Peer Reviews For CMMI

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Tom Cowles
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Agenda

- Purpose
- Introduction
- Verification Process Area Overview
- Peer Review Interaction With Other Process Areas (PAs)
- Summary
- Question and Answer Period

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Purpose

- **Peer reviews are a component of the process improvement framework contained in the CMMI model within the Verification process area (PA).**

- **The purpose of this presentation is to study and examine the scope of peer reviews from within the context of the model.**

- **As a strategy for CMMI implementation, we will**
  - ***Review the specific goals of the Verification PA***
  - ***Discuss how peer reviews support implementation of the VER specific goals.***
  - ***Illustrate how the Verification PA interacts with and supports the integrated implementation of some other process areas via peer reviews***

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Introduction

- **CMMI Model used for this presentation is CMMI-SE/SW/IPPD/SS, V1.1, Staged Representation, March 2002**
- **What is the scope of Peer Reviews within the CMMI Model?**
- **How can one determine this?**
  - ***One way is to examine how many references there are to Peer Reviews***
  - ***A search on "Peer" returned over 50 references to "peers", "peer review" and "peer reviews"***
    - **All references were cataloged and examined**
    - **References from following model sections: Overview (Ch 3, Model Terminology) + 11 Process Areas + Section D, Required and Expected Model Elements**
- **Let's review some of these references and look at the interactions, both direct and indirect, with other process areas**

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Verification PA: Overview

- **Specific Goals**
  - ***SG 1, Prepare for Verification***
    - **SP 1.1, Select Work Products for Verification**
    - **SP 1.2, Establish the Verification Environment**
    - **SP 1.3, Establish Verification Procedures and Criteria**
  - ***SG 2, Perform Peer Reviews***
    - **SP 2.1, Prepare for Peer Reviews**
    - **SP 2.2, Conduct Peer Reviews**
    - **SP 2.3, Analyze Peer Reviews**
  - ***SG 3, Verify Selected Work Products***
    - **SP 3.1, Perform Verification**
    - **SP 3.2, Analyze Verification Results and Identify Corrective Action**
- **Generic Goals**
  - ***GG 3, Institutionalize a Defined Process***

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Verification PA: Overview -2

- **Specific Goals**
  - ***SG 1, Prepare for Verification***

    Methods of verification include, but are not limited to, inspections, peer reviews, audits, walkthroughs, analyses, simulations, testing, and demonstrations.

    - **SP 1.2, Establish the Verification Environment**

      ... A peer review may require little more than a package of materials, reviewers, and a room.
  - ***SG 2, Perform Peer Reviews***
    - **SP 2.1, Prepare for Peer Reviews**
    - **SP 2.2, Conduct Peer Reviews**
    - **SP 2.3, Analyze Peer Reviews**
  - ***SG 3, Verify Selected Work Products***
- **Generic Goals**
  - ***GG 3, Institutionalize a Defined Process***

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Verification PA: Overview -3

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- **Specific Goals**
  - ***SG 1, Prepare for Verification***
  - ***SG 2, Perform Peer Reviews***
    - **SP 2.1, Prepare for Peer Reviews**
    - **SP 2.2, Conduct Peer Reviews**
    - **SP 2.3, Analyze Peer Reviews**
  - ***SG 3, Verify Selected Work Products***
    - **SP 3.2, Analyze Verification Results and Identify Corrective Action**

      <u>For each work product</u>, all available verification results are incrementally analyzed and corrective actions are initiated to ensure that the requirements have been met. Since a peer review is one of several verification methods, peer review data should be included in this analysis activity to ensure that the verification results are analyzed sufficiently.
- **Generic Goals**
  - **GG 3, Institutionalize a Defined Process**

Given This Reference, What Is The Scope of Peer Reviews?

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How do Peer Reviews Support The Integrated Implementation of Other Process Areas?

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- MA Level 2
- PMC Level 2
- PP Level 2
- PPQA Level 2
- TS Level 3
- OPD Level 3
- IPM Level 3
- OT Level 3
- QPM Level 4
- OPP Level 4
- OID Level 5
- CAR Level 5

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References Between Peer Reviews & MA, Measurement and Analysis

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- **VER SP 2.1, Prepare for Peer Reviews**

  Sub 2: Define requirements for collecting data during the peer review.

  Refer to MA PA for information on identifying and collecting data.

- **VER SP 2.2, Conduct Peer Reviews**

  Sub 4: Collect peer review data.

  Refer to MA PA for information on data collection.

- **VER SP 2.3, Analyze Peer Reviews**

  Refer to MA PA for more information about obtaining and analyzing data.

- **MA SP 1.2, Specify Measures**

  Examples of commonly used derived measures include the following:

  - ***Peer review coverage***

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Verification: Peer Review References to PMC, Project Monitoring and Control

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- **VER SP 2.2, Conduct Peer Reviews**

  ***Refer to PMC PA** for information about tracking issues that arise during a peer review.*

- **VER SP 3.2, Analyze Verification Results and ID Corrective Action**

  For each work product, all available verification results are incrementally analyzed and corrective actions are initiated to ensure that the requirements have been met. Since a peer review is one of several verification methods, peer review data should be included in this analysis activity to ensure that the verification results are analyzed sufficiently.

  Refer to the corrective action practices of PMC PA for more information on implementing corrective action.

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Verification: Peer Review Reference to PP, Project Planning

- **VER SP 2.2, Conduct Peer Reviews**

  Peer reviews may be performed on key work products of specification, design, test, and implementation activities and specific planning work products.

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Reference In PPQA, Process and Product Quality Assurance to Peer Reviews

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- **PPQA Introductory Notes**

  Objectivity in process and product quality assurance evaluations is critical to the success of the project. (See the definition of "objectively evaluate" in Appendix C, the glossary.) Objectivity is achieved by both independence and the use of criteria. Traditionally, a quality assurance group that is independent of the project provides this objectivity. It may be appropriate in some organizations, however, to implement the process and product quality assurance role without that kind of independence. For example, in an organization with an open, quality-oriented culture, the process and product quality assurance role may be performed, partially or completely, by peers; and the quality assurance function may be embedded in the process.

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Peer Review References: TS, Technical Solution

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- **Framework Interactions: Among Engineering Process Areas**

  The Technical Solution process area relies on the specific practices in the Verification process area to perform design verification and peer reviews during design and prior to final build

- **TS Related Process Areas**

  Refer to the Verification PA for more information about conducting peer reviews and verifying that the product and product components meet requirements.

- **TS SP 3.1, Implement the Design**

  Sub 3: Conduct peer reviews of the selected product components.

  Refer to the Verification PA for information about conducting peer reviews.

- **TS SP 3.2, Develop Product Support Documentation**

  Sub 5: Conduct peer reviews of the installation, operation, and maintenance documentation

  Refer to the Verification PA for more information about conducting peer reviews.

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Peer Review References: OPD, Organizational Process Definition

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- **OPD SP 1.1, Establish Standard Processes**

  Sub 8: Conduct peer reviews on the organization's set of standard processes.

- **OPD SP 1.2, Establish Life Cycle Model Descriptions**

  Sub 3: Conduct peer reviews on the life-cycle models

- **OPD SP 1.3, Establish Tailoring Criteria and Guidelines**

  Sub 5: Conduct peer reviews on the tailoring guidelines

- **OPD SP 1.4, Establish the Org Measurement Repository**

  Sub 2: Examples of classes of commonly used measures include the following:

  - ***Peer review coverage***

  Sub 5: Conduct peer reviews on the definitions of the common set of measures and the procedures for storing and retrieving measures.

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Peer Review References: IPM, Integrated Project Management

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- **IPM SP 1.1, Establish the Project's Defined Process**

  Sub 6: Conduct peer reviews of the project's defined process.

  Refer to the Verification PA for more information about conducting peer reviews.

- **IPM SP 1.3, Integrate Plans**

  This specific practice extends the specific practices for establishing and maintaining a project plan to address additional planning activities such as incorporating the project's defined process, coordinating with relevant stakeholders, using organizational process assets, incorporating plans for peer reviews, and establishing objective entry and exit criteria for tasks .

  Sub 5: Incorporate the plans for performing peer reviews on the work products of the project's defined process.

- **IPM SP 1.4, Manage the Project Using the Integrated Plans**

  Sub 2: An understanding of the relationships among the various tasks and work products of the project's defined process, and of the roles to be performed by the relevant stakeholders, along with well-defined control mechanisms (e.g., peer reviews), achieves better visibility into the project's performance and better control of the project

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Verification: Peer Review References to OT, Organizational Training

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- **Specific Goals**
  - ***SG 1, Prepare for Verification***
  - ***SG 2, Perform Peer Reviews***

    Peer reviews are primarily applied to work products developed by the projects, but they can also be applied to other work products such as documentation and training work products that are typically developed by support groups.

    - **SP 2.1, Prepare for Peer Reviews**
      - ***TWP: 5. Peer review training material***
      - ***Sub: 6. Develop a detailed peer review schedule, including the dates for peer review training and for when materials for peer reviews will be available.***
    - **SP 2.2, Conduct Peer Reviews**
    - **SP 2.3, Analyze Peer Reviews**
  - ***SG 3, Verify Selected Work Products***

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Peer Review References: QPM, Quantitative Project Management

- **QPM, Introductory Notes**

  Subprocesses are defined components of a larger defined process. For example, a typical organization's development process may be defined in terms of subprocesses such as requirements development, design, build, test, and peer review. The subprocesses themselves may be further decomposed as necessary into other subprocesses and process elements.

- **QPM SP 1.1, Establish the Project's Objectives**

  Sub 4: Examples of process performance attributes for which objectives might be written include the following:

  - **Percentage of defects removed by product verification activities (perhaps by type of verification, such as peer reviews and testing).**

  Sub 5: An example of a method to predict future results of a process is the use of process performance models to predict the latent defects in the delivered product using interim measures of defects identified during product verification activities (e.g., peer reviews and testing).

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Peer Review References: QPM, Quantitative Project Management - 2

- **QPM SP 1.4, Manage Project Performance**

  Sub 4: Use process performance models calibrated with obtained measures of critical attributes to estimate progress toward achieving the project's quality and process-performance objectives. Process performance models are used to estimate progress toward achieving objectives that cannot be measured until a future phase in the project life cycle. An example is the use of process performance models to predict the latent defects in the delivered product using interim measures of defects identified during peer reviews.

- **QPM SP 2.1, Select Measures and Analytic Techniques**

  Sub 3: Identify the measures that are appropriate for statistical management.

  Examples of subprocess measures include the following:

  - ***Coverage and efficiency of peer reviews***

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Peer Review References: OPP, Organizational Process Performance

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Although Peer Reviews are not specifically mentioned in OPP (a L4 PA), would you consciously *not* subject any of these to peer reviews?

- ***OPP SP 1.1, Select Processes***

  Select the processes or process elements in the organization's set of standard processes that are to be included in the organization's process performance analyses.

- ***OPP SP 1.2, Establish Process Measures***

  Establish and maintain definitions of the measures that are to be included in the organization's process performance analyses.

- ***OPP SP 1.3, Establish Quality and Process-Performance Objectives***

  Establish and maintain quantitative objectives for quality and process performance for the organization.

- ***OPP SP 1.4, Establish Process Performance Baselines***

  Establish and maintain the organization's process performance baselines.

- ***OPP SP 1.5, Establish Process Performance Models***

  Establish and maintain the process performance models for the organization's set of standard processes.

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Peer Review References: OID, Organizational Innovation & Deployment

- **OID SP 1.1, Collect and Analyze Improvement Proposals**

  Each process- and technology-improvement proposal must be analyzed.

  Examples of simple process and technology improvements include the following

  - ***Add an item to a peer review checklist .***

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Peer Review References: CAR, Causal Analysis and Resolution

- **CAR SP 1.1, Select Defect Data for Analysis**

  Sub 1: Gather relevant defect data.

  Examples of relevant defect data may include the following :

  - ***Project management problem reports requiring corrective action***
  - ***Defects reported by the customer***
  - ***Defects reported by end user***
  - ***Defects found in peer reviews***
  - ***Defects found in testing***
  - ***Process capability problems***

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Peer Review References: CAR, Causal Analysis and Resolution - 2

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- **CAR SP 2.2, Evaluate the Effect of Changes**

  Sub 1: Measure the change in the performance of the project's defined process as appropriate.

  An example of a change in the performance of the project's defined design process would be the change in the defect density of the design documentation, as statistically measured through peer reviews before and after the improvement has been made. On a statistical process control chart, this would be represented by a change in the mean.

  Sub 2: Measure the capability of the project's defined process as appropriate.

  An example of a change in the capability of the project's defined design process would be a change in the ability of the process to stay within its process-specification boundaries. This can be statistically measured by calculating the range of the defect density of design documentation, as collected in peer reviews before and after the improvement has been made. On a statistical process control chart, this would be represented by lowered control limits.

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We Examined How Peer Reviews Support The Integrated Implementation of 12 Other PAs

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- OID Level 5
- CAR Level 5

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Some Peer Review Issues To Address

- Entry criteria: What must be triggered before this process can start?
- Activities: What are the tasks that must be performed?
- Measures: What measures does this process produce?
- What reviews are performed to determine the peer review portion of the Verification process is followed and is producing the correct results (i.e., verification of Verification)?
- Exit criteria: How do we know when it is time to stop this process?

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Summary

- Peer reviews, though a part of the Verification PA, are involved with more than just this one process area
- Peer reviews can be thought of as a subroutine that is called or referenced by most other process areas.
- Peer reviews are referenced overtly by most all process areas of the model.
- Although not implemented with its own GP, the intent of the model appears to be that peer reviews be incorporated in all process areas.
- Measurement and analysis of the peer reviews you perform will help you determine the areas where you achieve the greatest benefit for the money spent and allow you to focus your peer reviews in those areas.

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Question & Answer Period

- Audience participation

- Contact Info

Tom Cowles
Raytheon Space & Airborne Systems
Tel: 310.647.4898
Fax: 310.647.2235
Email: tomcowles@raytheon.com

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