

# The application of International Software Engineering Standards in Very Small Enterprises

## 1.0 Introduction

In Europe, 85% of IT sector companies have between 1 and 10 employees [1]. A survey of the Montréal area in Canada has revealed that close to 80% of companies that develop software have fewer than 25 employees, as illustrated in Table 1 [2]. Over 50% have fewer than 10 employees. There is a need to help these organizations, which are defined as very small enterprises (VSEs), to understand and use the concepts, processes and practices proposed by the ISO's international software engineering standards.

Size (employees)	Software Companies		Jobs	
	Number	%	Number	%
1 to 25	540	78%	5,105	29%
26 to 100	127	18%	6,221	36%
over 100	26	4%	6,056	35%
<b>TOTAL</b>	<b>693</b>	<b>100%</b>	<b>17,382</b>	<b>100%</b>

Table 1: Size of software development companies in the Montréal area [2]

## 2. Historical Perspectives

At the Brisbane meeting of ISO/IEC JTC 1/SC71 in 2004, Canada raised the issue of small enterprises requiring standards adapted to their size and maturity level. A meeting of interested parties was held with delegates from five national bodies, at which a consensus was reached on the general objectives:

- Make the current software engineering standards more accessible to Very Small Enterprises
- Provide documentation requiring minimal tailoring and adaptation effort;
- Provide harmonized documentation integrating available standards;
- Align profiles with the notions of maturity levels presented in ISO/IEC 15504.

It was also decided that a Special Interest Group be created to validate these objectives, as well as to assign priorities and develop a project plan.

In March 2005, the Thailand Industrial Standards Institute (TISI) invited a number of software experts to advance the work items defined at the Brisbane meeting. A key topic of discussion was to clearly define the size of VSE that would be targeted by a future ISO/IEC JTC 1/SC7 working group. A consensus was reached to define our target VSE as IT services, organizations and projects with between 1 and 25 employees. The major output of this meeting was a draft of a New Work Item that would be discussed at the next ISO/IEC JTC 1/SC7 Plenary meeting. A list of actions that could be undertaken by a future ISO/IEC JTC 1/SC7 Working Group was also developed.

In May 2005, at the ISO/IEC JTC 1/SC7 Plenary meeting in Finland, a resolution was

<sup>1</sup>ISO/IEC JTC 1/SC7 stands for the International Organization for Standardization/International Electrotechnical Commission Joint Technical Committee 1/Sub Committee 7. For more information about the international standardization in information technology, refer to [3].

By Claude Y. Laporte<sup>1</sup>, Alain April<sup>1</sup> and Alain Renault<sup>2</sup>

<sup>1</sup>Department of Software and IT Engineering, École de technologie supérieure, Montréal, [www.etsmtl.ca](http://www.etsmtl.ca)

<sup>2</sup>Public Research Center Henri Tudor Luxembourg-Kirchberg, Luxembourg, [www.tudor.lu](http://www.tudor.lu)

### Abstract

At a time when software quality is increasingly becoming a subject of concern, and process approaches are maturing and gaining acceptance in companies, the use of ISO systems and software engineering standards remains limited to a few of the most popular ones. However, these standards were not written for enterprises with fewer than 25 employees in mind. As they are difficult to apply in such settings, a new international standardization project has been mandated to address some of those difficulties by developing profiles and by providing guidance for compliance with ISO software engineering standards in very small enterprises. A survey was conducted to ask very small enterprises about their utilization of ISO/IEC JTC 1/SC7 IT standards and to collect data to identify problems and potential solutions to help them apply standards.

### Sommaire

Alors que l'intérêt pour la qualité du logiciel augmente et que les approches de processus gagnent en maturité et en adoption par les entreprises, l'utilisation des standards ISO ingénierie système et génie logiciel reste limitée à quelques uns des plus populaires. Cependant, ces standards n'ont pas été écrits en considérant les entreprises de moins de 25 employés. Comme il est difficile de les appliquer dans un tel contexte, un nouveau projet international de standardisation a été mandaté pour s'attaquer à certaines de ces difficultés en développant des profils et en fournissant une orientation pour la conformité avec les standards de génie logiciel ISO dans les très petites entreprises. Un sondage a été tenu auprès des très petites entreprises à propos de leur utilisation des standards TI ISO/IEC JTC 1/SC7 dans le but de colliger des données pour identifier les problèmes et solutions potentielles et les aider à appliquer les standards.

approved to ballot a proposal for the development of software life cycle profiles and guidelines for use in very small enterprises.

The text below describes the mandate [4]:

- Provide VSEs with a way to be recognized as producing quality software systems, which would lessen the effort required to implement and maintain the entire suite of ISO systems and software engineering standards.
- Produce guides which will be easy to understand, short, simple and readily usable by VSEs.
- Produce a set of profiles and provide guidance to VSEs in establishing selected processes.
- Address the market needs of VSEs by allowing for domain-specific profiles and levels.
- Provide examples of use.
- Provide a baseline for how multiple VSEs can work together or be assessed as a project team on projects that may be more complex than can be performed by any one VSE.
- Develop scalable profiles and guides so that compliance with ISO/IEC 12207 and/or ISO 9001:2000 and ISO/IEC 15504 process assessment becomes possible with a minimum impact on VSE processes.

The proposal was accepted, and twelve countries committed to participating in the new working group: Belgium, Canada, the Czech Republic, Ireland, Italy, Japan, Korea, Luxemburg, South Africa, Thailand, the United Kingdom and the United States. We recall that participation in ISO/IEC JTC 1/SC7 working groups mostly occurs through national bodies or professional organizations, and no companies are represented.

### 3. VSE Survey and Profile Development Proposed

A new working group, WG 24, was established, made up of the following members, in addition to individuals sent by their national bodies:

- Mr. Tanin Uthayanaka (Thailand), who was appointed Convener.
- Mr. Claude Y. Laporte (IEEE Computer Society), who was appointed Project Editor.
- Mr. Jean Bérubé (Canada), who was appointed Secretary.

The Thailand Industrial Standards Institute invited a Special Working Group, in September 2005, to prepare material to facilitate the start-up of the new working group. The main outputs of the meeting were:

- Proposed requirements for International Standard Profiles (ISPs) based on technical report ISO/IEC TR10000-1 [5].
- A proposed survey on VSE exposure and their need for software development life cycles
- Proposed approaches to profile development
- Proposed business models
- Proposed agenda for the first WG24 meeting
- Proposed draft strategic plan for WG24

In October 2005, WG24 held its first working sessions in Italy to:

- Present the project to the official members of WG24;
- Finalize project requirements to constitute the project base-line;
- Gain consensus among WG members and obtain their commitment regarding the project;
- Process the comments received during the balloting of the New Work Item (NWI);
- Define the profile creation strategy;
- Identify lists of situational factors and business models;
- Build survey material to validate project requirements and to collect missing information from VSEs.

After the meeting, the survey questionnaire was translated into 9 languages. In addition, a Web site, hosted by the ÉTS, was developed to maximize the number of responses, which were collected between February 20 and May 12.

In May 2006, WG24 members met at the ISO/IEC JTC 1/SC7 Plenary meeting in Thailand. Two new countries, India and Mexico, sent delegates to WG24. The main outputs of the meeting were analysis of the survey responses and evaluation of documents tabled by national delegations; the Mexican Standard [6] was selected as an input document for the development of profiles and guides. Based on the survey analysis, WG24 decided to focus first on enterprises with fewer than 10 employees.

The next WG24 meetings will be held in Luxemburg in October 2006 and St. Petersburg in May 2007.

### 4. Additional Information

To complete the survey:

[http://iso-iec-sc7wg24.gelog.etsmtl.ca/Webpage/iso-iec-sc7wg24\\_english.html](http://iso-iec-sc7wg24.gelog.etsmtl.ca/Webpage/iso-iec-sc7wg24_english.html)

Username: isosurvey

Password: vse

Public site of WG24:

<http://profs.logti.etsmtl.ca/claporte/English/VSE/index.html>

### 5. References

[1] <http://www.esi.es/en/main/itmark.html>

[2] Gauthier, R., Portrait et vision de l'industrie des technologies de l'information et des communications (TIC) au Québec, presented at Conférence la Boule de Cristal CRIM, Montréal, 2004.

[3] Coallier, F., International Standardization in Software and Systems Engineering, Crosstalk, February 2003.

[4] New Work Item Proposal - Software Life Cycles for Very Small Enterprises, ISO/IEC JTC 1/SC7 N3288, May 2005. <http://www.jtc1-sc7.org/>.

[5] ISO/IEC TR 10000-1, Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: General principles and documentation framework, Fourth Edition, 1998.

[6] NMX-059-NYCE-2005, Information Technology-Software-Models of Processes and Assessment for Software Development and Maintenance. Part 01: Definition of Concepts and Products; Part 02: Process Requirements (MoProSoft); Part 03: Guidelines for Process Implementation; Part 04: Guidelines for Process Assessment (EvalProSoft). Ministry of Economy, Mexico, 2005.

## Survey Analysis

\*345 responses collected from 26 countries

- 219 responses were received from enterprises with 25 employees or less;
- More than 67% indicated it was important to be either recognized or certified (e.g. ISO, market)



Decision by \*\*WG24 to prioritize the development of profiles and guides for organizations with 25 employees or less (total staff). These profiles and guides should also be usable for projects and departments of less than 25 employees.

Separate profiles proposed for:

- Enterprises with fewer than 10 employees,
- Enterprises with 10 to 25 employees.

WG24 decided to focus first on enterprises with fewer than 10 employees.

\*Since the original study, additional data have been received for a current total of 432 responses from 30 countries

\*\*Working Group 24, which had its first meeting in Italy in Oct. 2005

### About the Authors

**Claude Y. Laporte** is a software engineering professor at the École de technologie supérieure and the editor of ISO/IEC JTC 1/SC7 Working Group 24, tasked with developing software life cycle profiles and guidelines for use in very small enterprises. He can be reached by e-mail at: [Claude.Y.Laporte@etsmtl.ca](mailto:Claude.Y.Laporte@etsmtl.ca)



**Alain April** is also a software engineering professor at the École de technologie supérieure and has contributed to ISO 9126 (Part 3). He is the associate editor of the SWEBOK (Software Engineering Body of Knowledge) software maintenance and quality chapters that have recently been published as an ISO/IEC Technical Report 19759. [Alain.April@etsmtl.ca](mailto:Alain.April@etsmtl.ca)



**Alain Renault** is project leader at the Public Research Center Henri Tudor in Luxembourg ([www.tudor.lu](http://www.tudor.lu)). He is also a member of ISO/IEC JTC 1/SC7 Working Group 24.

