PLCopen – OPC UA – Use Cases

Use Cases

The following use cases are used to illustrate the usage of the information model:

1. Observation

Observation comprises reading and monitoring data as represented in the IEC 61131-3 Software model with *Ctrl Configurations, Ctrl Resources, Ctrl Tasks, Ctrl Programs, Ctrl Function Blocks, Ctrl Variables*, and their *ObjectTypes* represented in the OPC UA Server.

Example 1: In a brewery, several tanks of the same type are operated. They are controlled by the same *Ctrl Function Block* which is instantiated in the *Controller* once for each tank. For developing the visualization it is useful to create first a template for operating a tank, which is based on the tank *CtrlFunctionBlockType* provided by the OPC UA server. Then this template can be instantiated and connected to the *Ctrl Function Block* instances within the OPC UA server as often as required (reuse).

Example 2: In a brewery, the number of bottles produced in the current shift shall be presented on a visualization panel. The bottles are counted by the *Controller* and the result provided as an output *Ctrl Variable* of a *Ctrl Function Block*. The visualization panel subscribes to the corresponding *Variable* in the OPC UA server, gets the current number of bottles delivered each time it is changing, and presents it to the user.

2. Operation

Operation inherits the functionality of observation and extends it.

Operation comprises writing data of *Ctrl Variables* represented in the OPC UA Server and execution control of *Ctrl Programs* and *Ctrl Function Blocks* using *Ctrl Tasks* represented in the OPC UA Server.

Example: In a brewery, several recipes are used to produce different kinds of beer. To choose the recipe for the next batch, the number of that recipe is written from an HMI to an input *Ctrl Variable* of a *Ctrl Function Block* via a corresponding *Variable* in the OPC UA server. After this, the batch is started using a *Ctrl Task* in the OPC UA server which triggers the *Ctrl Function Block*.

3. Engineering

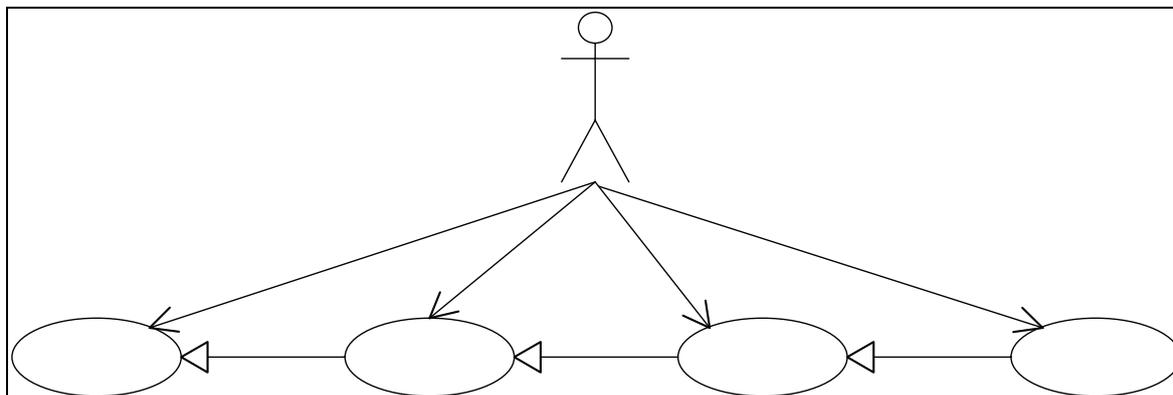Engineering (related to Programming and Maintenance) inherits the functionality of operation and extends it.

Engineering comprises writing of *Ctrl Configurations, Ctrl Resources, Ctrl Tasks, Ctrl Programs, Ctrl Function Blocks, Ctrl Functions, Ctrl Variables*, and their *ObjectTypes* into the OPC UA Server.

Example: The *Ctrl Program* of a machine tool shall be updated via remote access (internet). This download is done using programming software by writing the corresponding *Ctrl Program ObjectType* into the OPC UA server while observing strict security (and safety) regulations.

4. Service

Service inherits the functionality of engineering and extends it.

Service comprises the carrying out of service specific functions, e. g. reading / writing of special data and firmware updates.

Use case diagram