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CMMI®

Top 10
Interpretation Issues

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Topics

Background

"Interpretation Top Ten"

Summary

Background and Context

Interpretive Guidance project collected information using
- birds-of-a-feather sessions
- an online survey
- detailed interviews

There were ~7,500 comments reported by CMMI users and potential users regarding CMMI® adoption/interpretation.

The Interpretive Guidance team analyzed comments and reported results in these two reports:
- *CMMI Interpretive Guidance Project: What We Learned*
- *CMMI Interpretive Guidance Project: Preliminary Report*

Issue Selection

Issues were selected from the Interpretive Guidance Database and from questions that students raised during CMMI courses.

The top ten list is prioritized from least to most critical.

The list is limited to ten issues.

Drum roll please….

Issue 10: Process Performance Baselines and Models

"In Organizational Process Performance (OPP) SP 1.4 and SP 1.5 are highly confusing ... which is required first, a model and then a baseline or a baseline and therefore a model?"

Process performance baselines
- Are a measure of performance; they establish a distribution of results that characterize expected performance (e.g., median, range, and natural bounds)
- Are derived from project data and capture the actual performance of processes used in the organization
- Are often used for estimating purposes

Process performance models
- Estimate/predict the value of process performance measures from other measurements
- Predict expected performance at a specific time in the project
- May be used when enough data isn't available to establish a performance baseline; may be developed to estimate performance

These two specific practices imply no order and should both be used to characterize the organization's performance of critical processes.
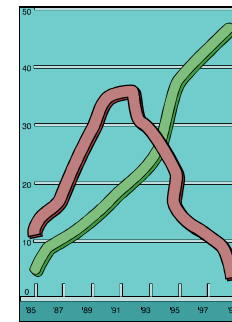
Issue 9: Configuration Audits

"What is meant by SG 3 in Configuration Management, specifically SP3.2, Perform Configuration audits?"

The Configuration Management (CM) process area encourages users to define the different levels of CM.

SP3.2 is designed to ensure that the CM system is complete and accurate, including but not limited to functional and physical configuration audits.

Physical Configuration Audits
- The physical description enables the reconstruction of products/ product components/baselines.
- The physical configuration is complete.

Functional Configuration Audits
- The functional description enables the evaluation of conformance to requirements.
- The functional configuration is correct.

Other Audits
- CM records are complete and accurate.
- The status of configuration items is complete and accurate.
- Change requests are complete.
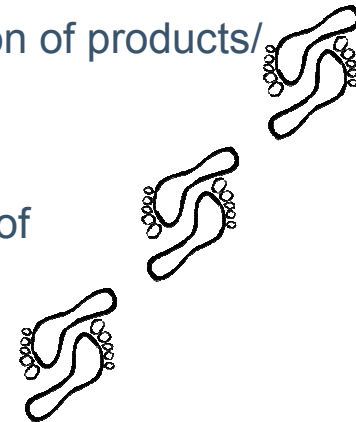
Issue 8: SP2.1 in Supplier Agreement Management (SAM)

"The sudden inclusion of commercial off-the-shelf (COTS) in SG2 seems out of place. Need to clarify the concepts of how COTS applies and fits into SAM."

Version 1.1 Development Team wanted to add COTS concept to CMMI:
- It is present in CMMI source models and other standards.
- Many products are delivered with COTS products included.
- Engineering process areas are impacted by COTS.

SAM SG1 addresses establishing and maintaining the supplier agreement and SG2 addresses executing the agreement:
- Since COTS already has an agreement (i.e., license) in place, the practice was placed under SG2.

There were many change requests received on SP2.1, *Review COTS Products*. Changes to this practice will be considered as part of the development of the CMMI Version 1.2 release.

Issue 7: Bidirectional Traceability -1

"Bidirectional traceability could be better explained"

Bidirectional traceability primarily applies to vertical traceability and at a minimum needs to be implemented both forward and backward (i.e., from requirements to end products and from end product back to requirements).

Vertical traceability
- Identifies the origin of items (e.g., customer needs) and follows these same items as they travel through the hierarchy of the Work Breakdown Structure to the project teams and eventually to the customer
- Assures that a requirement can be followed from its inception through any and all changes until it takes its final form

Examples of vertical relationships: among levels of requirements, between requirements and project plans, between plans and work products, between work products and product components, etc.

Issue 7: Bidirectional Traceability -2

Horizontal traceability is also important and is mentioned in subpractice 3.

Horizontal traceability
- Identifies the relationships among related items across work groups or product components for the purpose of avoiding potential conflicts
- Enables the project to anticipate potential problems (and mitigate or solve them) before integration testing

Examples of horizontal relationships: among requirements, across interfaces, among product components, from function to function, etc.

Issue 6: Relationships Among Engineering PAs

"It is difficult to distinguish between activities in the engineering PAs, especially between Product Integration, Verification, and Validation."

The Engineering PAs are intentionally highly related and recursive. One example:
- RD SP3.1, Establish Operational Concepts and Scenarios
- TS   SP1.2, Evolve Operational Concepts and Scenarios

Engineering practices were designed to stress specific information; they weren't designed to mirror a process.
- Requirements Management and Requirements Development
- Verification and Validation

Where appropriate, practices are written similarly but with a different target
- VER, VAL, and PI

Issue 5: Scope of Supplier Agreement Management (SAM) -1

"[The] scope of SAM is something we've had a lot of trouble with."

SAM, at a minimum, covers the acquisition of product components that will be delivered to the customer. It may be used for other significant products and services:
- in-house (a.k.a., internal) vendors/ organizations
- subcontractors
- partnerships

SAM does not apply to
- Contractors that work on your project and use your processes even though a contract usually exists.

Issue 5: Scope of Supplier Agreement Management (SAM) -2

Technical Solution is where the make/buy/reuse decision is described.

The formal agreement in SAM guides the relationship, but should not determine the scope/applicability of the PA.

Many organizations have a contracts/ procurement/buyer group that implements many of the practices.

The *CMMI Acquisition Module* and *SA-CMM®* can help acquisition organizations to improve.

Issue 4: Generic Practice and PA Recursion/Overlap -1

"The cross-product of generic practices (GP) with each PA can in some cases appear redundant, confusing, or difficult to interpret."

Generic practices support institutionalization in the organization and serve as reminders to the organizations to do things right.

Many PAs also address institutionalization activities by supporting the implementation of GPs. In these cases, there is overlap.

GP and PA relationships
- GP2.2, Plan the Process   PP
- GP2.5, Train People   OTP and PP
- GP2.6, Manage Configurations   CM
- GP2.7, Identify &Involve Relevant Stakeholders   PP (SP2.6)
- GP2.8, Monitor and Control the Process   PMC
- GP2.9, Objectively Evaluate Adherence   PPQA

Issue 4: Generic Practice and PA Recursion/Overlap -2

More GP and PA relationships

- GP3.1, Establish a Defined Process   IPM & OPD
- GP3.2, Collect Improvement Information   IPM, OPD, & OPF
- GP4.1, Est. Quantitative Obj. for the Process   QPM
- GP4.2, Stabilize Subprocess Performance   QPM & OPP
- GP5.1, Ensure Cont. Process Improvement   OID
- GP5.2, Correct Root Causes of Problems   CAR

Specific practices in PAs may

- Fully implement a GP
- Generate a work product that is used

Detailed descriptions of relationships are in *CMMI Guidelines for Process Integration and Product Improvement*, pages 51-54.

Issue 3: Scope of Validation (VAL) -1

"Most practitioners interpret Validation as happening only at the end of the life cycle instead of in all phases of the life cycle."

The focus of validation is whether the product or product component, as provided (or as it will be provided), will fulfill its intended use in its operational environment.

In many cases, the validation of product components will occur on intermediate work products early in the life cycle to ensure that the product meets its intended use. In rare cases, acceptance testing may be an adequate implementation of this process area.

Validation does not only happen at the end of the life cycle:
- Validation begins with requirements in specific goal 3 of Requirements Development
- Prototypes are used to test design concepts
- Acceptance testing is used
- Independent verification and validation (IV&V) is employed

Issue 3: Scope of Validation (VAL) -2

"What is the difference between verification and validation? Verification and validation are always areas that I've seen cause users confusion."

Verification
- Are you meeting the specified requirements?
- Are you building the product right?

Validation
- Are you meeting the operational need?
- Does this product meet its intended use in the intended environment?
- Are you building the right product?

These concepts were separated into two process areas to stress both concepts. Often a test/activity can be done to address both PAs.
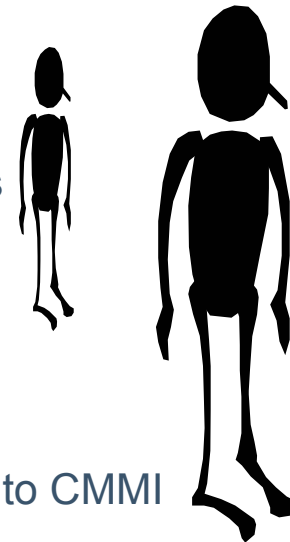
Issue 2: Applying CMMI to "Small Organizations" -1

"What is lacking is how to apply to small projects."

Practices are the same for small organizations, but implementation is different.

Less formal organizational structure means fewer barriers to "knock down;" leadership involvement is not difficult to obtain.

Challenges
- Affordability of implementation and appraisals
- Access to process improvement expertise
- Small business needs to realize pay off quickly
- Small business does not have a staff dedicated solely to CMMI implementation
- Implementing CMMI without a large functional organization to leverage from
- State of company quality systems have major impact on implementation effort, for good or ill
- Just In Time training is critical for small organizations
- "The customer rules"
- Maximizing the use of resources

Issue 2: Applying CMMI to "Small Organizations" -2

Approach
- Connecting the model to business problems provides initial motivation.
- Informative language in CMMI is where most of the "confusion factor" is for small companies.
- There must be a translation of CMMI terminology to organizational context:
  - This issue is similar to those experienced by larger organizations using CMMI for the first time.
- Many of the issues in starting CMMI adoption in larger organizations are seen in the small companies:
  - The difference is in the number of resources the small companies can dedicate to process improvement.

Taken from presentation describing pilot study for "CMMI For Small Business Pilot Study" in Huntsville, Alabama, USA" - SuZ Garcia

Number 1 CMMI Interpretation Issue

"Which process areas can be considered non-applicable?"

Issue 1: Non Applicable Process Areas

"Which process areas can be considered non-applicable?"

Supplier Agreement Management (SAM) and Validation (VAL) are the most common examples.

CMMI V1.1 Models allow PAs to be excluded, HOWEVER:

- This decision to exclude PAs must be made considering the PA goals and practices compared with the organization's scope of work. If one or more projects perform the practices of a PA, that PA should be included.
- Appraisal reports provided to the SEI[SM] must contain adequate rationale for each PA excluded.

- Goals in applicable PAs can never be excluded.

- Practices considered not applicable must be addressed through alternative practices.

Taken from Ferguson & Konrad presentation, "Model - Appraisal Method Interactions"

Summary

The CMMI Web site contains information that can answer many interpretation issues:

- For general interpretation questions, see CMMI Frequently Asked Questions (FAQs)
  www.sei.cmu.edu/cmmi/adoption/ques-ans.html

- For interpretation information for acquisition, service development, small organizations, and others, see
  www.sei.cmu.edu/cmmi/adoption/extensions.html

Other activities are planned such as
- CMMI Version 1.2 Development
- A new course covering CMMI model interpretation

For More Information…

For more information about CMMI, see
http://www.sei.cmu.edu/cmmi/

Or, contact
SEI Customer Relations
Phone: 412 / 268-5800
Email: customer-relations@sei.cmu.edu

Questions?