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DEFINING THE FUTURE

Guidelines for CMMI Use in Acquisition

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Background

- **This presentation will discuss guidelines for appropriate use of CMMI in acquisition**
 - How to determine whether cited CMMI appraisal results accurately reflect contractor capability
 - How to ensure mature processes contribute to program success

Topics

- **What Does a CMMI Level Guarantee?**
- **How to Write a Better RFP**
- **Fiction or Non-Fiction: How to Read Appraisal Results for Fun and Profit**
- **Staged versus Continuous – Why it Simply Doesn't Matter**
- **The First Three Months: Essential Project Start-Up Activities**

A Typical RFP Response

**“ABC Company has been appraised
CMMI Level X”**

(so don't worry about the program being
over budget, over schedule, poor quality
or any other problem)

What Does a CMMI Level Guarantee?

Decisions made on the basis of maturity level ratings are only valid if the ratings are based on known criteria.

- SCAMPI A Method Description Document

- **A CMMI appraisal indicates the organization's capacity to perform the next project, but cannot guarantee that each new project will perform in that way**
- **A CMMI appraisal judges the maturity of the organization's processes – based upon the projects sampled**
 - Most CMMI appraisals correctly review projects in place for some time and can demonstrate adequate artifacts related to the execution of their practices
 - New projects must embrace the new processes
- **The CMMI methodology assumes the organization will propagating their processes to every new project**
 - An organization that gets appraised solely to demonstrate a maturity level might not have that intent
 - Organizations may not have developed the skills to roll out their processes effectively

Where Could Problems Arise?

- **The appraisal results may not be an accurate reflection of the organization's capability**
 - Sampling bias
 - Appraisal inaccuracies
 - Organization's inability to immediately apply their appraised processes
- **The projects within the organization may not live up to their capability**
 - Start-up problems, especially planning, subcontractors, and infrastructure
 - Problems with staffing, either as the prime or with subcontractors
 - Differences in domain experience
 - Back-sliding
- **The customer may prevent (or fail to demand) the supplier's use of their proven processes**

Sampling Bias

The size and number of instantiations investigated should be selected to form a valid sample of the organizational unit to which the results will be attributed.

- SCAMPI A Method Description Document

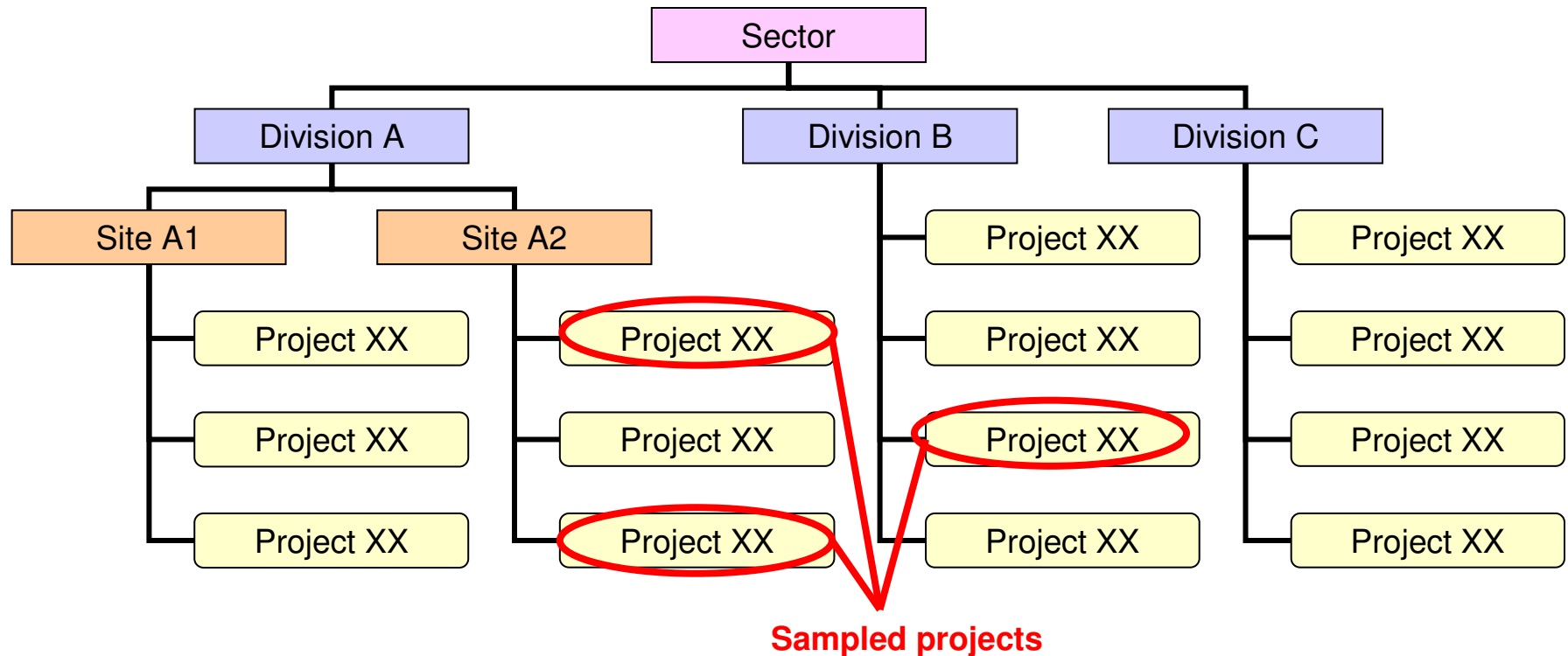
- **The Lead Appraiser is permitted to select sample projects as “representative” of the organization as a whole**
 - Little guidance in the SCAMPI Method Description Document
 - Wide variation among Lead Appraisers

Only some of the projects get appraised

The remaining projects don't implement

- **If an organization is only interested in a good appraisal result, they will appraise large organizations with a handful of samples, and/or exclude/hide inferior projects**
- **Note that this can be happen with both staged and continuous representations**

Organizational Sampling



- An organization with 50 projects at multiple sites may select 4-5 sample projects
- Are the appraisal results representative of the organization?

Appraisal Inaccuracies

- **Methodology**

- SCAMPI A appraisals provide highly accurate appraisal results
- SCAMPI B, C, and other appraisal methods may be useful, but they are not designed to provide the same accuracy

- **Appraiser skill**

- There is wide variation in appraiser skill, experience and insight
- Although appraisal experience is a crucial contributor to accuracy, the appraisal methods do little to ensure sufficient experience – method, type of organization
- There is wide variation in how the model is interpreted, even among experienced lead appraisers

- **Appraiser independence**

- Appraiser independence is needed to ensure unbiased results
- It is difficult to establish a completely independent situation

Rick Hefner, "How Does High Maturity Benefit the Customer?," Systems & Software Technology Conference, 18-22 April 2005

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Fiction or Non-Fiction: How to Read Appraisal Results for Fun and Profit

The ADS is a summary statement describing the appraisal results that includes the conditions and constraints under which the appraisal was performed. It contains information considered essential to adequately interpret the meaning of assigned maturity level or capability level ratings.

- SCAMPI A Method Description Document

- **Only SCAMPI appraisals (the most accurate) create an ADS**
 - Organizations that cannot produce an ADS (did not conduct a SCAMPI appraisal) may portray a very inaccurate view of their current maturity
 - Although SCAMPI B and C appraisals create an ADS, they do not provide the accuracy or validity of a SCAMPI A
- **The Appraisal Disclosure Statement (ADS) provides additional keys to assessing an appraisal's accuracy and validity**
- **SCAMPI version 1.2 was improved to provide more information about the validity and applicability of the appraisal results**

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Interpreting the ADS - Scope

Section 1: Appraisal Identification

Organization Name

Provide the name of the organization. The organization is the legal entity for which this appraisal is being conducted.

Organizational Unit

Provide a description of the organizational unit. The organizational unit is that part of an organization that is the subject of an appraisal and to which the appraisal results will be generalized. It is possible that the organization and the organizational unit may be one and the same.

Projects within the Organizational Unit Excluded from this Appraisal

List projects, categories of projects, or groups/functions that were specifically excluded from this appraisal and a justification for their exclusion. Note: The appraisal results (e.g., findings and ratings) do not apply to these projects and groups/functions.

Organizational Scope

Provide a description of the organizational scope for this appraisal. The organizational scope is the portion of the organizational unit that participates in the appraisal. It is possible that the organizational unit and organizational scope may be one and the same.

What part of the organization was appraised? Is this the organization/ site proposed to perform the work?

How sparse was the sampling? Which projects were excluded and why?

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Interpreting the ADS - Sampling

Organizational Projects and Support Groups

Specify all of the projects and support groups that are included within the scope of this appraisal and from which objective evidence has been obtained and analyzed..

Project or Support Group

Project or support group name:

Project type (Enter Y or N.)

- Focus project? (yes or no)
- Non-focus project? (yes or no)
- Support group? (yes or no)

Process areas for which objective evidence was collected and analyzed:

Size (i.e., number of people):etc.

Critical Factors

- application domains (or lines of business)
- geographical breadth
- disciplines (e.g., SE, SW, HW)
- effort types (e.g., development, maintenance, services)
- project types (e.g., legacy and new development)
- customer type (e.g., commercial, DoD, and NASA)
- lifecycle models in use within the organization (e.g., spiral, evolutionary, waterfall, and incremental)

Do the sampled projects reflect the type and size of the proposed project ?

Focus projects – all process areas are appraised

Non-focus projects – only some process areas are appraised

Interpreting the ADS - Accuracy

Key Appraisal Participants

Appraisal Role	Name	Organizational Affiliation
Appraisal sponsor		
Appraisal team leader		
Appraisal team member		
Appraisal team member		
Appraisal team member		

What is the experience of the appraisal team leader?

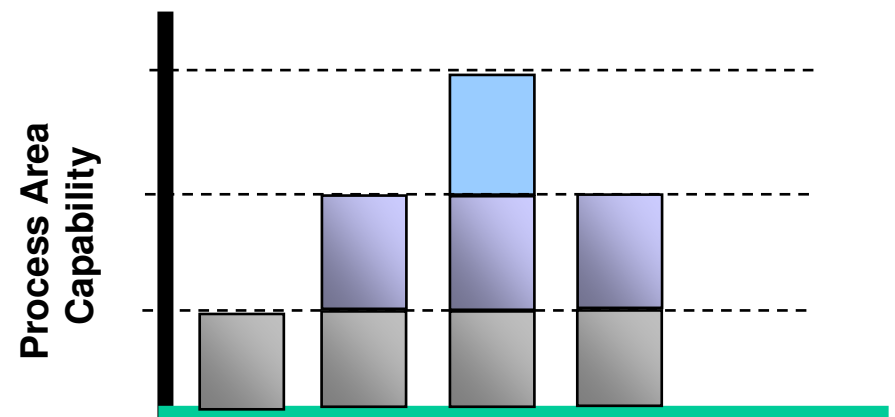
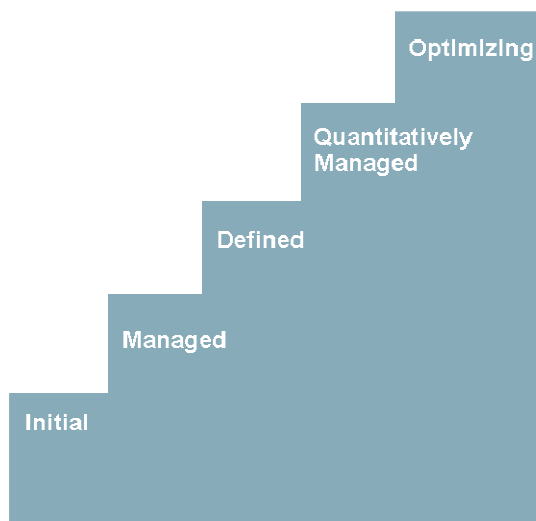
What is their organizational affiliation?

Note: Objectivity is hard to determine - hired external vs. internal

A key measure of objectivity is the level of sampling – unrepresentative samples may indicate bias

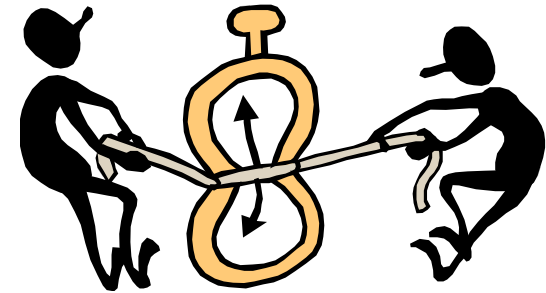
Staged versus Continuous – Why it Simply Doesn't Matter

- Both the staged and continuous representations require exactly the same CMMI practices – neither is easier
- Although “level mania” (pursuing a maturity level for marketing purposes) is often associated with the staged representation, the same condition happens with the continuous model
 - “We have achieved Capability Level 5 in all process areas”
- Staged versus continuous is just a style choice



The First Three Months: Essential Project Start-Up Activities

- **Many process-related problems arise in the first few months of a project**
 - New relationships
 - Personnel changes and shortfalls
 - Pressure to produce quickly
 - Gaps between the planned processes and what was bid
- **If a project is going to live up to the organization's process capability, it is essential to fully implement the processes from the beginning**
 - Processes should be defined during the proposal, by tailoring the organization's standard process
 - Estimates should be based on historical data from the organization's measurement repository
 - Process assets (e.g., templates) should support detailed planning to ensure consistency with the organization's best practices
 - Evidence reviews should be used early to ensure CMMI compliance



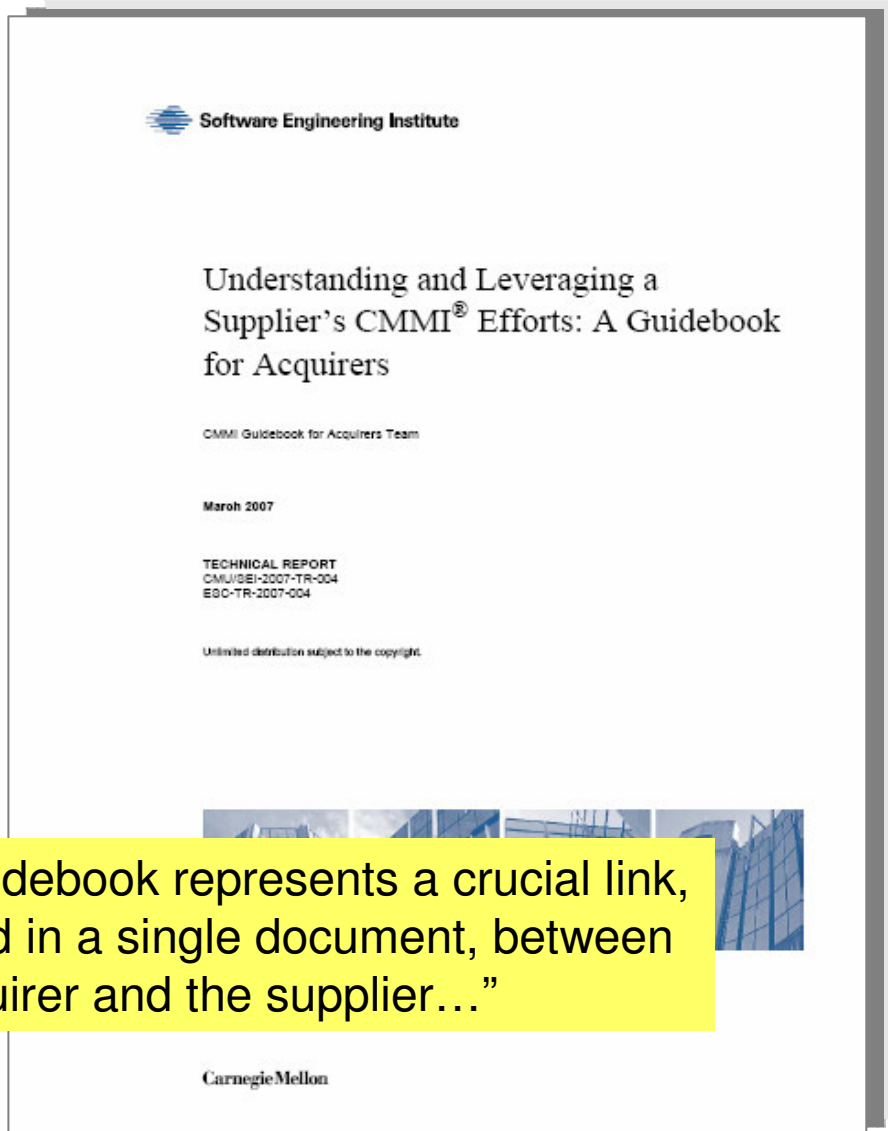
Preventing Back-Sliding

- The CMMI generic practices ensure that processes are institutionalized – sustained over time
- The approach for implementing the generic practices must reflect:
 - Efficiency
 - Effectiveness
 - Applicability to ALL projects
- Frequent appraisals should be used to assess the effectiveness of the institutionalization

Commitment to Perform	Ability to Perform
<i>Policies and sponsorship</i>	<i>Project and/or organizational resources</i>
GP 2.1 Establish Organizational Policy	GP 2.2 Plan the Process GP 2.3 Provide Resources GP 2.4 Assign Responsibility GP 2.5 Train People GP 3.1 Establish a Defined Process
Directing Implementation	Verifying Implementation
<i>Managing performance of the process</i>	<i>Management review, process conformance</i>
GP 2.6 Manage Configurations GP 2.7 Identify/Involve Relevant Stakeholders GP 2.8 Monitor and Control the Process GP 3.2 Collect Improvement Info.	GP 2.9 Objectively Evaluate Adherence GP 2.10 Review Status with Higher Level Management

Geoff Draper and Rick Hefner, "Applying CMMI Generic Practices with Good Judgment," SEPG Conference, 2004.

Published Guidance



“The guidebook represents a crucial link, captured in a single document, between the acquirer and the supplier...”

- Interpreting a supplier's claims of achieving a CMMI rating
- The significance of the improvements to the CMMI product suite in v1.2
- How to request, understand, interpret, and use the results of a supplier's CMMI appraisals
- How to determine which process areas are critical to the success of the program
- Methods that leverage a supplier's process improvement initiatives
- How to gather and interpret information for effectively monitoring supplier processes throughout the execution of an acquisition program

www.sei.cmu.edu/pub/documents/07.reports/07tr004.pdf

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Summary

- **There is a marked difference between organizations that truly want to implement CMMI, and those who are simply trying to get a “certificate”**
- **A knowledgeable acquirer must understand:**
 - Sampling bias
 - Appraisal inaccuracies
 - Organization’s inability to immediately apply their appraised processes
 - Start-up problems