

## PLM Meets Scrum

### CIMdata Commentary

A recent visit to PTC's new Blaine, Minnesota software development center proved to be enlightening and refreshing—no trivial task considering this is coming from someone who has a degree in Computer Science and who in the past worked on some of the largest software systems ever coded. The visit proved that software development practices, processes, and facilities continue, at least in the case of PTC, to evolve to meet the needs of ever-increasing market demands. For the most part, you will not find anyone following the traditional waterfall software development approach here, but you will hear a lot about Scrum and how customers' interactions are a cornerstone to software innovation and the delivery of high quality, enterprise ready software solutions.

So what is Scrum, you might ask. According to the Scrum Alliance ([www.scrumalliance.org](http://www.scrumalliance.org)), a not-for-profit professional membership organization created to share the Scrum framework, "Scrum is an innovative approach to getting work done." More succinctly, "Scrum is an agile framework for completing complex projects." According to the Scrum Alliance, Scrum originally was developed for software development projects, but it can and is being applied to other complex projects such as software maintenance and, in fact, any type of project or program where execution must result in tangible deliverables. The Scrum Alliance believes that "the possibilities are endless."

Many computer science historians point to a Harvard Business Review article entitled "The New New Product Development Game"<sup>1</sup> by Takeuchi and Nonaka to be Scrum's birth. In that article the two authors described a new development approach that would increase speed and flexibility—a holistic product development strategy, as summarized by the Harvard Business Review, "where a development team works as a unit to reach a common goal." In the article, the two authors compared this new holistic approach in which the various development phases operate in a highly concurrent manner and the entire process is performed by one cross-functional team. Using a rugby analogy, where the entire team "tries to go the distance as a unit, passing the ball back and forth" always working together with a common goal in mind. It is believed that the first reference to this new development approach being called "scrum," a rugby term mentioned in the article by Takeuchi and Nonaka, can be found in "Wicked Problems, Righteous Solutions," by DeGrace and Stahl<sup>2</sup>.

As described on the Scrum Alliance's website and illustrated in Figure 1, the Scrum framework is deceptively simple. At the beginning of a project a product owner creates a prioritized list of desired outcomes (e.g., desired features and functions) called a product backlog. In the sprint planning step the development team pulls a small manageable set of items from the top of the product backlog, thereby creating a sprint backlog, and decides how to implement those items. The development team then has a finite amount of time (two to four weeks is common), a sprint, to complete its work. The team meets during a daily scrum to assess progress, manage risks, and solve problems. Throughout the process a ScrumMaster keeps the team focused on its goal (i.e., delivering the items chosen from the product backlog). At the end of the sprint, the deliverables should be ready for use by the appropriate

<sup>1</sup> Takeuchi, Hirotaka and Ikujiro Nonaka. The New New Product Development Game. Harvard Business Review. January-February 1986.

<sup>2</sup> DeGrace, Peter, and L. Hulet Stahl. Wicked Problems, Righteous Solutions: A Catalog of Modern Engineering Paradigms. Prentice Hall PTR. 1st edition. 12 February 1998. ISBN 0-13-590126-X.

users. Finally, the sprint ends with a sprint review and retrospective. The process repeats until enough items in the product backlog have been completed, the budget is depleted, or a deadline arrives (e.g., a product release freeze). At the end of the day, Scrum ensures that the most valuable work has been completed when the project ends.

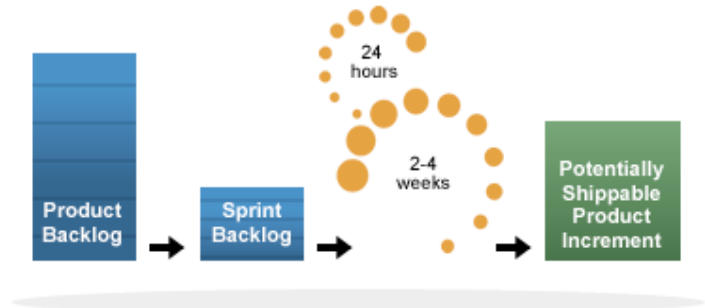


Figure 1—The Scrum Framework  
(Reprinted with permission of the Scrum Alliance)

A quick visit to PTC’s Blaine development center vividly illustrates the fact that the Windchill Product Group has embraced the Scrum approach to software development and the many techniques that support it. PTC reports that their Windchill product group also uses Scrum in their Needham, Massachusetts headquarters and other locations worldwide. Formal software development isn’t new to PTC. The organization has been defining, coding, and delivering desktop and enterprise class software solutions for many years. In 2005, the organization received a Capability Maturity Model Integration (CMMI) level 2—“Managed” certification. A reasonably solid achievement—one that has undoubtedly resulted in more consistent project execution and software deliveries for years. But like many other progressive organizations, this wasn’t good enough. The traditional waterfall approach they had been using just wasn’t giving them the competitive edge they felt they needed. It wasn’t allowing them to be as responsive and agile to the market as they knew they needed to be, and this is where Scrum came into play. Much of what PTC executes in Scrum terms, can be traced back to what Schwaber and Beedle describe in their book “Agile Software Development with Scrum<sup>3</sup>.” This book has been very influential to the development and implementation of Scrum in organizations like PTC’s.

PTC’s Scrum pursuit as it relates to the Windchill product group primarily dates back to Windchill 9.1 and much of the development work it performed for one of its major industrial customers at the time. Today, the Windchill product development group boasts more than 50 teams using Scrum, who are shipping product features and functions (i.e., releasable code) to quality assurance (QA) every two to four weeks. In turn, these two- to four-week cycles are repeated throughout a longer three-month cycle to deliver something quite tangible to PTC’s customers. PTC is currently looking to shorten these cycles. This doesn’t mean that they will inundate their customers with new functionality, but rather it does mean that PTC should have a much higher percentage of first-time-right code releases and a much higher probability of meeting or exceeding its customers’ expectations regarding quality, functionality, ease of use, delivery date, etc. These short development cycles keep PTC’s 10-person development teams on task and ensure that they don’t lose focus on what they are trying to accomplish. This also allows them to validate their development with key customers and the QA group much earlier than ever before. As mentioned previously, this has already proven to be a key enabler for higher first-time quality and customer satisfaction. This should even become more evident with the upcoming release of Windchill 10.

<sup>3</sup> Schwaber, Ken and Mike Beedle. Agile Software Development with Scrum. Prentice Hall. October 21, 2001.

It should be noted that the Windchill development group isn't the only group within PTC who have embraced the Scrum approach. Building on some of the experience of their acquired products including CoCreate, MathCAD, Insight and others, where best practices were identified, PTC has had the opportunity to create a community of practice around the Scrum approach. Additionally, the CAD development group is using a Scrum approach today on a few initiatives and plans to adopt it across the entire group over the coming year. We expect PTC's other development organizations will do the same over the next several months and years. The various Scrum team's success and lessons learned appear to be transferable and repeatable—a testimony to PTC's management and product development culture, and Scrum's flexibility and agility.

Finally, it is important to note that PTC's Blaine product development facility is also a customer center. PTC intentionally built the facility so that it would not only support Scrum techniques, but also allow critical interaction with PTC's customer base. The facility's layout provides ample space for group discussions, daily scrum meetings, and customer interaction. Overall, the facility was configured to facilitate internal as well as external collaboration throughout the product development process and, in fact, throughout the useful life of the solution.

It is nice to see that software product development doesn't have to be a black art, where individual developers go off into a cave and create what they think the customers want or need. PTC's approach to Scrum is refreshing and has clearly proven to be successful. As mentioned previously, the release of Windchill 10 should further demonstrate the robustness of PTC's software development approach, and all the good work and dedication put into evolving it from your traditional waterfall approach to one that is highly collaborative and responsive to the market's rapidly changing needs. PTC's challenge now is to fully embrace this approach across all of its Product Development System solutions and to continue to refine its development processes and further embed them into its various product development organizations. PTC's Blaine development center clearly represents the way PLM and other enterprise class software should be developed.

### **About CIMdata**

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