Manufacturing Cycle with Equiplets

From User Input to End Product

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Introduction

The manufacturing lifecycle is the process a product will to undergo during its production. In REXOS, Products are manufactured by taking each product through series of actions that either involve decision-making by the agents or direct execution of so called services.

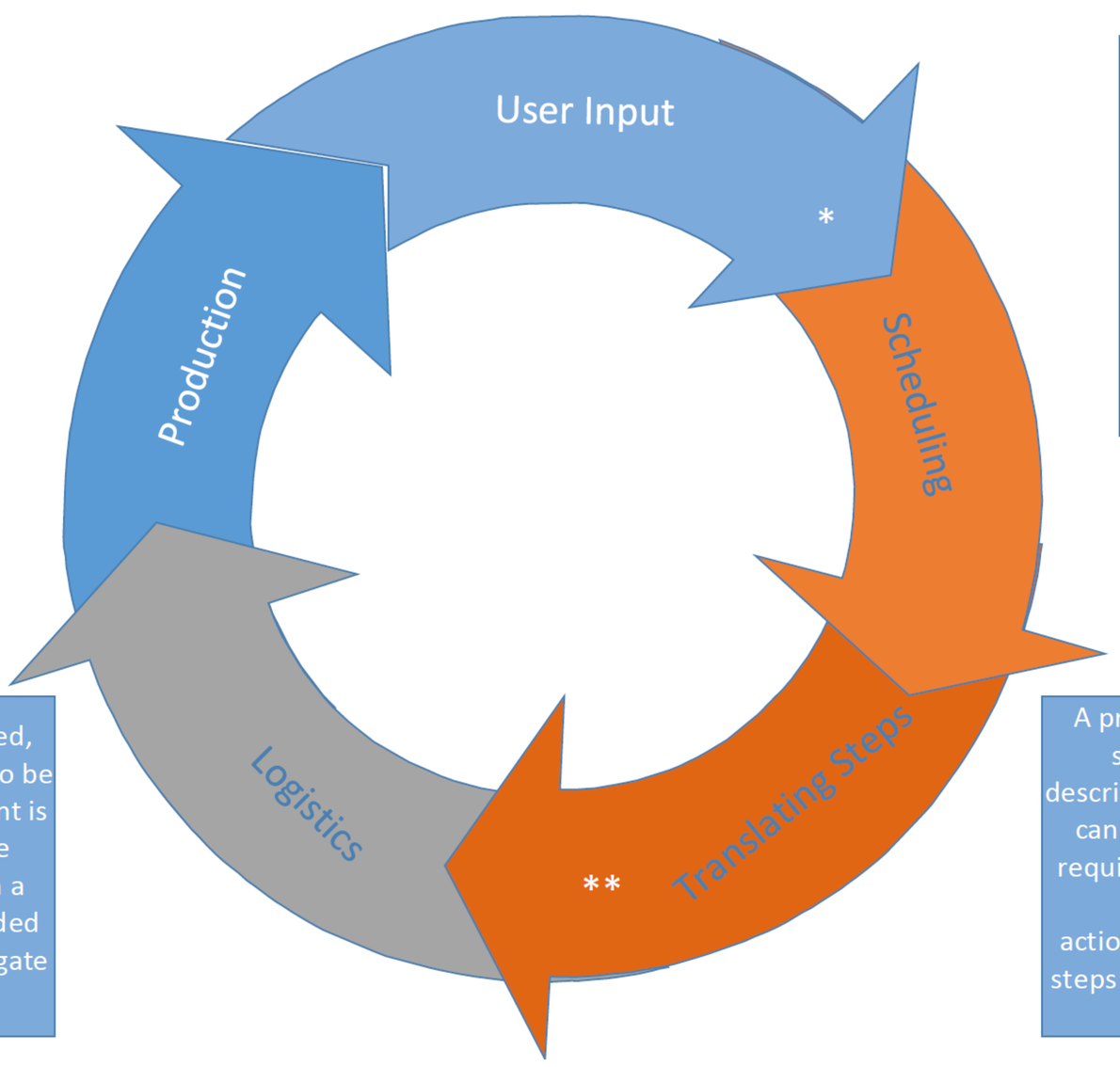
Finding the Right Equiplets *

Once the blueprint for a product is known, it is time for the system to decide where to build it. The system will start by asking each equiplet in the grid whether it is capable of performing a particular step. The equiplets have capabilities which are based on the modules attached and therefor the services it provides. If an equiplet has the right capability to perform a step, it will reply to the message, confirming that it can perform that step.

Manufacturing Cycle

In order to create a product, we must first receive the blueprints for it. These blueprints find their way into the equiplets through user input. The most desirable way to do so is using a GUI. In this GUI it should be possible to rebuild a certain blueprint with a set of simple steps; pick, place, paint, glue, etc. Once the design is finished, a product agent will be spawned with this blueprint. From this point onwards it will make sure the product will be fabricated.

After the product and required parts are available at the right equiplet, the product steps will be executed by the equiplets. The responsible product agent will receive feedback from the equiplet containing information about the executed product step.

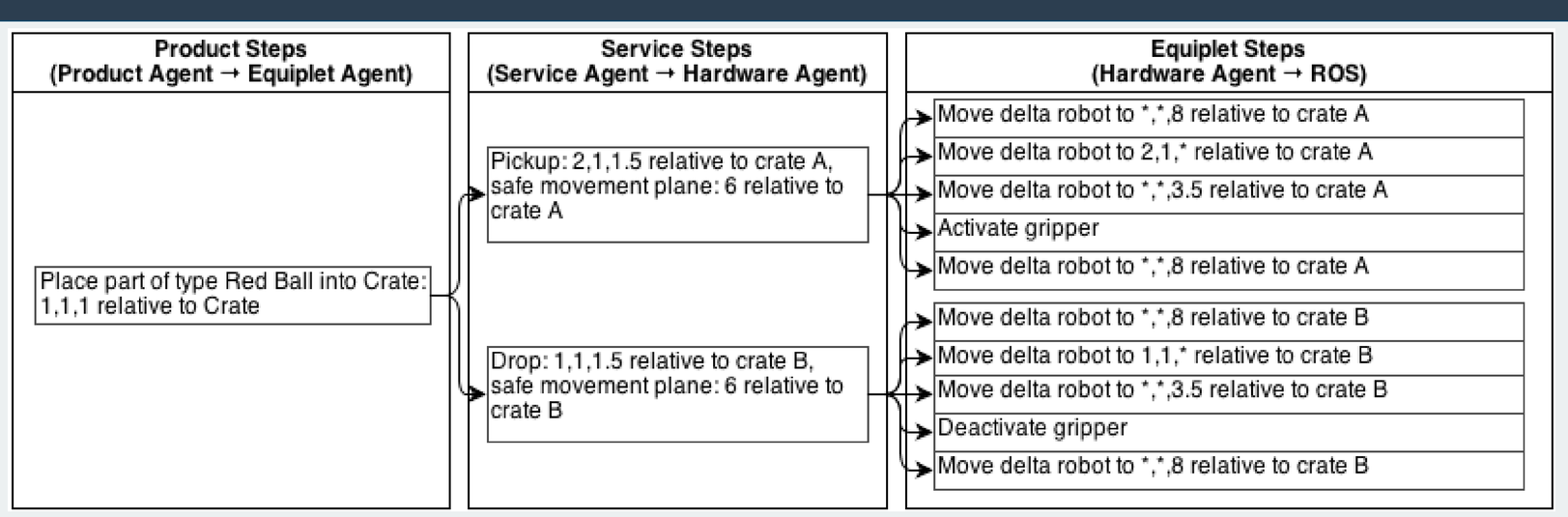


Once all the feasable equiplets have been found, the product agent will start the scheduling process. During this process it will create a schedule based on which equiplet can handle the most (consecutive) product steps, and has the least load. After an equiplet has been chosen, the equiplet will be contacted in order to schedule.

Whenever the product is ready to be produced, part that are needed for production will have to be transported to the equiplets. The product agent is responsible for transporting the parts to the proper equiplet. Parts will be transported on a single robot, capable of carrying all parts needed for one complete product. This robot will navigate through the grid autonomously.

A product is defined by a collection of product steps. These products steps are abstract descriptions of manufacturing steps. Product steps can be processed by equiplets which offer the required service. Services divide product steps in service steps, which are more specific actions. The service steps are divided in equiplet steps by the modules. Equiplet steps are concrete steps which ROS can perform.

Example Translating Steps **



Refferences

TEXT...

Product Life after Production

The produced product logs can be used in different situations.
When a product has a defect on a specific part, the product logs can be compared to the real product and production can be optimized. Future services like generating reparation schematics can be developed using these detailed production logs.

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