Cutting Appraisal Costs in Half

CMMI Technology Conference & User Group
12-15 November 2007

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Background

- The SCAMPI method has significant flexibility and tailoring options
- Unfortunately, many Lead Appraisers do not take advantage of these options
  - Some continue to conduct appraisals in the same style as the discovery-based CBA IPI methods used over 10 years ago
- This presentation discusses the fundamental value-added steps of a SCAMPI appraisal, and how to tailor the methods to different organizational situations
  - Preparation (scoping, planning, evidence gathering)
  - On-site (evidence review, interviews, consolidation)
  - Close-out (reporting, record keeping)
Topics

- Understanding the purpose of a SCAMPI appraisal
- Identifying the non-value added appraisal activities
- Scoping and planning the appraisal for minimum cost
- Tailoring choices, and how to make them
- Preparing the evidence
- Eliminating known time-wasters
- Being a smart buyer

Hefner, "Cutting Appraisal Costs in Half", 2007
Characteristics of CMMI Appraisal Classes

- The ARC (Appraisal Requirements for CMMI) defines appraisal classes
  - A guide to inventors of appraisal methods, and their customers
- SCAMPI is a family of ARC-compliant methods

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Class A</th>
<th>Class B</th>
<th>Class C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Objective Evidence Gathered (relative)</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Ratings Generated</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Resource Needs (relative)</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Team Size (relative)</td>
<td>Large</td>
<td>Medium</td>
<td>Small</td>
</tr>
<tr>
<td>Appraisal Team Leader Requirements</td>
<td>Lead appraiser</td>
<td>Lead appraiser or person trained and experienced</td>
<td>Person trained and experienced</td>
</tr>
</tbody>
</table>

SCAMPI-A  SCAMPI-B  SCAMPI-C

“A Quantitative Comparison of SCAMPI A, B, and C,” R. Hefner and D. Luttrell, CMMI Technology Conference and User Group, 2005

Hefner, "Cutting Appraisal Costs in Half", 2007
A Variety of Appraisals

All Appraisals

ARC-Compliant Appraisals

SCAMPI-C

SCAMPI-B

SCAMPI-A

“Lower Cost, More Effective Alternatives to SCAMPIs,” R. Hefner, 2007 CMMI Technology Conference and User Group, Thursday, Nov 15, 3:30 pm

“Using Workshops to Speed CMMI Adoption and Evidence Gathering,” R. Hefner et al, 2007 CMMI Technology Conference and User Group, Thursday, Nov 15, 4:15 pm

Hefner, "Cutting Appraisal Costs in Half", 2007
Applying Six Sigma To Appraisals

- Several Six Sigma projects were conducted to optimize the SCAMPI appraisal process.

- Collected metrics on time spent on various appraisal activities, defects.
- Used Pareto chart to identify bottlenecks, opportunities for improvement.
- Used individuals charts to study variation in the appraisal process.
- Used fishbone charts and other causal analysis methods to identify potential improvements.

- Key considerations:
  - Project preparation time
  - On-site appraisal time
  - Cost & resources
  - Accuracy of appraisal results


Hefner, "Cutting Appraisal Costs in Half", 2007
Mapping the Process to Identify Bottlenecks

Suppliers
- Organizations
- Project Personnel
- Lead Appraisers

Inputs
- Assessment Schedules
- Project Evidence
- Personnel Availability
- Project Schedules

Process
- SCAMPI Appraisals

Outputs
- Improvement Plan
- Savings
- Effective Appraisals

Customers
- Projects
- Appraisal Teams
- Organizations
- Lead Appraisers

Process Steps
- Site/Project Readiness
- Team Training
- Evidence Review
- Interviews
- Consolidation
- Findings

Hefner, "Cutting Appraisal Costs in Half", 2007
 Techniques for Reducing Cost - Preparation

- **Scoping** – Determining the portion of the organization to be appraised (the “organizational unit”)
  - Any logical portion of the organization may be chosen, e.g., a division, a site, a domain, etc.
  - The scope will impact both the utility of the appraisal results in marketing and the organizational buy-in
  - “Cherry-picking” only part of the organization to be appraised may send the signal that CMMI is cost without value

- **Planning** – Determining the budget, schedule, and logistics
  - Highly driven by the approach to evidence review and interviewing

- **Evidence gathering** – Compiling the direct and indirect evidence needed to provide compliance with the CMMI goals and practices
  - Biggest preparation cost and effort
  - Perceived by the projects to be non-value-added

*Hefner, "Cutting Appraisal Costs in Half", 2007*
Minimum Team Size

- Cost is composed of:
  - Team costs – goes up with team members
  - Organizational costs (interview, presentations) – largely fixed regardless of size

- Accuracy goes up with as team size increases

- Buy-in is driven by the confidence the organization’s members has in the appraisal process and appraisal team
  - Larger teams can increase the likelihood that a respected person is on the team

Hefner, "Cutting Appraisal Costs in Half", 2007
Team Accuracy vs. Team Size

- Team accuracy vs. team size, for given individual accuracies

As team size goes up, team accuracy rapidly increases (assuming the right answer is obvious once presented)

- Teams of greater than 4 provide little increase in accuracy

- Same, assuming 90% leader accuracy

If the team leader is 90% accurate, additional team members add little accuracy

- Adding team members does give a chance for them to learn

Appraiser accuracy, not team size, is critical

Hefner, "Cutting Appraisal Costs in Half", 2007
Evidence Mapping Should Use An Automated Tool

- **Key Tool Capabilities**
  - Point to existing project file structures
  - Capture status and needed actions
  - Provide statistics over time - project compliance, organizational compliance
  - Identify common gaps across projects
  - Identify typical evidence for each practice

- **Tips**
  - Finding the “right” evidence will involve iteration
  - Remember that the goal is **improvement** (learning/implementing new practices effectively), not finding/creating the evidence
  - Use workshops to educate, motivate, populate
  - Careful preparation reduces on-site evidence review time

*Hefner, "Cutting Appraisal Costs in Half", 2007*
Techniques for Reducing Cost - On-Site

- **Evidence review** – Evaluating the gathered evidence to verify CMMI goal and practice compliance
  - Remember the goal is to validate that the practice is performed, not to judge goodness of the document
  - Inexperienced appraisers should be coached to develop the proper perspective and speed

- **Interviews** – Verifying the evidence is appropriate
  - Not as important as evidence review
  - Simply verifies that what you saw is what is being used (verification, not discovery)
  - Not a test of practitioners’ memory

- **Consolidation** – Using direct, indirect and affirmations to form judgments about goal and practices compliance
  - Biggest time-waster
Reducing Interview Costs

- To reduce cost:
  - Use pre-scripted interview questions
  - Conduct interviews simultaneously in mini-teams (Remember that more than 3-4 people don’t increase accuracy much.)
  - Schedule one interview per practice & instantiation (no SCAMPI requirement for multiple interview sources like in CBA IPI)

Hefner, "Cutting Appraisal Costs in Half", 2007
Reducing Variation in Evidence Review

- The time is takes to review evidence is predictable
  - Some variation by process area

- The mean review time and variation is much higher among inexperienced appraisers
  - At least half of the appraisers on the team should be experienced

- Review time is driven by the clarity with which evidence is assembled and mapped to the CMMI practices
  - Ensure thorough evidence scrub prior to on-site period
  - Inappropriate evidence ("defects") causes unexpected schedule overruns

Hefner, "Cutting Appraisal Costs in Half", 2007
## Reducing Consolidation Time

### Crafting observations
- Voice of Customer data indicates organizations and projects simply want to know which practices they do not comply with
  - Consistent with Verification mode
  - No need to wordsmith charts
- Use an Appraisal Findings tool to capture the ratings at the instantiation level (every project, every practice)
  - Simplifies data consolidation, team discussion

### Reviewing as a team
- Most of the time is spent arguing about how to interpret a few CMMI practices
  - Especially Generic Practices
- We created “CMMI Interpretation” training which clarifies how ambiguous practices will be evaluated
  - Driven by areas where disagreement occurred
  - Useful in reaching team (and organizational) consensus

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*Hefner, "Cutting Appraisal Costs in Half", 2007*
Ten Most Misinterpreted CMMI Practices

- **Requirements Management**
  SP 1.4 Maintain Bidirectional Traceability of Requirements

- **Project Planning**
  SP 1.2 Establish Estimates of Work Product and Task Attributes

- **Project Monitoring and Control**
  SP 1.1 Monitor Project Planning Parameters

- **Measurement and Analysis**
  SP 1.1 Establish Measurement Objectives

- **Configuration Management**
  SP 3.2 Perform Configuration Audits

- **Verification**
  SP 2.2 Conduct Peer Reviews
  SP 2.3 Analyze Peer Review Data

- **Risk Management**
  SP 1.1 Determine Risk Sources and Categories
  SP 1.3 Establish a Risk Management Strategy

- **Generic Practices**

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Summary

- **Mission Systems** is typically conducting Level 5 SCAMPI appraisals of 5-6 focus projects in 5-6 days
  - Post-appraisal follow-up indicates >95% accuracy rate

- **We are continuing to look at ways to decrease cost and increase effectiveness and value**
  - Effective sampling using non-focus projects
  - Re-appraisals to prevent “back-sliding”
  - Handling evidence refresh
  - Combining with ISO 9000, AS-9100 appraisals

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