

Work-in-Progress – AgiES: Agile Methods for Embedded System Development

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Abstract—AgiES project aims to develop and utilize agile methods for the development of embedded systems covering all of its parts such as electronic hardware, hardware dependent software, and digital integrated circuit design. Agile philosophy is famous in the field of software engineering but rarely used in the development of embedded systems due to the more rigid nature of it. Our goal is to gather a toolbox of agile practices which may be adopted by teams developing embedded systems. These practices originate from principles presented in Agile Manifesto and they are said to improve development team productivity and well-being at work. Attention will be also paid into collaboration between agile and traditionally working teams as well as into interaction between developers and customers.

INTRODUCTION

Agile methods have gained remarkable popularity in the field of software engineering. In contrast to more traditional waterfall and spiral development models, agile methods are claimed to make development work more resilient and less exhausting. The Agile Manifesto [1], which is the cornerstone of agile software development, states four main values and twelve principles which should be followed and fulfilled to make software development agile. In our work, we aim to adopt these principles to the development of embedded systems and examine their effects in terms of productivity and well-being at work in collaboration with Finnish Institute of Occupational Health.

AGILE METHODS FOR EMBEDDED SYSTEMS

Agile methodologies, such as Scrum and XP [2], include practices and characteristics whose straight adoption to the design of embedded systems is challenging. Many of the practices rely on changing requirements and incrementally growing implementation. However, the full adoption of these practices can be expensive and challenging because of the hardware dependent nature of embedded systems. Changing requirements may not be welcome in a field where hardware and software are tightly tied, real-time functionality can be required and frequent prototyping may be expensive.

Our approach is to rip agile methods [2] into pieces and find out how they fulfil the principles of the Agile Manifesto. Features which can be applied to the development of embedded systems are picked up and adapted. Our goal is not to teach embedded system developers to exactly follow previously known agile methodologies. Instead, we aim to gather a toolbox of agile practices which support the twelve agile principles in the development of embedded systems.

EARLY FINDINGS

The AgiES project is carried out in close collaboration with companies whose fields of operation vary from software engineering throughout embedded systems to digital integrated circuit design. The research is conducted through series of case studies. Our work has started with the documentation of the present development processes in our partner companies. We have surveyed their process bottlenecks as well as the present practices which are already found to be workable. The collected information is used to shape the overall picture of the present development processes in the collaborating companies.

The knowledge and adoption of agile development methods varies significantly between different companies. Some companies are familiar with them and already utilize them in their every-day work while others are just starting the adoption. The latter ones may utilize some agile practices without knowing the stories behind agile methods.

NEXT STEPS

In the following phases, we create the toolbox of suitable agile practices and introduce them to our partner companies. During several iterations, we form the selection of workable agile practices for embedded system development. The functionality of the methods is ensured by studying and evaluating the productivity of the piloting teams before and after the mobilization of the agile practices. The members of the teams are interviewed to locate and ensure the true forces behind the observed change in the team productivity.

The ultimate goal of the AgiES project is to develop agile methodology for development of embedded systems which takes into account the special characteristics of hardware development. The methodology will assist collaboration between agile and traditional teams, give guidelines for customer-developer collaboration and promote the well-being at work.

PROJECT PARTNERS

The project is carried out in collaboration with Finnish Institute of Occupational Health and industry partners BA Group, FiSMA, Lindorff Finland, Neoxen Systems, Nextfour Group, Nordic ID, and ST-Ericsson. It is funded by Tekes - the Finnish Funding Agency for Technology and Innovation.

REFERENCES

- [1] Agile Manifesto. <http://www.agilemanifesto.org> .
- [2] R. Martin. *Agile Software Development, Principles, Patterns, and Practices*. Prentice Hall, 2003.