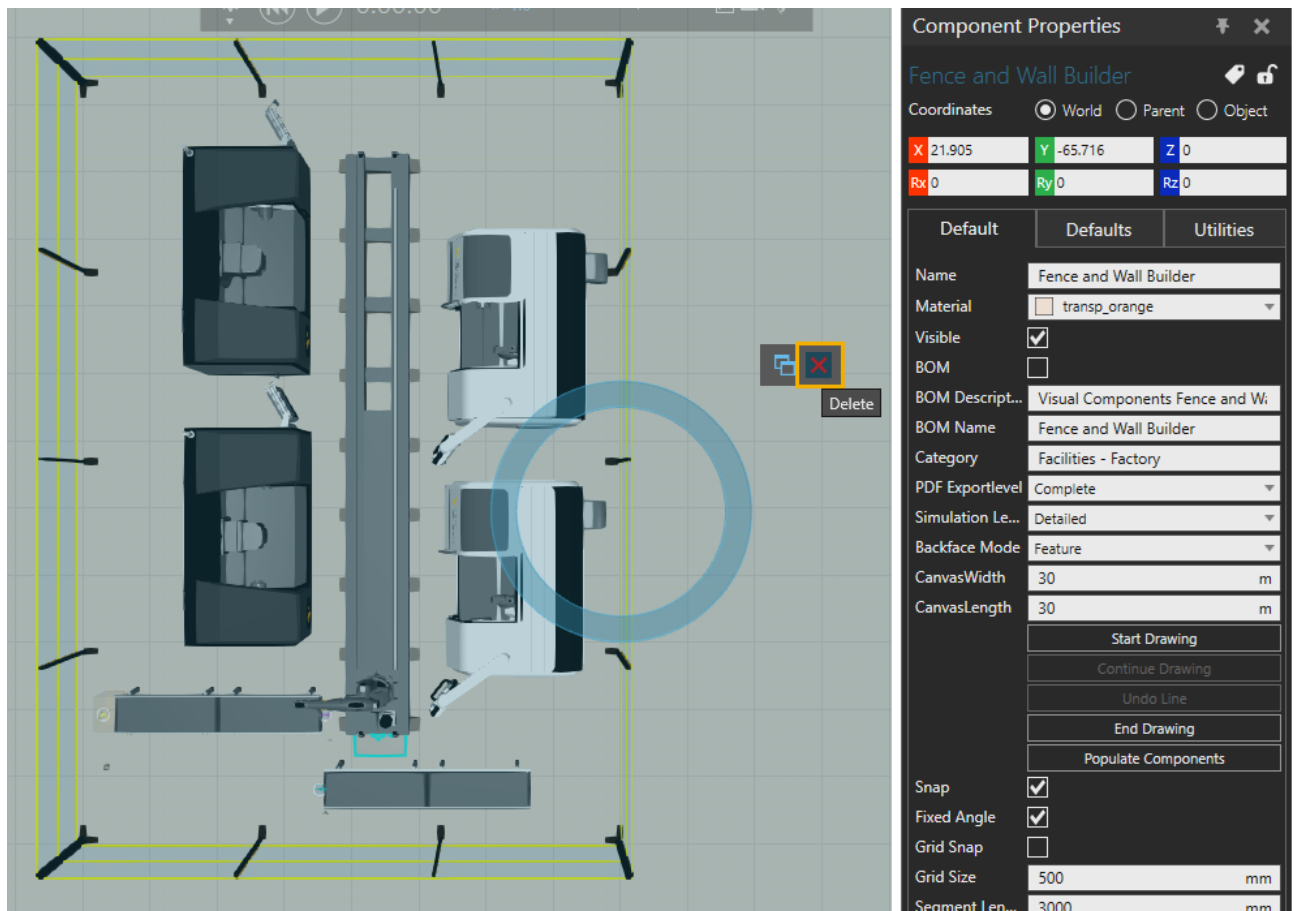


3. Select the Fence and Wall Builder and click **Start Drawing**, and place the green indicator in the 3D world view to create a starting point, in this example in the lower right corner. Draw all around the robot cell to create a closed contour for the fences. During the drawing, if you want to undo a line, you can press **Undo Line**.

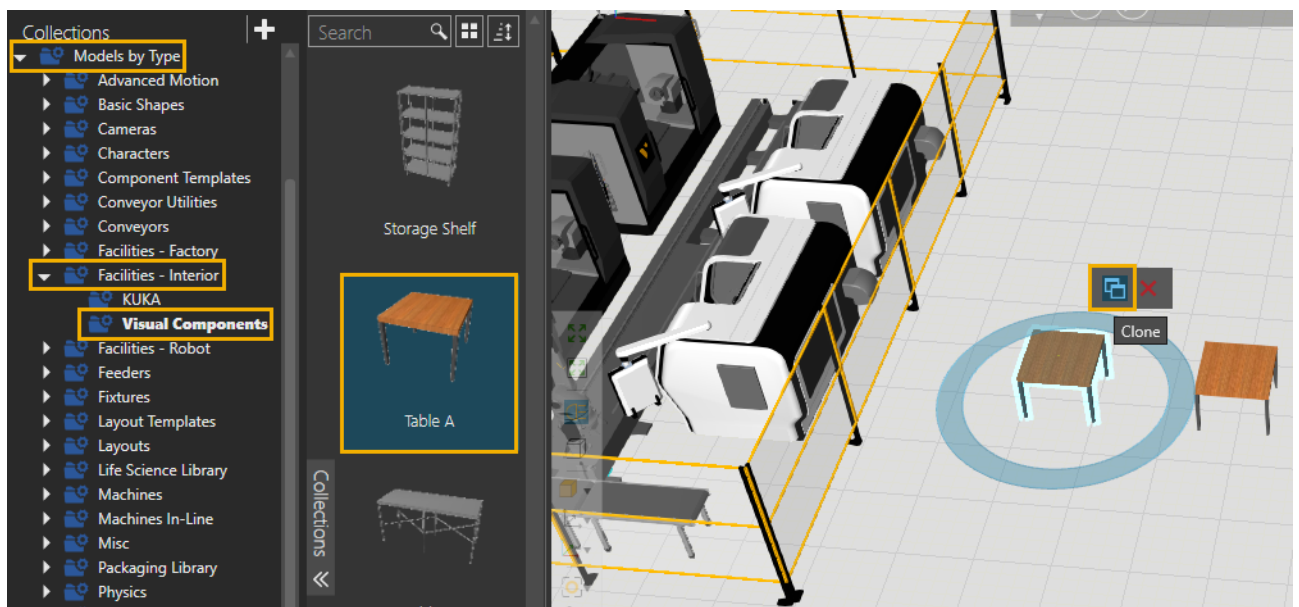
Once the drawing is finished, click **End Drawing**. And to render the fence click **Populate Components**.



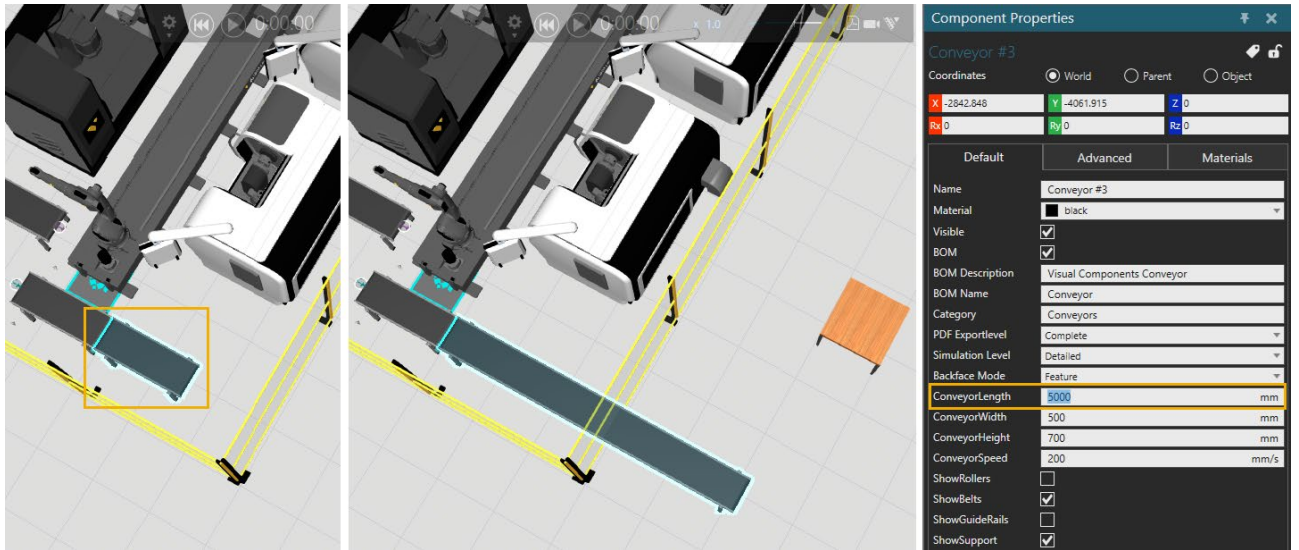
- With the fence created we no longer require the Fence and Wall Builder component. Click away from the robot cell to select the Fence and Wall Builder, and from the toolbar that appears click **Delete**.



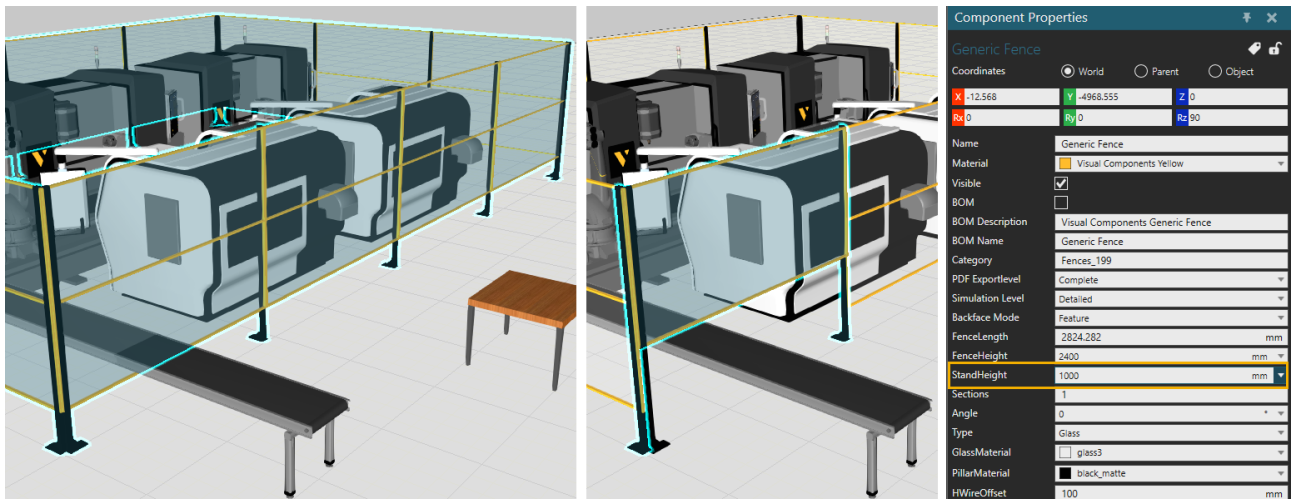
- From the eCatalog expand **Models by Type** and **Facilities - Interior** and **Visual Components** and drag and drop a **Table A** into the 3D world placing it outside the robot cell as shown below. Using copy and paste or **Clone** create another **Table A** placing it beside the first.



- Now let's extend the output Conveyor outside of the fence. Select the second Conveyor in the line, and from its **Component Properties** edit the **ConveyorLength** to 5000 mm.

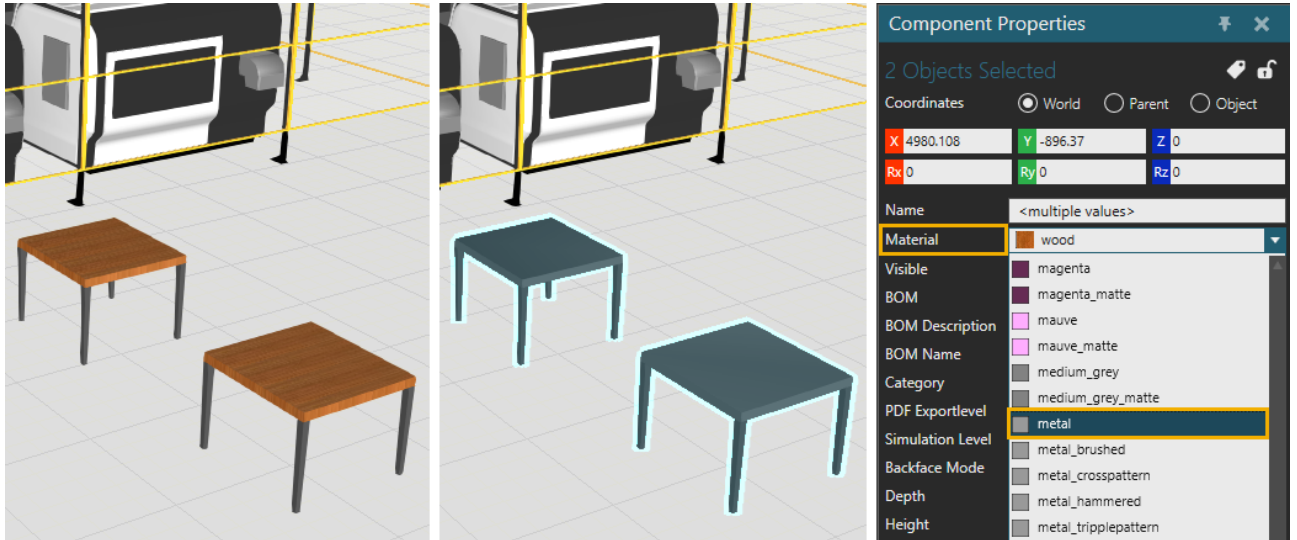


- We need to create a space in the fence for the conveyor. Click on the fence and click again to select this specific **Generic Fence** section and adjust the **StandHeight** to 1000 mm.



- Maybe wooden tables are not the best option for an industrial environment so let's change the material. Holding CTRL to multiselect both Table A components, from the **Component Properties** change the **Material** to **metal**.

**Tip!** Typing the first few letters of the **Material** name you want will jump to that selection.



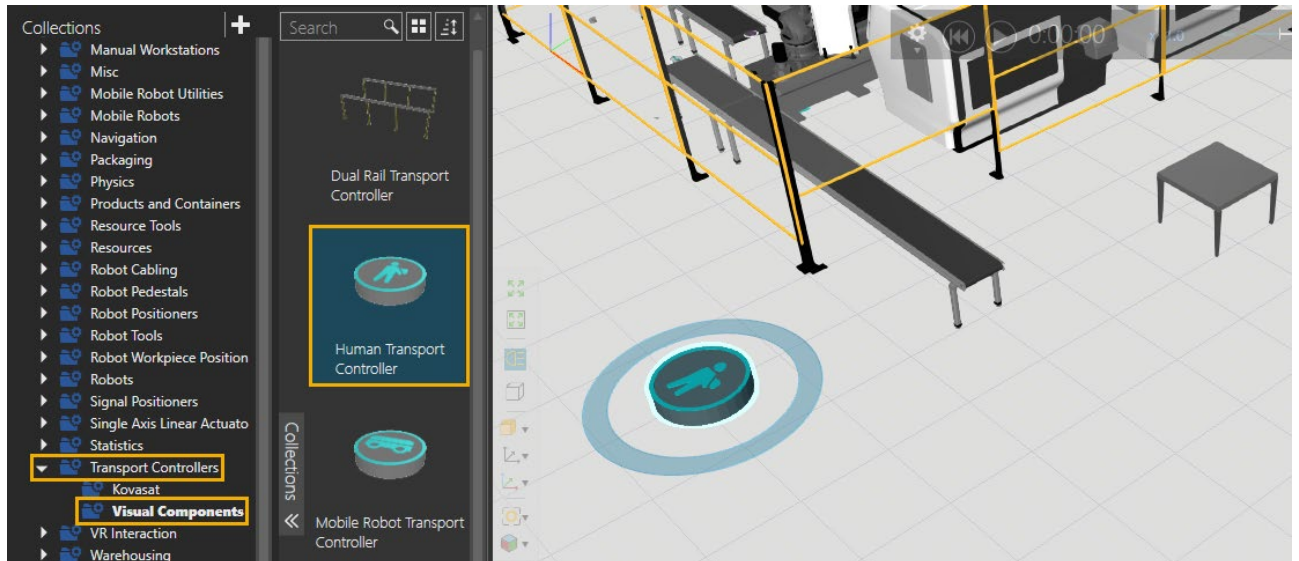
- Later we will place Process Nodes on these Table A components which have a height of 700, so let's also change the **Height** of the Table A components to 700 mm.



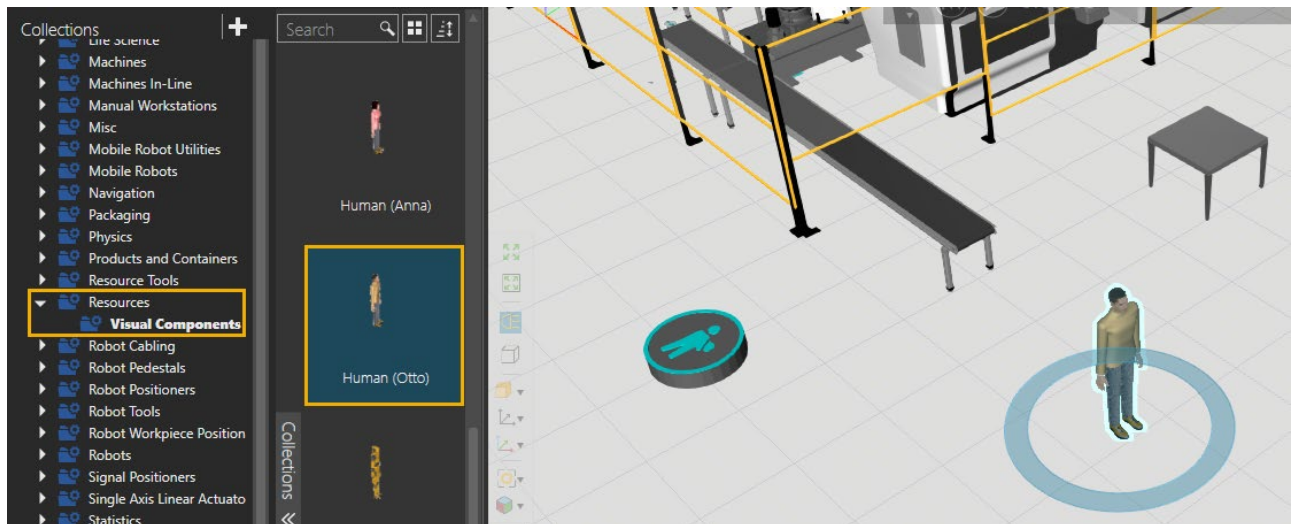
## Create Statements

A Process Modeling Statement is used for creating and executing specific tasks. Now we'll create a manual assembly cell using the Process Modelling components.

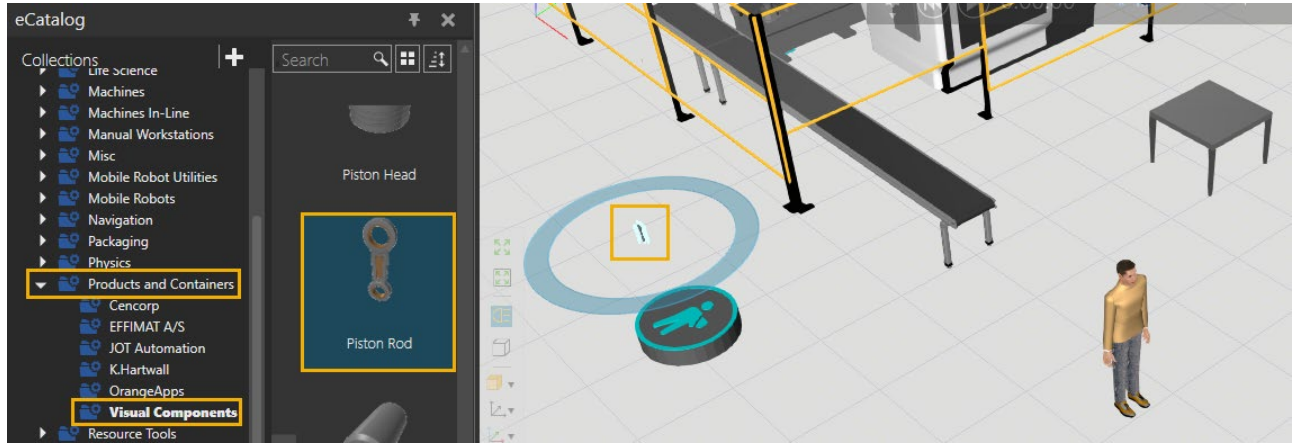
1. In the **HOME** tab, from the **eCatalog**, expand **Models by Type** and **Transport Controllers** and **Visual Components** and drag and drop a **Human Transport Controller** into the 3D world. Where we place this component is not important, let's place it close to the output Conveyor.



2. Expand **Resources** and **Visual Components** and drag and drop a **Human** into the 3D world placing it close to the output Conveyor.



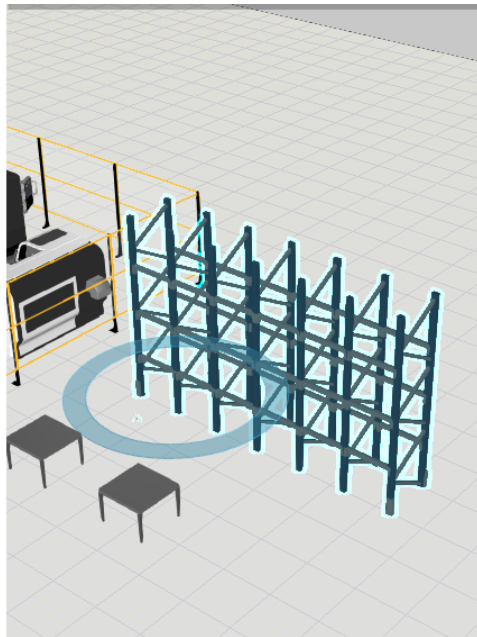
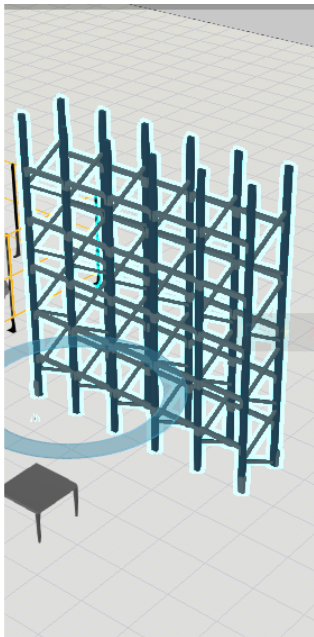
- Expand **Products and Containers** and **Visual Components** and drag and drop a **Piston Rod** into the 3D world. Again, where we place it is not important, let's place it beside the Human Transport Controller. And like the Piston Head the Feeder creates, the **Piston Rod** is also a template for dynamic components that will be created later.



- Expand **Warehousing** and **Visual Components** and drag and drop a **Warehouse Shelf** into the 3D world placing it behind the Table A components as shown below.



- From the **Component Properties** we can customize the shelf, so in the **Default** tab set **Tiers** to 3 and **Bays** to 6.



**Component Properties**

Warehouse Shelf

Coordinates: World Parent Object

X: 2693.478 Y: 2514.723 Z: 0

Rx: 0 Ry: 0 Rz: 0

Default Options Materials

Name: Warehouse Shelf

Material: metal

Visible:

BOM:

BOM Description: Visual Components Warehouse Shelf

BOM Name: Warehouse Shelf

Category: Warehousing

PDF ExportLevel: Complete

Simulation Level: Detailed

Backface Mode: Feature

Presets: Pallet Rack

Tiers: 3

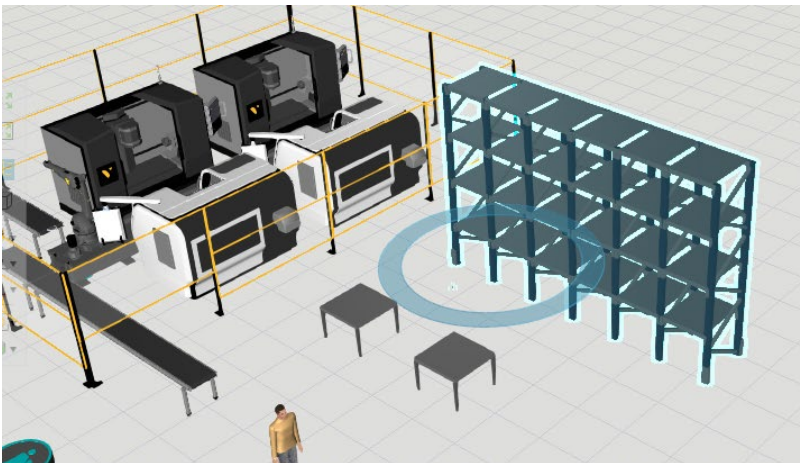
Bays: 6

BaysPerSupportBeam: 1

BayWidth: 900 mm

BayDepth: 1100 mm

- And in the **Options** tab, enable **Shelf** and **TopShelf**.



**Component Properties**

Warehouse Shelf

Coordinates: World Parent Object

X: 2693.478 Y: 2514.723 Z: 0

Rx: 0 Ry: 0 Rz: 0

Default Options Materials

Shelf:

Rail:

Beam:

TopShelf:

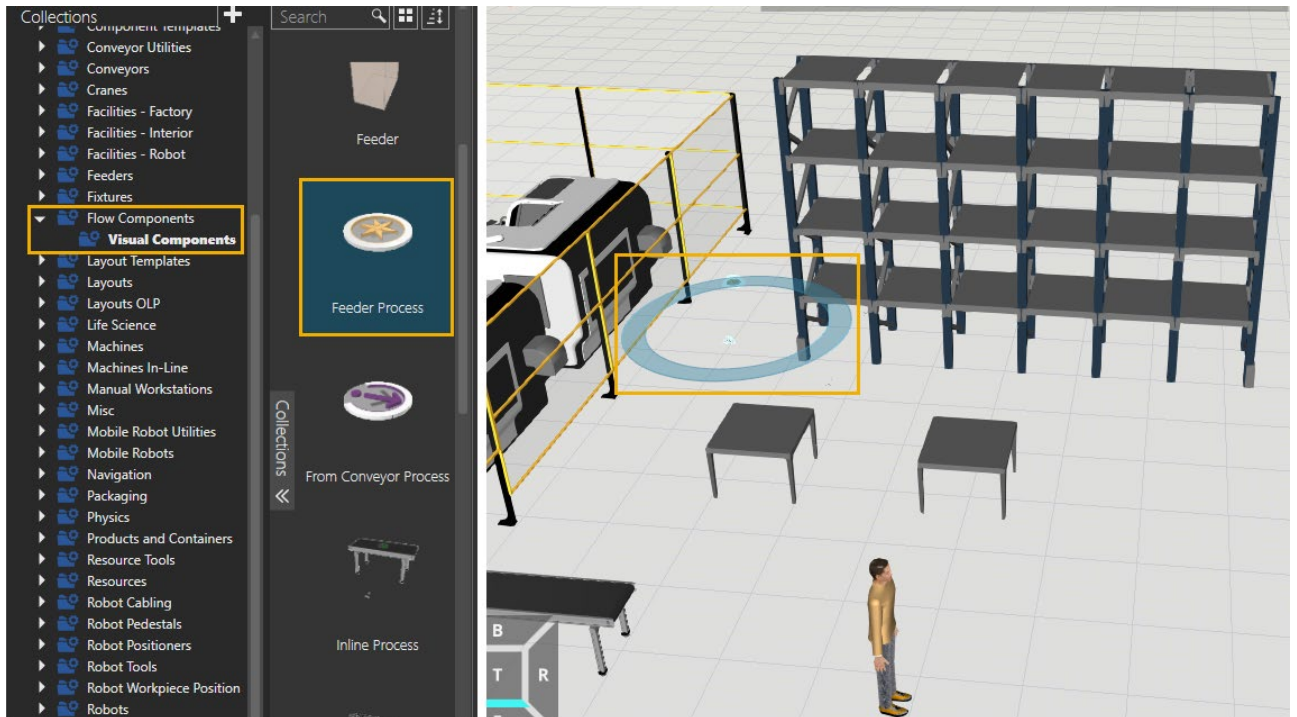
DiagonalBrazing:

UprightProtector:

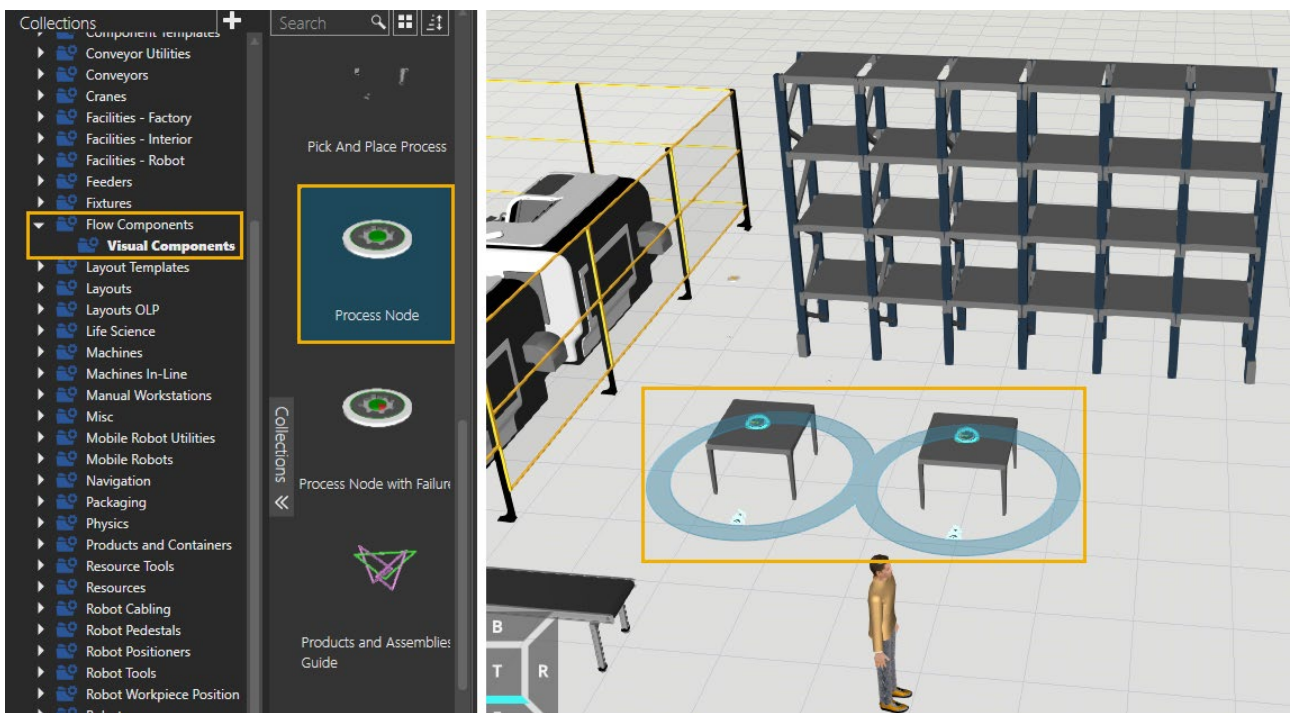
FallProtectionMesh:

PickToLight:

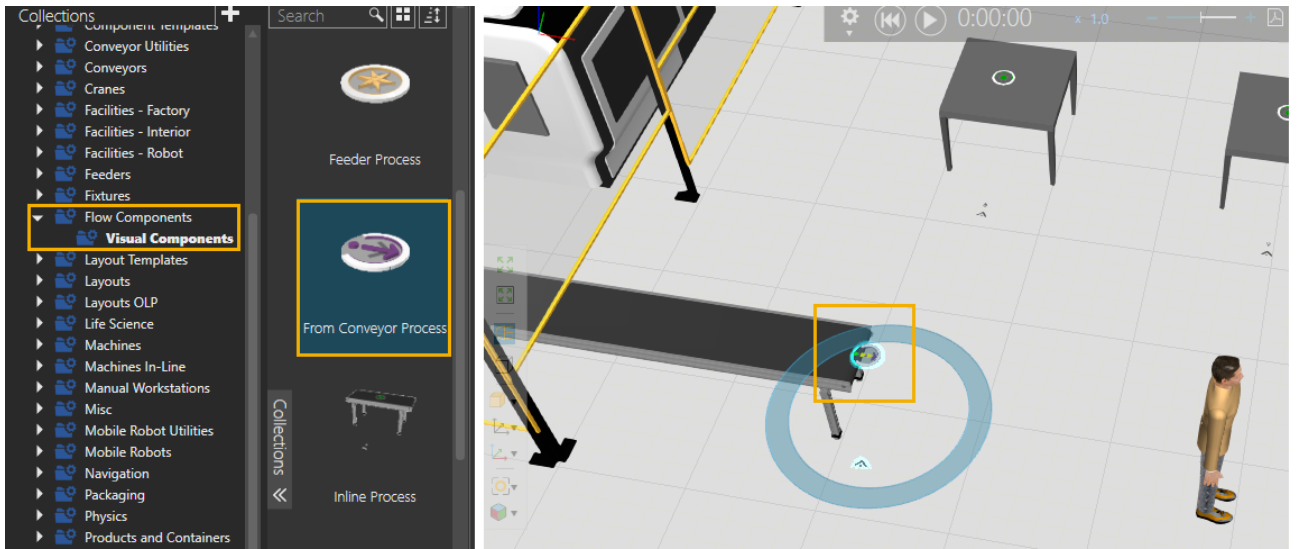
- Expand **Flow Components** and **Visual Components** and drag and drop a **Feeder Process** into the 3D world, placing it between the Warehouse Shelf and the fence.



- From the same category, drag and drop a **Process Node** into the 3D world, placing it on a Table A. And to add another **Process Node** to the other Table A, we could just drag and drop another **Process Node** or copy and paste or Clone the first one.



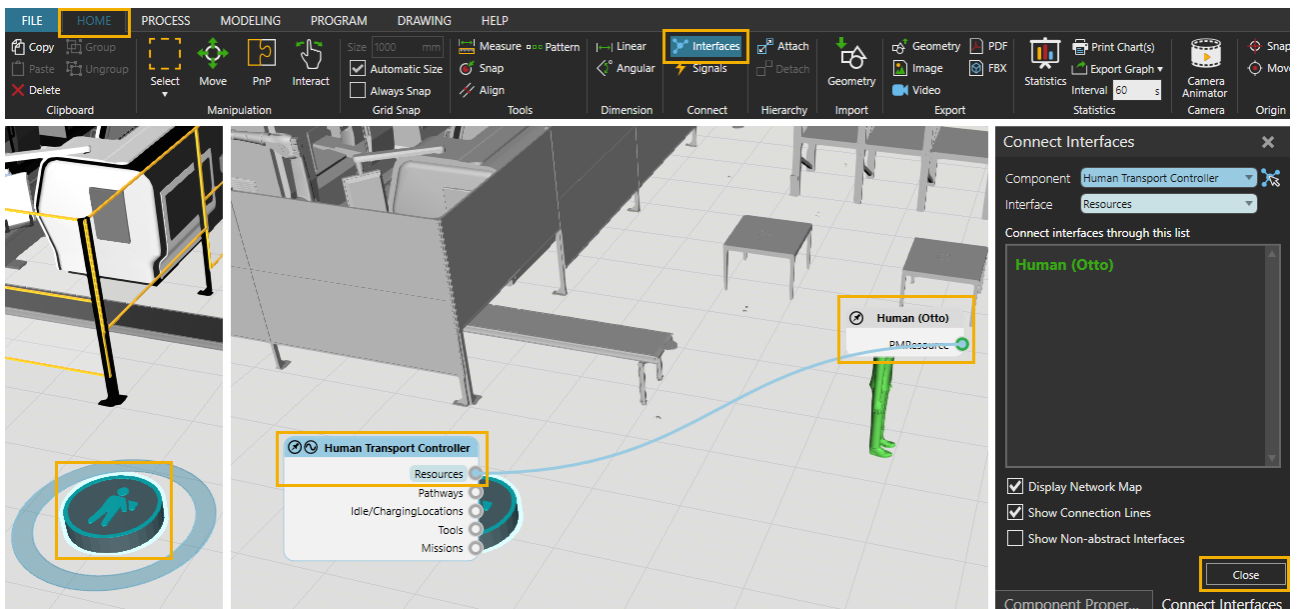
- From the same category, drag and drop a **From Conveyor Process** into the 3D world and using PnP attach it to the end of the out conveyor that extends outside of the fence.



- In the **HOME** tab, select the Human Transport Controller and click on **Interfaces**. This displays an action pane along with connection editors in the 3D world for wiring connections.

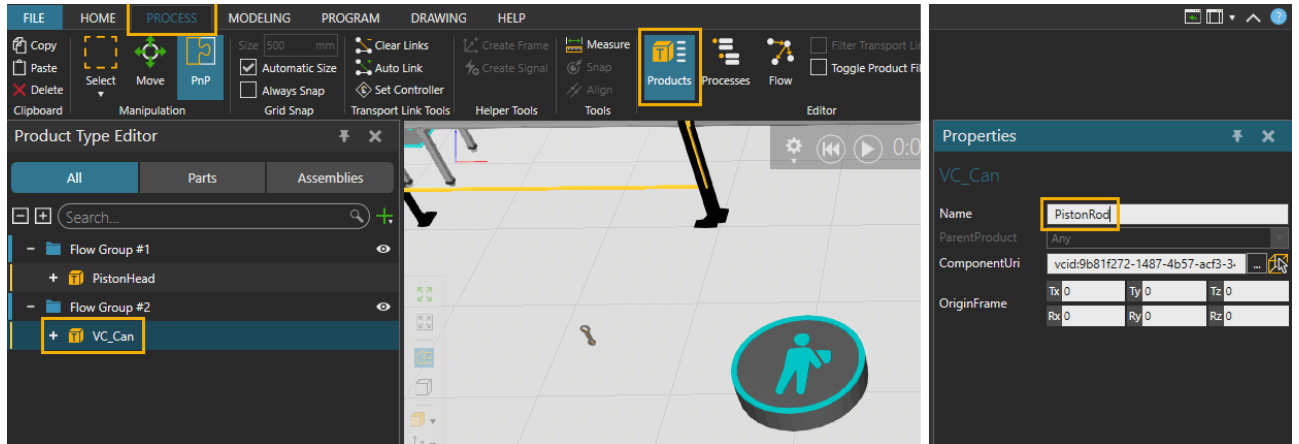
Using the connection editors click and drag to create a connection from **Human Transport Controller > Resources to Human > PMResource**. Then we can close the **Connect Interfaces** panel using the **Close** button in the lower right corner.

**Note:** The Human will turn from yellow to green once the interface has been connected.

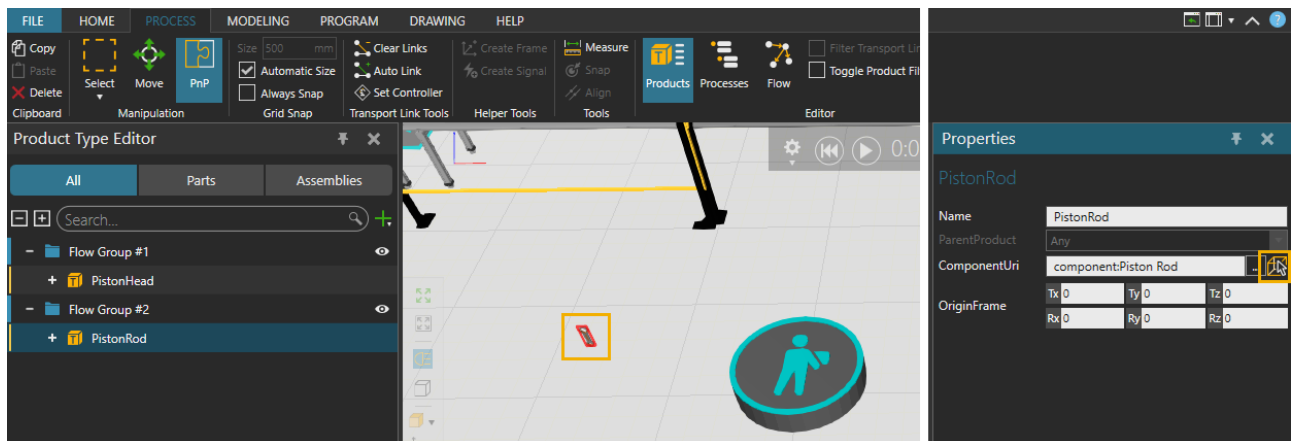


Now let's change some settings, before creating the Flow for these new components.

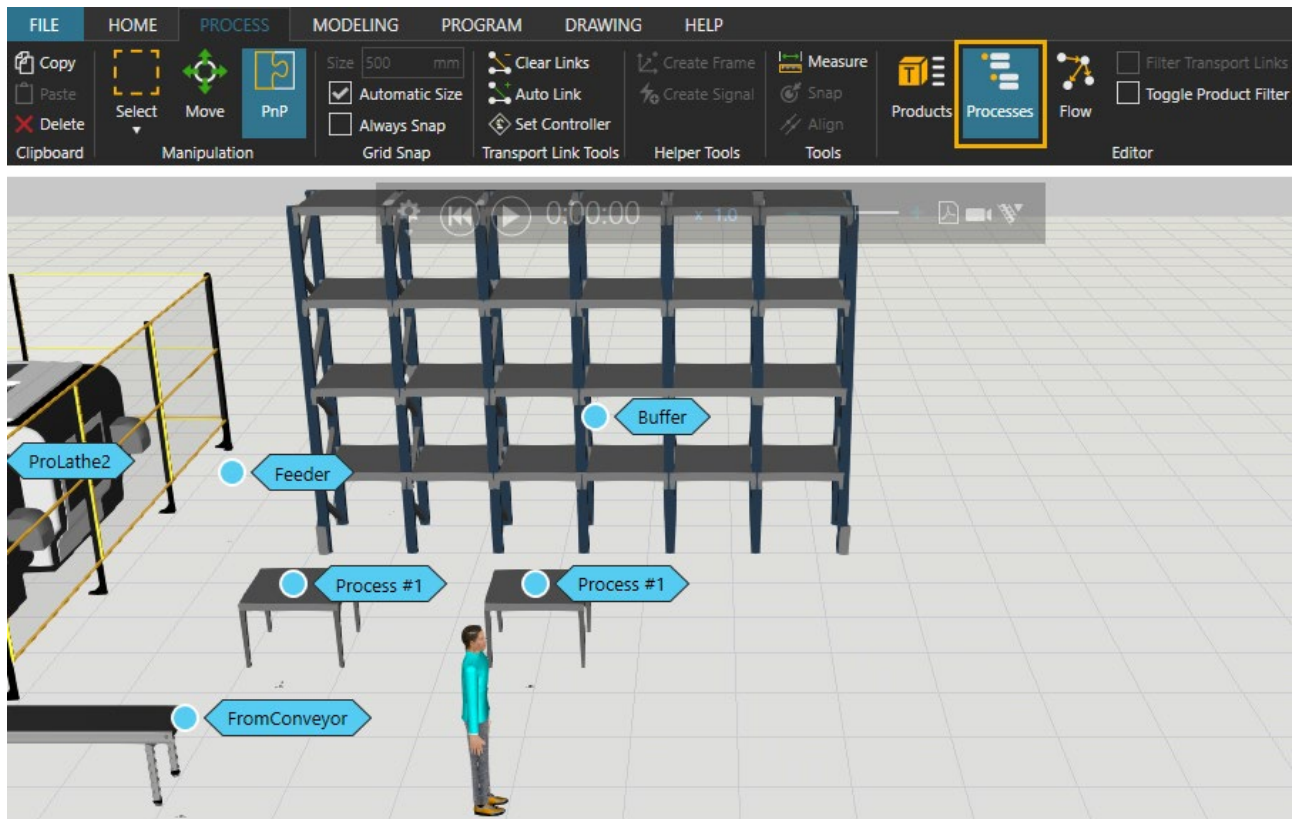
1. In the **PROCESS** tab, click on **Products** to access the **Product Type Editor**. And under **Flow Group #2** select **VC\_Can**, and from its **Properties** on the right change the **Name** to **PistonRod**.



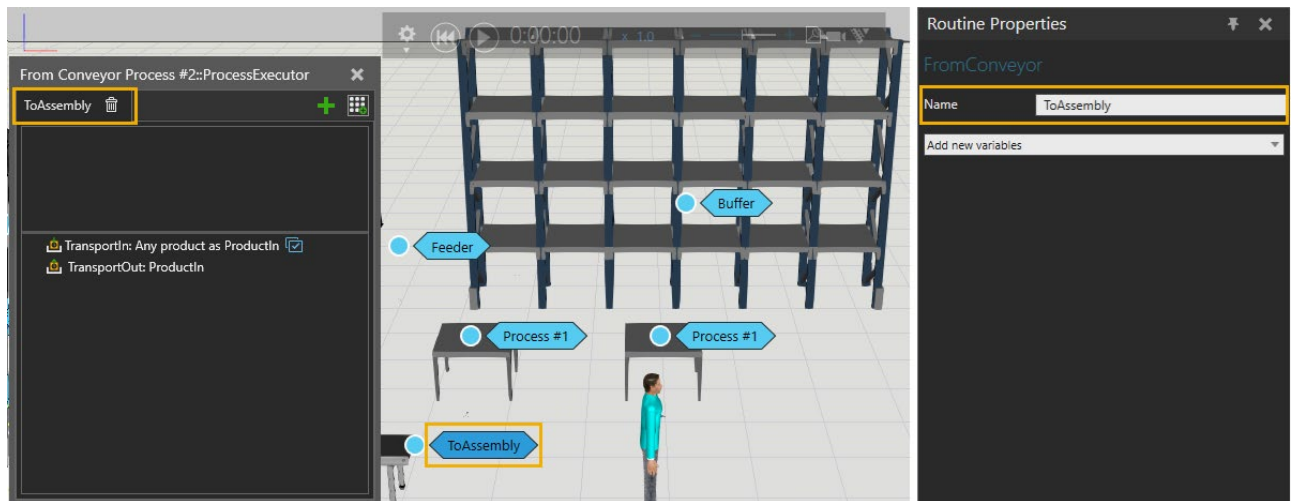
2. Then again from the **Properties** on the right, select the **ComponentUri** Pick Component tool, and from the 3D world select the **Piston Rod** component.



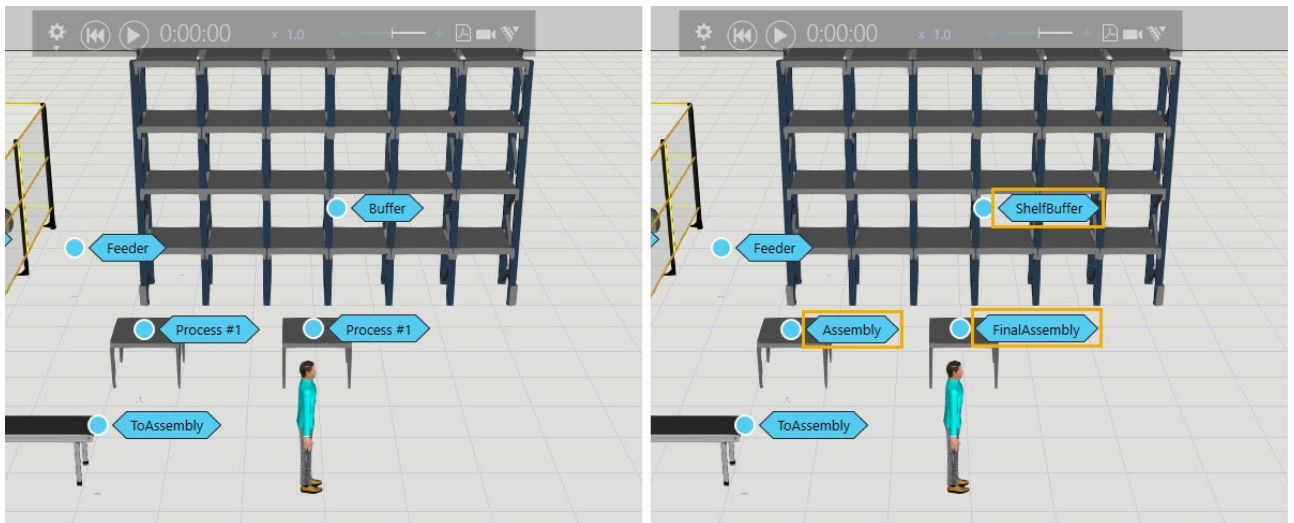
- Click on **Processes** so we can view the process labels of the components we added.



- Click on the **FromConveyor** process the end of the out Conveyor to open its **ProcessExecutor** panel, and in the **Routine Properties** rename it to **ToAssembly**.

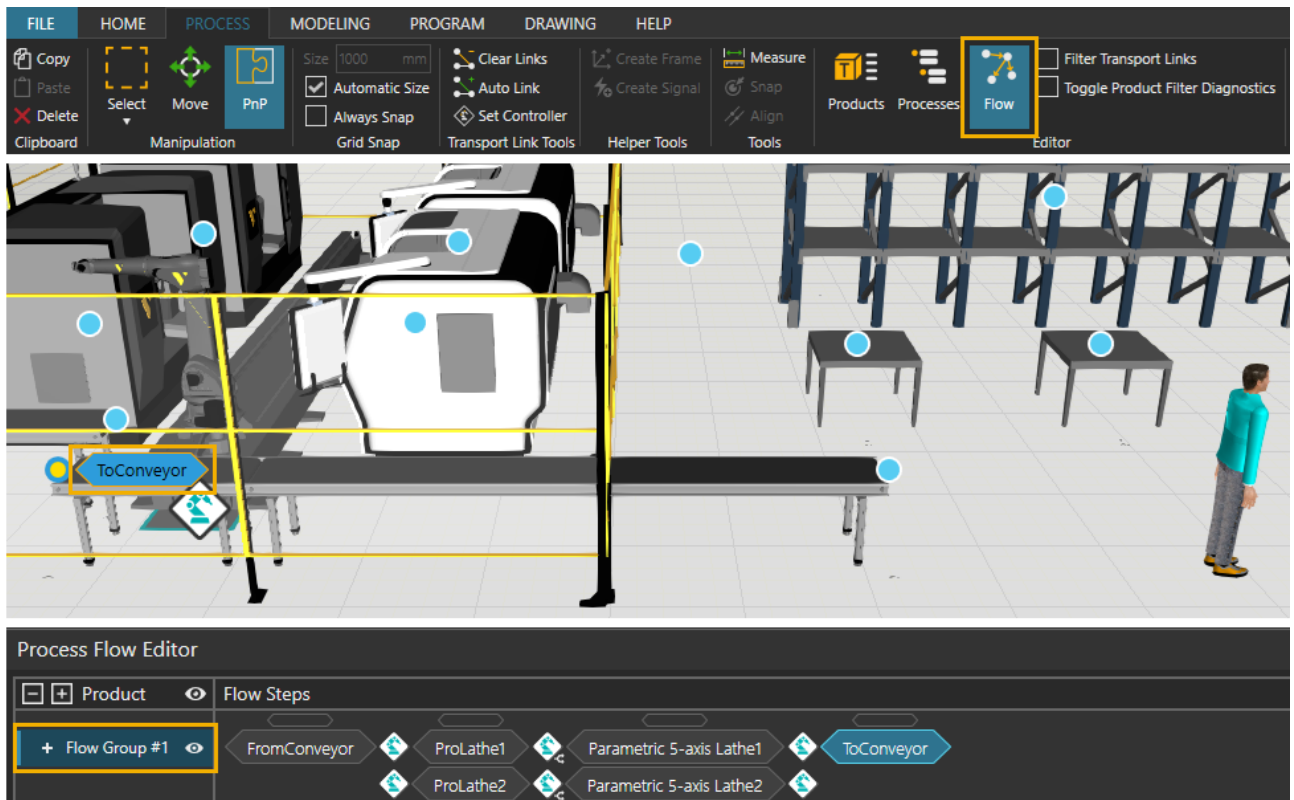


- Do the same for the **Process #1** on the Table A on the left, and rename it to **Assembly**. And **Process #1** on the Table A on the right, rename it to **FinalAssembly**. And rename the Warehouse Shelf label **Buffer** to **ShelfBuffer**.

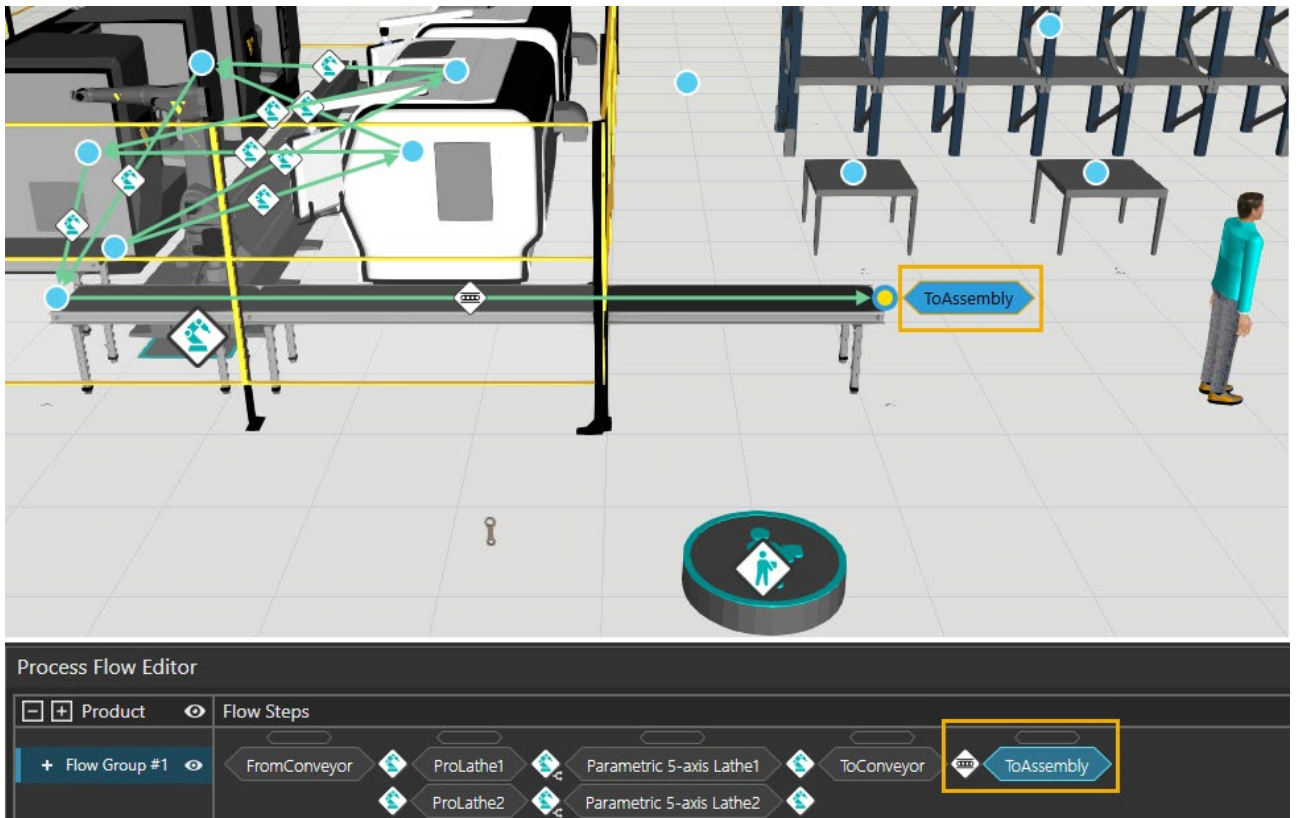


Now let's create the Flow. The human should pick the part from the Conveyor, place it to the Process Node (**Assembly**) on the Table A on the left, assemble it with the part from the Warehouse Shelf (**ShelfBuffer**) and place it to the other Process Node (**FinalAssembly**) on the Table A on the right.

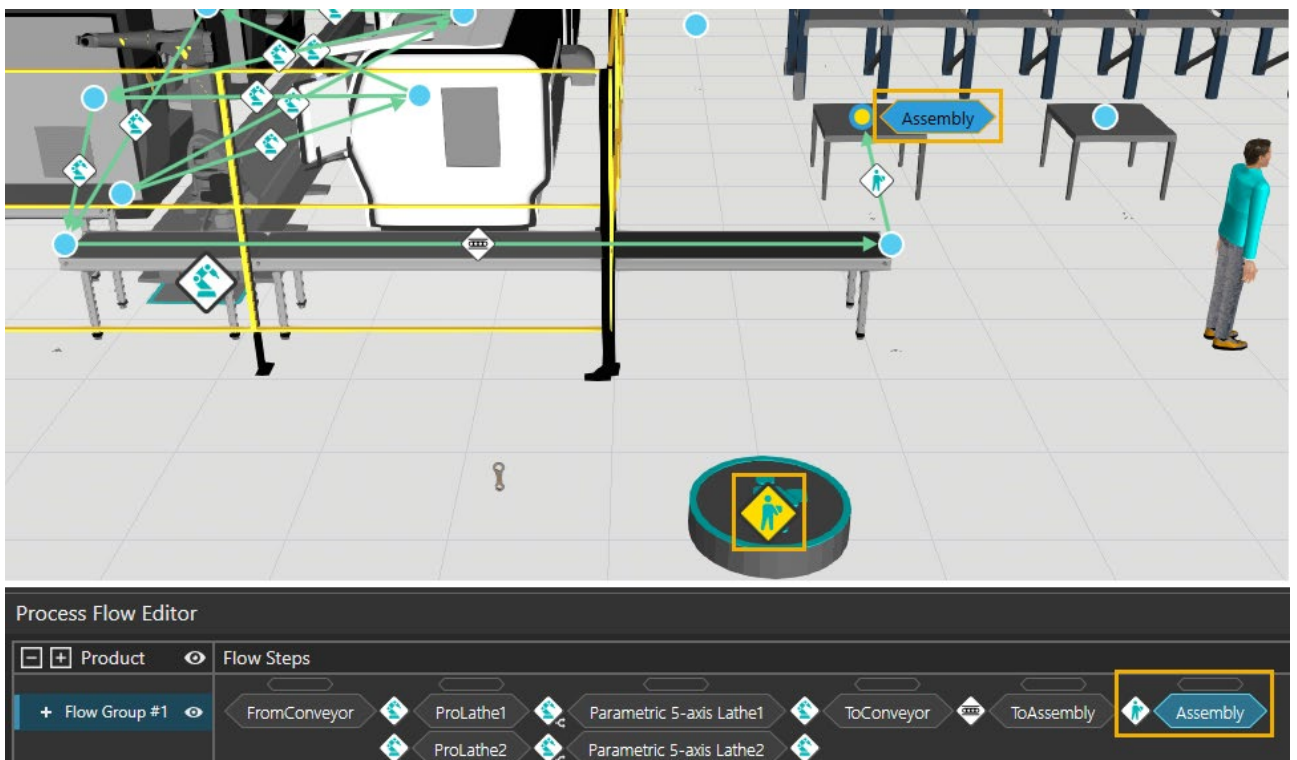
- Click on **Flow** and selecting **Flow Group #1** in the **Process Flow Editor**, in the 3D world click on the label of the **ToConveyor** process.



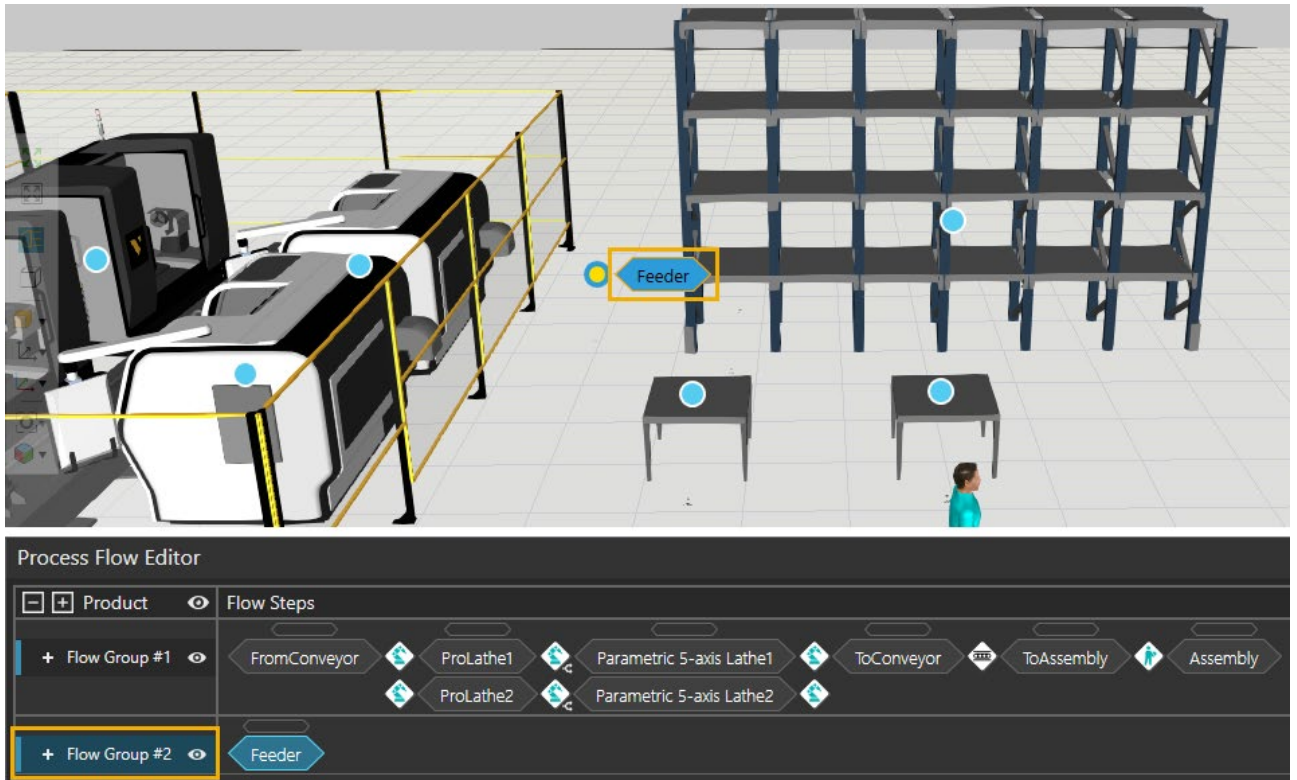
- In the 3D world, with the Human Transport Controller deselected, click on the **ToAssembly** process label, a transport link is created, and it will be added to the Flow.



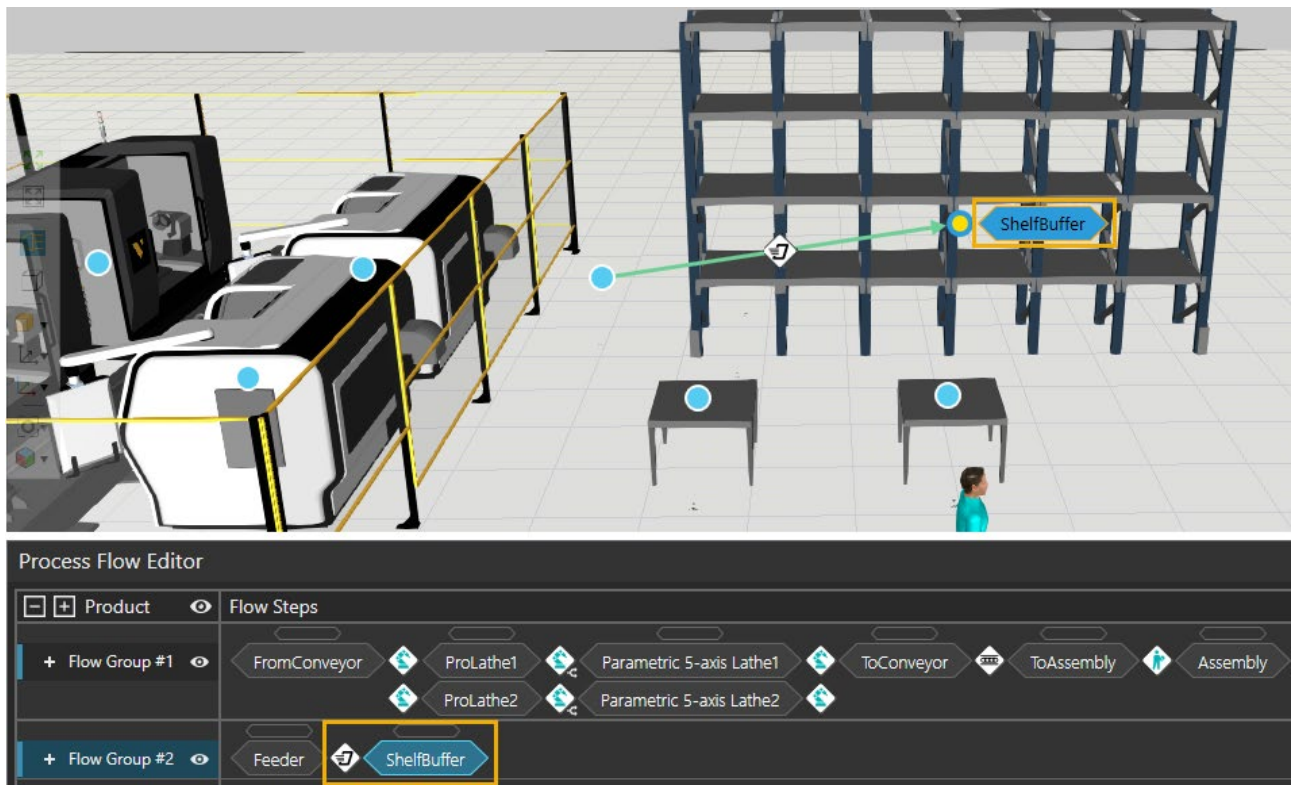
- In the 3D world, now selecting the Human Transport Controller, click on the **Assembly** process label. And note how the transport link implementer is the Human Transport Controller.



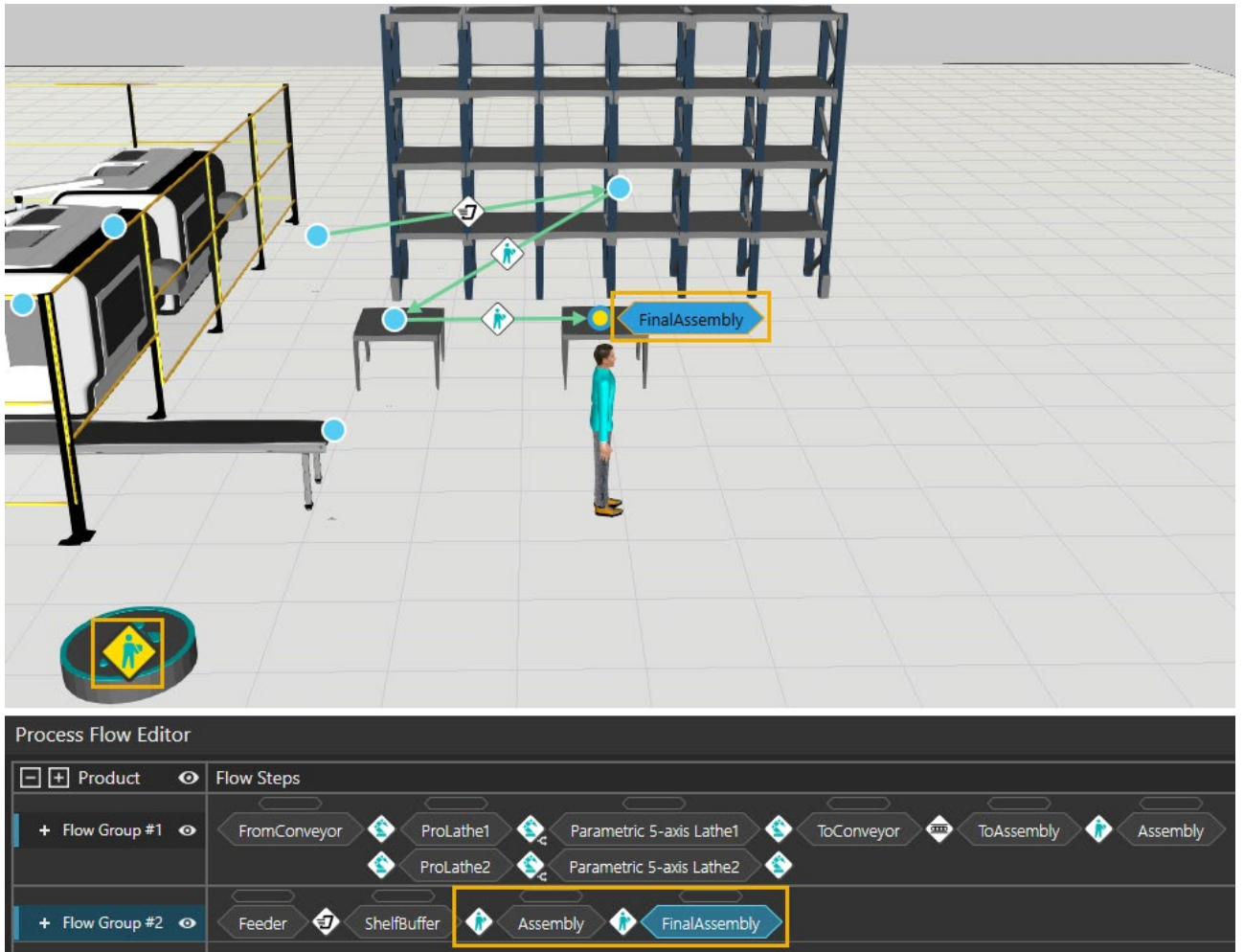
4. Select **Flow Group #2** in the **Process Flow Editor**, and in the 3D world click on the **Feeder** process label to add it to the Flow.



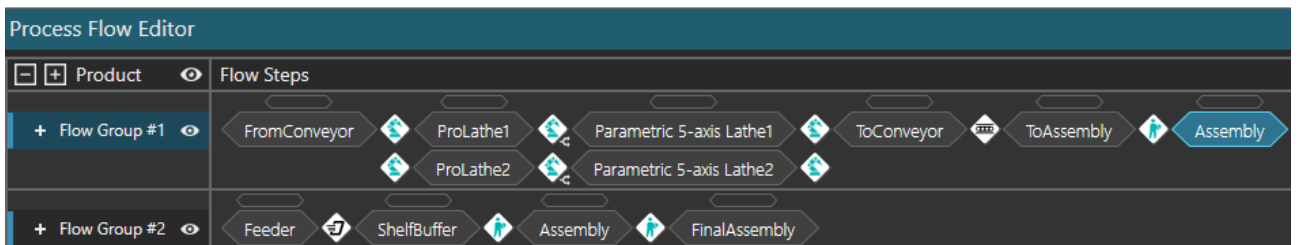
5. In the 3D world, first making sure the Human Transport Controller is deselected, click on the **ShelfBuffer** process label, a transport link is created, and it will be added to the Flow.



- In the 3D world, we can now select the Human Transport Controller once more and click on the **Assembly** process label and then the **Final Assembly** label.



- When we are done the final Flow should look like the example below. And remember that if you make a mistake when adding Flow steps and transport links, that you can always delete them from both the **Process Flow Editor** and the 3D world and then create them again.



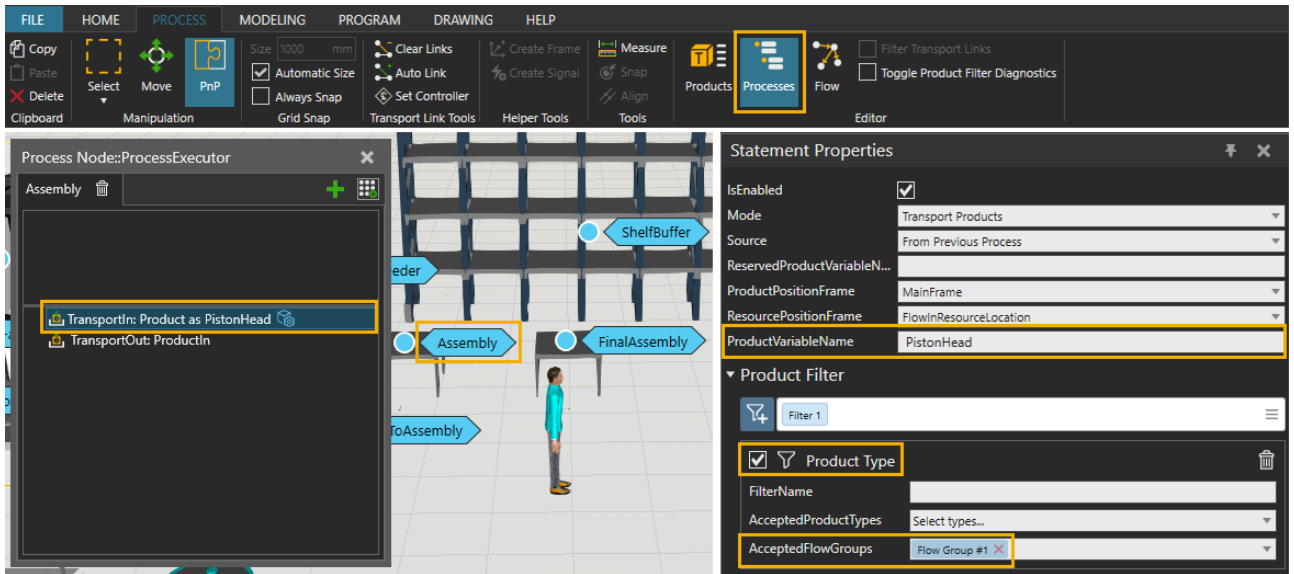
Now let's modify the Statements for the **Assembly** and **FinalAssembly** processes.

1. In the **PROCESS** tab, click on **Processes** and click on the **Assembly** process label in the 3D world to open its **Process Executor** panel.

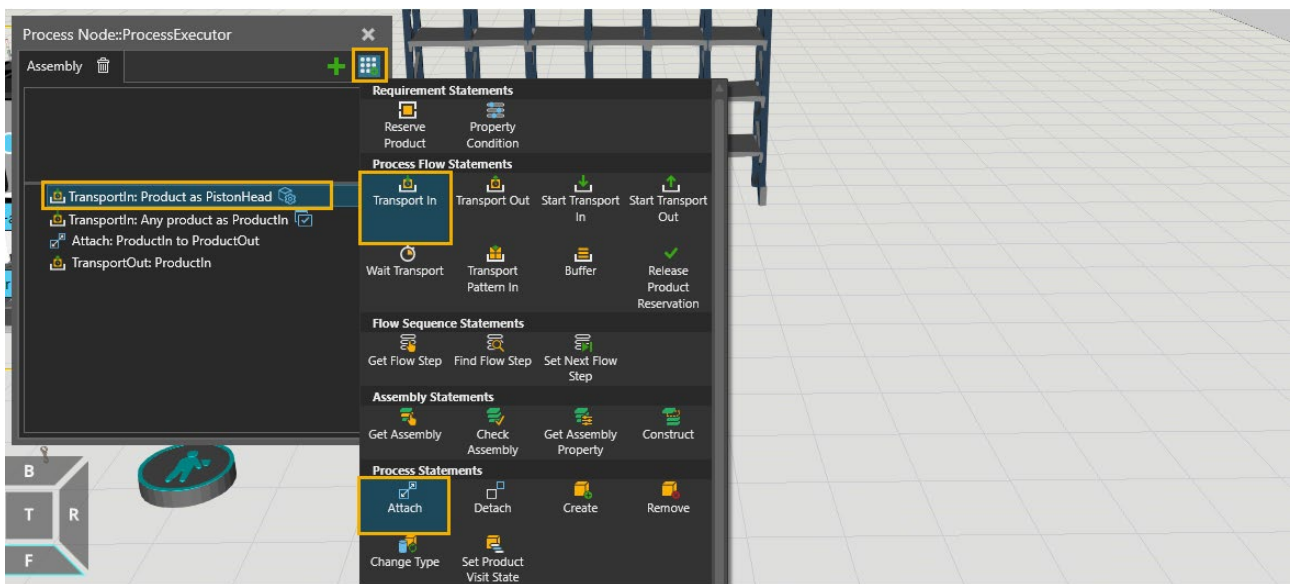
Select the **TransportIn** Statement and apply the following settings:

**ProductVariableName:** PistonHead

**Product Filter > Product Type filter > AcceptedFlowGroups:** Flow Group #1



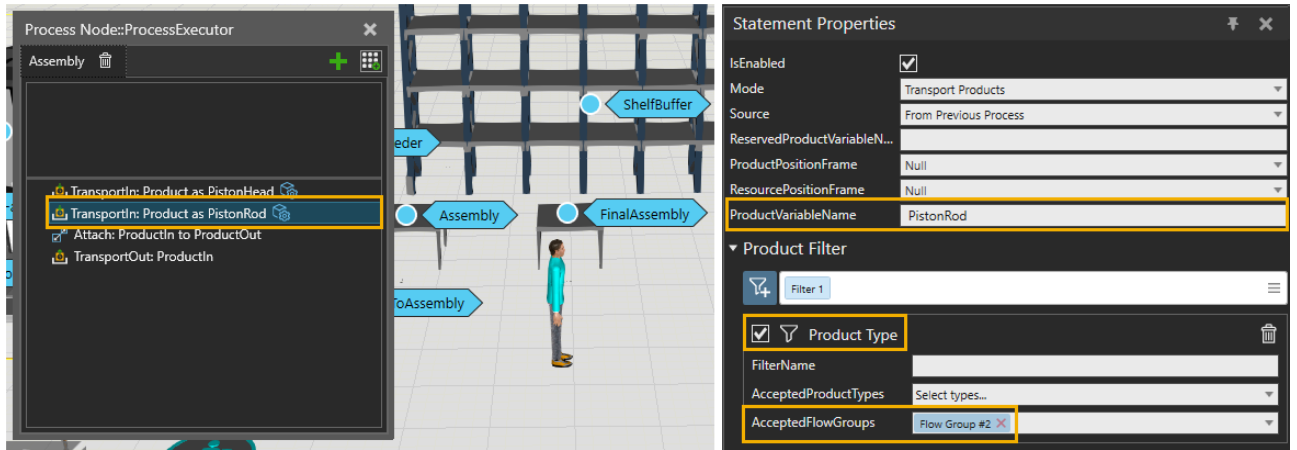
2. From the Statements list add another **Transport In** Statement. And selecting the new **TransportIn** Statement, from Statements again add an **Attach** Statement, so that both the Piston Head and the Piston Rod will be merged.



3. Select the second **TransportIn** Statement we added and apply the following settings to accept the PistonRod:

**ProductVariableName:** PistonRod

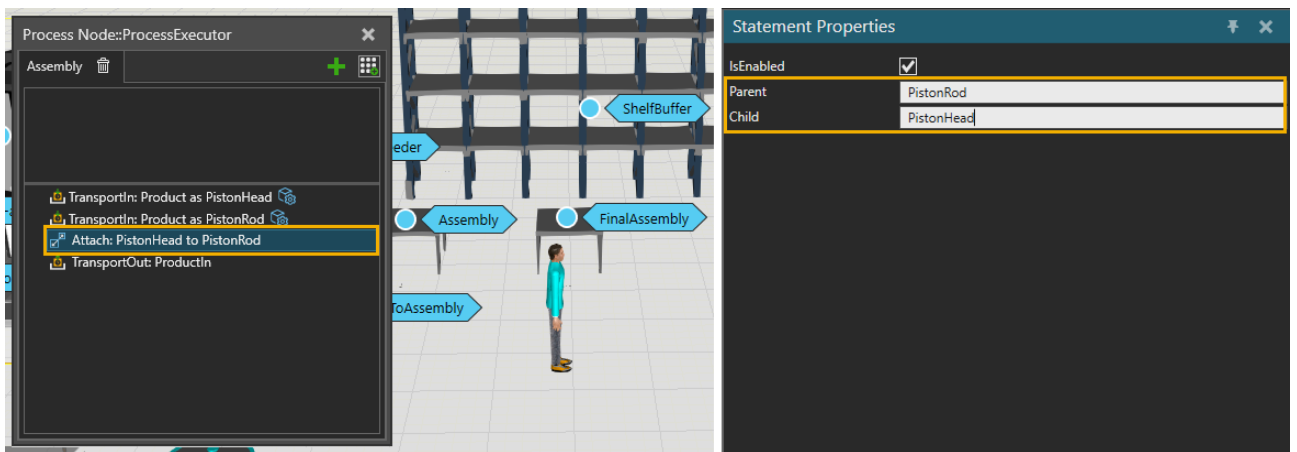
**Product Filter > Product Type filter > AcceptedFlowGroups:** Flow Group #2



4. Select the **Attach** Statement and apply the following settings to attach both components:

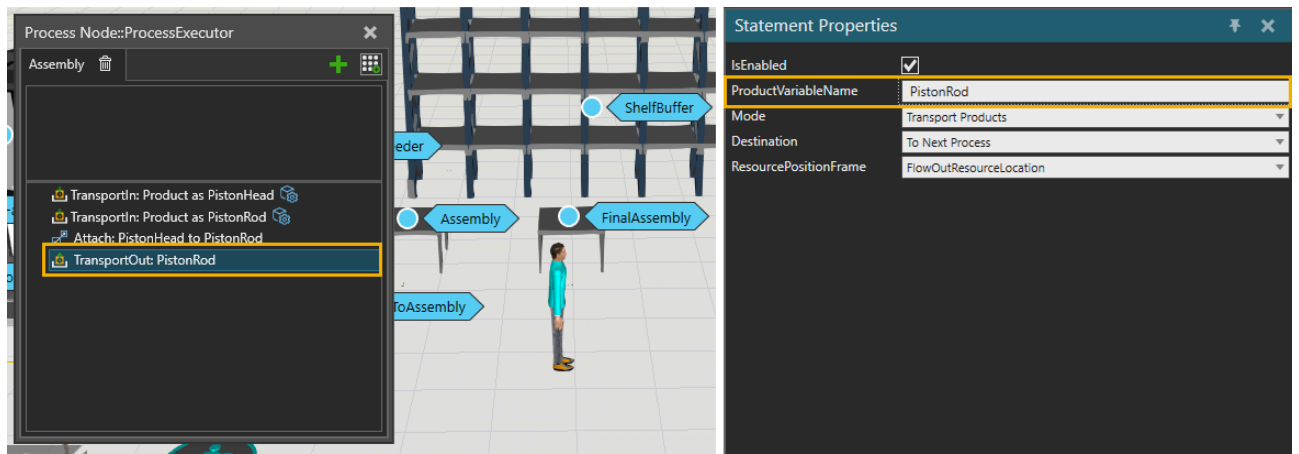
**Parent:** PistonRod

**Child:** PistonHead



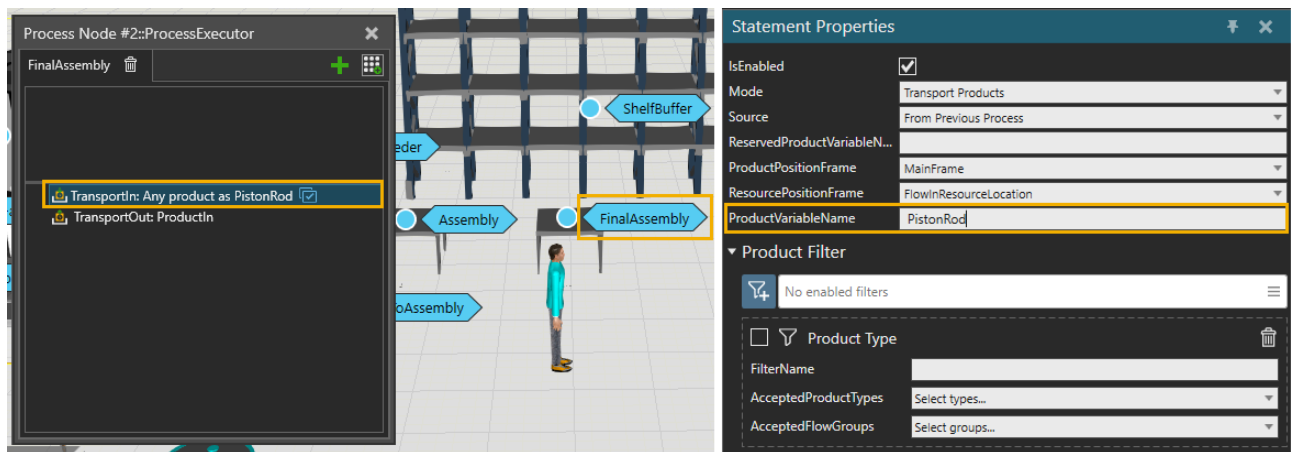
5. Select the **TransportOut** Statement and apply the following settings to transport both components out to the FinalAssembly:

**ProductVariableName:** PistonRod

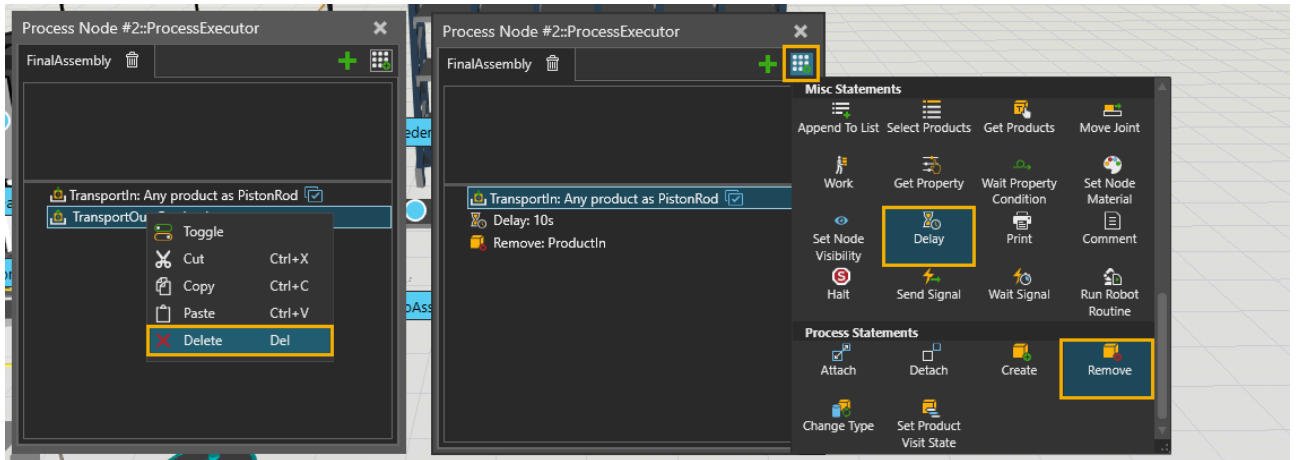


6. Click on the **FinalAssembly** process label in the 3D world to open its **Process Executor** panel. Select the **TransportIn** Statement and modify it to accept the new assembly, it is called PistonRod in this case. So apply the following settings:

**ProductVariableName:** PistonRod

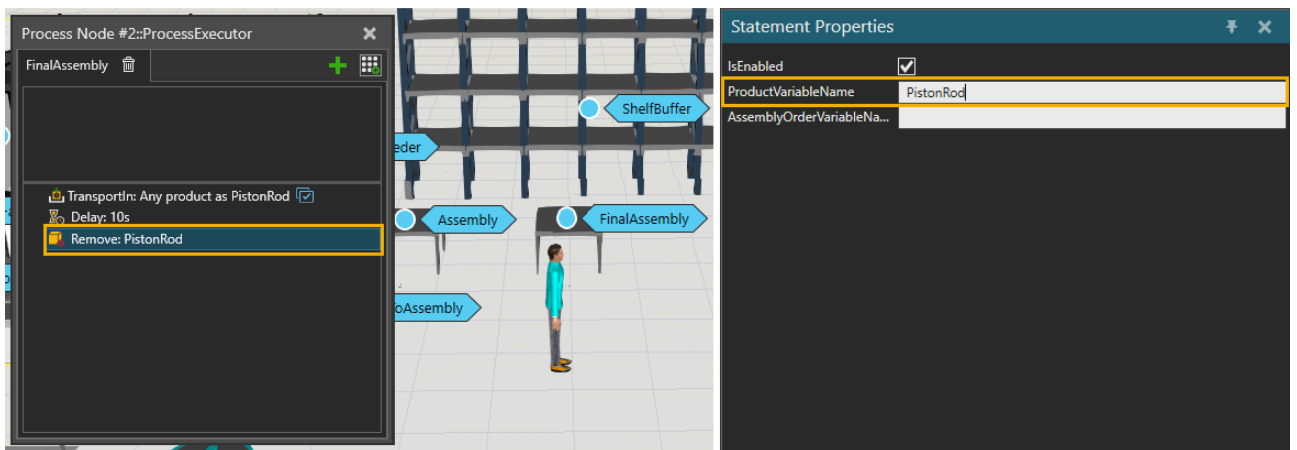


7. Delete the **TransportOut** Statement, and from the Statements list add **Delay** and **Remove** Statements.



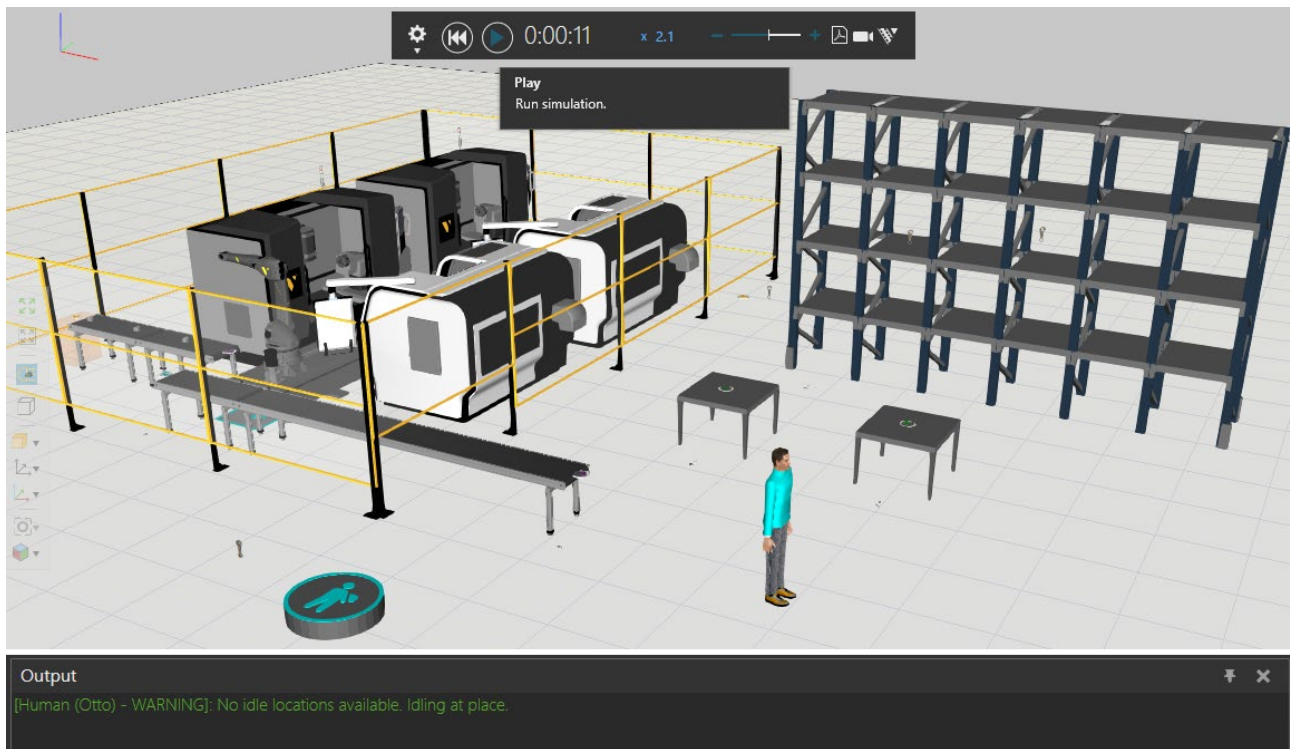
8. Select the **Remove** Statement to modify it to remove a new assembly. So apply the following settings:

**ProductVariableName:** PistonRod

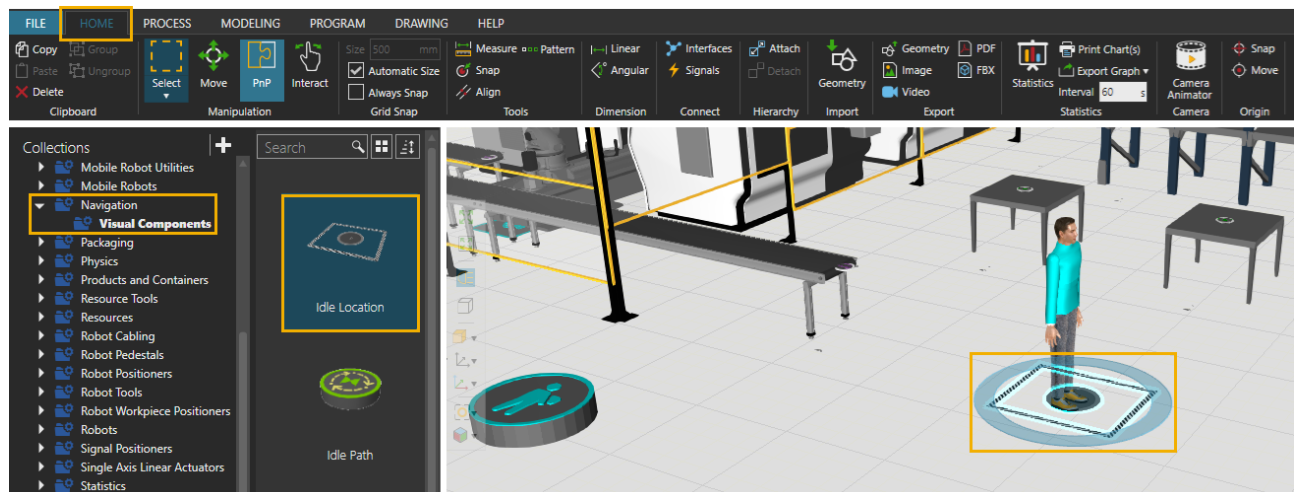


## Testing the final layout

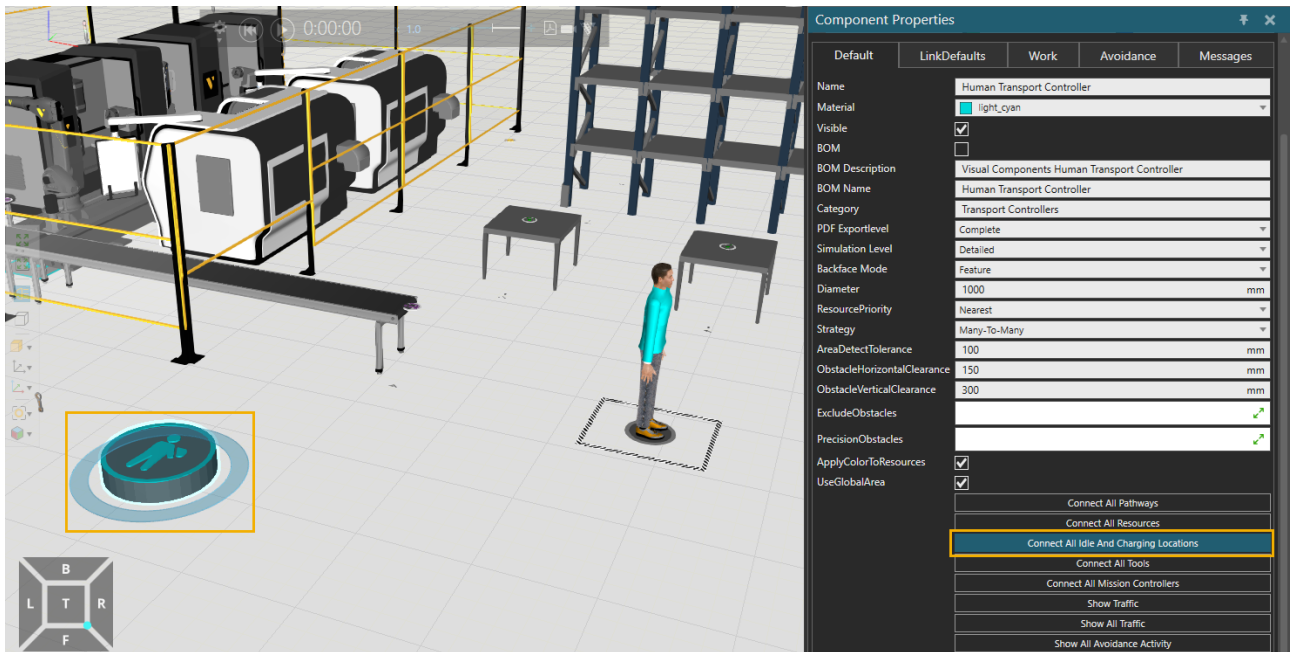
Let's now run the simulation to check if we have everything working correctly. We click **Play** and after 10 seconds we receive an error that the human operator has no idle location. So let's try and fix that.



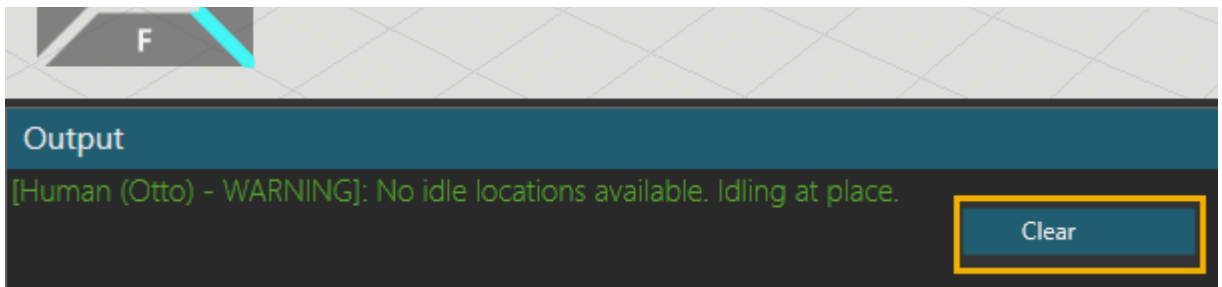
1. Reset the simulation and in the **HOME** tab from the **eCatalog**, expand **Models by Type** and **Navigation** and drag and drop an **Idle Location** into the 3D world, and place it where the Human is standing.



2. Select the Human Transport Controller in the 3D world, and from its **Component Properties** in the **Default** tab, click **Connect All Idle And Charging Locations**.



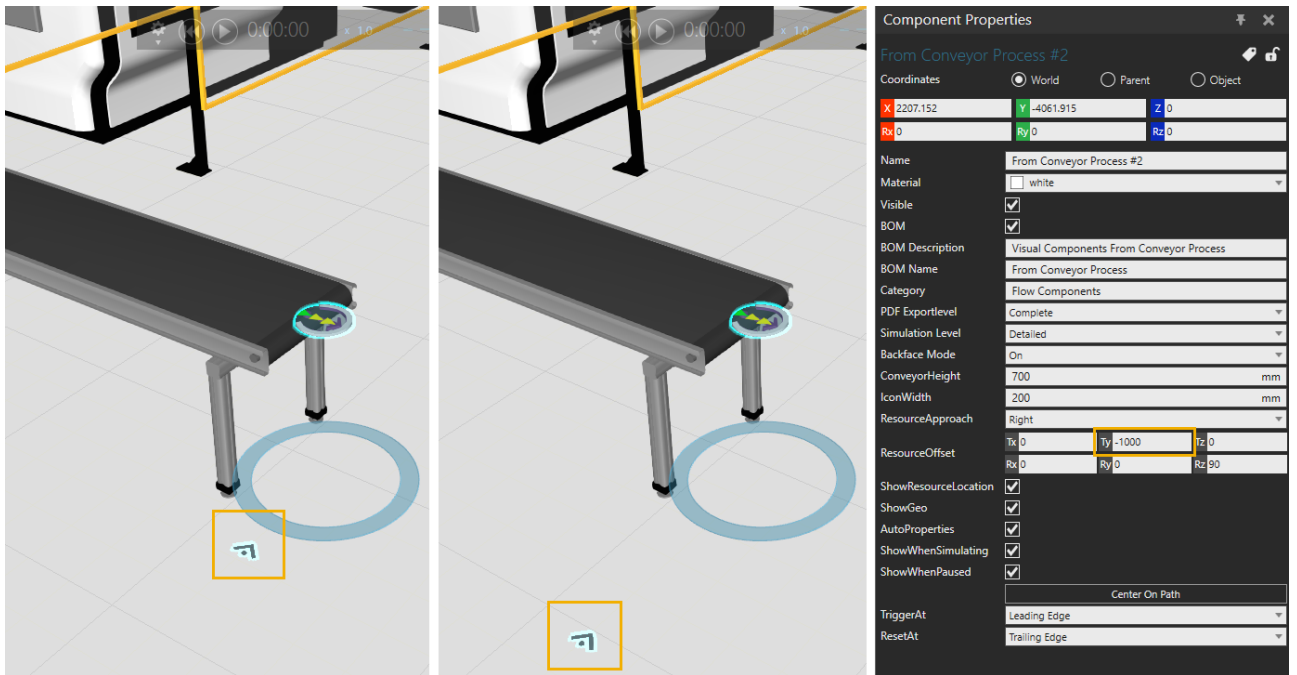
3. Now we can right-click on the **Output** panel and click **Clear** to remove the error message.



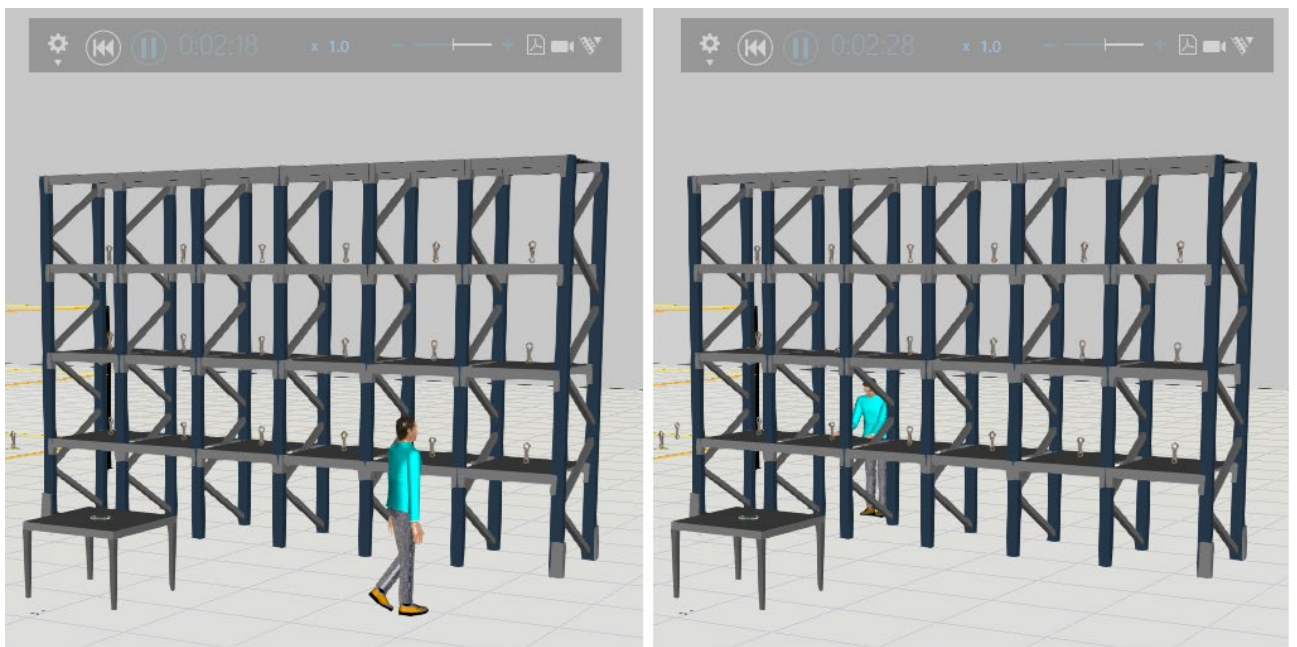
4. Running the simulation again, the idle location error has been resolved, and now we receive an additional error that the human operator has some kind of obstacle when it approaches the output Conveyor. Let's try and fix this too.



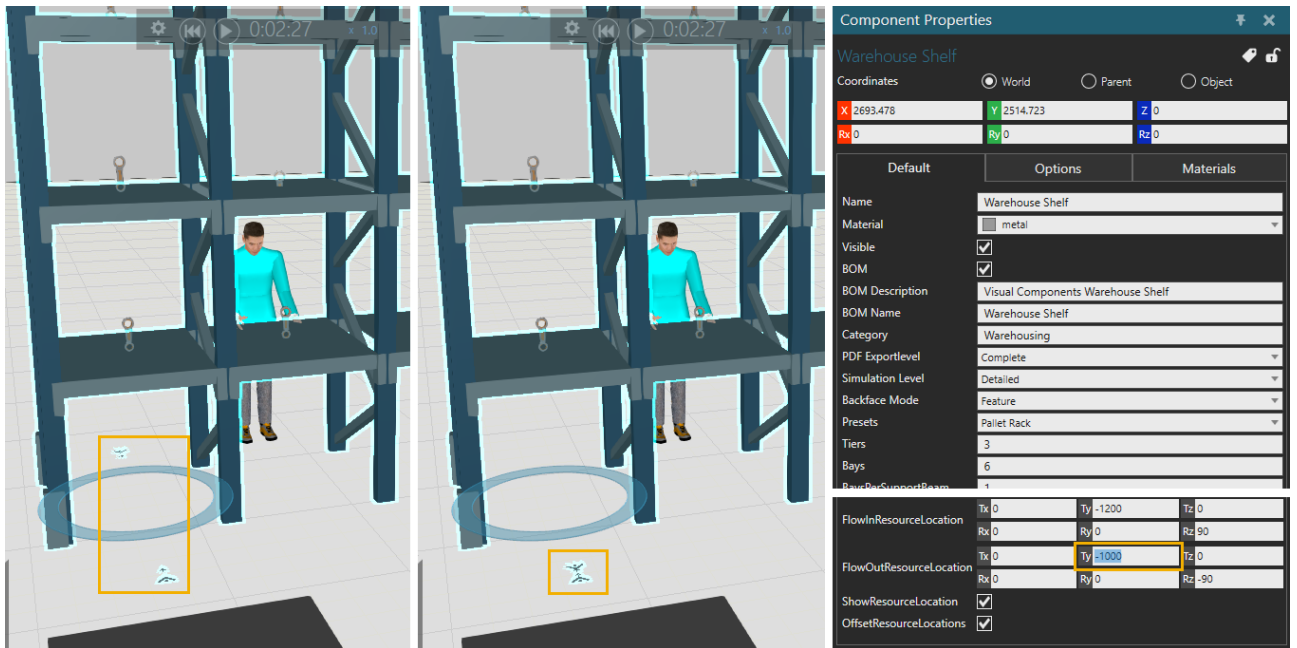
- Let's first reset the simulation and clear the Output panel. And selecting the From Conveyor Process at the end of the output Conveyor, from its **Component Properties** edit the **ResourceOffset** distance on the **Ty** axis from -500 to -1000.



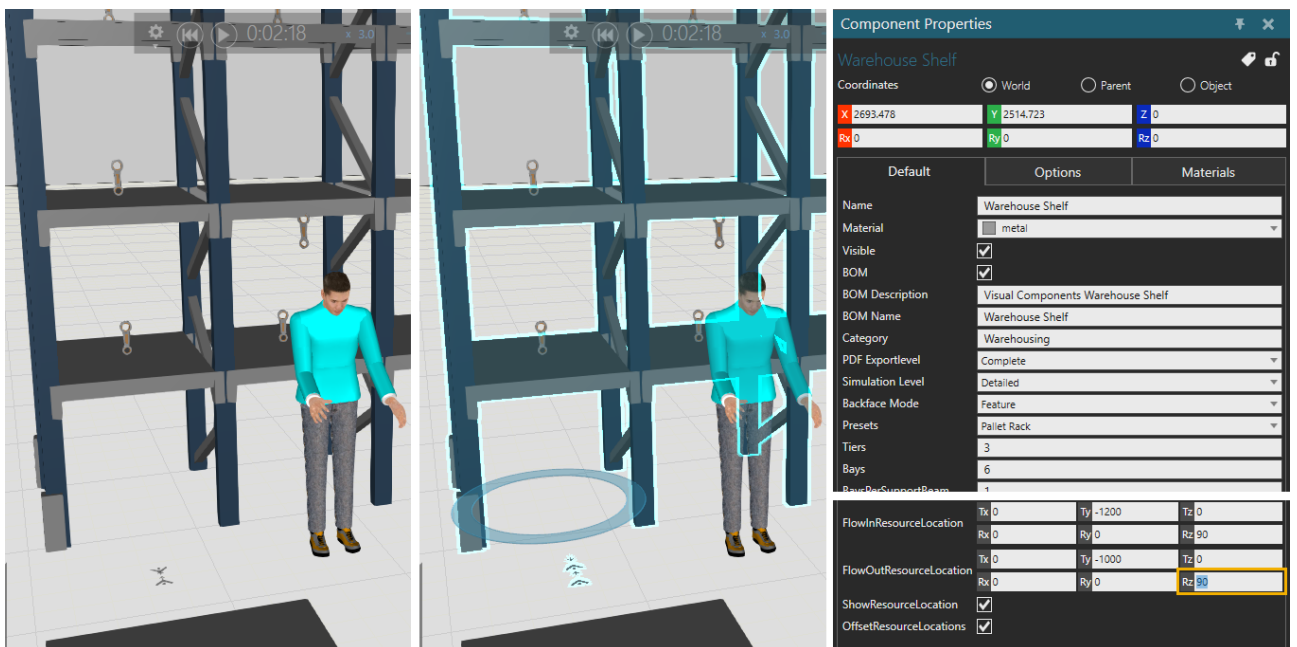
- Okay so we have now removed the errors that appear in the Output panel. And running the simulation again, when the human operator approaches the Warehouse Shelf it walks behind it, so let's try and improve this behavior.



7. Select the Warehouse Shelf and from its **Component Properties** edit the **FlowOutResourceLocation** distance on the **Ty** axis from 1000 to -1000



8. Reset and run the simulation, and the human operator now approaches the Warehouse Shelf on the correct side but is facing the wrong direction. So again from the **Component Properties** of the Warehouse Shelf, edit the **FlowOutResourceLocation** rotation on the **Rz** axis from -90 to 90.



Let's now run the simulation for a final check. The human operator is now facing in the right direction and everything seems to be working correctly. And now our layout, and this lesson has been completed!

