REQUIREMENTS MANAGEMENT AND ACQUISITION MANAGEMENT EXPERIENCES IN SPANISH PUBLIC ADMINISTRATIONS

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Abstract: As a part of the activities of the first Symposium on Process Improvement Models and Software Quality of the Spanish Public Administration, working groups were formed to discuss the current state of the Requirements Management and Supplier Agreement Management processes. This article presents general results and main contributions of those working groups. The results have allowed the obtention of a preliminary appraisal of the current state of these two processes in the Spanish Public Administration.

Keywords: Requirements engineering, subcontracting management, improvement models, process.

ACM Classification Keywords: D.2.9 Management, K.6.3 Software Management

Introduction

Most of the organizations have the same problems in their software production process in spite of the advances in Information Technologies (IT). These problems are:

- The software product is delivered, most of the time, with 15% defects.
- One quarter of software projects are not finished or they are abandoned.
- From 30% - 45% of software costs are dedicated to software rework.
- Only one half of the plans and schedules established at the beginning of the projects are satisfied.

Over the last decade, some of the software engineering research centers began to organize the practices that are used to produce and maintain software and have demonstrated to be effective in some organizations [1].

The Software Engineering Institute (SEI) defines a process as a set of practices to perform and obtain a result, including tools, techniques, materials and people. This set of tools, techniques, materials and people is named "Software Process". The SEI has grouped the effective practices in reference models.

A reference model is a set of processes that helps organizations to know their process status and it is used as a guide to improve them. One of the most important improvement process models is the "Capability Maturity Model for Software (Sw-CMM)", developed by the SEI [2]. Currently, this model is recognized for its integrated version (Capability Maturity Model Integration, CMMI) [3]. The purpose of CMMI is to provide a "road map" for process improvement that works as a framework to improve processes in an effective way. This "road map" will be a useful guideline to improve organizational processes. In addition, the CMMI offers a structured framework to evaluate the organization's current processes and establish priorities for the improvement activities.

Motivation

Due to the increasing use of Internet and the continuous developing of new IT, Public Administrations are focused on improving their services. In this context, Madrid's Region (called "Comunidad Autónoma") through its Informatics and Communications Agency in collaboration with the Polytechnical University of Madrid, organized the 1st Symposium on Process Improvement Models and Software Quality of Public Administrations sponsored by some software companies.

The Symposium Committee invited the Spanish General Public Administration, the 17 Autonomous Regions Public Administration and the some city councils to participate in the symposium. Finally, the Symposium had an audience of 133 participants from three Ministries, eleven Autonomous Regions and two local Councils. Besides, eleven enterprises participated in the Symposium.

The Symposium objectives were:

1. Spread the evolution on Process Improvement Models, mainly CMMIv1.1 [4] [5].
2. Identify the benefits of applying CMMIv1.1 to Public Administrations software process.

3. Take quick view of the current state of the Requirements Management process (RM) and the Subcontracting Management process (SAM) in Public Administrations using CMMI as the reference model.
4. Obtain recommendations about how to begin a process improvement initiative in Public Administrations.

In order to achieve the above objectives, the Symposium was organized in:

- Conferences.

  The current trends of the Process Improvement Models, particularly the CMMI suite developed by the SEI were shown. Also, CMMI implementation experiences were presented [5] [6] [7] [8]. These activities were done to achieve the objectives 1 and 2.

  In order to get a common language about the RM and SAM processes, some brief explanations were presented. This activity was done to achieve the objective 3.

- Focus Groups.

  A quick view of the RM and SAM processes in the Public Administrations using the CMMI as the reference model was obtained. RM and SAM processes were selected because they have a special interest for Public Administration.

  As mentioned earlier, two brief explanations were presented. Then, the RM and SAM processes were discussed in several and separated focus groups.

  Each focus group was formed with ten participants. A moderator managed the meeting and a note keeper took notes about discussions and wrote down the issues raised. A ground rule was not to accept in the same group two or more participants of the same Public Administration.

  The following activities were carried out:

  1. Gathering the current state of the PA processes.
  2. Identifying the potential benefits of implementing CMMI practices.
  3. Obtaining a list of short term recommendations.

  These activities were done to achieve the objectives 3 and 4.

- Workshops.

  Some workshops to help in the implementation of a process improvement were addressed by the symposium sponsors. In addition, several practical demos were showed to the participants.

  These activities were done to achieve the objectives 1 and 2.

Next, findings and proposals of short term actions of RM and SAM focus groups were presented.

Requirements Management Focus Groups

In order to establish a common language, as was indicated earlier, the moderator explained the Requirement Management Process concepts and practices of CMMIv1.1. Then, Public Administrations explained their current stated of RM process.

To facilitate the comprehension of the obtained findings, a brief explanation of each specific practice (SP) of the RM Process is described.

- SP1.1. Develop an understanding with the requirements providers on the meaning of the requirements.

  Description. A requirement provider could be an internal or external user, and it could be any other official source from which to receive requirements (customer, project manager, systems engineers, software suppliers, software engineering group, marketing, higher level management, etc.).

  Findings. There are multiple providers for the Public Administrations. It is true that most of the time these providers could be identified by their name; however the communication process is informal. This means that no documentation exits to identify all requirements providers. Usually, the requirements are communicated to the top level in a horizontal way.

- SP1.2. Obtain commitment to the requirements from the project participants.

Description. The previous specific practice dealt with reaching an understanding with the requirements providers, this specific practice ensures that project participants commit to the current approved requirements and the resulting changes in project plans and activities.

Findings. Almost all of the participants determined that they do not have defined processes for establishing agreements with the requirements providers. The commitments are made informally, mainly orally, through work meetings.

- SP1.3. Manage changes to the requirements as they evolve during the project.

  Description. During the project lifecycle requirements change for many reasons; nevertheless it is fundamental to manage these changes in an efficient way. Documenting the requirements changes and the rationale is the most important activity of the Requirement Management Process.

  Findings. On the one hand, almost all Public Administrations do not have a process for change management or in the best of cases they have a poor process because they do not document their changes. On the other hand, the participants found that it is too difficult to manage the changes because sometimes the requirements providers are not aware of the impact generated by the change.

- SP1.4. Maintain bidirectional traceability among the requirements, project plans and the work products, from their source to a lower level.

  Description. Requirement traceability is the ability to describe and follow the life of a requirement, in both a forwards and backwards direction. The traceability that covers both the horizontal and vertical relationships is called bidirectional traceability.

  Findings. On the one hand, a lot of the participants did not understand the “traceability” concept. This exposed the lack of knowledge of participants because it was the first time that they had heard the word. In this way, many Public Administrations did not perform traceability practices and they do not use a traceability matrix for their requirements. On the other hand, only some of the participants performed a change management process but poorly.

- SP1.5. Identify inconsistencies between the project plans and work products and the requirements.

  Description. This specific practice finds the inconsistencies between the requirements and the project plans and initiates the corrective action to fix them.

  Findings. It was determined that Public Administrations did not perform the revision of their projects plans, activities or work products for consistency with the requirements.

Finally, “process institutionalization” to ensure that the process will be documented, effective, repeatable and lasting is a long term objective. Public Administrations confirmed the use of one or two previous practices, but the institutionalization practices are a concept out of their hands in this moment.

Proposals of Short-term Actions on Requirements Management Process in Public Administrations

The participants of these focus groups identified the need of having an effective, repeatable and lasting Requirements Management Process in order to obtain reliable and controllable requirements. The following short-term actions were identified:

- Involve all the organizations in the process improvement project, mainly the Senior Management.
- Promote RM process training among the Public Administration personnel.
- Sensitize Public Administrations Senior Management with the importance of having an effective, repeatable and lasting RM process, and the benefits that this process brings to the software development process.
- Make the users understand the cost (in time and effort) that any change implies and the importance of having an adequate requirements definition process at the beginning of a development.
- Implement traceability techniques and promote the purchase of tools to make the implementation easy.
- Develop a list of the most common terms used in Requirements Engineering to avoid confusions.
- Develop a guideline of RM practices to obtain a successful process in future projects.

Conclusions about RM process in Public Administrations

Focus Groups allow an active participation of Public Administrations to achieve identify their current issues. Also, with the ideas and concepts expressed in the Conferences, each Public Administration took a quick look of their own current state of the RM process using the CMMIv1.1 as reference model. In this way, Public Administrations identified the gap that they had with respect to the model. Although it is true that each Public Administration use a poor RM process, this Symposium helped them to compare their process with the CMMI and then identify their deficiencies and what they had to do to improve their RM process. In addition, all Public Administrations understood the importance of having processes that allow them to repeat the successes in all their projects.

Subcontracting Management Focus Groups

The Acquisition Process is defined as the process of acquiring partially or totally the Information System (IS) Technologies from an external services supplier [10]. This means to delegate everything or part of the IT work through a contract with an external company that joins in the client organizational strategy and seeks to design a solution to existing software problems inside the latter. In the last years, the SAM process of IT functions has been gained the attention of many researchers and industries.

In order to establish a common language, as was indicated earlier the moderator explained the Subcontrating Management Process concepts and practices of CMMIv1.1. Then, Public Administrations presented the current state of SAM process.

To facilitate the comprehension of the obtained findings, a brief explanation of the specific practices grouped by Specific Goals (SG) of the SAM Process was described.

- SG1. Establish supplier agreements.

  Description. Establish agreements with the suppliers by a formal contract. Also, it is necessary to determine the product to acquire, and consequently identify and select the potential suppliers.

  Findings. Public Administrations usually perform a call for proposals to subcontract their projects. However, these types of projects exceed budget the most of the time. Also, this results in a loss of project control and lack of communication.

  One of the main issues was the poor knowledge that Administrations have about the products or services to be contracted. Also, the supplier has a poor knowledge of the services o products to be offered. With this context in mind, a loss of negotiation capacity is produced and it is necessary to have and independent supervision.

  Another issue appears in the supplier selection activity because the Regional Government is in charge of selecting the providers and does not consider the selection criteria and requirements of the Local Administrations.

- SG2. Satisfy supplier agreements.

  Description. Monitor the supplier agreements for each project.

  Findings. Public Administrations have a subcontracting process, efficient or not, but they do not have a control process for managing the subcontracting project. This loss of control can be due to the lack of knowledge about subcontracting standards and models within the Public Administrations.

Proposals of Short-term Actions on Acquisition Management Process in Public Administrations

The participants of these focus groups expressed the following short-term actions:

- Subcontract in a rational way, maintaining the strategy and project functional analysis.
- In depth knowledge of the product that Public Administration wants to acquire: “If I do not have the knowledge, I do not know what we want to subcontract”.
- Never forget that the subcontracting process does not avoid the work, but generates a new role: the control and monitoring of the acquisition process.
- Establish clear objectives between the Public Administration and the provider.
- Use subcontracting strategies and establish processes to control the required service.
- Subcontract small projects because they are easier to control.

Conclusions about SAM Process in Public Administrations

Public Administrations have certain mechanisms that manage the SAM process. Usually they plan the project without metrics and they do not have monitoring processes.

The lack of project control can be due to the lack of knowledge about subcontracting standards and procedures in the Public Administrations.

Public Administrations use a model of effective practices, like Spanish methodology called METRICA3, to cover partially the SAM process. However their implemented processes are not very efficient although it is not very difficult to align them with CMMI practices.

Conclusions

This first Symposium represents the first stage to initiate an improvement program, taking into account the poor knowledge and initial skepticism. A discussion forum to study and debate how Public Administrations could improve their current states was made. Also, recent studies on improvements models and their applicability in Public Administrations around the world were presented.

With this “quick look” at Public Administration, both in Requirements Management and Software Acquisition Management processes specifically, the lack of control in these processes was expressed. This issue will promote Public Administration’s initiatives to begin an improvement program.

Initial Symposium objectives were accomplished. Firstly, an initial quick look at RM and SAM processes of all Public Administrations was obtained and secondly, the idea that it is possible to improve and obtain the leadership in Public Administrations was promoted among all the Symposium participants.

This Symposium was the first step to begin an improvement program. Now it is the turn of Public Administrations. Public Administrations should begin the formal assessment of their processes to identify the strengths and weaknesses, and prioritize their improvements actions.

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A PRACTICAL CASE OF SOFTWARE LOCALIZATION AFTER SYSTEM DEVELOPMENT[1]

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Abstract: Internationalization of software as a previous step for localization is usually taken into account during early phases of the life-cycle of software development. However, the need to adapt software applications into different languages and cultural settings can appear once the application is finished and even in the market. In these cases, software localization implies a high cost of time and resources. This paper shows a real case of a existent software application, designed and developed without taking into account future necessities of localization, whose architecture and source code were modified to include the possibility of straightforward adaptation into new languages. The use of standard languages and advanced programming languages has permitted the authors to adapt the software in a simple and straightforward mode.

Keywords: Localization, Internationalization, XML.

ACM Classification Keywords: D. Software, D.2.7 Distribution, Maintenance and Enhancement

Introduction

Any technical device devoid of human interaction operates and yields an expected level of productivity regardless of the cultural environment where it is located. The same can be said for software, as long as it does not call for any human interaction. However, many software applications require human interaction for a correct functioning. In this case, the level of productivity of the software will depend not only on software's intrinsic technical characteristics but on external human factors.

When a software application is used in a context with a different cultural environment (like different mother language, different icons, symbols, etc.) from its original one, a process of adaptation into the new work culture is required. This process is known as localization. The adaptation into a new culture not only comprises evident factors like the language of the interface and messages to the user, measure units or data formats (also known as overt factors according to [Mahemoff et al, 1998]); but also other slippery and fuzzy issues that finally

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