

## Deploying Lifecycle Profiles for Very Small Entities: An Early Stage Industry View

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**Abstract.** The recently published ISO/IEC 29110 standard Lifecycle profiles for Very Small Entities has at its core a Management and Engineering Guide [1] which is targeted at very small entities (enterprises, organizations, departments or projects) having up to 25 people [2], to assist them unlock the potential benefits of using standards which are specifically designed to address their needs. This paper will also outline this standard and the implementation of a series of pilot project initiative harnessing a set of detailed guidelines known as “Deployment Packages” to assist very small companies in understanding and exploring the potential usage of an international software process standard. This paper will address issues of small company needs, industry reaction to early pilot projects and highlight the needs for a light weight process assessment mechanism to meet the needs of very small entities and complement this new lifecycle standard.

**Keywords:** VSE, ISO/IEC 29110, Standards

### 1 Introduction

In a time when software quality is a key to competitive advantage, the use of ISO/IEC systems and software engineering standards remains limited to a few of the most popular ones. Research shows that Very Small Entities (VSEs) can find it difficult to relate ISO/IEC standards to their business needs and to justify the application of the standards to their business practices [2, 3]. Most of these VSEs don't have the expertise or can't afford the resources - in number of employees, cost, and time - or see a net benefit in establishing software life-cycle processes. There is sometimes a disconnect between the short-term vision of the company, looking at what will keep it in business for another six months or so, and the long-term benefits of gradually improving the ways the company can manage its software development and maintenance. A primary reason cited by many small software companies for this lack of adoption of such ISO standards, is the perception that they have been developed for large software companies and not with the small organisation in mind [3]. Subsequently, VSEs have no or very limited ways to be recognized as enterprises that produce quality software systems in their domain and may therefore be cut off from some economic activities.

## 2 ISO/IEC 29110 Background

Accordingly there is a need to help such organizations understand and use the concepts, processes and practices proposed in the ISO/IEC JTC1/SC7's international software engineering standards. The ISO/IEC 29110 standard "Lifecycle profiles for Very Small Entities" [1] is aimed at addressing the issues identified above and addresses the specific needs of VSEs [2].

The approach [2] used to develop ISO/IEC 29110 started with the pre-existing international standard ISO/IEC 12207 [4] dedicated to software process lifecycles. The overall approach consisted of three steps: (1) Selecting ISO/IEC 12207 process subset applicable to VSEs of less than 25 employees; (2) Tailor the subset to fit VSE needs; and (3) Develop guidelines for VSEs.

At the core of this standard is a Management and Engineering Guides (ISO/IEC 29110-5) [1] focusing on Project Management and Software Implementation.

The core characteristic of the entities targeted by ISO/IEC 29110 is size, however there are other aspects and characteristics of VSEs that may affect profile preparation or selection, such as: Business Models (commercial, contracting, in-house development, etc.); Situational factors (such as criticality, uncertainty environment, etc.); and Risk Levels. Creating one profile for each possible combination of values of the various dimensions introduced above would result in an unmanageable set of profiles. Accordingly VSE's profiles are grouped in such a way as to be applicable to more than one category.

Profile Groups are a collection of profiles which are related either by composition of processes (i.e. activities, tasks), or by capability level, or both. The "Generic" profile group has been defined [1] as applicable to a vast majority of VSEs that do not develop critical software and have typical situational factors. This profile group does not imply any specific application domain, however, it is envisaged that in the future new domain-specific sub-profiles may be developed in the future.

To date the Basic Profile standard has been published by ISO, the purpose of which is to define a software development and project management guide for a subset of processes and outcomes appropriate for characteristics and needs of VSEs developing a single application. Work is current underway on the Entry and Intermediate profiles. VSEs targeted by the Entry Profile are VSEs working on small projects (e.g. at most six person-months effort) and for start-up VSEs while VSEs targeted by the intermediate profile are developing multiple applications.

## 3 Deployment Assistance

The issues of assistance to VSEs in understanding and adopting standards, as outlined in section 1, must be addressed. To this end, some members of the ISO/IEC JTC1/SC7 WG 24 have produced a set of "Deployment Packages" (DP). A DP is a set of artifacts developed to facilitate the implementation of a set of practices, of the selected framework, in a VSE. A DP is not a process reference model (i.e. it is not prescriptive). The elements of a typical DP are: description of processes, activities,

tasks, roles and products, template, checklist, example, reference and mapping to standards and models, and a list of tools. The mapping is only given as information to show that a deployment package has explicit links to standards, such as ISO/IEC 12207, or models, such as the CMMI® for Development, hence by deploying and implementing the package, a VSE can see its concrete step to achieve or demonstrate coverage. Packages are designed such that a VSE can implement its content, without having to implement the complete framework at the same time. These DPs are freely available from [5]:

In addition a series of “Implementation Guides” have been developed to help implement a specific process supported by a tool and are freely available from [5]. To date a small number of implementation guides have been developed. These include: Version Control with CVS; Version Control with SVN; and Project Management with GForge.

#### **4 Pilot Implementation Projects**

The working group (ISO/IEC JTC1/SC7 WG 24) behind the development of this standard is advocating the use of pilot projects as a mean to accelerate the adoption and utilization of ISO/IEC 29110 by VSEs. Pilot projects are an important mean of reducing risks and learning more about the organizational and technical issues associated with the deployment of new software engineering practices. A successful pilot project is also an effective means of building adoption of new practices by members of a VSE. Pilot projects are based on the ISO/IEC 29110-5 Management and Engineering Guide [1] and the deployment package(s). In particular these are aimed to collect, as a minimum, the following data:

- Effort and time to deploy by the VSE
- Usefulness for the VSE
- Verification of the understanding of the VSE
- Self-assessments data - A self-assessment at the beginning of the pilot and at the end of the pilot project DP

To date a series of pilot projects have been completed in several countries utilizing some of the deployment packages developed. For example in Canada a pilot study has been conducted with an IT department with a staff of 4: 1 analyst and 3 developers, who were involved in the translation and implemented 3 DPs: Software Requirements, Version Control, Project Management. In Belgium a VSE of 25 people started with a process assessment phase aiming to identify strengths and weaknesses in development related processes. This company is now working on improvement actions mainly based on the following Deployment Packages: Requirement Analysis, Version Control, and Project Management. In France, a pilot study [6] was conducted with a 14-people VSE that builds and sells counting systems about the frequenting of natural spaces and public sites. In addition a further series of pilot projects are currently underway in Canada, Ireland, Belgium and France, with further pilot projects planned in the near future.

## 5 Discussion

As ISO/IEC 29110 is an emerging standard there is much work yet to be completed. The main remaining work item is to finalise the development of the remaining three profiles: (a) Entry - six person-months effort or start-up VSEs; (b) Intermediate - Management of more than one project and (c) Advanced - business management and portfolio management practices.

With any new initiative there is much to be learnt from conducting pilot projects. One issue of major importance to VSEs which is emerging from these pilot projects and similar work by the ISO working group is the need for a light-weight flexible approach to process assessment. Whilst work is currently underway on an assessment mechanism for ISO/IEC 29110 [7], a clear niche market need is emerging which may force the process assessment community to change their views on how process assessments are carried out for VSEs. In particular there is a strong need to ensure that VSEs are not required to invest the anything similar in terms of time, money and other resources on process assessments, as may be expected from there larger SME (small and medium enterprises), or even MNC (multinational corporation) counterparts. Indeed some form of self-assessment, possibly supported by Internet based tools, along with periodic spot-checks may be suitable alternative to meet the unique needs of VSEs. It is clear that the process assessment community will have to rethink process assessment, new methods and ideas for assessing processes in VSEs.

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