PRISMA
(ITEA 2 07024)

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Improving productivity for
globally distributed software systems development

The ITEA 2 PRISMA project has developed a Wiki offering an extensive web-based catalogue of good practices and a software workbench tool supporting shared methodology to improve the quality, productivity and effectiveness of globally distributed software-based systems development. Project partners have already demonstrated faster development with lower costs and a marked reduction in the number of bugs found during development. The SameRoomSpirit Wiki was made publicly available in September 2011.

Key to PRISMA was the need to make globally distributed systems development (GSD) better with the growth of outsourcing, subcontracting, distributed working, multi-site development and joint ventures. Improvements were foreseen in methods, practices, tools and tool integration to make collaborative development more effective and efficient by, for example, improving transparency to partners' work, better consistency and synchronisation of engineering tasks, and reducing overheads resulting from distance and time differences. The target was to achieve the 'same room' spirit in a multi-site fashion.

FACT OF INDUSTRIAL LIFE
Collaborative engineering of software-intensive systems has become a fact of industrial life. Some 81% of software developers interact with colleagues from different sites, while 87% spend some of their time working with external partners. And the global economic slowdown has caused re-evaluation of contracts to improve efficiency and costs.

Cheaper labour is not the only reason for collaboration; others include the ability to capitalise on the global resource pool to access scarce resources successfully and cost competitively, wherever located. This is particular necessary when certain competences are not available in-house or when there is a desire to focus in-house resources on core competences and enabling specialisation in selected functionalities or skills. There are also the business advantages of proximity to the market with knowledge of customers and local conditions, and the good will created by local investment.

Pressure to cut time to market encourages using time-zone differences in 'round-the-clock' development. And the resulting flexibility makes it possible to capitalise on merger and acquisition opportunities wherever they present themselves. Cloud computing will have high impact on GSD trends. PRISMA addresses several cloud-computing drivers and restraints, including: elimination of complexities resulting from managing and integrating multiple applications and vendors; geographical dispersion; and vendor lock-in.

MARKED EFFECT ON PRODUCTIVITY
However, development technologies are insufficiently prepared for different collaboration situations. Productivity in GSD project can drop by up to 50%, with rework two to five times greater than for a co-located project. A team separated by as little as 100 m can have communications reduced by as much as 95%.

Philips' experience on embedded software development indicates that productivity drops by a factor of two to three when the number of sites involved increases by one to two or more. And Nokia Siemens Networks' experience shows factors such as communications, transfer of documentation and results, distributed testing and testing environments are not yet at the level of sophistication that would increase productivity in collaborative product creation.

PRISMA's key objectives were to boost the productivity of collaborative systems' development by enhancing and supporting asset improvements — including methods, practices and techniques — and enabling and improving tool interoperability.

The ITEA 2 project concentrated on two areas:
1. *SameRoomSpirit Wiki* — with the development of practical solutions to meet the industrial challenges of GSD; and
2. *PRISMA software workbench (PSW)* to enhance awareness and synchronisation of assets in GSD by enabling interoperability of various software development tools in collaborative settings. This allowed for a configurable set of development tools, tailored to individual partner or project needs.

USER-FRIENDLY WEB-BASED APPROACH
The SameRoomSpirit Wiki set out to improve collaborative software development by providing sound industrial solutions to typical distributed development issues. It provides industrial experiences and best practices in the form of reported processes, methods and practices in a user-friendly web-based Wiki.

Industry identifies its problems in GSD in different way from literature. Moreover, finding solutions

www.SameRoomSpirit.org
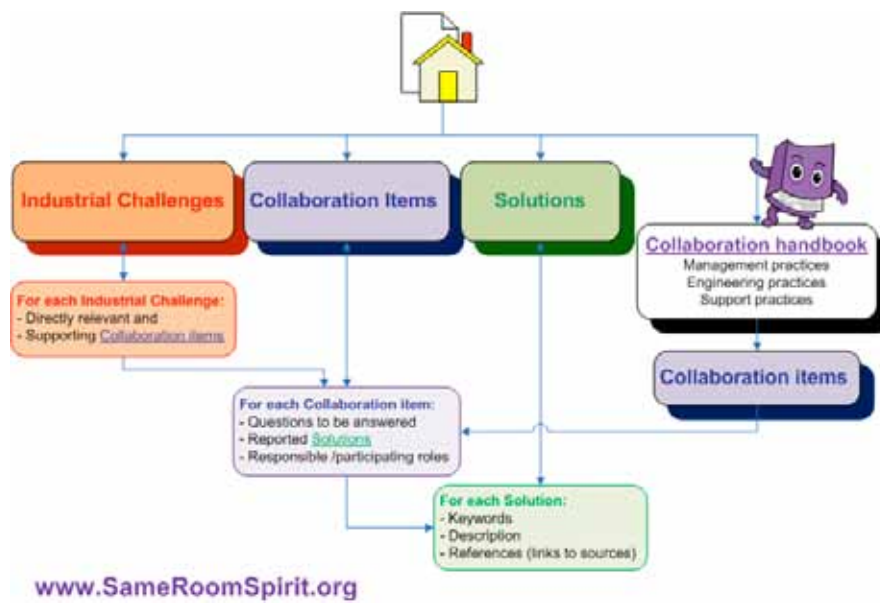
The PSW offers a way to integrate distributed data and tools, building on the experience of the ITEA MERLIN and TWINS projects tool chains. The PSW makes integration feasible in various situations by providing real-time views of data, enabling use of legacy tools — such as defect, test and version management tools — and offering distributed/multi-site support.

It supports GSD development by:
- Enhancing awareness of important project events;
- Managing and inspecting relationships between work products developed in different settings, so ensuring full traceability;
- Making data available to all partners so that they can inspect the work products;
- Offering shared workspace in terms of voice, video and desktop views; and
- Simplifying project management reporting.

from literature is difficult, as different terminology is used. The SameRoomSpirit Wiki has gathered GSD knowledge in one place where terminology familiar to industry can be used. The Wiki was developed using Mediawiki software with the first version based on the ITEA MERLIN project collaboration handbook which covers management, engineering and support practices.

Assets in terms of processes, methods and practices are continuously collected from various sources, including industrial case studies and experience reports, master's theses and related literature. Wiki content is categorised to simplify browsing and help find the appropriate set of assets to meet various industrial challenges.

Solutions can be found based on industrial challenges, by browsing collaboration items or by using the search functionality provided. The industrial challenges are collected from companies carrying out distributed product development. Challenges are categorised according to various collaboration and engineering topics. Collaboration items are related to industrial challenges and are categorised according to typical practices in software development. Solutions are possible answers to collaboration items, categorised according to which topic they relate.

Solutions are now based on more than 130 published technical articles. Some 27% of solution descriptions are based on the industrial partners' experience, 46% on

literature and 27% on a combination of both. The Wiki was piloted within PRISMA partners and experimented in two industrial GSD cases at Symbio and ABB with promising results.

WORKBENCH AMALGAMATES RESULTS
The objective of the PSW was to amalgamate the results from the many different kinds of tools found in GSD environments. In such activities, it is easy to lose track of what is happening with scattered tools, with no single tool providing an overall picture.

PRISMA set out to connect the tools and manage the connections efficiently with the PSW. A flexible tool integration solution offers many benefits as companies already have defined practices which work well and have selected tools supporting their way of working. Making use of the bundle of tools offered by most existing integrated tool packages risks change which can be costly. Moreover, it is always to better to keep proven solutions for parts of the problem.

EXTENSIBLE TOOL INTEGRATION FRAMEWORK
Overall, PRISMA demonstrated an extensible, modifiable tool-integration framework for globally distributed software development with companies able to benefit from the PSW without major changes to their tool infrastructure.
Quantified achievements included:
- Time wasted on projects reduced from 19% to 10.5% by partner ABB;
- Overconsumption of human resources reduced from 80% to 25% by Symbio;
- Reduction in the duration of requirements analysis from around 50 days to around 10 days by Nokia Systems Networks — together with the ability to build an open source-based tool integration platform almost without licences, resulting in significant costs savings; and
- A 60% cut in the number of bugs found during development by CBT.

Exploitation of the main results is already starting with the SameRoomSpirit Wiki made publically available on 15 September 2011 (www.sameroomspirit.org). Consultation packages are also available from VTT, Innovalia Association and others on GSD challenges and their solutions. The PSW tool has become standard within Symbio — an SME which has grown tenfold in the past year — and which plans to use it further in the communications with its clients.

MORE INFORMATION:
www.prisma-itea.org