

An Appraisal View of Measurement and Analysis

*Practical Software Measurement
Technical Working Group
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**David Dayton
Q-Labs, Inc.**

Topics

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Problem Statement

- The scope of the Measurement & Analysis (MA) Process Area is very broad
- Organizations preparing for appraisals often are unsure exactly what evidence to provide
- Because MA is a foundation for many other activities, a poor showing in MA can have a large impact on appraisal results

Caveats

- Focus on CMMI Level 3 requirements – similar thinking applies to higher levels of maturity
- Description of best practices – not the minimum to “pass the test”
- Limited to artifacts typically provided to appraisal team

Types of Evidence

- Role
 - Direct Artifact
 - Tangible output(s) resulting from implementation of a specific or generic practice
 - Indirect Artifact
 - Artifacts that are a consequence of performing a specific or generic practice or that substantiate its implementation, but which are not the purpose for which the practice is performed.
 - Affirmation
 - Oral (interviews) or written statements confirming or supporting implementation of a specific or generic practice



Types of Evidence - 2

- Use
 - Process Definition (Compliant Document)
 - Work Product
- As MA is a “Support Process Area”, evidence provided for MA should be used elsewhere, as well



Key MA Process Area Requirements

- Specific Goal 1 – Align Measurement and Analysis Activities
- Specific Goal 2 – Provide Measurement Results
- Generic Practice 2.2 – Plan the Process
- Generic Practice 3.1 – Establish a Defined Process

SG 1 – Specific Practices

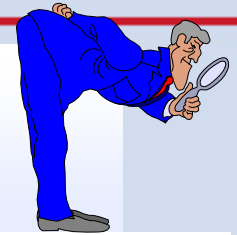


- 1.1 Establish Measurement Objectives
 - Direct: statement of objectives, risks, problems, etc. motivating measurement activities – may be in plan or measurement specification
 - Indirect: Workshop or meeting results, information requests, CMMI requirements
- 1.2 Specify Measures
 - Direct: Definitions of base measures, derived measures, and indicators; Selections of measures and pre-defined thresholds/decision criteria; May be described in a “dictionary” of measures.
 - Indirect: Meeting minutes related to the activity of defining a measure.

SG 1 – Specific Practices

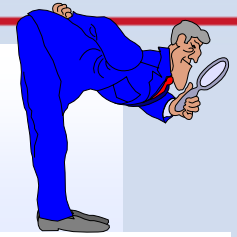


- 1.3 Specify Data Collection and Storage Procedures
 - Direct: Documented procedures that define the frequency, format, media, and sources for measurement data.
 - Indirect: Minutes from a meeting to discuss changes in data collection procedures
- 1.4 Specify Data Analysis Procedures
 - Direct: Documented procedures that define the frequency and method to analyze measurement data.
 - Indirect: References to data analysis procedures included within management briefings of measurement results.



SG 2 – Specific Practices

- 2.1 Collect Measurement Data
 - Direct: Actual data resident in the measurement repository.
 - Indirect: “printout” summary of data transfer activities.
- 2.2 Analyze Measurement Data**
 - Direct: Documented evidence showing discussion of measures in technical or management reviews, for the purpose of making decisions.
 - Indirect: Invitations to technical reviews, for which the agenda specifically mentions plans to include discussion of measures.



SG 2 – Specific Practices

- 2.3 Store Data and Results
 - Direct: Documented artifacts showing both entities and attributes (items to be measured mapped to their measured values) stored.
 - Direct Stretch: Assure ALL specified measures have been mapped to quantifiable values (stretch for thoroughness!). See documentation of this.
 - Indirect: Weekly status report from employee noting storage of data.
- 2.4 Communicate Data and Results**
 - Direct: Documented evidence showing discussion of measures in technical or management reviews, along with mentioning decisions resulting from the use of measurement data.

**Note: 2.4 may subsume 2.2 and 2.3 may subsume 2.1

Generic Practices

- Generic Practice 2.2 – Plan the Process
 - Direct: Existence of a measurement plan or “measurement planning”, within other plans (such as the project plan), stating measurement tasks and when they are to occur.
 - Direct Stretch: A documented measurement plan for the project, to include content required by SP’s 1.1 - 1.4 (above), and additionally assuring assignments, milestones, resources and deliverables are specified.
 - This may be embedded within the project plan – or be a separate plan.
 - Indirect: Minutes from a meeting to discuss changes in data collection procedures (could be same as any Indirect artifact for SP1.1 - 1.4)

Generic Practices

- Generic Practice 3.1 – Establish a Defined Process
 - Direct: Project-level measurement process, referencing organizational measurement standards.
 - Direct Stretch: In addition to above (direct) items, also to state tailoring guidelines followed, and project-to-organization feedback mechanisms to use (some overlap here with IPM and GP 3.2).
 - Indirect: Managerial meeting minutes discussing the use of standard measures within various projects, as applicable.

Related Project Management Reqt.s.

- PP SP 1.2, Establish estimates of the work product and task attributes
 - Direct: Evidence showing the use of historical measures in completed estimates rendering size and complexity factors.
 - Indirect: Correspondence to gather information about the current project attributes.
- PP SP 1.4, Determine estimates of effort and cost
 - Direct: Evidence showing the use of size and complexity/risk factors within completed estimates rendering effort and cost totals.
 - Indirect: Meeting minutes related to gathering information about the current project attributes (*yes appraisers can “re-use” also!*).
- PMC SP 1.1, Monitor project planning parameters
 - Direct: Evidence of documented EVMS values, planned vs actual.
 - Indirect: Meeting minutes mentioning cost / schedule deviations and actions taken.

Related Project Management Reats.

- OPD SP 1.4, Establish the organization's measurement repository**
 - Direct: An organizational measurement database or mechanism for gaining an organization view of project-level measurement databases, showing both entities and attributes (items to be measured mapped to their measured values), for organizational comparison across projects. (see MA SP 2.3 "Store Data and Results").
 - Indirect: A set of standard measurement entities from which the projects may select based on tailoring guidelines.
- IPM SP 1.2, Use process assets (measurement repository) for planning project activities
 - Direct: Documented evidence of completed estimates showing use of historical measures resident in the measurement repository.
 - Indirect: Result of a query from the organizational data base that is relevant for use in in project estimating (could be a request to the EPG).

**Separate measurements for organization and project use.

Related Project Management Reqts.

- GP 2.8, Monitor and control the process
 - Direct: Management briefing slide showing a useful measurement from the $\langle x^{**} \rangle$ process used in decision making.
 - Indirect: A meeting agenda specifying plans to look at process $\langle x \rangle$ measurements for making decisions.

**Examples: Verifications planned vs. completed. Planned vs actual effort is commonly used and has obvious practical value for status and future estimates.

Breadth of Generics

- GPs 2.2 (plan), 2.8 (monitor & control), 3.2 (collect improvement information) span across all Process Areas, enabling MA to aid appropriate domains within the project and organization (PP, PMC, RM, CM, PPQA, Ver/Val, ...).
- MA SPs couple with the GPs to provide depth into the measurement process and practices.
- A measured basis exists for decisions to enhance product quality, service quality and process performance goals.

MA Relationships to OPD, IPM, PP, PMC

- Is MA “redundant”?
 - **Yes:** it is or should be in some respects.
 - **No:** MA is not “absolutely redundant” as it provides the “depth” of *Specification of Procedures* and *Alignment of Objectives*, not intuitively obvious for one measuring in the process areas alone.

Summary

- MA requirements apply whenever measurement is performed for any purpose.
 - Value is in supporting business, organization and project objectives.
 - Procedures, documented and followed, assure measurement accuracy, currency, and appropriate collaboration.
- Measurement system and evidence must be integrated with “measurement-using processes”.
 - GPs leverage and enable MA SPs, assuring this integration.

Questions?

Contact Information

David Dayton

Q-Labs, Inc.

www.q-labsusa.com

(202) 441-2966