SOFTWARE

GOOD NEWS FOR MICRO-SCALE SOFTWARE DEVELOPERS

If you are in a software development organisation with less than 25 employees then you are not alone. Roughly 75 per cent of software companies internationally are in the same boat. This not surprising – the best software has always been associated with small teams. Whether it is IBM's Fred Brooks advocating the "surgical team" back in the 1970's or researcher Tom DeMarco warning that over-staffing, particularly in the early phases of a project, can cause serious problems, there is a consensus: smaller is better.

The opportunities are growing too. Open standards in areas such as telecommunications allow the smaller players to access niches in markets traditionally dominated by multi-nationals. Software is becoming more componentised. Instead of building monolithic products (such as the IBM OS/360 operating system), modern vendors are happy to plug in the best software available for each particular task. Just think of the wide variety of USB devices you have plugged into your PC – few of these being manufactured by your PC vendor.

VERY SMALL ENTERPRISES NEED STANDARDS TOO However, while there is great scope for the micro-company, there is still a certain stigma hanging over it. Why should a giant multi-national accept your invention over that of a well-established player? How can the component integrator be assured that the software you produce will satisfy its requirements and won't cripple the product with warranty claims down the line? In other words, how does your small, nimble operation get around the 'hacker' or 'cowboy' label?

No matter what size your company is, it is vital that it is properly managed and that everyone shares the same understanding of what is required. Traditionally, the major mistakes made in software development relate to poor communication. For instance, a developer or development team might rush off to implement a customer's set of requirements, without ever really understanding what the customer wanted in the first place. Similarly, several developers may work alone to produce the components of a system and face disaster when it comes to integrating them. Then there are the aspects of the project we simply forget – when the site engineers ask how are they going to install the software and the red-faced developers run off to knock together some installation scripts.

Putting effective management and communication mechanisms in place will reap benefits. However, the only way the world (i.e. your potential customer base) will know is if you can demonstrate that you apply these mechanisms. An effective way of doing this is by means of accreditation. Organisations such as Carnegie Mellon University's Software Engineering Institute (SEI), the International Standards Organisation (ISO) and the International Electro-technical Commission (IEC) have developed accepted assessment techniques to ensure that a given software company is following proven engineering practices. Unfortunately, as Professor Andrew S. Tanenbaum observes, "the nice thing about standards is that there are so many to choose from".

Certification under SEI's Capability Maturity Model Integration (CMMi) or the ISO/IEC 12207 standard is expensive, time consuming and involves adding a lot more bureaucracy to the development process than a small company can afford. Which is not surprising because the goal of assessment is to establish that clear communication mechanisms are in place, and the most tangible (and reviewable) form of communication is a well-structured document. It could be argued that, if the small companies want to compete in the software arena, they need to document their work in a careful and professional manner. But we have to remember that small companies have to be nimble and flexible. Strategic goals, like systematically improving the way they build software, may take second place to existential considerations like landing reference sites

MAIN POINTS
Existing ISO software development standards can be too demanding for very small enterprises
Lero is part of working group, developing more appropriate solutions for smaller developers

Lero, the Irish Software Engineering Research Centre, is helping to develop new standards, defining software process lifecycles for very small companies. **Jack Downey**, industrial research officer at Lero, explains the benefits.

or even constantly re-positioning the product to find a worthwhile niche. Try producing a formal requirements document and getting it signed off by conscientious reviewers in that environment.

A BETTER SOLUTION However, there is some good news on the horizon. The ISO identified the importance of very small enterprises (VSEs) and formed a working group in 2005 to develop and refine a new standard for this sector. Given that nearly half of Irish software employment is in indigenous companies, most of which employ less than 25 people, this work is of immense importance in an Irish context.

Two researchers from Lero – the Irish Software Engineering Research Centre – are part of the ISO's effort to define software process lifecycles for very small companies. The work is being done under the umbrella of ISO's Sub-Committee 7 (SC7). This group's remit is to develop, maintain, promote and facilitate IT standards relating to software and systems engineering. There are currently over 16 separate Working Groups (WGs) in SC7, specialising in areas such as: Software Process Assessment (WG10), Software Life Cycles for Very Small Enterprises (WG24) and Software Testing (WG26).

Lero's Dr Marty Sanders and Dr Rory O'Connor are part of Working Group 24 (WG24) which is creating this new

standard (ISO 29110) for use specifically by VSEs who develop software.

WG24's first task was to conduct a survey of 345 companies from 20 countries to find out more about the small enterprise's needs. It is interesting to note that only 18 per cent of VSEs are certified, but over 74 per cent indicated that it was important to be either recognised or certified. Of that group, ISO certification was requested by 40 per cent; market recognition requested by 28 per cent and only 4 per cent were interested in a national certification.

In this context, there is a clear need for the Irish software industry to educate its managers in a software process improvement (SPI) and quality agenda. Given the large number of VSEs operating in the Irish software sector and the need for global competitiveness with a quality orientation, the potential role of ISO/IEC 29110 for the Irish software industry is immense.

WG24 is now developing several products to give small enterprises a better opportunity to develop high-quality software on time, and to make a profit in the process. The group's outputs include an overview, framework, profile and taxonomy, leading to a standard that will enable the development of guides for engineering, management and assessment. It will also be the first ISO or IEC standard where

everything, including the training tools and guidelines, will be accessible from the web.

It is all very well for a working group to create a set of guidelines and recommendations that look lovely on paper, but the real proof of ISO/IEC 29110 will be in its implementation. Will following these guidelines lead to better software? Will the overheads involved be excessive? Does adopting the standard make life easier for developers in a VSE environment?

To answer these questions Marty and Rory need to go out to VSEs and train the companies in the new standard. They will also need to assist in the rollout of the new development approaches and determine if things have improved as a result. Companies getting involved in this initiative will gain from an expert assessment of their development lifecycles and will have a chance to influence the emerging standard in a practical way. **TI**

Lero is inviting invite very small software companies to become test-beds for the new standards. If you are interested in taking part in this project, contact the Lero researchers at: rory.oconnor@lero.ie or marty.sanders@lero.ie

Details of the Working Group's progress are held at: http://www.lero. ie/research/internationalprojects/ softwareprocessesforsmallenterprises/

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