

Probing Product Line Practices

Claire Dixon

Increasingly, organizations are moving toward the product line approach to software development and reaping major benefits. The strategy of deriving an entire set of products, to satisfy a particular market need, from a common set of building blocks is an idea whose time has come. However, the product line approach also involves unique risks and costs. A company's awareness and preparedness can mean the difference between a sustained success and a waning effort. The SEI has developed the Product Line Technical Probe (PLTP)—a diagnostic tool for examining an organization's readiness to adopt the product line approach, or to proceed effectively with its existing product line effort.

The PLTP is based on the principles described in A Framework for Software Product Line Practice—Version 2.0.1 Released by the SEI in 1999, the framework is an evolving Web-based document that describes the essential concepts, practice areas, and activities involved in successful development or acquisition of a software product line. It provides organizations with the ingredients of an integrated business and technical approach—the "product line practice approach"—that allows them to produce and maintain similar systems of predictable quality, at lower costs, and in significantly shorter time. The PLTP examines how well an organization measures up against the Product Line Practice (PLP) Framework.

The SEI has spent more than three years creating the PLP Framework. Its contents were developed from a combination of in-depth studies of organizations that build product lines; direct collaborations with industry and Department of Defense organizations on product line efforts; and workshops involving participants from the product line commercial leaders. Larry Jones of the SEI feels that the probe is the natural outcome of the framework development, and is valuable to organizations that are trying to adopt its practices. "When you have a model of best practices, it makes sense to compare yourself to that model to see how you might improve."

The PLTP is intended to benefit two groups of organizations: 1) those that are considering adopting a product line approach and 2) those that have already initiated a product line effort. Organizations that are candidates for the PLTP might be asking the questions, "Will this endeavor prove profitable to our company?" "This seems like it will be worth doing but how ready are we?" or "We've hit an impasse in our implementation; how do we proceed to assure a positive outcome?"

The result of the probe is a set of findings that portray an organization's strengths and challenges relative to its product line endeavors. These findings can then be used as a basis for improvement planning, with the goal of increasing the organization's capability for product line success.

The Probe Process

Preparation

During the preparation phase of the probe, the PLTP team communicates extensively with the organization executive who has commissioned the probe—the "organization sponsor." Team members discuss the organization's experience with the product line approach, its goals regarding the approach, and its objectives and expectations for the PLTP.

Data Gathering

The data gathering phase follows, featuring structured interviews with small groups of organization members. Open communication is crucial; groups are made up of peers, so that none report to each other in the organization. All comments are non-attributable. The PLTP team poses to each peer group a set of questions, based on the practice areas described in the SEI PLP Framework. These practice areas are loosely organized into three categories: software engineering, technical management, and organizational management. While the practice areas under consideration may be required for any software system, the product line context imposes its own set of constraints that must be specifically addressed. The scope of the question set is determined during the preparation phase. Different questions from this set may be posed based upon the job responsibilities of particular interview groups. The team may probe more deeply into certain areas to learn about specific strengths and challenges. The team may also request documentation to support the interview data-gathering process.

Data Reduction and Analysis

The PLTP team consolidates and compares the data gathered against practice areas documented in the framework, and classifies findings as strengths and challenges based upon that comparison. Findings may also include information that lies outside of the scope of the framework, if the team determines that the information affects the organization's product line readiness.

Results

The team presents its findings to an audience designated as appropriate by the organizational sponsor. A written report follows. Depending on its arrangement with the organization, the SEI may assist the organization in developing an action plan to address the findings.

The PLTP method is based on years of SEI experience in evaluating organizations' software engineering practices. It gives a penetrating view of how the approach fares at

all levels of infrastructure. It detects where technical management is strained, where organizational weakness may develop, and where engineering competencies are exceptionally strong. This perspective provides a map of where reinforcement or revision is required. It is a picture not generally available to decision makers through their typical information-gathering methods. Without the benefit of the probe, a company may not even be aware of a deficit, or may misdiagnose its cause.

The extraordinary potential of a product line approach multiplies the probe's value. The rewards of establishing a whole line of software from a common engineering basis can be tremendous. One company was able to reduce its system build time from a year to one week by adopting a product line approach. Another organization increased its production six-fold over three years. All this is possible, but having the necessary insight and guidance to determine the correct approach is essential. The probe can help provide that insight.

For more information contact-

Customer Relations

Phone

412 / 268-5800

Email

customer-relations@sei.cmu.edu

World Wide Web

<http://www.sei.cmu.edu/tsp/>

or

Linda Northrop

Email

lmn@sei.cmu.edu

World Wide Web

<http://www.sei.cmu/plp/>