Experiences with Indicator-Based CMMI Appraisals at Raytheon

Use and benefits/drawbacks of identifying PIIs in preparing and conducting appraisals

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Preparation for Appraisals

Each project, in maintaining its processes and preparing for an appraisal

- **Projects use Practice Implementation Indicators (PIIs)**
  - -- **Identify each item of documentation as direct or indirect**
  - -- **Require projects to understand and consider their level of compliance with CMMI practices**
  - -- **Serve as a basis for understanding what CMMI really means**
  - -- **Ensure adequacy of appraisal preparation**

- **"PA mapping tool" provides mechanism for identifying CMMI compliance**
  - -- **Used in preparation for appraisals, by projects and the organization**
  - -- **Internally developed, Access-based (sometimes adapted for web-based use)**

- **Workshops provide understanding**
  - -- **Define self-assessment and preparation process**
  - -- **Provide added insights into intent and content of model and individual practices**
  - -- **Review gap analysis between CMMI and current practices**
  - -- **Mechanism for organization's process group to assist projects**

Conduct of Appraisals

Each appraisal team

- **Uses Practice Implementation Indicators (PIIs)**
  - -- **Data provided by organization/projects in PA mapping tool, indicates their CMMI compliance**
  - -- **Team identifies 'real' PII for each practice in conducting the appraisal, based on SCAMPI definition: direct, indirect, affirmations**

- **Appraisal team's process identifies practice and goal implementation**
  - -- **Team uses team tool and summary method**
  - -- **For each practice, across entire organization, team identifies PII (i.e., fully implemented, largely implemented, partially implemented, or not implemented), and PII information helps identify goal satisfaction**
  - -- **In appraisals, differences between appraisal team evaluation and organization's self-evaluation are used to provide lessons learned feedback**

CMMI-Based Appraisals Used at Raytheon

(1) Verification Approach
- **Class C appraisal**
- **Limited scope, on per-project basis**
- **Provides feedback to assist internal improvements**
- **Typically used by organizational process group for individual projects**
- **Uses either PA mapping workshops or ICPA**

Benefits:
-- Project status review and feedback
-- PA workshops emphasize identifying PIIs, collecting direct/indirect artifacts and mentoring

(2) CMMI Focus Review
- **Class B appraisal, in-depth**
- **Limited scope, typically per-project basis**
- **Provides strengths and weaknesses, but no rating**
- **Typically used for initial appraisals in organization**
- **Provides lessons learned for preparation for future**

PII for each practice
Benefits:
-- Organization/project gets feedback
-- Emphasizes direct/indirect

CMMI-Based Appraisals Used at Raytheon

(3) CMMI "PBA" Process Baseline Appraisal
- **Class B appraisal**
- **In-depth, thorough appraisal, may limit scope**
- **Provides strengths and weaknesses, but no rating**
- **Typically used for intermediate appraisals in organization**

PII for each practice
Benefits:
-- Organization & projects indicate their level of CMMI compliance
-- Org/project understanding

(4) Standard CMMI Appraisal Method for Process Improvement (SCAMPI)
- **Class A appraisal**
- **Most in-depth, thorough appraisal, with broad coverage**
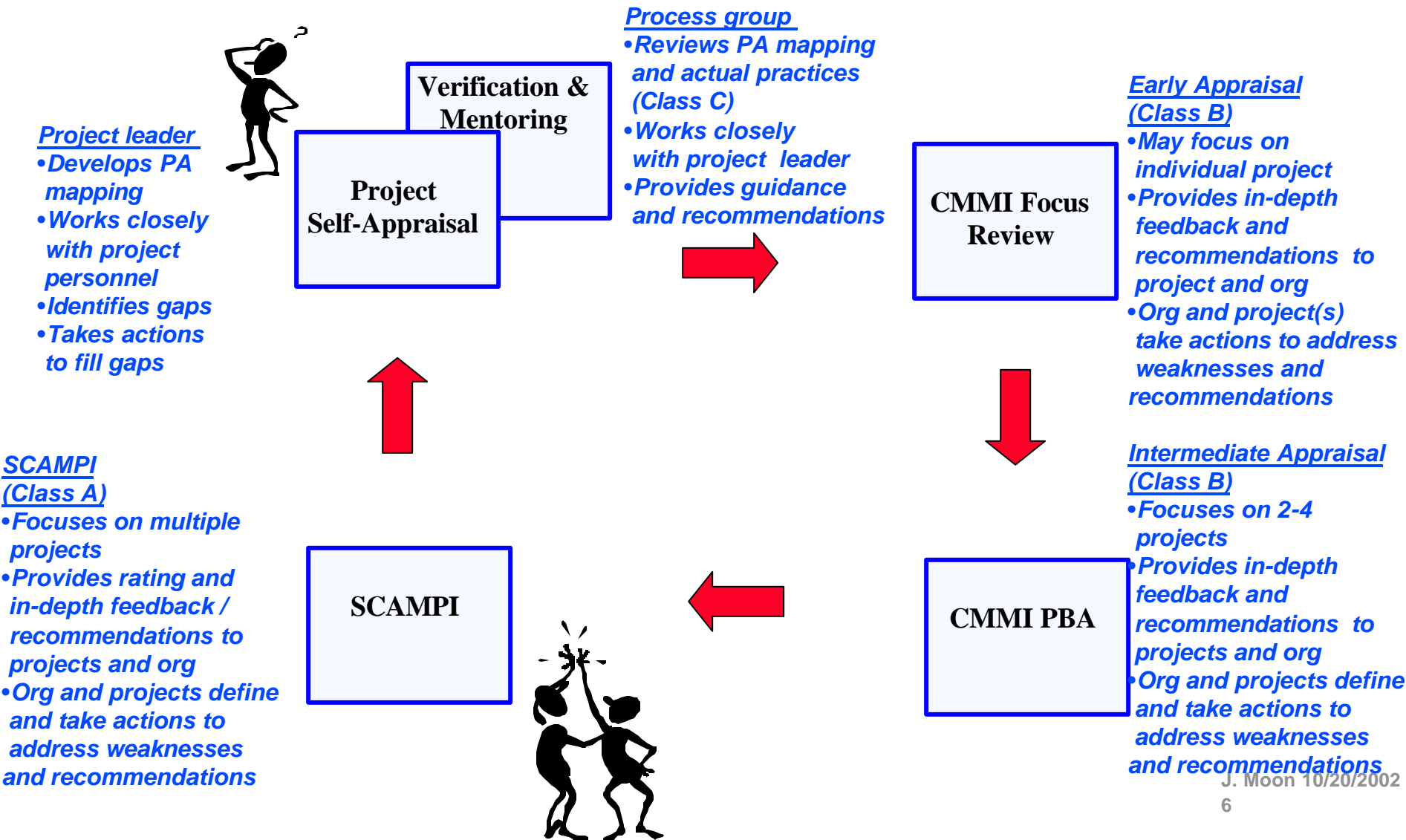- **Provides a rating (e.g., CMMI maturity level 1 through 5)**

PII for each practice
Benefits:
-- Completeness, understanding

Appraisal Cycle
Approach that facilitates evolving improvements

Raytheon

Project leader
- Develops PA mapping
- Works closely with project personnel
- Identifies gaps
- Takes actions to fill gaps

Verification & Mentoring

Project Self-Appraisal

Process group
- Reviews PA mapping and actual practices (Class C)
- Works closely with project leader
- Provides guidance and recommendations

CMMI Focus Review

Early Appraisal (Class B)
- May focus on individual project
- Provides in-depth feedback and recommendations to project and org
- Org and project(s) take actions to address weaknesses and recommendations

SCAMPI (Class A)
- Focuses on multiple projects
- Provides rating and in-depth feedback / recommendations to projects and org
- Org and projects define and take actions to address weaknesses and recommendations

SCAMPI

CMMI PBA

Intermediate Appraisal (Class B)
- Focuses on 2-4 projects
- Provides in-depth feedback and recommendations to projects and org
- Org and projects define and take actions to address weaknesses and recommendations

Benefits and Drawbacks

Benefits

- **Use of PIIs in preparation**
  - -- Assists organizations and projects in understanding their level of compliance
  - -- Provides added knowledge of CMMI that helps interviewees understand appraisal team questions
  - -- Builds database for individual projects, that can be updated and maintained (helps evolve model knowledge and appraisal preparations)

- **Use of PIIs in appraisal**
  - -- Assists team in evidence review and correlating affirmations
  - -- Provides insights, based on similarities or differences in organization's self-evaluation versus appraisal team evaluation
  - -- Can provide lessons learned to organization, helps future understanding and improvements
  - -- For mature organizations, saves appraisal time

Drawbacks

- **Use of PIIs in preparation**
  - -- Takes added time and effort for organizations and projects to prepare

Significant Lessons

Preparing for a CMMI appraisal

- **Major preparation effort for organization and projects**
    - -- **Must collect, organize, and review the evidence**
    - -- **Provides needed understanding**

- **Significant preparation and effort for appraisal team**

Evolving through multiple phased appraisals

- **Early use of PIIs and mentoring with Class C method helps provide useful project insights**

- **Participation in Class B appraisals essential before Class A SCAMPI**

Most important – must retain focus on $value$ of the improvements, not just the evidence or achieving success in assessments