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## **Could a Resource be Simultaneously a Schedule according to the REA Ontology**

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# Could Resource be Concurrently Schedule according to the REA Ontology

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## Abstract

This paper describes using of the resource-event-agent (REA) framework to model enterprise planning at operational level. The aim is to further extend the possibilities and potential of the framework to the areas of prevailing conversion processes rather than exchange processes. In the paper we try to think about a controversial entity we encountered while attempting to model the area. This entity may be viewed both as a *resource* or a *resource type* and as a *schedule*. The paper tries to describe the problem and then to find some rational solution of the described problem.

## Introduction

The areas of enterprise models for production planning and control at operational and policy levels remains under standard and in many ways rather awkward planning and accountancy models. These models or at least their accountancy part is formed by traditional ways and means and brought adequate results. Despite of its success, traditional methods have their limits. The main problems they have to tackle with are increasing complex of the ERP, which is more and more difficult to process the relevant data for the enterprise management.

We see a demand for enterprise resource planning systems that would be designed from the scratch for the use with information technologies, which enables full traceability of all, not only some activities that influence the value of the enterprise's resources. The further current demand is to calculate the value of the enterprise's resources on demand, and not only at determined time intervals.

On the other hand the REA framework offers a method that enables full traceability of all activities that influence the value of enterprise's resources. It shows up that the REA framework is also a tool for suitable model-driven design.

## Production Planning and Control Model

The greater attention is devoted to the REA exchange processes than the REA conversion processes by the examples we have studied in literature. Perhaps it is done by the fact that exchange processes are more obvious and draw great attention. The area of the enterprise production planning and control at operational and policy level draws our attention from a number of reasons. The main reason is that most of the authors of the paper have detailed professional information and knowledge of that area. However the information and knowledge are connected with the traditional methods and approaches that suffer from all earlier described drawbacks. The other reason for the special interest is that we were allocated by the local grant that deals with modeling enterprise processes using REA ontology.

In our approach we tried to describe simple example of production planning at operational level by the REA concepts. The example, which is illustrated in the figure 1 is a simple one but with all characteristic features we met with. The short but clear description follows.

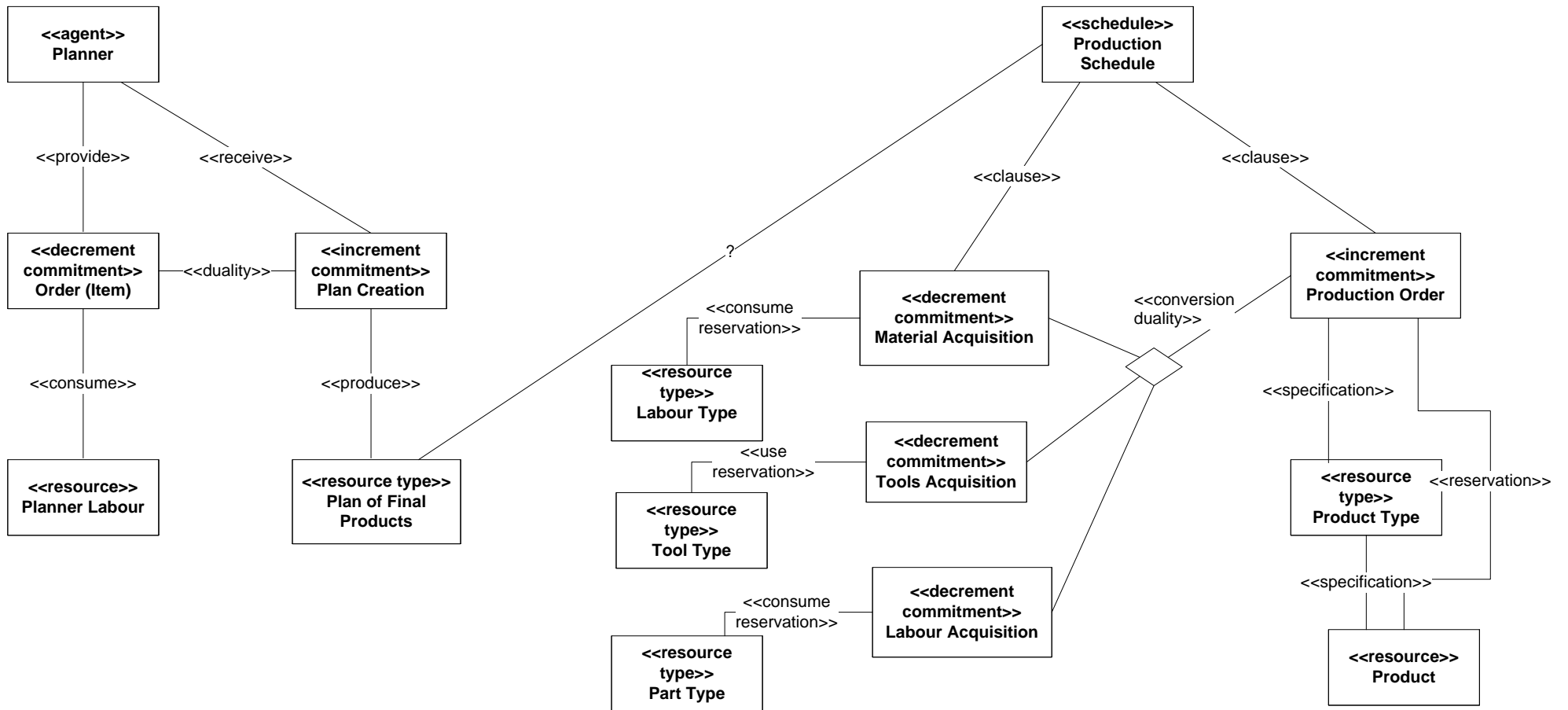


Figure 1: Production Planning and Control Model

In enterprise a production plan is made up from the customer's orders. The production plan is a *resource* or *resource type* in the REA model because it was created by the planner – *Initiator* for the production manager - *Terminator*. At the same time the production plan is used as a *schedule* in this way for managing when events occur in the conversion process. In this context, the production plan (resource) contains *commitments*. However this construction is not allowed in the REA ontology. This entity seems to be a controversial one as it may be viewed as a *resource* and as a *schedule* too.

## Achieved Results

Our approach and achieved results, which break the REA ontology, can be seen in the figure 1. Controversial relationship is noted by the question mark and connects the Plan of Final Products entity with the Production Schedule entity. To make the problem simple, we remain at the planning level as we use commitments entities and reservation relationship and do not go on into the detailed level with event and resource entities.

Being unsatisfied with the achieved results we made another a different attempt to model the planning enterprise production. The model is drawn in the figure 2 noted as a Production Planning and Control Model – different approach.

As may be seen from the figure 2 we also remain at the level of commitments to make the problem simple. The Product Plan is modeled as a increment commitment with a clause relationship to the Production Schedule. The Production Plan has exchange reciprocity relationship with the four decrement commitments named as Labour Acquisition, Workplace Acquisition, Tool Acquisition and Material Acquisition. All of these decrement commitments are connected to adequate type by the reverse relationship.

Complex figure with the event and resource entities would be too confused for description and explaining the problem in a simple way.

## Discussion

During modeling of enterprise production systems it is necessary to carefully distinguish between *actual situation* expressed by the event entity and *promising situation* expressed by the commitment entity. The other important thing that deserves attention is proper using of typing (distinguishing between entity type and pure entity).

In our example the idea that the Plan of Final Product is a resource is correct without any doubts. In the same time however it must be a schedule as a Production Schedule. Except for the solution drawn at the figure 2 we could propose some solution based on the principle of using roles. As the REA modeling framework provides only concept of agent it does not provide rational solution. Instead of roles some type of relationship between the resource entity and the schedule entity should be used.

Ambiguous view at an entity was described in the literature as the *Prototype Abstraction Relation Problem*, formulated by Brian Smith. The problem is that an entity (a prototype) may be also viewed as its instance. To model this it is necessary to be able to describe an entity both as an instance and as a class. This is possible in the block oriented languages with the possibility for declaring nested classes. This may be used for the fulfillment relationship between the commitment and the event entities.

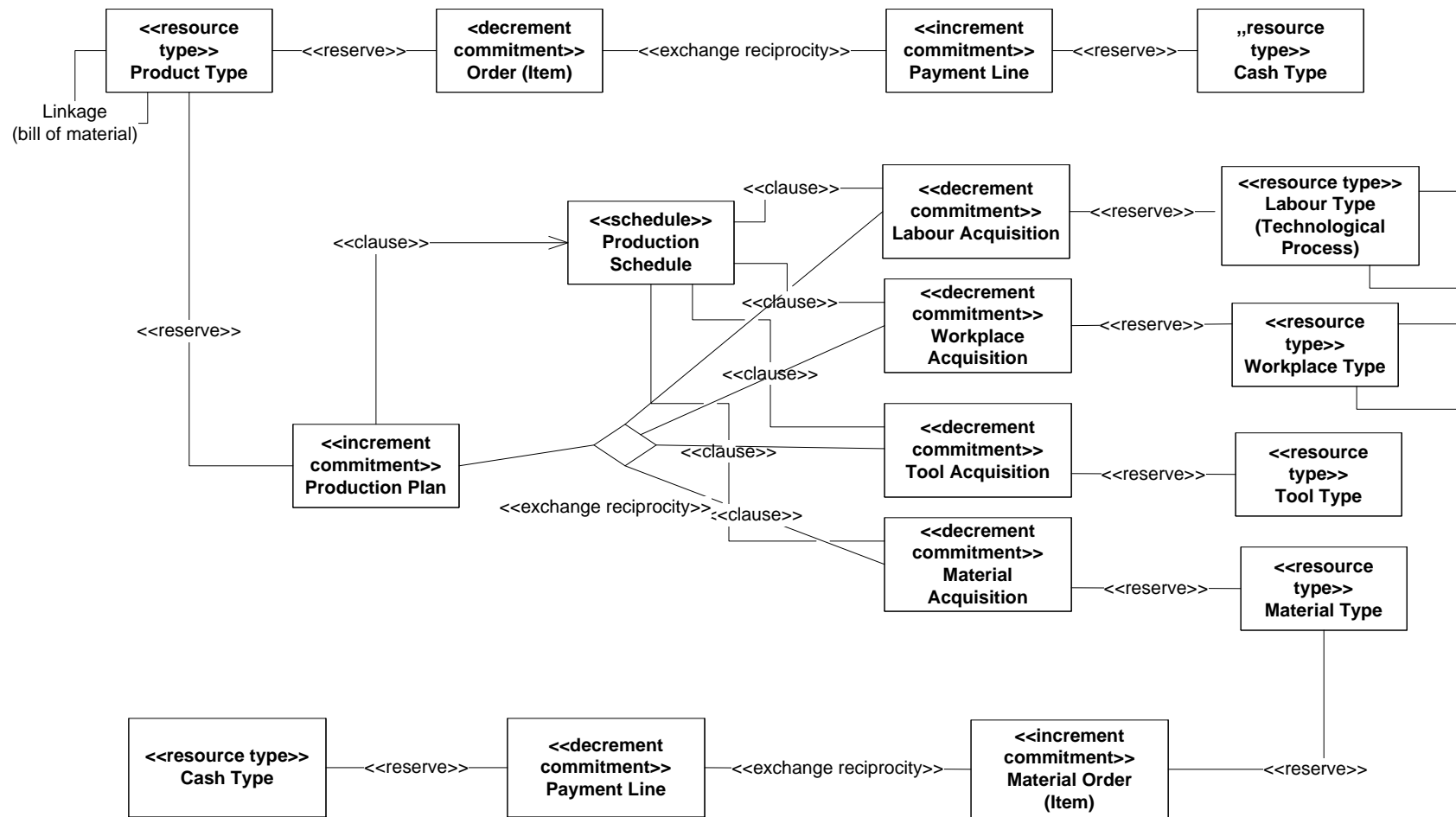


Figure 2: Production Planning and Control Model – different approach

## **Conclusion**

In the paper a two different approaches to production planning and control model were presented. However the first approach does not fit the current REA ontology so another solution of the problem was proposed. There may be possibly some other solution or approach solving the problem.

## **References**

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