A Practitioner's View of the CBA-IPI

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Abstract:

The CMM Based Assessment for Internal Process Improvement (CBA-IPI) is the method that is adopted to assess the process capability of organizations using the Software CMM (SW-CMM). While the structure, rigor and manner in which a CBA-IPI is conducted is quite robust with very little flexibility, there are a few soft areas that could easily lead to a subjective interpretation of process capability. This paper is being written primarily to highlight some of these sensitive areas. It is also intended for collective thought and responsibility to evolve from both the lead assessor community and the software organizations pursuing CBA-IPI assessments.

There is a perceived belief in some work cultures, that a higher process maturity rating on the first CBA will guarantee sustained senior management sponsorship for follow on action programs. And from an organizational viewpoint, a CBA should orient itself to serving the business needs of the process improvement program by bringing about a lasting change management to the process designs of an organization. But, from an assessment or a lead assessor viewpoint, how lose an interpretation of the CMM framework is tight enough! This is a dilemma that gets overwhelmed when the assessment team belonging to the organization knows the effects of a low maturity rating on follow on process improvement program. This dilemma is compounded many times when a new assessment team with little or no prior assessment experience has to work with a more experienced lead assessor. The assessment team training that happens before a CBA is often not a true depiction of the situations to anticipate during a formal CBA. And, when an assessment takes a lenient view, it is also not very uncommon to see eyebrows being raised after organizations announce a higher process capability assessment (typically Level 4 and 5). After all, an authorized lead assessor did the assessment. So, where is the doubt in the results? Experience with the CBA suggests that even the most straightforward assessment would have to deal with "process masks" – the ones that cover up the real process. Some of these masks that have been encountered by the author on both formal and informal assessments will be described in what follows. A few questions would remain unanswered because of their very nature!

OVERVIEW

There are two major reasons when there is a debate about the credibility of a high process maturity assessment. The first has to do with having to accept the incredible pace with which some organizations embrace change and their ability to do the right things right almost overnight! It is *possible* for such transformations to happen in some software organization. Dynamic leadership with the right abilities to engineer and sustain ongoing process improvement is what it takes to do a quick turnaround and is not impossible to find. Some

organizations are blessed with change agents who are closure and detail oriented to a degree where engineering process improvement is almost a second nature to these empowered and talented individuals in the organization.

The second reason for the debate has to do with the CBA method and the masks that processes tend to wear. The assessment method clearly does not get into the merits or the quality of the process artifacts that are being assessed. During assessments, this approach opens up a number of questions that are difficult to interpret and hard to justify especially when the process begins to show up with a number of masks.

This paper will describe them to a degree that is necessary and sufficient for an intellectual understanding and an awareness of the possibilities that have to be considered while making interpretations. My opinion is that – the tougher the interpretation, the better would be the transfer of responsibility back to the organization's process owners. In fact, while assessments are never intended to make "qualitative judgments", I must confess that as a lead assessor I have made them in the interests of an organization that was recently assessed at Level 5 in the final findings presentation in a section called "Points to Ponder". Observations in this section were also included in the final rating of the maturity level. Having been on both sides of the turf – as part of the organization that was assessed and being the lead assessor - on different occasions, I have had some of the best insights into the possibilities of how assessments can be camouflaged! A few of the noteworthy masks in the camouflage are being unmasked in what follows!

MASK 1

Most assessments have the lead assessor onsite, in the week of the assessment. Normally, there is a preliminary assessment a couple of months before the formal CBA-IPI called an abbreviated assessment or mini-assessment. The maturity questionnaire (MQ) is given to obtain a feel for an approximate level of the process capability. And, since the MQ for the Software CMM is well known, the respondents will have a tendency to safe guard the interests of the CBA-IPI. There is a general tendency to paint a very rosy picture. During the mini-assessment a very small sample of the organization is also called forth to represent the organization's process in interviews (normally the project leaders). Here again, there is a very good tendency for organizations to put their best talent forward. Organizations cannot be blamed for doing this. After all, a CBA costs a lot of money and they have every reason to get the highest possible level – it is a management responsibility after all! So, in many cases the mini-assessment may not reveal the true story that a site has to say. Document review in a mini-assessment is quite a challenge because it is possible for organizations to show all the right things especially if they have prior experience with the CBA and if they are attempting the higher maturity levels. Tools developed in-house that have the capability to draw control charts are very common. This process mask is particularly the trickiest one – from making a qualitative judgment on the real virtues of the use of statistical process control, a requirement at Level 4. The reason is, all the documentary evidence of having followed a process exists in a tool and the tool can generate all the graphs that are necessary for an assessment to qualify at a higher process capability. But, do the process owners really know how to use the information in the graphs for a better control of the process? Do the process owners really understand how the control limits established by the tool was arrived at? If the answer is no, then what is the degree of tolerance that can be permitted for process owners to be ignorant? This leads to the next mask.

MASK 2

When organizations plan for a Level 4 or a Level 5 assessment, the typical question that seems puzzling is - what is the minimum degree to which they must reveal an understanding of the use of SPC? Answer to this question is really very crucial because rules of corroboration mandate that we see the process in execution once and hear about it twice. From the way CBAs are structured, there will be enough opportunity to hear about it "correctly" - twice, and see it once in reports generated by tools. But, what if there is a gross misunderstanding or even inadequate understanding of SPC and other analytical techniques that are being used across the organization? Can the ignorance about these methods from the other functional area representatives (FARs) that are not as knowledgeable as they ought to be, pardoned? Would a global finding or a weakness in one of the KPAs such as – "inconsistent understanding of the use of SPC techniques to software measurement" – be the reason for level 4 being in jeopardy?

There is also a tendency during the assessments to make the findings as "non-controversial" as possible for better transfer of ownership! So, the findings themselves are worded with a view to get better acceptability of the assessment team with the organization in the interests of "maintaining the credibility of the assessment team". The cautious wording of a weakness may also mask the seriousness of the problem. The question that is difficult to answer is - when every other key practice up to a Level 4 are fulfilled and an organization has a global finding or a weakness which is as close to - "inconsistent understanding of the use of SPC techniques to software measurement", should the level be a level 4 or a level 3? When tough interpretations are made – if 2 or more FAR interviews out of the 9 interviews that form a CBA (normally) have a difference of understanding, then the rating should be a Level 2. This is because Training Program at Level 3 must address all the "required" training (Activity 1 on Training Program) that is necessary for organizations to perform effectively with the use of the process and its measurement objectives. Normally, leniency prevails. SPC is a support process and not the main process that gives rise to the end of phase deliverables. Further, Activity 1 of Training Program on sub-practice 3 makes the interpretation lenient by saying – "training that is required, for whom it is required, and when it is required". So, if let us say the SQA and SEPG are fully aware of SPC and it is heard correctly from these interviews and seen once in reports, can a soft approach be taken on the assessment? Is that the right approach? Level 4 exhibits process capability at a project level and a Level 5 dictates that every individual is sensitive to continuous process improvement – which is impossible without the right orientation to measurement and use of analysis techniques on improvement programs.

How should an assessment turn out if hypothetically speaking, the SQA and SEPG don't have a clue on SPC techniques – but the organization has a separate measurement group that is responsible for SPC that is also vested with the responsibility of making the interpretations for the organization?

MASK 3

There is a lot more information in the tools that are used than in documents. The lead assessor has to play a significant role in document reviews – which is not normally the case. Generally, the assessment team does most of the document review and provides the "necessary" visibility to the lead assessor. With companies having robust intranets and process servers with a capability to generate documents at the click of a few buttons, the real strategy should be to obtain an in depth understanding of the process servers and documentation tools rather than the artifacts they produce – the documents. So, document reviews must make way for tool

and automation support analysis. Such a review is quite an intensive job. When ignored, it will give rise to subjective evaluation on assessments.

MASK 4

Be wary of the tools that generate reports automatically! Organizations that are showcasing a level 4 or level 5 capabilities normally have very simple but effective tools deployed in their process. These tools also have the capability of generating reports in monthly, weekly or whatever periodicity an assessor likes to see! These tools will also plot the control charts – correctly and consistently in the established periodicity! Everybody in the organization may be entering the raw data that is needed to generate these reports – but no analytical processing of these reports may ever be done. And much worse, nobody in the organization may understand the significance of these graphs and parameters such as schedule overruns or under-runs. They may be there to prove the point – "we have SPC in place!" And, we will hear about them in at least two different interviews.

Can this type of an input be taken as sufficient proof for a level 4 or a level 5 capability? Should we not impose a mandatory action plan for every control chart that is drawn? And further, should we not place a more stringent corroboration criteria for a level 4 or 5 assessment – such as, every interview must speak the same language consistently and correctly? While being on the same topic, is the existence of a status report sufficient to prove senior management oversight into projects? These reports may in fact be generated from a tool automatically to fulfill the CMM verification and validation key practices. Since many offshore development centers have very minimal management decision-making, what should the assessment's view be on business reasoning where the onus of configuration management, tracking of cost, schedule and budget is not part of the site's activities? Can the assessment take a stand such as – "not within the current scope of the site"?

MASK 5

Goal 3 in Quantitative Process Management says – "process capability of the organization's standard software process is known in quantitative terms". With 6-sigma in vogue, there is an attempt to characterize the process capability in statistical terms using the number of post release defects normalized using the critical to quality characteristics. There are standard conversion tables available to get the sigma capability. The dilemma in determining this capability for a software process is that, if you increase the number of critical to quality observation points (CTQs), the sigma value will automatically get closer to 6-sigma! This is because the number of identified CTQs forms the denominator of the ratio that determines the sigma capability - Number of post release defects to the number of CTQs. As this ratio reduces in number, the conversion table suggests a higher process capability in sigma terms. So, does the QPM GL 3 reduce to being a matter of good guesswork? And, what if any should be the view of the assessment because the CBA never makes qualitative judgments but is more of a – "let the facts speak for themselves" - approach?

MASK 6

How long, is long enough for a process to qualify as having endured the test of time? This question comes up every time an assessment notices a practice that is recent or is still in the plan for adoption. Many stable level 3 processes have periodic internal best practice reviews. These reviews by themselves may be a very old phenomenon that has withstood the test of time, but what about the process improvement ideas themselves that are being submitted in

such sessions when they get too close to a formal CBA-IPI? And, can an assessment get into qualitative assessments of the best practice submissions?

About Raghav Nandyal

Raghav S. Nandyal has numerous years of software engineering and management experience in areas including requirements gathering, analysis, design, development, software testing, quality assurance, package selection and integration. He has been a prime consultant on Software and People-CMM based process improvement initiatives in leading multinationals since 1996. He is among the very few authorized lead assessors on both the Software CMM and the People CMM in the world. He is currently the Chief Executive Officer and Chairman of the board – SITARA Technologies Private Limited.

In his prior assignment at Intelligroup, Inc. as Chief Process & Quality Officer, he was the primary architect and the driving force behind Intelligroup's Indian subsidiary to be assessed at the highest rating for software management and technology practices at Software CMM Level 5 in a record time of 12 months in October 2000 since they were assessed at SW-CMM Level 3 in October 1999. He also led their People CMM assessment at Level 2 in May 2000 - among the first sites to publicly acknowledge this in the world. As a General Manager, he managed their Corporate R&D division for over 1 year.

He held several senior management positions at LG Software Development Center (India) ranging from program manager to Head-Emerging Technologies. He was also the prime consultant to LG-EDS Systems, Inc. a 2000 person company in South Korea where as a consultant to the senior management of LG-EDS Systems, Inc., he mentored and coached the Quality Management Team in addition to facilitating outsourcing of project development activities.

He worked as senior manager at NYNEX Science and Technology Asia (P) Ltd., in their Bangkok and New York locations. He was responsible for project management and user acceptance testing of several software modules involving intelligent field access service of telephony applications. He facilitated the software process improvement program based on the SEI-CMM model at NYNEX S&T. He was a Research Assistant at Illinois Institute of Technology during his Master of Science program in Electrical and Computer Engineering and a project associate in the VLSI CAD Laboratory at Indian Institute of Science, Bangalore before joining Motorola. He worked in a software engineering position at Motorola India Electronics Pvt. Ltd., where he developed systems software using structured methods for the Motorola Cellular Infrastructure Group. He also published several papers and developed innovative award winning software tools in an attempt to automate the software development life cycle.

His current research interests in software management are in mitigating software risks and building self-sustaining software process improvement programs in development environments working on emerging technologies. He has a number of technical papers in international conferences to his credit. He is on the international review panel for IEEE Software in the areas of Software Engineering and has guided students as an external guide on their Master's project work.