**A Software Process Improvement Initiative in Northern Ireland**

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**1. Introduction**

The Centre for Software Process Technologies (CSPT) was established in September 2002 and is jointly funded by Invest Northern Ireland (an economic development agency) and the University of Ulster. It’s goal is to be an internationally recognized centre of excellence for research and knowledge transfer in areas allied to the process of developing software. CSPT is tasked with evolving a software process improvement (SPI) capability to be utilized by software companies in Northern Ireland (NI). Consequently, one of the centre’s early priorities was to obtain an understanding of current local software engineering practice.

**2. The Nature of the On-going work**

This paper describes CSPT’s ongoing software process improvement initiative and presents some of our survey conclusions. The findings constitute a stage in our ongoing endeavor to make SPI a high priority for software companies in NI. The ultimate objective was to discover the current state of software processes employed by NI companies and encourage SPI initiatives to be evolved, with the help of CSPT. This initiative has several stages:

• Perform the survey (2002/2003)

• Analyze the findings and disseminate the results (2003/2004)

• Build SPI relationships with interested companies (2003/2005)

• Conduct survey to assess industry improvement (2006)

These stages of this initiative will now be considered.

**2.1. Performing the survey**

During the period September 2002 to June 2003 the survey data was collected. It was then analysed over the period from July 2003 to September 2003. The survey targeted only companies who engaged in working on all or part of the software development lifecycle. The survey was administered through face-to-face interviews.

NI has approximately 110 software companies that develop software either as a prime business activity or as an important part of their business function. The survey was extensive in its scope encompassing more than half of all of NI’s software development companies, which together employ 80% of NI’s software engineering employees (the companies surveyed employ a total of 2428 software employees out of an entire industry with approximately 3000 software employees). The survey questions addressed a spectrum of technical, quality and software process improvement issues.

**2.2. Analyze the findings and disseminate the results.**

The findings of the survey have been analysed and the results have been produced and disseminated in several ways. The companies involved in the survey were invited to a number of seminars at CSPT and the results of the survey were presented. In addition the survey results are to be published at the EUROSPI 2004 Conference in Trondheim, Norway, November 2004.

 In the NI software industry, awareness of standards that can be applied to software is limited and while there is some awareness of SPI, there is a distinct lack of familiarity with it. Several NI software companies have already experienced difficulties in competing with software development organizations worldwide, for work in the U.S.A. Interestingly the prime factor here was not simply cost, but the quality agenda as a whole, with competitor companies having engaged in process improvement programmes.

Although many medium to large software companies in NI are using sound processes governing a strong methodological base, too often many smaller indigenous companies are driven by their entrepreneurial managers and directors who know the processes well and act as mentors to other staff members. Methodology is sacrificed in favour of a set of loosely defined techniques. Training is event driven for the most part even though it is part of almost all strategic plans. Many companies use what they regard as CASE tools during software development. Few of these instances are examples of full computer aided software engineering tools, this is a consequence of limited methodology adoption and indeed the small size of local organizations with limited funds for investment.

The larger companies and multinationals, attracted by an educated workforce, employ a large proportion of the software engineers in NI and are very conscious of good standards and practices in software engineering. Many of the multinationals import a sense of urgency in the adoption of best practice from their parent structures and this has had a positive effect on some indigenous software organizations.

Most of the NI software companies are convinced of the importance of process in their working environments and many want to engage in SPI. Although only proper assessment can be conclusive, for the majority of NI companies, particularly small indigenous companies, the characteristics of low maturity are evident. Reliance on individuals in a fire fighting environment, low awareness of standards and problems experienced at the managerial and technical level. Many of the larger companies employing most of the software engineers are process focussed and have a much clearer understanding of the need for process improvement with a better appreciation of the global picture.

**2.3. Building SPI relationships with interested companies**

The CSPT is currently at this stage in the outlined initiative. A significant number of companies involved in the survey were sufficiently interested in the SPI facilities offered at CSPT. In 2003 to 2004, CSPT developed its own appraisal method which complies with the ARC 1.1 [1] for a class-C method. Our method is called Agile Process Appraisal (APA). In a pilot appraisal programme in 2004, driven largely by the survey results, APA was used to appraise six software development companies in Northern Ireland. Each of the companies received a report detailing their perceived strengths and weaknesses in relation to the CMMI® framework [2]. Currently only limited SPI follow-up work has been conducted, although it is still relatively early in the initiative. The results of this work have been compiled in a paper which has been submitted for consideration in the Journal for Software Process Improvement and Practice. We currently await confirmation of the launch of an extended programme of Class C appraisals and in the creation of SPI plans for individual companies that have already been appraised, which is the logical next step in furthering our SPI objective in NI.

**2.4. Conduct survey to assess industry improvement**

Those companies involved in the pilot appraisal programme have already submitted favourable written reports to INI which allows CSPT to judge this part of the work a success. Once an extended programme of appraisals has been executed and SPI plans drawn up and executed with several companies, the feedback from the companies involved will be carefully considered. Ultimately a survey will be undertaken to assess the success of the CSPT SPI initiatives, although it is unlikely that this stage of the work will be completed on the same scale as the original survey.

**3. Conclusion**

This SPI initiative is only one strand of CSPT’s work and indeed the centre (a Technology Transition Partner of the Software Engineering Institute at Carnegie Mellon University) engages in other SPI work not directly related to the survey. We are currently at stage 3 (section 2.3) of this initiative and at this point we can see that the initiative has certainly been a success from the perspective of understanding the current state of the art of software development in NI and in the dissemination of this information. We have also performed initial appraisals with several software companies but this programme needs to be expanded and more importantly, needs to be turned into improvement plans to bring about real and tangible software process improvement.

**4. References**

[1] “Appraisal Requirements for CMMI, Version 1.1 (ARC, V1.1)” by the CMMI Product Team, Software Engineering Institute, Carnegie Mellon University, Pittsburgh, PA. Technical Report CMU/SEI-2001-TR-034, ESC-TR-2001-034, pp1-49, (2001).

[2] “The Capability Maturity Model: Guidelines for Improving the Software Process”, by Carnegie Mellon University Software Engineering Institute, Addison Wesley Longman, (1994), ISBN 0-201-54664-7.

**5. Acknowledgements**

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