Using SW-CMM SQA independent verification as a first step for the transition to CMMI

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Context - CenPRA - Centro de Pesquisas Renato Archer

Brazilian Government funded Research Center on Information Technology
Research Areas: Technological Innovation, Qualification and Applications for the Society
230 researchers in 13 Technological Divisions

DMPS: Divisão de Melhoria de Processos de Software Software Process Improvement Division

- Focus: Process Evaluation and Improvement
- Activities: technology research, articulation, dissemination and services
- CMM/CMMI, ISO/IEC 15504 and MPS.BR (Brazilian Software Process Improvement) models
  - Participation in technical committees of ISO/IEC 15504 and MPS.BR
  - Technical orientation for Process improvement in groups of small enterprises
  - Training courses
- Specific Process Models development.

Motivation

- After 2005 December no more CMM appraisals will be held

- Organizations with CMM level 2 or 3 have a powerful tool for the beginning of the transition process: The independent verification of SQA

How it began

- In 2004 December, an Organization at CMM level 2 has asked us to make an independent evaluation in order to comply to CMM SQA Verification 3:
  - Experts independent of the SQA group periodically review the activities and software work products of the project's SQA group.
  - Organization's Process Manual defines that the independent evaluation would be conducted by external entity.
- Due to the near deadline of CMM retirement, we proposed to the Organization to take advantage of this opportunity to make a more comprehensive and deep verification, making a SCAMPI B based assessment and, using both CMM-SQA and CMMI-PPQA as references for the evaluation.

How it was done

- The evaluation has followed the SCAMPI phases:
    1. Plan and Prepare appraisal
    2. Conduct appraisal
    3. Report results

Activities done - Phase 1: Plan and Prepare the appraisal

- Preliminary Appraisal (1 day)
  - Objectives:
    - Understand how CMM was applied in the Organization
    - SQA preliminary appraisal
    - Define a document list for the appraisal
    - Present and discuss the appraisal format
  - Meetings with the appraisal sponsors
  - Work with SQA people
  - Initial collection of practice implementation indicators (PII)

- Appraisal Plan and preparation
  - Appraisal Plan was written by CenPRA based on the Preliminary Appraisal, reviewed and complemented
  - It defines, in compliance with the Organization Process Manual:
    - Scope and objectives of the appraisal, roles and responsibilities
    - Organization's Departments to be appraised
    - SQA process according to SW-CMM SQA and CMMI-SE/SW PPQA
  - According to SCAMPI-B (initially it was defined to be C, but during the work, it was found that the assessment could be level B)

- ## Appraisal done according to the Plan:

  - Organization's appraiser training

  - Opening presentation for the participants

  - Documents verification

  - Interviews: project teams, project managers, process improvement groups, SQA

  - Results compilation

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Activities done - Phase 3: Results Reporting

- Results presented to sponsors and appraisal participants.
  - SQA Process is implemented and institutionalized compliant to SQA KPA and PPQA PA; none non-conformity was identified.
  - SQA provides senior management visibility of inconsistencies, supports the execution and improvement of the processes, and helps maintaining the compliance of all processes to SW-CMM level 2.
  - In the transition to CMMI, it will be necessary to elaborate new instruments for the verification of the PA's, but the SQA process itself would be kept as is because it is compliant to PPQA
  - The SQA role is perceived as a reference and support for each one's job to comply with SW-CMM
  - The SQA Status Report presents in a clear and concise form, the results of monthly evaluations, and the corrective actions
  - There is a process and practice for process revision and improvement

Conclusions of the case study

- The existence of a very good "SQA Status Report" contributes to a comprehensive and deep insight

- Assessing the level 2 KPA's based in this Report is a simple matter of confirmation of the verification of the Process Implementation Indicators that has been verified previously by the organization's SQA function

- **It's possible to use the independent verification as a first step in the transition from SW-CMM to CMMI-SE/SW**

- The more the SQA function is well done, the more it's possible to use the SQA independent verification to identify the gaps to CMMI-SE/SW

- In the preparation phase, it is possible to have a first insight of how good is the SQA and if it is possible to apply the proposed approach

- In this case study:
  - The "SQA Status Report" reports the non-conformities for each KPA against the Goals, Commitment, Abilities, Activities, Measurements, and Verification. Based on this, the Process Implementation Indicators can be identified.
  - It's possible to extract the frequency, recurrence and trends of the non-conformities, allowing a priority analysis of the problems.
  - It is a very good instrument for the appraisal of the Level 2 PAs

- If, as in this case study, it is perceived that it would be possible to extend the objectives of the independent verification to a first gap analysis, make the plan for doing so

What to do
1- Preparation

- Define, with the appraisal sponsor, the intention to use the SQA independent appraisal for the gap analysis

- Verify the availability of SQA instruments like that "SQA Status Report".

- If it has been concluded that there is good information, do the following activities:

    a) Include the goal of identifying the gaps to CMMI in the Appraisal Plan

    b) Use a SW-CMM KPA's to CMMI PA's mapping

    c) From a "SQA Status Report" or equivalent, raise the objective evidences not only for SQA/PPQA but also for the other PA's.

    d) Identify other Process Implementation Indicators (PII) for other PA's

    e) Adapt the Appraisal Plan, the agenda, required resources and documents to the additional goal of identifying the gaps

    f) In the team training, include some comparison between CMM and CMMI highlighting the differences and similarities. Include also some comparison between SCAMPI and CBA-IPI.

# What to do
2 - Conducting the appraisal

- Conduct the appraisal according to SCAMPI (B or C) verifying the SQA function and the processes verified by it

- Organize the results separating the CMM issues and the CMMI issues

What to do
3 - Reporting the results

- The report will be done in two distinct parts:

  - CMM-SQA issues

  - CMMI gaps issues

- Take advantage of the closing session to explain differences between CMM and CMMI and, CBA-IPI and SCAMPI

14
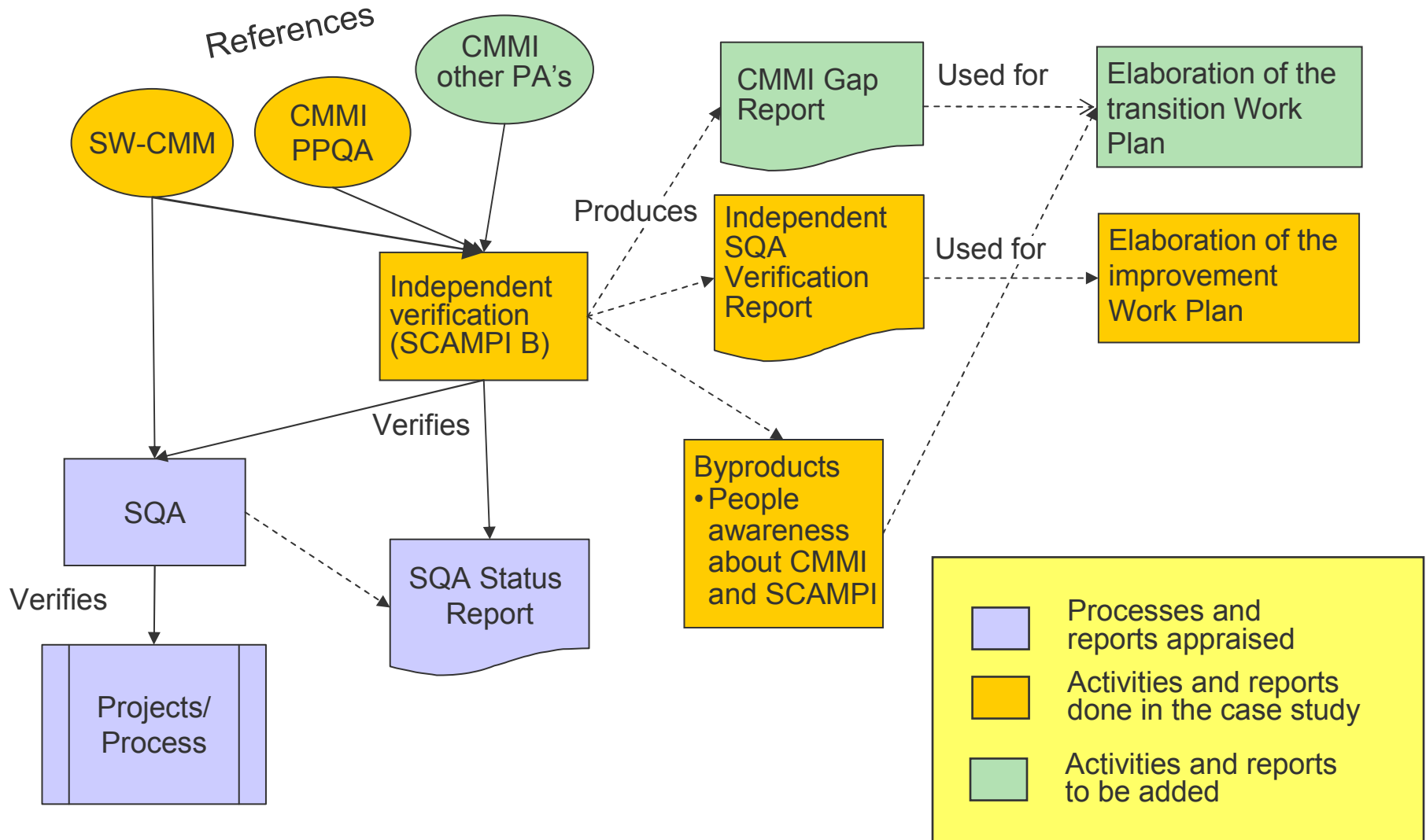
Advantages

- First gap analysis with small increase in the appraisal costs – it can be used as input for the decision about how and when the transition will be done

- The Organization will have a contact with CMMI and SCAMPI, in a practical way, through the opening and closing sessions, and with the objective evidences gathering and the interviews

- SQA people can reformulate their instruments for their internal evaluations for a better transition support

Conclusions

- This work is an application of the "Industry as Laboratory" concept proposed by Potts [5]. The initial intent of the industry aimed to a specific necessity: to perform independent verification of SW-CMM SQA. We, from CenPRA, proposed to widen the appraisal using CMMI PPQA as reference and SCAMPI B as the appraisal method.

- The results of the appraisal indicate us the possibility of proposing an even more widening of the appraisal objectives: use the independent verification of SW-CMM SQA for the gap identification for the transition from SW-CMM to CMMI-SE/SW

- We have defined "What to do" to apply this approach

- We intend to apply this approach soon in the same organization or in another one

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