Critical manufacturing
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Fablive Tutorial

11.2

February 2026

DOCUMENT ACCESS

Public

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Estimated time to read: 7 minutes

Introduction to Fablive: Creating a 3D Digital Twin of Your Factory

In the dynamic world of Industry 4.0, the ability to visualize and optimize manufacturing operations in real-time is crucial for maintaining competitiveness. Fablive, an advanced module of the Critical Manufacturing MES, offers precisely this capability by enabling the creation of a 3D digital twin of your factory. But what exactly is a digital twin, and why is it so important?

A digital twin is a virtual representation of a physical process, product, or service. This innovative technology allows companies to simulate, analyze, and improve their operations more efficiently. With Fablive, factories can create a detailed three-dimensional model of their operations, providing a comprehensive and interactive view of all aspects of production.

In this tutorial, we will explore how Fablive can transform the way you manage your factory, from initial setup to continuous optimization. We will guide you through the steps necessary to create and utilize a digital twin, highlighting the key features and benefits this technology can bring to your business.

Get ready to discover how Fablive can revolutionize your approach to manufacturing, offering valuable insights and enhancing operational efficiency.

Overview

In this tutorial, we will guide you through the process of creating a digital twin of the Cookie Factory, a model factory widely used by beginners in the Critical Manufacturing MES. The Cookie Factory serves as an excellent starting point for understanding the concepts and functionalities of Fablive, allowing you to apply this knowledge to real-world scenarios.

Tutorial Objectives:

1. **Introduction to Fablive -** Understand the role of Fablive within the Critical Manufacturing MES and how it facilitates the creation of digital twins.
2. **Initial Setup -** Learn how to set up the Fablive environment for the Cookie Factory, including importing data and defining essential parameters.
3. **Creating the Digital Twin -** Step-by-step guide to modeling the Cookie Factory in 3D using Fablive tools and features.
4. **Interactivity and Simulation -** Explore how to interact with the digital twin, perform simulations, and analyze real-time data to optimize operations.
5. **Benefits and Practical Applications -** Discuss the key benefits of using a digital twin and how to apply these insights to improve manufacturing efficiency and productivity.

By the end of this tutorial, you will have a solid understanding of how to create and utilize a digital twin with Fablive, applying this knowledge to optimize operations in the Cookie Factory and beyond.

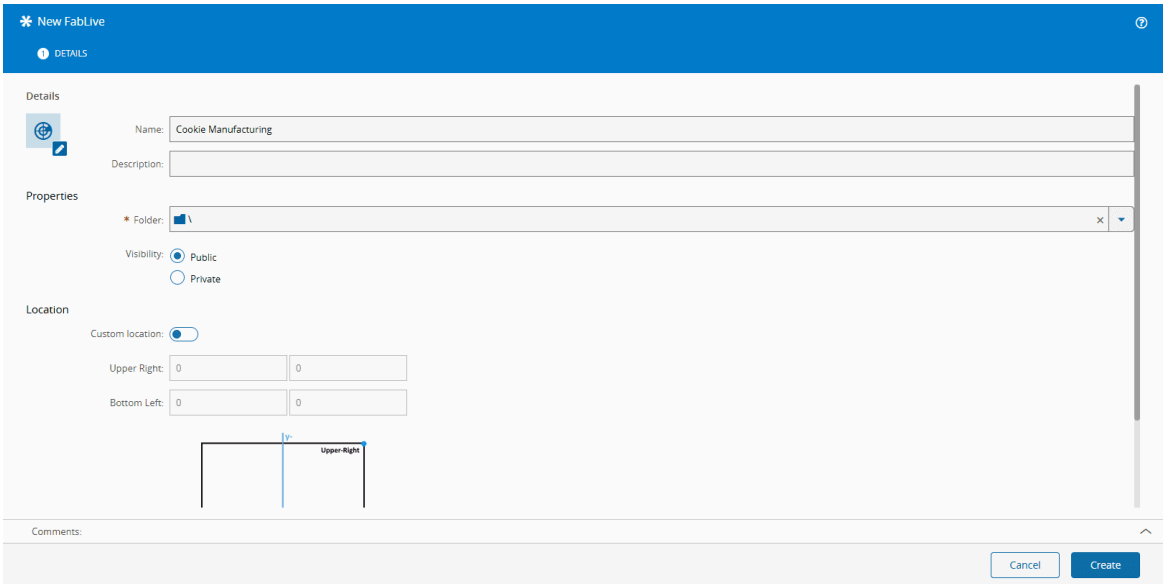
Concepts

Concept	Description

Concept	Description
Digital Twin	A virtual representation of a physical process, product, or service that allows for simulation, analysis, and optimization of operations.
Fablive	A module within the Critical Manufacturing MES that enables the creation of 3D digital twins of factories, providing a comprehensive view of operations.
Cookie Factory	A model factory used for learning and demonstration purposes within the Critical Manufacturing MES, serving as a practical example for tutorials.
3D Modeling	The process of creating a three-dimensional representation of the Cookie Factory using Fablive tools and features.
Real-time Simulation	The ability to interact with and simulate the digital twin to analyze data and optimize factory operations in real-time.
Operational Efficiency	The improvement of manufacturing processes and productivity through insights gained from the digital twin.
Data Import	The process of bringing in necessary data to set up the digital twin environment for the Cookie Factory.
Parameter Definition	Setting essential parameters within Fablive to accurately model and simulate the Cookie Factory.

Step 1: Create Cookie Manufacturing FabLive

This is the first step in creating the Cookie Manufacturing FabLive. By doing this, you establish an MES entity that will support all subsequent steps. You should end up with something like:



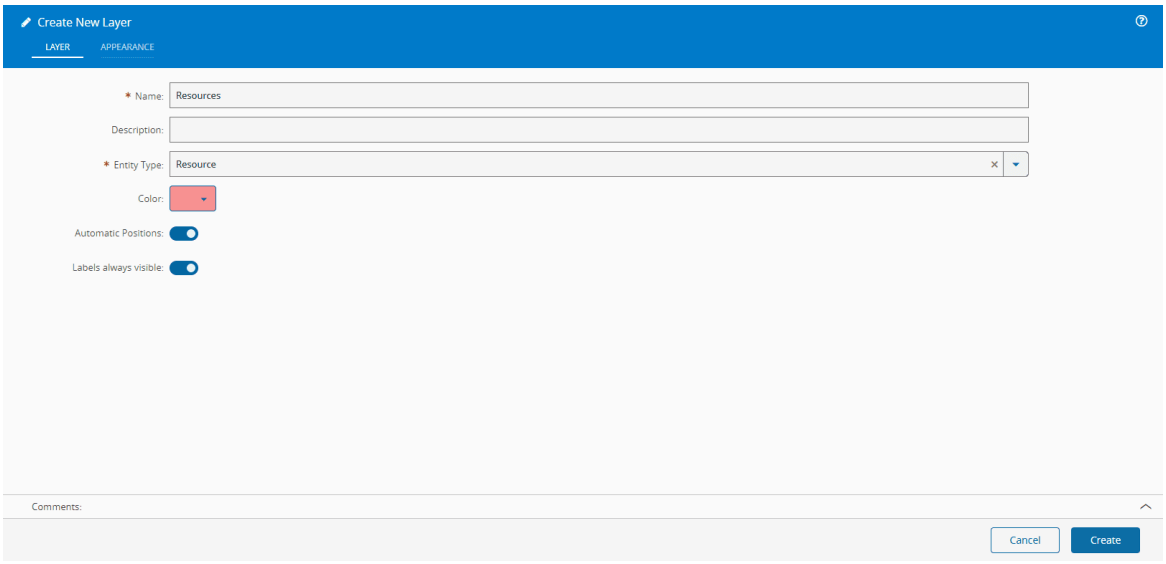
For more information, see How to: Create a FabLive.

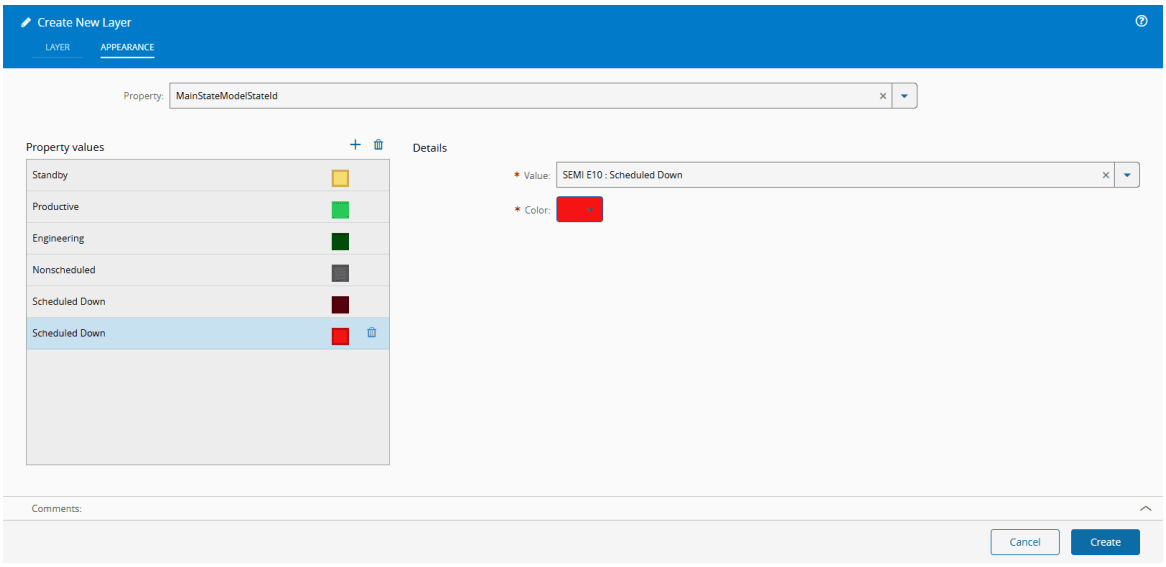
Step 2: Add the required layers

Once FabLive is created, you can edit or view it:

- **Edit mode** - access tools and features to make changes to the model. This mode lets you update configurations, adjust settings, and refine details.
- **View mode** - explore and interact with the model without making changes. This mode is designed for visualization and analysis.

In the Edit mode, you must create the Resources layer and end up a similar result as shown below.





For more information, see How to: Add a layer in FabLive.

Info

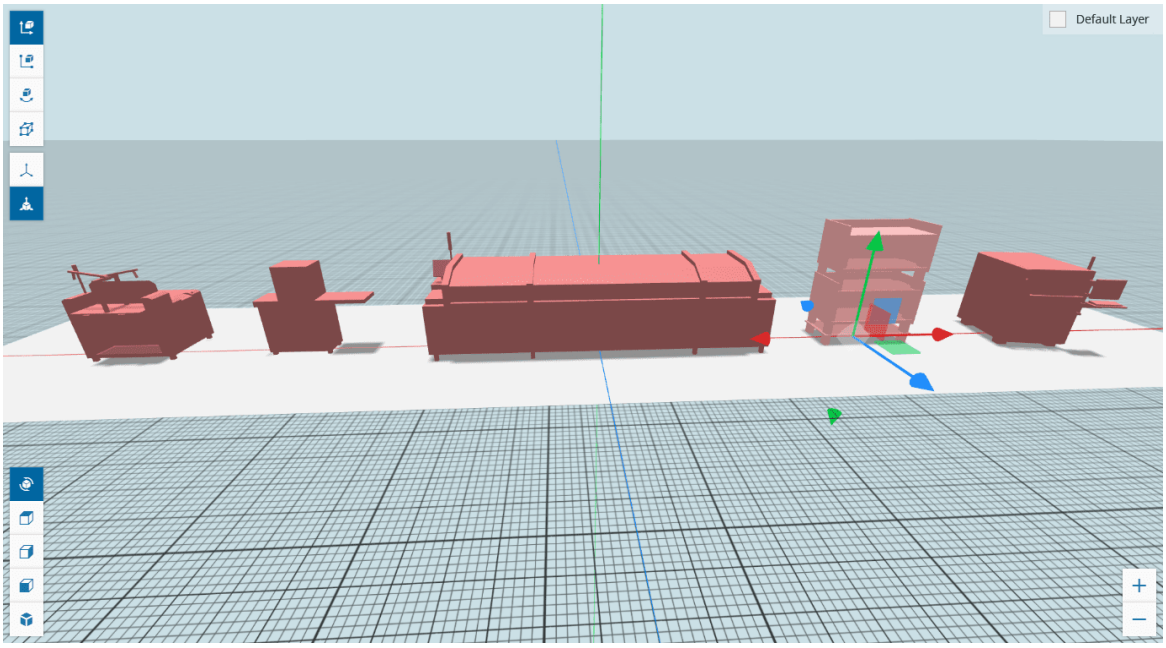
It is helpful to create the factory floor in the Default Layer. You can use a Plane object for this purpose, which can later be adjusted to fit the required dimensions. Additionally, applying a texture to the floor can enhance its realism.

Step 3: Add the objects that represent the resources used in the Cookie Factory

The Cookie Flow consists of five steps: Mixing, Molding, Baking, Cooling, and Packing. Each of these steps has defined service contexts that correspond to specific resources: Mixer, Molder, Baker, Cooler, and Packer.

Currently, we are planning to create an area in FabLive where the digital twins of these resources will be positioned.

You should now import the objects (.obj) files that you want to use. Place them on the floor and rearrange them until you achieve a final arrangement as shown in the image below.

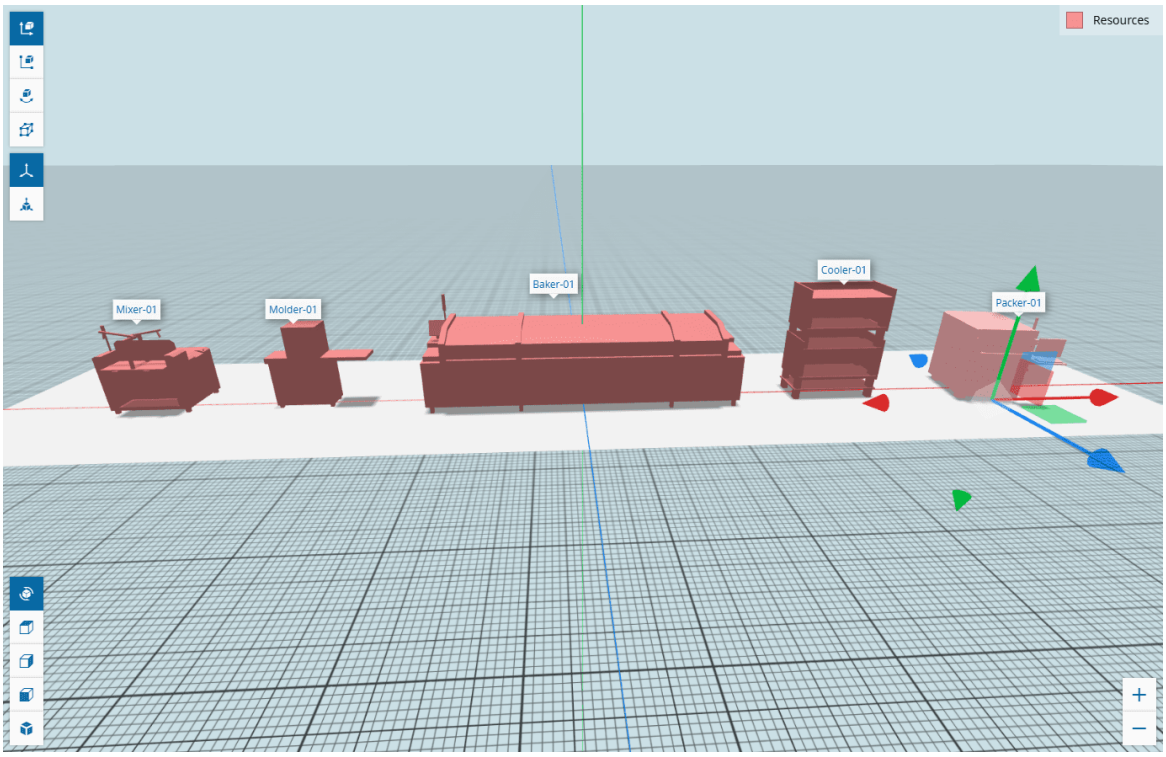


For more information, see the following How to guides:

- How to: Add Objects in FabLive
- How to: Translate (move) an Object in FabLive
- How to: Scale an object in FabLive
- How to: Rotate an object in FabLive
- How to: Import a 3D object into FabLive

Step 4: Link objects with MES instances

After placing objects that replicate the shop floor, connect them with the corresponding MES entities. After that, you should see the name of the linked MES entity hovering above the objects.

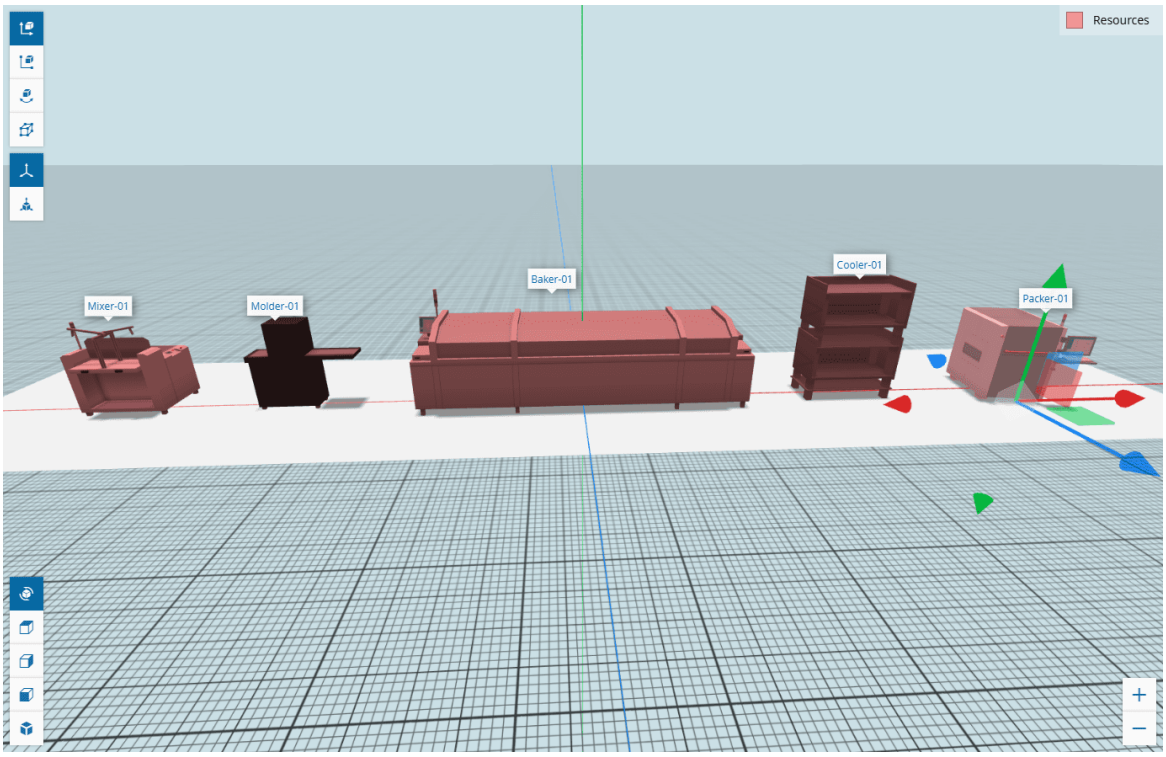


This link is essential for establishing a real-time connection between the model and the system model. Without it, the colors of the shapes in the model will not change when the value of the property specified in the appearance tab at the time the layer was created is modified.

For more information, see How to: Add objects to a FabLive instance.

Step 5: Add textures to the objects

Although the Fablive is now working properly, we can add an extra layer of reality to it by adding textures to the objects used to mimic the shop floor. This will make them more appealing:

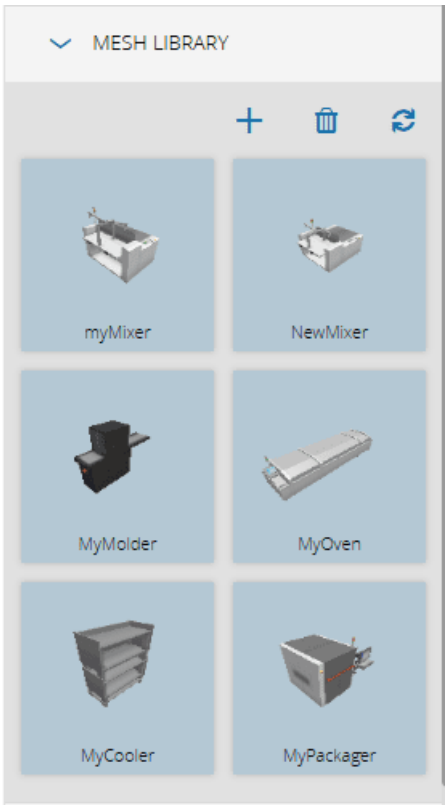


For more information, see How To: Add a texture in FabLive.

Step 6: Add objects to the library

To be more efficient in the future, you can add your objects, now with the texture, to the library. This makes creating or updating a Fablive faster and smoother.

Once added, your Mesh Library will resemble the image below.

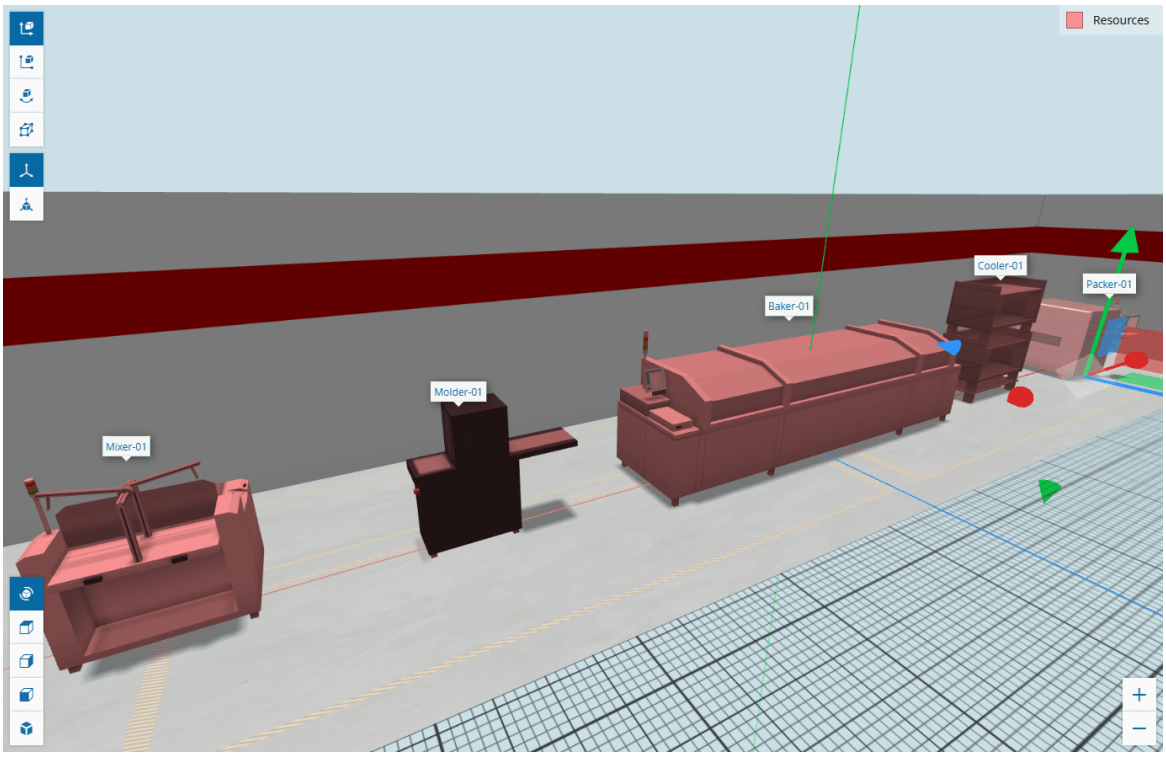


For more information, see How to: Add an object to the library in FabLive.

Step 7: Add additional details

To further enhance the digital twin, you can add walls and textures, not only to those walls but also to the floor.

You should complete this tutorial with similar result as shown below.

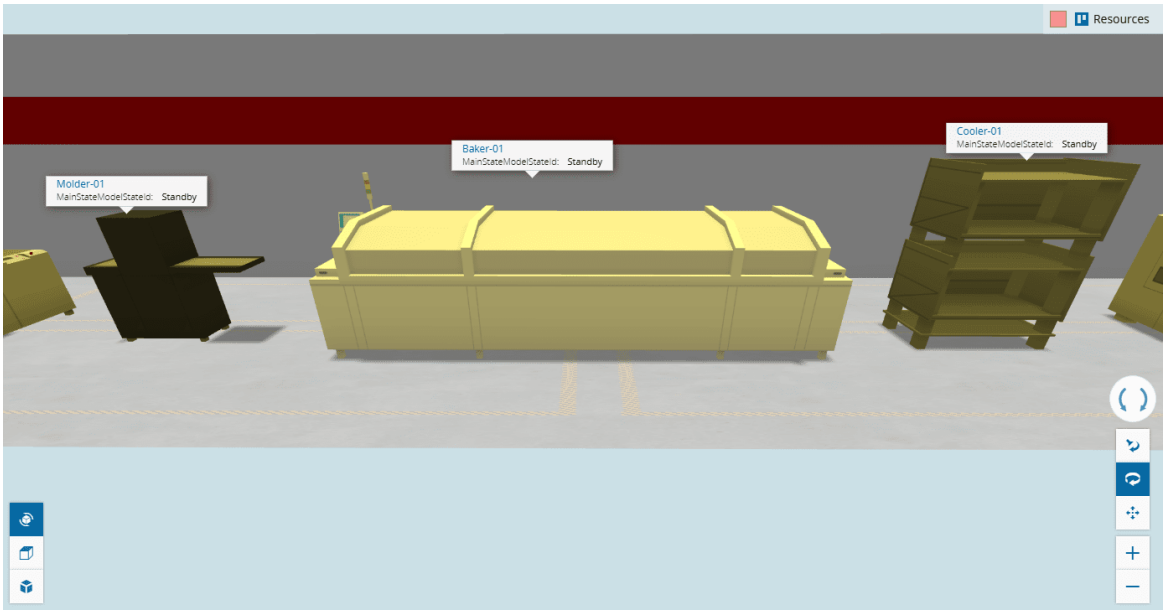


Step 8: Testing the model

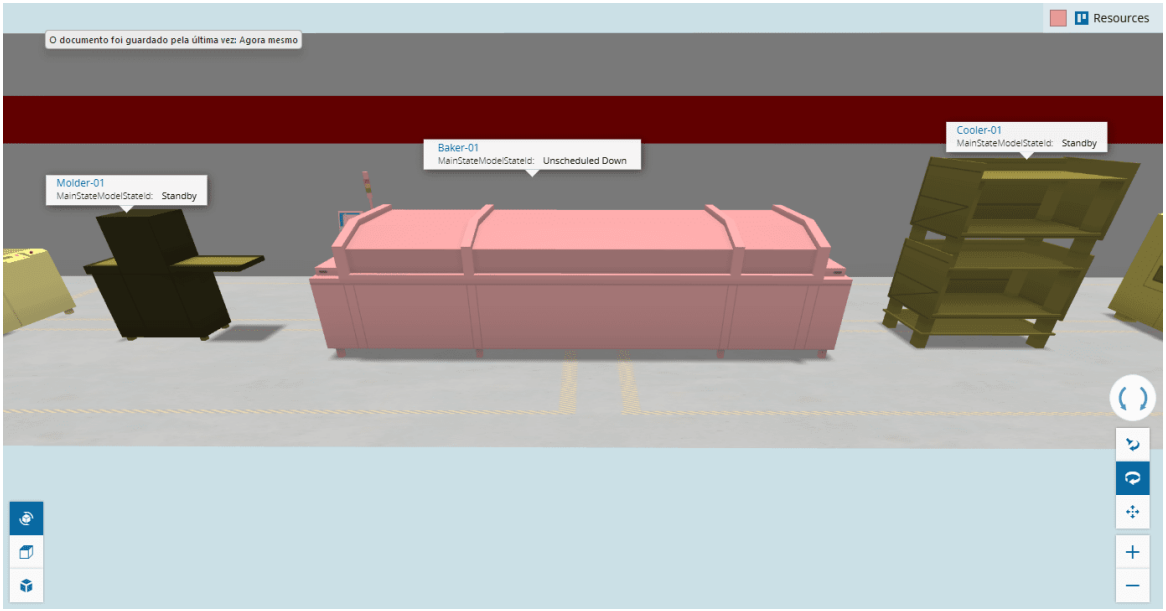
After enhancing the appearance and ensuring that the scenario is fully functional, it's time to test it.

You can switch to view mode, open the entity for one of the resources, such as the Baker, and change its state to another status, like "Unscheduled Down".

This change should immediately be reflected in a color change of the object that represents the Baker, as displayed in the images below.



After


Resources
O documento foi guardado pela última vez: Agora mesmo
Molder-01
MainStateModelStateId: Standby
Baker-01
MainStateModelStateId: Unscheduled Down
Cooler-01
MainStateModelStateId: Standby

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