Process Improvement – When the Fog Clears, Business Success Counts

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Abstract: Simultaneously improving project management, product development and engineering processes is for many companies crucial to surviving in a fast changing environment. However, the integration of these activities often falls back due to methodology wilderness, lack of vision or organizational misalignment. To stay competitive with its systems and software development, Alcatel has put in place an orchestrated improvement program of its processes and the underlying engineering tools environment. We will in this overview present Alcatel's engineering process improvement initiatives over the past years. Results are impressive. For instance, with moving to a CMM(I) maturity level 3, we reduced delays of projects to half. We also pinpoint some challenges, such as the need of appraisal model stability in order to facilitate timeline benchmarking.

Summary

Successful systems and software development involves profound technological knowledge, teamwork, processes, methods and tools. To improve performance and to reduce complexity, it looks just rational to put all engineers at one place, share the objectives, introduce a world-class process (from the many evangelists selling their experiences and beliefs), utilize latest and outstanding technology, and let the projects run. Reality is different, especially in times of global development of solutions with lots of different players, components, interfaces, and anything else, which could possibly increase complexity. Process improvement initiatives thus must take a multi-dimensional focus in order to achieve lasting results. It starts out with clear business objectives and influences strategy, life-cycle, portfolio management and product development processes (see Figure 1). We will briefly summarize some results and their impacts [1]:

Improved quality. We can directly address the customer needs by linking dedicated improvement objectives, such as return rate, via the Capability Maturity Model to process changes in R&D. Over past years Alcatel proved substantial field quality improvements and defect reduction. We saw improvements of more than 20% per year in field quality if the CMM is applied and closely followed up in engineering projects.

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[1] A more detailed summary on approach and results is published at: Ebert, C., R.Dumke, M.Bundschuh und A.Schmiedendorf: Best Practices in Software Measurement. Springer, ISBN 3-540-20867-4, Heidelberg, New York, 2004, Chapter 10.

Reduced cycle time. The efficiency and effectiveness of engineering processes directly impact engineering cycle time. For instance earlier defect detection means faster and more comprehensive defect correction. A defect found during development costs less than 10% to correct compared to detection during test. Cycle time reduction builds upon a consistent product life cycle and process repository, which allows instrumenting and tuning processes to needs. One of our product lines was able to cut cycle time to less than half after having given emphasis on CMM and introducing product lines.

Improved engineering flexibility. With decreasing size and duration of projects, engineers need to be flexible to quickly start working in a new environment. While technical challenges cannot be reduced, the organizational and administrative overheads must be managed and limited. Alcatel relies on a consistent product life cycle across the company to ensure we can deliver solutions independently of where the components come from. In today's competitive pressure it is key to align working environments and the development process in order to reduce the learning curves when starting a project.

Reduced overhead. Links to the management system with its process and role descriptions, document templates are embedded in the workflow support system, presenting engineers with immediate process support when and where they need it. Long process descriptions are replaced by pictorial overviews and automated interfaces. For example, an interface to a document management system can be activated by clicking on a work product name, while administrative data such as the document number are automatically derived from the project context.

Improved communication. Information is presented in a consistent way for all projects, avoiding replication of data and reducing search time. The Product Lifecycle view of the workflow system provides a dashboard with immediate visibility on key data and responsibilities contributing to an increase awareness of accountability. We thus achieve that product management, portfolio management and engineering are on the same page.

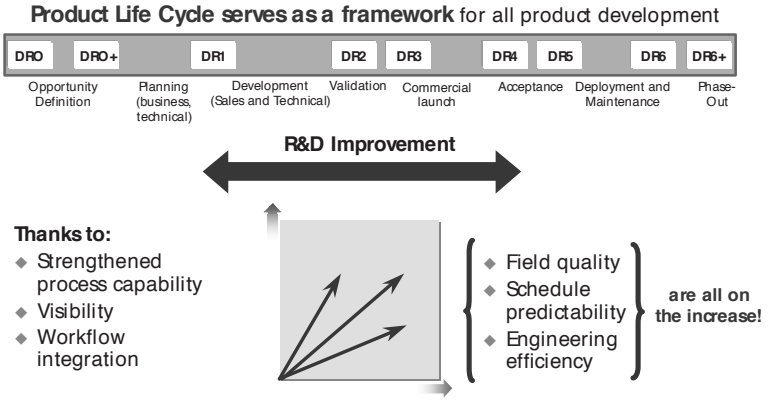

Figure 1: Effective R&D process improvement happens throughout the entire product life-cycle.