Practical Software and Systems Measurement

A foundation for objective project management

Process Measurement
July 28, 2010
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Agenda

- Review objectives and outputs of workshop
- Review current state of Process Performance category
  - Process Efficiency
  - Process Effectiveness
  - Are there new ones needed
- Review current Process Performance Specifications
- Process Performance Guidance

Objectives of the Workshop

- Review/update the measures of Process Performance category
  - process efficiency (productivity, cycle time)
  - process effectiveness (defect containment, test effectiveness and coverage, rework)
- Review existing related existing measurement specifications
- Discuss and document implementation guidance
- Discuss and document potential new indicators and measurement specifications.

Process Measurement

Goals/Products

- Documented implementation guidance on process performance measures
- Edited measurement specifications
- Plans for completing additional measurement specification

Review current state of Process Performance category

"Process" describes the people, methods, and tools that are used to generate the organization's products.

"Process component" describes any specific procedure or resource that is established within an organization's process and is measured in a process assessment.

- Concepts
  - Process Compliance
  - Process Efficiency
  - Process Effectiveness
- Current PSM ICM Table

Process Compliance

How consistently does the project implement the defined project and enterprise processes?

- Address compliance of an enterprise's process to
  - Standard process assessment model such as CMMI or ISO
  - Enterprise's policies and procedures
- Identify strengths and weaknesses of an organization's process
- Monitor progress towards improvement of the process

Process Compliance (cont.)

Name	Description	Base Measures
Process Reference Maturity/Capability Model Rating	Generally done at the enterprise level, but can be applied for a large project For project it focuses on where an individual project complies with enterprise processes, and where tailoring (changes) were required. Examples reflecting the use of the process can include: Counting the number of tailorings over time: counting the number of approved M&A plans or measurement reports reviewed over time "	•Maturity/Capability Rating Goal, Assessed
Process Audit Findings Distribution	Indicates how well the project is following the process defined by the enterprise. Provides insight into coverage of audit areas, ensuring compliance with the organizational processes and providing process audit schedule visibility Counts the number of defined process elements that were reviewed and passed the audit. (Passing an audit means that the enterprise actually follows the procedures that are defined for that process element) Ratio of these numbers provides information on the level of compliance achieved in each audited process elements May also indicate which specific process elements need corrective action.	•Number of audit findings by process area
Others?		

Process Efficiency

Are the processes efficient enough to meet current commitments and planned objectives?

- ***Monitors how well the project uses resources to perform its tasks***
- ***Goal is to increase efficiency by enhancing process performance without compromising the quality of the product***
- ***Typically increased through reduced costs, reduced variability, and reduced cycle time.***
- ***May quantify the resources consumed in the process relative to minimum possible levels***
- ***May relate resources consumed to output levels.***

Process Efficiency (cont.)

Name	Description	Base Measures
Productivity Performance Trends	Provides a ratio of the amount of product completed to the amount of effort expended Basic input to project planning Evaluate whether performance levels are sufficient to meet cost and schedule estimates Useful early in the project for estimate and baseline comparisons before actual productivity data is available	•Work unit size •Effort expended
Cycle Time Performance Trends	Provides a comparison of schedule times against organization norms, for specific activities, processes, or projects. Evaluates current status and whether process improvements are effective. Comparison of actual versus expected durations for defined tasks within the process.	•Elapsed calendar and time expended
Service Level Agreement (SLA) Response Trends	Measures how the support function is working with the customer. Evaluates whether the criteria established in the SLA are being met.	•Elapsed calendar and time expended
Others?		

Process Effectiveness

Are the processes generating the results expected?

How much rework is occurring?

- ***Describes what is produced in relation to what is needed or expected***
- ***Quantifies process performance and the consequences of poor performance***
- ***Must relate to specific goals***
- ***Ineffective process results in poor product quality or rework to fix the product***
- ***Increased by improving the products or services (outputs) delivered***
- ***Depending on the situation, improvement may be achieved through redesigning the process or redesigning the product or service***
- ***Indications include low rework level and high defect containment***

Process Effectiveness (cont.)

Name	Description	Base Measures
Defect Containment	Identifies defects that were inserted and caught within a process or phase, or its corresponding review activity. Calculation of escaped defects Indicates how well the review and verification processes are performing. Related to the amount of effort, resources and tools applied..	•Defects by phase injected, discovered, and resolved
Test Effectiveness	Indicates the capability of the testing process. Measures the filtering capability of the test processes to detect defects Ratio between the number of defects that were detected in a specific testing phase over the total number of faults that are actually in the product under test. Since actual number of remaining defects is unknown historical data may be used to predict the number of remaining defects	•Defects discovered per test case and test type
Test Coverage	Measures how much a system has been exercised by tests. Assess how many times a particular function, system element, or test condition has been executed Measures if all statements in a program have been executed, at least once. Can be used to determine if there are test procedures missing Provides confidence that the system will perform as expected.	•Defects discovered per system element

Process Effectiveness (cont.)

Name	Description	Base Measures
Defect-Prone System Elements Distribution	Tracks the amount of defects detected in each system element Identifies those system elements that most need to be improved. Especially relevant for key elements of the architecture and those that directly affect the Operational Availability of the system. Can also be used to improve the performance of the processes by identifying root causes of defect-prone development phases.	•System elements requiring rework
Operational and Maintenance Effectiveness	Provide an evaluation of how effective the organization is at delivering solutions to the problems reported by the customer.	
Rework Effort Distribution	Tracks the amount of work effort expended to fix defects, compared to the rework budget and the total effort. Rework may be expended to fix any product. Identifies the quality of the initial project effort, products that need the most rework, and processes that need improvement.	• Schedule and effort expended - total and rework
Rework System Elements Trends	Quantifies the number of system elements that require rework. System elements added, changed, and deleted may be reported by time period.	•System elements requiring rework
Others?		

Workshop Background

- PSM history in this area
- Where we're heading
- Issues, questions, and topics

Intended Output

- Updates to ICM Table
- Specification Tables of Indicators

Outbrief slides

Process Measurement

- July 28, 2010 (Wed afternoon)

Workshop Participants

Name	Name
Greg Mazourek	George Mack
Kyoung-a Park	Rami Audi
Miyoung Shim	Paul Below
Dan Beisel	Mark Gormar
Kelly Koser	David Card
Cheryl Jones	Jennifer Fischer
Antonio Moya Catena	Bill Golaz

Summary

- *Reviewed Information Needs, Measurement Concepts, and proposed Indicators for Process Measurement at both project and enterprise levels*
  - *Took notes for clarifications and additions*
    - *Questions to be answered*
    - *Potential indicators*
    - *Base measures*
- *9 participants volunteered to work on 16 spec tables over next few months*
- *Bill will provide Cheryl with notes and suggested changes.*
- *Cheryl or Bill will send participants current spec tables, ICM table and assignments*

Spec Table Assignments

Name	Indicator
George Mack	Process audit findings (project and enterprise) Process compliance (project and enterprise Trouble ticket response time
Miyoung & Kyoung	Productivity
Kelly Koser	Cycle time Enterprise cycle time baselines and trends
Greg Mazourek	Defect containment
Dan Beisel	Test effectiveness Test coverage
Bill Golaz	Rework effort distribution(project and enterprise level)
Antonio Moya	Reference model rating
David Card	Tailoring distribution Exception distribution

Conclusions, Recommendations, and Results

- *Make recommended clarifications and additions to Process Measurement portion of ICM table*
- *Include completed specification tables*

Next Steps/Action Items