Taking the Road Less Traveled: The CMMI® Continuous Approach

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A greater degree of granularity in organizational performance measurement, a more revealing look at the trouble spots in organizational practices, and a greater focus on organizational strengths—just a few of the reasons software practitioners give for how a continuous approach to process improvement is benefiting their organizations.

"It's like going to a dressmaker and having a dress fitted," says Mary Anne Herndon, a process improvement manager for the Aerospace Intelligence and Information Sector (AIIS) of the Science Applications International Corporation (SAIC). "The continuous representation tailors easily to an organization's current state. It helps you figure out where you are now and where you need to go."

SAIC's AIIS represents a growing number of organizations that are selecting the continuous representation over the staged representation when implementing a Capability Maturity Model Integration (CMMI) model or performing a Standard CMMI Appraisal Method for Process Improvement (SCAMPI℠) appraisal. Since the release of CMMI V1.1 in December 2001, approximately one-third of the Introduction to CMMI course attendees have selected the continuous version of the course and nearly one-third of all SCAMPI appraisal results reported to the Software Engineering Institute (SEI℠) have been from organizations using the continuous representation.

Although the staged and continuous representations are simply two ways of viewing CMMI best practices, and the staged approach remains a proven method for achieving organizational maturity, those with experience using the continuous approach say this newer and less-documented path to software process improvement is transforming software businesses and yielding significant results.

Staged Versus Continuous

Generally, organizations new to process improvement prefer a staged approach, which predefines the process areas required to attain each maturity level (1-5) and thereby provides a roadmap for institutionalizing best practices. Achievement of a maturity level is based on achievement of the practices of a set of related process areas. Organizations that are upgrading from the Capability Maturity Model® (CMM®) for Software, a staged model, are more likely to prefer staged.

In the continuous representation, process areas are organized into four process area categories: Process Management, Project Management, Engineering, and Support. Based on its business objectives, an organization selects the process areas in which it wants to improve and to what degree. Instead of maturity levels, capability levels (0-5) are used to measure improvement. Achievement of a capability level is based on achieving the practices of a single process area. This also enables an organization to implement process improvement in different process areas at different rates. For example, an organization can reach capability level 2 for one process area and capability level 3 for another.

"In moving away from the quest for an overall maturity level," Herndon says, "the continuous approach helps an organization focus on its capabilities and meet business objectives. Concentrating on strengths is a great way to motivate people. Staged tends to be a one-size-fits-all approach; it's pass or fail. That doesn't help you succeed like knowing what you do well and figuring out how to do it better."

A Targeted Look

Terry Rout, a manager with the Software Quality Institute at Griffith University in Australia and chairman of the Australian Committee for Software Engineering Standards, has been using continuous models for more than eight years. Whether through the CMMI Product Suite or ISO 15504, Rout says a continuous approach offers the most enlightening glimpse into how an organization is performing its processes.

"A high degree of granularity occurs naturally from using the continuous framework," says Rout, noting that continuous is widely used in Australia and is the preferred standard for its Department of Defence. "You have to work fairly hard to get those kinds of results from staged."

Like most appraisers, Rout presents his findings in an achievement profile—a series of charts showing the capability levels an organization has achieved in its targeted process areas. "A well-crafted profile can speak volumes about an organization's capabilities. A profile might show that an organization is getting close to capability level 2 in the Project Management process areas, but is at level 0 in some of the Engineering ones. That's a pretty serious warning signal that something needs to change. Otherwise you're just establishing great management of rather poor engineering practices," Rout says. "With staged, you might very well miss how the weaknesses in your process areas are reflected across the board."

Both Rout and Herndon find value using achievement profiles for discussing problem areas with upper management. "It makes it very easy to decide where the investments need to be made, based on the business case," says Herndon, who is also an authorized SCAMPI Lead Appraiser[SM].

A Case for Using Both

Despite his personal preference for using a continuous approach, Rout says that an organization may find value in both representations at some point in its improvement history. “An organization should use the richness of the continuous view, but they should also consider the priorities of staged,” he said. “In the end, both roads go in the same direction. It’s just a matter of knowing when to skip back and forth.”

Craig Hollenbach, a technical fellow for the Defense Enterprise Solutions (DES) sector of Northrop Grumman, sees the reward of applying both principles. “The staged approach gives you a maturity level, which is easily communicated in the business world,” says Hollenbach, whose sector was appraised at maturity level 5 at its December 2002 assessment and achieved capability level 5 in nearly all CMMI process areas. “But we have a lot of projects that perform only a certain part of the life cycle…we have to pare down the number of process areas we look at and to what extent. This is where continuous is most appropriate.”

Extending the Continuous Approach

Now that Northrop Grumman DES has reached such a high level of maturity and capability, Hollenbach is faced with how to keep the momentum going. He anticipates extending continuous practices to areas outside of the technical arena, such as business services. “We will keep broadening the scope of improvement,” he says. “In 2000, we were wondering what to do next. Now that we’re at level 5, we just have to keep using the tools and processes that got us here to continue to make a difference.”

At SAIC, AIIS is also starting to use the continuous approach as a way to make connections across the organization, from the technical areas to service units such as finance and contracts. “Even though the products are different, by applying the same practices, we are integrating the stovepipes,” Herndon says. “This integration really promotes communication. Now we have a language that everyone speaks.”

Share your Experiences

The SEI is interested in hearing from other organizations that have benefited from using the continuous (or staged) approach to CMMI. Please contact the SEI to tell us about your experiences and what you have learned from them.

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