PROJECTS AT WORK

Critical Chain & Agile

by Bob Tarne: December 1, 2011

The Critical Chain approach to executing projects has been compared to Lean, which also shares common ground with Agile-related techniques such as Kanban. Is there untapped synergy between Critical Chain and Agile methods? A recent conference helped to shine light on their similarities and key differences.

In his book *Kanban*, David J. Anderson, in discusses how his approach evolved from drum-rope-buffer, part of Theory of Constraints and the work by Eliyahu Goldratt. Critical Chain is also based on the work by Goldratt, who passed away earlier this year. Both Theory of Constraints and Kanban are forms of pull systems. So is Critical Chain, like Kanban, another flavor of Agile, or is it something different?

During the Project Flow 2011 Conference held in San Diego this past November, a number of case studies were presented on how organizations used Critical Chain and the success that was achieved following this technique. A key concept that a number of the presenters attributed to their success was reducing work in progress.

Studies have shown how people cannot multitask. People will be more effective when given a fewer number of tasks and allowed to complete those before being assigned additional work. Critical Chain takes this idea a step further and says organizations cannot multitask either. They are best served by focusing on fewer projects at a time, as well as reducing multi-tasking within projects.

Like Critical Chain, Kanban takes a similar approach. At the project level, a Kanban project limits work in progress with explicit limits for each step in the project flow so individuals are not multi-tasking. Kanban is also taking this idea to a higher level as organizations mature in their use of Agile. As organizations scale Agile to the enterprise, this same idea of using Kanban and limiting work in progress is being applied across projects.

From the Critical Chain perspective, one of the steps many of the presenters at Project Flow discussed to reduce multi-tasking was staggering the start of projects. The logic was that when resources were spread across multiple projects, they struggle when starting more than one project at a time.

This, however, highlights a difference between Critical Chain and Agile. In a Critical Chain organization, resources may be spread across multiple projects. In addition, they are assigned work from management. This differs from the agile approach of having dedicated, self-organizing teams. A principle behind the Agile Manifesto states that "the best architectures, requirements, and designs emerge from self-organizing teams." So unlike Agile, Critical Chain still uses more of a command-and-control approach to assigned work.

This approach reveals another difference between Critical Chain and Agile: how the plan evolves during the project. Like Agile, Critical Chain recognizes that it is impossible to capture all details at the start of a project effectively. However, unlike Agile, in Critical Chain, an end-to-end plan is developed up front. In order to accommodate changes, a Critical Chain schedule builds in buffers

to account for changes.

Buffers exist at two levels in Critical Chain: feeding buffers and project buffers. Feeding buffers are used on sub-projects that feed into the main project. Think of the hardware team on a systems project. The hardware has to be in place by a certain point in the project. By adding the feeding buffer, the project can absorb the impact if there is a delay in the hardware sub-project.

At the project level, the buffer performs the same function for the overall project. These buffers allow for an important aspect of project control: how resources are assigned work. By monitoring how the buffers are being consumed, the project manager can reprioritize tasks so that more resources are assigned where buffers are being consumed faster.

Buffers serve another function as well. They are used to counteract Parkinson's Law and Student Syndrome. Parkinson's Law states that "Work expands so as to fill the time available for its completion." Student Syndrome states that work will start at the last possible moment. Both of these concepts help explain why projects can be delayed when buffers are applied to each task on the project. The person performing the work will use up any buffer added at the task level, and start as late as possible, so any delay in completing the task impacts the whole schedule if that task is on the critical path.

Eliminating task-level buffers counters Parkinson's Law — the additional time for the work to expand into is gone. By putting the buffer at the end of the project, the work starts earlier, so if the work takes longer than expected, the buffer absorbs the extra time, rather than causing a schedule delay. By taking this approach to buffers, the overall schedule is still shorter than if buffers were applied to each task.

When it comes to managing the project, some practitioners of Critical Chain still follow more traditional aspects of project management as well. They use Critical Chain for scheduling but still use a PMBOK-based approach for such things as managing communications, procurement, or human resources. From this aspect, the projects are different from Agile. A Critical Chain project is executed in a linear fashion, rather than a set of short iterations with deliverables completed at each iteration.

If you have read the Agile Manifesto, you will see some clear differences with Agile principles and how Critical Chain works.

1. The team isn't self-organizing, they are given direction from management.
2. The output is not delivered in short iterations but in more of a waterfall approach.
3. Critical Chain doesn't specify how the team and customer interact.
4. There is more emphasis on upfront planning in Critical Chain, though it should be noted that Critical Chain plans are meant to be less detailed and more flexible than a traditional waterfall plan.

So, no, Critical Chain is not another flavor of Agile. Critical Chain primarily focuses on orchestrating the activities among team members through effective scheduling. In other aspects of the project, such as communications or budget management, Critical Chain practitioners follow more traditional approaches than agile. However, for the right type of project, Critical Chain is a very effective approach to use. The Project Flow conference was full of success stories from practitioners to illustrate this point, and I'll share some of those in a future article.

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