

U.S. Army Research, Development and Engineering Command



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

CMMI-DEV v1.3 Good? – Bad? – Ugly?

Jackie Lawrence Certified High Maturity SCAMPI Lead Appraiser

Nathaniel Becker US Army Armament SEC Process Lead

Jeanine Courtney-Clark Certified High Maturity SCAMPI Lead Appraiser



Context

- **Appraisal Preparation and Planning**
- **Appraisal On-site**
- **Appraisal Reporting**

Impact on Appraisal Results

CMMI[®]- DEV v1.3 Practice Characterizations

Model Specific Recommendations

•[®] CMM, Capability Maturity Model, and CMMI are registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

•sm CMM Integration, SCAMPI, and IDEAL are service marks of Carnegie Mellon University.



Integrated System Diagnostics

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

- **Long (>10 year) organizational process improvement legacy.**
- **Appraisal Sponsor requested the appraisal team pilot CMMI[®]- DEV v1.3 high maturity practices.**
- **Appraisal objective - determine the potential impact to the organization's current practices.**
- **Repeat CMMI[®] ML 5 appraisal for the organization.**

- **Appraisal team training supplemented by:**
 - Most of appraisal team attended the SEPG 2010 Conference special session: CMMI®- DEV v1.3 for High Maturity Lead Appraisers, as invited guests.
 - QPM and OPM webinar conducted by two members of the SEI staff and other CMMI®- DEV v1.3 development team members during the appraisal readiness review.
 - Each team member was required to review the CMMI®- DEV v1.3 GLOP provided to the team by the SEI CMMI® Program Manager.
- **Other Planning**
 - No additional interviews.
 - No additional data collected.
 - No schedule impact.

Jackie Lawrence (Team Lead)	ISD
Nathan Becker	Armament SEC
Billy Thomas	Armament SEC
Helen Huie	Armament SEC
Steve Lubash	Armament SEC (UTRS)
Timothy Grealy	QESA
Jeanine Courtney-Clark	ISD

CMMI®- DEV v1.3 materials used.

- **GLOP – March 22, 2010 (CAR and OPP)**
- **QPM – April 28, 2010 (email date)**
- **OID/OPM – May 12, 2010**

- **Use the existing data provided by the organization for the CMMI-DEV v1.2 appraisal.**
- **Focus on ML4 (OPP and QPM) and ML 5 (OPM and CAR) process areas.**
- **Identify areas that may impact either implementation or an appraisal.**
- **Carefully review the intent of the new model text and classify each change as either better explanations, new expectations (practice changes) or new recommendations (informative text).**

Team Feedback/Experience:

“Maintain Business Objectives” (OPM SP 1.1) seemed out of sequence. We felt a need to have a practice in OPP to maintain objectives already established (also see recommendation for OPF).

The explanations in the informative material are more helpful. Specifically the new language in sub practices 1 – 3:

- criteria for selecting sub practices,
- traceability between sub processes and objectives
- using causal and sensitivity analysis for sub process selection
- determining a range of expected performance results.

Team Recommendation:

Move SP 1.1 Maintain Business Objectives from OPM SP 1.1 to OPP SP 1.1 and renumber practices in OPP SG 1.

v1.3 - New SP 1.1 Establish and maintain the organization's quantitative objectives for quality and process performance, which are traceable to business objectives.

v1.3 - SP 1.2 Select processes or subprocesses in the organization's set of standard processes to be included in the organization's process performance analyses and maintain traceability to business objectives.

v1.3 SP 1.3 Establish and maintain definitions of measures to be included in the organization's process performance analyses.

v1.2 SP 1.3 Establish and maintain quantitative objectives for quality and process performance for the organization.

v1.3 SP 1.4 Analyze the performance of the selected processes, and establish and maintain the process performance baselines.

v1.2 SP 1.4 Establish and maintain the organization's process-performance baselines.



Team Feedback/Experience:

There appears to be significant overlap between QPM SP 2.1 and QPM SP 2.2 (e.g., a clear distinction is not made between manage versus monitor in the subpractices). [QPM SP 2.1, QPM SP 2.2]

We would prefer to see some other types of examples. As written this the model may lead organizations to focus on PR too much. [QPM SP 1.2]

We suggest there should be fewer subpractices on measures and more on selecting analytic techniques. [QPM SP 1.4]

QPM SP 2.2 subpractice 6 and QPM SP 2.3 subpractice 2 are virtually the same. [QPM SP 2.2, QPM SP 2.3]

Team Recommendation:

Remove SP 2.2 Monitor Performance of the selected sub processes.



v1.3 SP 1.2 Using statistical and other quantitative techniques, compose a defined process that enables the project to achieve its quality and process performance objectives.

v1.2 SP 1.2 Select the subprocesses that compose the project's defined process based on historical stability and capability data.

v1.3 SP 1.3 Select subprocesses and attributes critical to evaluating performance and that help to achieve the project's quality and process performance objectives.

v1.2 SP 1.3 Select the subprocesses of the project's defined process that will be statistically managed.

V 1.3 SP 1.4 Select measures and analytic techniques to be used in quantitative management.

v1.2 SP 1.4 Monitor the project to determine whether the project's objectives for quality and process performance will be satisfied, and identify corrective action as appropriate.

SP 2.1 Monitor the performance of selected subprocesses using statistical and other quantitative techniques.

v1.2 SP 2.1 Select the measures and analytic techniques to be used in statistically managing the selected subprocesses.

SP 2.2 Manage the project using statistical and other quantitative techniques to determine whether or not the project's objectives for quality and process performance are being satisfied.

v1.2 SP 2.2 Establish and maintain an understanding of the variation of the selected subprocesses using the selected measures and analytic techniques.

SP 2.3 Perform root cause analysis of selected issues to address deficiencies in achieving the project's quality and process performance objectives.

v1.2 SP 2.3 Monitor the performance of the selected subprocesses to determine their capability to satisfy their quality and process performance objectives, and identify corrective action as necessary.

Team Feedback/Experience:

The words "including clear definition of the improvement needed or expected" – subpractice 3 - seems to anticipate the root causes before the root causes are determined. [CAR SP 1.1]

Including positive outcomes is an improvement to the model. [CAR SP 1.2]

The new wording poses a risk that organizations will be required to show evidence of analysis of both problem and success outcomes in an appraisal.

Implement the action plans – sub practice 4 – ties to the practice text of "Implement". This is an improvement in the wording. [CAR SP 2.1]

Team Recommendation:

- No recommended changes were given by the team.

v1.3 SP 1.1 Select outcomes for analysis.

v1.2 SP1.1 Select the defects and other problems for analysis.

v1.3 SP 1.2 Perform causal analysis of selected outcomes and propose actions to address them.

v1.2 SP 1.2 Perform causal analysis of selected defects and other problems and propose actions to address them.

v1.3 SP 2.3 Record causal analysis and resolution data for use across projects and the organization.

v1.2 SP 2.3 Record causal analysis and resolution data for use across the project and organization.

Team Feedback/Experience:

Suggest moving OPM SP 1.1 to make it a new OPP SP 1.1. Need to have a practice in OPP to revise the business objectives identified in OPF and expanded in OPM. [OPM SP 1.1]

Incremental improvements are handled by the pilot organization in OPF, and not explicitly called out as relating to the QPPOs and business objectives like an innovation would be. [OPM SP 2.1]

Adding incremental and innovative improvements in two separate practices may cause confusion for implementers and appraisers. Recommend deleting this practice. With the exception of tying them to business needs, incremental changes are analyzed and implemented in OPF (see current examples given in OPM SP 2.1 text). [OPM SP 2.1]

Team Feedback/Experience:

Add Business Objectives to this practice in same way that QPPOs are currently included. [OPM SP 2.5]

Team Recommendation:

- Move SP 1.2 Analyze Process-Performance Data to SG 2 SP 2.1.
- Remove SP 2.2 Elicit and Analyze Incremental Improvements.
- Remove SP 2.3 Implement Improvements. [Note: The GLOP said “implement” and SP 2.5 said “deploy”]

SG 1 Manage the organization's business performance using statistical and other quantitative techniques to understand process-performance shortfalls and identify areas for process improvement.

- **SP 1.1 Maintain business objectives based on an understanding of business strategies and actual performance results.**
- **SP 1.2 Analyze process-performance data to determine the organization's ability to meet identified business objectives.**
- **SP 1.3 Identify potential areas for improvement that could contribute to meeting business objectives.**

Team Recommendation:

- **Remove SG 1 and associated specific practices and renumber SG 2 and SG 3.**

SG 2 Improvements are proactively identified, evaluated using statistical and other quantitative techniques, and selected for deployment based on their contribution to meeting quality and process-performance objectives.

- **SP 2.1 Elicit and categorize suggested improvements.**
- **SP 2.2 Analyze suggested improvements for their possible impact on achieving the organization's quality and process-performance objectives.**
- **SP 2.3 Validate selected improvements.**
- **SP 2.4 Select and implement improvements for deployment throughout the organization based on an evaluation of costs, benefits and other factors.**

Team Recommendation:

- **Rename proposed current SG 2 to Manage Business Performance and Select Improvements.**



Integrated System Diagnostics

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

SG 3 Measurable improvements to the organization's processes and technologies are deployed and evaluated using statistical and other quantitative techniques.

- **SP 3.1 Establish and maintain plans for deploying selected improvements.**
- **SP 3.2 Manage the deployment of selected improvements.**
- **SP 3.3 Evaluate the effects of deployed improvements on quality and process performance using statistical and other quantitative techniques.**

Feedback:

If OPF SP 1.1 were changed to read “Establish and maintain business objectives” this would better support “Maintain business objectives” in OPP and “Analyze the process-performance data” in QPM.

Team Experience:

- The organization of the SPs between OPF, OPP and OPM was confusing for the team.
- It was the team’s view that because an SP to establish the business objectives does not appear in ML3 that this might cause a disconnect in implementation (e.g., the model says maintain objectives in OPP and use the business objectives OPM but did not clearly establish the objectives beforehand).

Team Recommendation

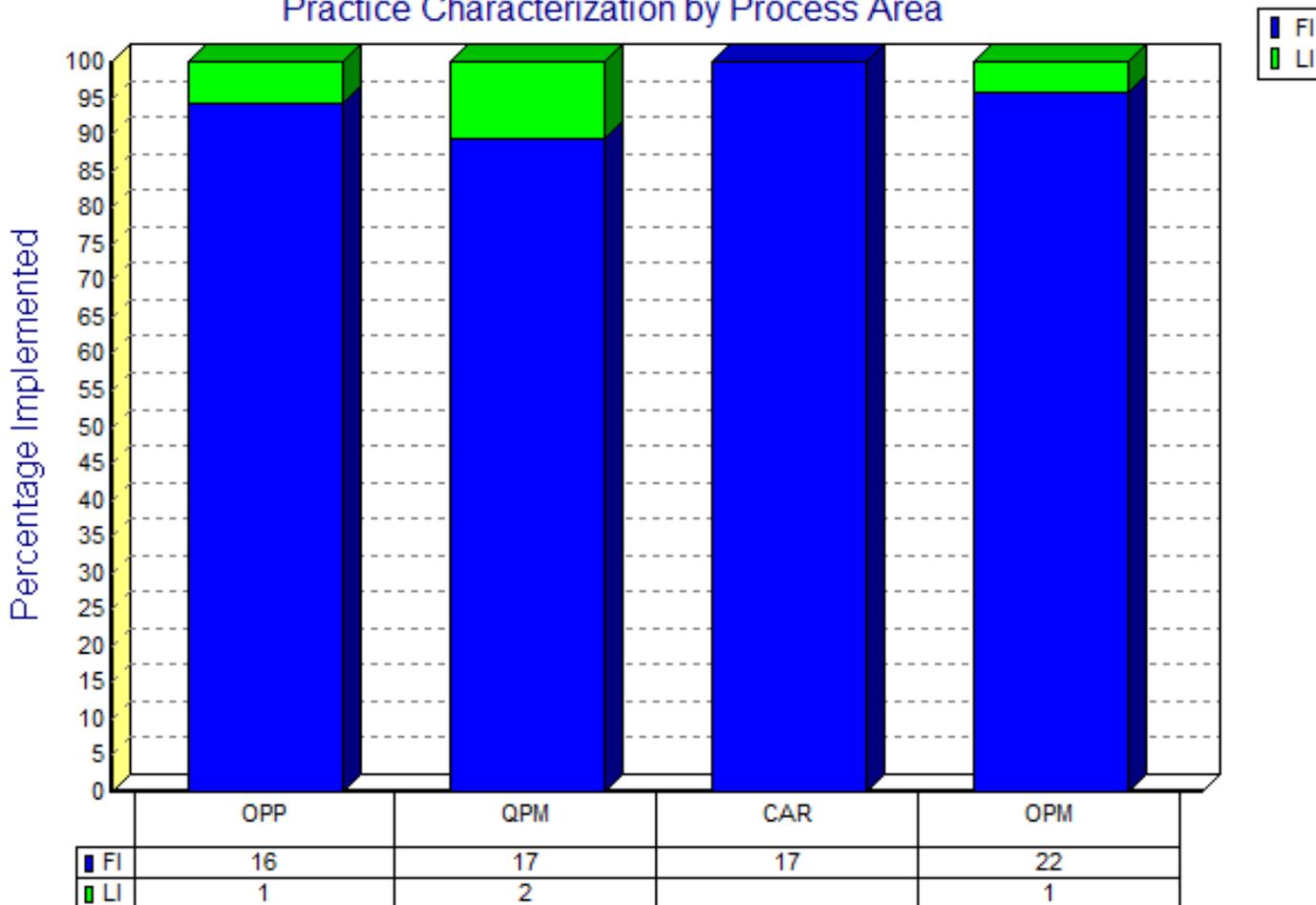
- Replace SP1.1 with “Establish and Maintain Business Objectives”



- The team created a detailed feedback report including redlines for each process area of the CMMI®- DEV v1.3 materials that we were provided.
- Collaborating to build a report that included information from both an appraisal team and the organization allowed us to provide detailed feedback while taking both an appraisal and implementation perspective.
- Mapping of CMMI®- DEV v1.2 to CMMI®- DEV v1.3 was completed by the team to provide CMMI®-DEV v1.3 equivalent ratings.
- Ratings against CMMI®- DEV v1.3 helped identify areas where the potential changes in the model would impact the organization being appraised.



CMMI-DEV v1.3
Practice Characterization by Process Area



- **The maintenance of traceability to business objectives for the organization's quantitative objectives for quality and process performance was not explicitly evident. [OPP SP 1.2]**
- **Attributes critical to evaluating performance to help achieve the project's quality and process performance objectives were not clearly identifiable. [OPP SP 1.3]**
- **Risks associated with achieving the project's quality and process performance objectives are not explicitly identified or managed. [QPM SP 2.1]**
- **Incremental improvements are not explicitly called out as relating to the QPPOs and business objectives. [OPM SP2.1]**

- **In evaluating CMMI-DEV v1.3 we had the biggest problem with OPM.**
 - We were able to agree that the second two goals would be valuable with some rewording.
- **There was a lot of discussion about “Review Business Objectives” in OPM.**
 - We suggested moving Establish and Maintain Business Objectives to OPF.
 - We suggested moving Maintain Business Objectives to OPP.
 - We suggested removing Review Business Objectives from OPM because it is already in OPP.

- **Planning for and obtaining the necessary resources to train the team, while the model was still being developed, was not easy.**
- **Using draft material from a model with a moving baseline was difficult to manage and caused rework for the team.**
- **A template or any specific guidance on what is the desired output for piloting a new model would have been helpful.**

- **We completed a thorough review of CMMI®- DEV v1.2 and CMMI®- DEV v1.3 through the eyes of an appraisal team and the implementing organization.**
- **The team agreed with most of the changes in CMMI®- DEV v1.3 and felt that the changes clarified the intent of the practices.**
- **Our recommendations were provided directly to the CMMI® development team immediately upon completing the appraisal to support their decisions for further development of the final draft.**
- **Most of our pilot recommendations were considered and incorporated into the model.**