

Improving Technology Adoption Using INTRo

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As software-intensive organizations increasingly recognize the need for guidance in seamlessly introducing new software tools and technologies, many practitioners are discovering they lack the skills necessary to champion successful adoptions.

To help organizations systematically analyze, select, and implement new technology, the SEI in collaboration with Computer Associates has developed a high-level approach for technology implementation known as the IDEALSM-Based New Technology Rollout (INTRo). INTRo is a Web-based resource that guides software professionals through technology change management through organizational and technological assessments, proven practices, and methodologies that foster learning.

From IDEAL to INTRo

INTRo builds from IDEAL, a comprehensive approach to long-term software improvement through the five key process stages for which it is named: Initiating, Diagnosing, Establishing, Acting, and Learning. IDEAL serves as a model for planning and implementing effective improvements. “We wanted to take advantage of the lessons learned from using IDEAL in software process improvement, and to extend and apply those lessons to the new domain of information technology (IT) and commercial off-the-shelf (COTS) software selection and deployment,” says Linda Levine of the SEI. “INTRo goes further by providing a greater level of detail, content, and support for users.”

Using INTRo, an organization can introduce new software tools and technologies by following a series of structured and informative process steps, tutorials, tips, checklists, and sample process outputs. The model emphasizes the importance of sharing information and disseminating knowledge practices throughout an organization in order to develop more lasting and complete business solutions. Further, INTRo addresses change across the dimensions of process, technology, people, and culture. While typical change models tend to focus on one or two dimensions, INTRo provides a more customized method across multiple variables.

As interactive learning and collaborative practice were integral to developing INTRo, Levine hopes to stimulate an online community around the use of INTRo by developing a Web-based forum for users to share lessons and explore alternative approaches to technology adoption. “Such a forum for exploration and learning would allow the SEI to extend its interactions with its partners and constituency and to build a community of practice,” Levine says.

INTRo is designed to meet the needs of large efforts, including multi-site, cross-organizational, enterprise-wide rollouts. INTRo is most applicable to organizations at maturity level 3 and higher on the Capability Maturity Model® for Software (SW-CMM®). For small projects, such as a development team of a few engineers adopting a new tool, INTRo may be applied informally or in part. In the case of such informal and partial use, adoption results will vary.

The INTRo Process

IDEAL-Based New Technology Rollout consists of seven stages: Project Initiation, Problem/Domain Analysis, Solution Definition, Technology Customization and Testing, Whole-Product Design, Breakthrough, and Rollout.

- Project Initiation establishes project and management goals, and structures the effort. After defining a project's key players, scope, purpose, resources, time variables, deliverables, benefits, and work processes, the project team develops these ideas into a formal, resourced, and funded project.
- Problem/Domain Analysis analyzes the connection between the business problem and the new technology area, assesses the current environment, and develops user requirements. In the documentation stage, the team assesses its organization's strengths and weaknesses in the technology area, analyzes improvement opportunities, drafts a new business process, and develops a prototype of a "whole-product" solution, as described in the whole product design stage below.
- Solution Definition identifies two or more of the solution options, and plans for later implementation. The solution is selected based on its ability to support the technical and business requirements and cost effectiveness. Team members identify and evaluate component packages, recommend product purchases, and conduct early test planning.
- The purpose of Technology Customization and Testing is to adapt the core technology; design and perform data migration; design, develop, and execute tests; and perform integration. The Technology Solution and Desired State products are used to guide the selection team to products that will achieve the business goals/drivers for the architecture.
- Whole-Product Design consists of planning and developing each whole-product component so that when the Breakthrough stage begins, the whole-product solution will be ready to be implemented. The whole-product solution is concerned with introducing the new technology with a level of service that includes the user's perception of that service. During this stage, the project team maps out the following components:

- social design (organizational structure, rewards and incentives, performance measures)
 - policies and standards
 - support mechanisms
 - training
 - knowledge and skills transfer mechanisms
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- In Breakthrough, the team pi-lots the solution to evaluate and fine tune it before full deployment. Breakthrough is also an important marketing opportunity; users throughout the organization will ask team members what they think about the new technology and how it is being introduced. Difficulties in Break-through can jeopardize the success of Rollout. The goal is to determine the most predictable introduction process for the new technology solution with the least impact on productivity, cycle time, and quality.
 - Rollout moves the solution out to all the business units that are adopting the new technology and implements it throughout the organization. The team builds an iterative rollout plan, and purchases technical components. Rollout includes briefing and training users, installing and testing tools, and activating the whole-product solution. When this stage is complete, the technology solution is periodically analyzed and validated for product and process improvement.

INTRo is available for pilots or early customer use. Plans are currently being made for additional pilots. Please contact us if you are interested in being an early adopter.

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