# Automatic reconfiguration of the factory

### Problem

We have three user stories that speak about automatic reconfiguration of certain parts of the factory based on the available machines.

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| **User Story - Factory Owner** |
| As a factory owner, I want to offer the greatest diversity of products that can be produced by the factory production line capabilities. |

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| **User Story - Factory Owner** |
| As a factory owner, I want the factory to be aware of its capabilities |

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| **User Story - Factory Owner** |
| As a factory owner, I want the machines to be easily exchangeable by similar versions without breaking changes of my factory’s software |

From these user stories it follows that the machines dictate what products are available and ultimately what can be ordered by the user in the shop. The problem for us is the question of how we are made aware of the capabilites of the machines and how extensive the corresponding changes to the available products are.

The following questions will have to be answered:

* Are there no “hardcoded” production tasks e.g. are the task somehow digitally transmitted to our API by the agents? What kind of format would be needed?
* How big are the changes that are possible when changing machines? What does the term *similar version* in the user story mean? We have to differentiate between new datasets like a new flavour that is added when a new machine is added and a whole new machine interaction like suddenly offering a cookie that is packaged with the rest of the product. This would have an impact on the whole database structure, the production plan, obviously the production tasks and ultimately a whole new section would have to be added to the configurator on the shop website.
* Do we get the information about dependencies between specific tasks like that adding toppings to the ice only makes sense if there was already ice added to the container? Are starting and ending tasks somehow marked?
* What do we do if there are products in the production queue (already started or not) that rely on machines that then are removed from the factory?

### Concept

If the agents are to provide our API with the tasks they offer we have to first ask the question: what can an agent offer as a task? The structure could possibly be as follows:

* **Product Feature Task:** It can offer a new feature for the product e.g. it offers a component that is added to the product like the topping on the joghurt.
  + With these tasks two things can happen if a new agent joins the factory. First it can offer a new manifestation of an existing feature like a new flavour that is offered but the product could already be flavoured before. Secondly it could offer a whole new feature like a topping that is added to the joghurt when there was no topping before.
* **Supporting Task:** This task has no direct influence on the product but supports the creation. An example would be the transportation of items.
  + Here the question is what kind of tasks are possible? Is it feasible to construct an architecture that supports any job? How do we handle input data that might be needed for the task?