

CMMI High Maturity An Initial Draft Interpretation for V1.3

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Agenda

Goal

Initial Draft Interpretation

- Informative material
- Terminology
- Understanding Process Performance Models (PPMs) & statistical management
- Organizational support

Communicating the Better Understanding



Goal

Organizations, Certified HM LAs, and the SEI have a common understanding of the HM Practices and expectations for ML 4 and 5.

- *The slides that follow focus on providing clarifications where they are most needed: to the process management concepts introduced at ML4.*



HM Appraisal Audit Criteria

On Nov. 17 (Monday!), the CMMI Steering Group approved a set of criteria for use by the SEI in CMMI High Maturity appraisal audits that are found here:

<http://www.sei.cmu.edu/cmmi/appraisals/hmapprl-audit-criteria.html>

These criteria are not intended to replace the existing expectations for the HM process areas (OPP, QPM, CAR, OID) in process improvement nor in conducting appraisals, which must still be addressed.

The model will be updated to improve clarity regarding high maturity expectations as part of the V1.3 revision effort (V1.3 scheduled for release March 2010).



Initial Draft Interpretation – Info Material 1

Purpose of Informative Material

- Help users including appraisal teams understand the intent of CMMI Practices.
 - MDD and CMMI Glossary currently say this, but there are some weaker statements in CMMI Introductory chapters that will need to be revised.



Initial Draft Interpretation – Info Material 2

Informative material plays multiple roles

- Typical work products and subpractices characterize elements of a *typical implementation*
 - Characterizing the rigor and detail one might expect to see in a large-project implementation
- Introductory notes and specific goal notes portray the *gestalt*:
 - Describing how the PAs and their practices interrelate
 - To what end and how they work together
- Other notes may serve either or both roles as well as motivating or explaining a practice



Initial Draft Interpretation – Info Material 3

LAs are to judge “reasonableness” of an implementation

- Using informative material as a *guide*
 - BUT NOT a *checklist*
- Reasonableness includes *correctness*.
 - But not “goodness” (Goodness would encourage too much subjective judgment on LA’s part.)

Judging whether an implementation is reasonable requires knowledge of context and possible approaches to implementation



Initial Draft Interpretation – Terms – Variation

Add “Variation” to glossary, giving it two meanings:

- Differences in the output of a process resulting from the influences of its definition; the people and other resources used in performing it; and the inputs and materials provided
- A measure (typically derived by mathematical formula) of spread or dispersion in the values assumed by a variable.



Initial Draft Interpretation – Terms – PPM 1

Current PPM definition:

- A description of the relationships among attributes of a process, its work products, or other processes
- Developed from historical process-performance data and calibrated using collected process and product measures from the project
- Used to predict results to be achieved by following a process.



Initial Draft Interpretation – Terms – PPM 2

To make the PPM definition more consistent with the way PPMs are used in the model, add this to the definition in the glossary:

- The predictions account for variation.
- A PPM may also be used to aid composition of projects processes, analyze the effects of changes to a process, or analyze or compare the results from following alternative processes.
- PPMs may be organizational or project specific.



Initial Draft Interpretation – Terms – PPB

Current “Process Performance Baseline” definition:

- A documented characterization of the actual results achieved by following a process, which is used as a benchmark for comparing actual process performance against expected process performance.

Add this to the definition:

- The characterization will include a description of the distribution (e.g., central tendency and spread) along with sufficient context information to understand what the baseline represents.



Initial Draft Interpretation – Use of PPMs

Predictions link to the quality and process performance objectives

PPM prediction accompanied by some kind of characterization of its accuracy and precision (e.g., prediction interval or goodness-of-fit test)

PPM prediction accuracy and precision are periodically evaluated

Ideally, PPMs include controllable parameter(s) (can help identify an approach to corrective action)

Ideally, PPMs encompass multiple attributes (e.g., relating product quality and process performance)



Initial Draft Interpretation – Statistical Mgt 1

QPM SG 2 addresses statistically managing selected subprocesses

- In support of QPM SP 1.4, in which the project regularly makes predictions (PPMs) as to whether the project can satisfy its quality and process performance objectives (small projects treated as an ensemble)
- Subprocesses that impact PPM prediction quality are candidates for statistical management



Initial Draft Interpretation – Statistical Mgt 2

Collectively, the subprocesses selected from the project's defined process for statistical management (QPM SP 1.3) *make significant contributions to:*

- *reducing variation* in outcomes that impact the project's objectives
- *reducing risks* associated with achieving the project's objectives
- *calibrating PPMs* used in predicting project outcomes (QPM SP 1.4)



Initial Draft Interpretation – Statistical Mgt 3

Subprocesses selected for statistical management are controlled at the event level as opposed to an aggregated level. This implies a routine and correct use of data and statistical analyses to both statistically manage the subprocess and to take timely corrective action when the performance of a selected subprocess warrants it



Initial Draft Interpretation – Statistical Mgt 4

Subprocesses selected for statistical management should be periodically evaluated.

Considerations during evaluation should include:

- Is the variation experienced too large?*
- Should event data be disaggregated by type or source?*
- Should a subprocess be decomposed further into more fine-grained subprocesses and from these, an appropriate (re)selection be made for statistical management?*
- Are sufficient attributes of the selected subprocesses included in its statistical management?*



Initial Draft Interpretation – PPMs + Stat'l Mgt

PPMs and statistical management are key parts of the process m'gt system that enables ML4

- *Statistical management focuses on improving prediction of a single process variable; PPMs focus on multiple process variables – BOTH FOCUS ON MANAGING PROCESS BEHAVIORS in context*
- *HM practices exploit that understanding!*
- *Properly implemented, they work synergistically together to help a project (and the organization) predict & control how its processes will behave*
- *Leading to the paradox of better alignment from “the top” while greater empowerment “from below”*



Initial Draft Interpretation – Org Support

Improved understanding of HM Practices is also needed at ML5, e.g.:

- The org and projects employ formal criteria on when to apply PPMs and statistical m'gt
 - In support of not just QPM, but also CAR and OID
 - Target high-risk/opportunity projects and process changes
- Statistical analyses should be embedded in the day-to-day activities of engineers & managers
 - Approaches such as Six Sigma and TSP can help institutionalize these behaviors



CMMI V1.3 Scope (Proposed)

Clarifications to High Maturity Practices

Improved coverage of deploying empowered teams

- IPPD addition replaced by CMF practices on empowered teams
- Organizational enablers for effective deployment of teams in OPD, OT
- Importance of teams performing measurement, analyses, and management practices themselves, particularly at high maturity, in order to obtain very significant gains in performance at maturity levels 4 and 5

Harmonized DEV, ACQ, SVC around a common CMF

Improved sampling approach in SCAMPI

Performance evaluation (before and after) to be introduced as a possible requirement for high maturity appraisals



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