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Project management using the buffers of time and resources

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Abstract

One of the reasons to distinguish project management as a separate field of knowledge is the uncertainty. The way we manage the uncertainty in the project (and risk management in particular), has direct influence on the project duration and its success. According to multiple studies performed for the traditional project management methods, only 44% of the projects finish in time. 70% of the projects reduce the amount of planned work, 30% of the projects simply die unrealized. Even so nowadays, with new tools and techniques, that numbers tend to decrease, the overall picture says that we, as a project manager, perform our work poorly. This article examines the use of a relatively new method of project management, Critical Chain Project Management (CCPM), comparing it with the traditional approach to project management.

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1. Introduction

Nowadays there is a method applicable to monitor changes and uncertainties - the Critical Chain Project Management method (CCPM). It does not focus on separate tasks, but it focuses on the only important date - the project completion date.

CCPM is a planning and project management method that focuses on the project resources limitations. It was proposed and developed by Eliyahu Goldratt in 1997. This method's approach is opposite to the PERT (Project Evaluation and Review Technique) in the sense that it does not propose neither rigid tasks sequence nor rigid plan. On the contrary, the plan prepared in the terms of CCPM consists of the time-equalized resource load. However, it requires some flexibility in the tasks start time and fast switching between them (without working on them simultaneously) in order to keep project in its time borders.

Perhaps the most difficult task which project managers need to solve on the daily basis is to keep dynamic project in initial schedule. Limited resources and growing qualification requirements in difficult projects leads to resource limitation becoming the most important factors of risk on the way of project successful completion. In order to review how that kind of risk affects the project schedule project leads trained to focus on the tasks on the critical path of the project. They also know, that resources involved in that tasks need to be managed proactively. This requirement is especially important in relation to the resources involved in the external projects of the company.

That is the situation when CCPM helps project lead to plan and manage project schedule with the dedicated optimization tool, which combines the critical path of the connected project tasks with the critical path of the resources used in that tasks. And that connection directly affects the project completion date. The critical chain of the project clearly defines the array of the project tasks that needs their resources to be aligned. If the amount of the resources in the project was infinite, the critical path and the critical chain of the project would be the same.

Unfortunately, actions focused on aligning of the resources related to the critical chain of the project often leads to the project later completion time. On order to complete the project in time the new schedule should be optimized. The critical chain optimization as well as the critical path optimization is a task, where you need to reduce the duration. The difference is that the CCPM also focuses on the resources of the project, aligning them with early start and fast switching between tasks.

CCPM optimization defines that the reserves, included in the project estimated execution time, may not be required, and, in theory, all project tasks may be completed earlier than estimated. Here we should take into account that despite of the individual tasks time reserves, there is no big chance to significantly reduce project duration at their expense. On the other hand, if we reduce individual tasks reserves, the delay of the only one task may result in the overall project delay.

2. Literature Review and Hypotheses

With a traditional approach to project management, problems related to the uncertainty (the Murphy's law), the Parkinson's law, and simultaneous work on the several different tasks could be solved using the following approaches.

2.1. Including risks and uncertainty into the project task estimates

Often both the employee and his boss tends to include into the project estimates risks and uncertainty they see. Uncertainty for example may be connected to the various factors like new technology, low level of employee experience, lack of knowledge about the task and inability to accurately estimate its duration. They try to minimize risks adding some reserve time to each task estimated duration. Because each task completion time is represented as a probability distribution, not as a constant, the graphical representation of the task estimated duration in the terms of traditional project management it has been shown at Figure 1 below:

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