

The CMMI Measurement Focus

Eduardo Góngora
Especialización en Construcción de Software
Universidad de los Andes

1

The Engineering Process Areas

“The Engineering PAs include:

- Requirements Management (REQM)
- Requirements Development (RD)
- Technical Solution (TS)
- Product Integration (PI)
- Verification (VER)
- Validation (VAL)

Table 16.1 Example Measures for Engineering Process Areas

Process Areas	Measures to Monitor and Control the PA (GP 2.8)
REQM	Requirement volatility (percentage of requirement changes)
RD	Cost, schedule, and effort expended for rework Defect density of requirement specifications
TS	Cost, schedule, and effort expended for rework Percentage of requirements addressed in design Size and complexity of product, product-component, interfaces and documentation Defect density of technical solutions work products
PI	Product-component integration profile (e.g., assemblies planned and actual, and number of exceptions found) Integration evaluation problem report trends (e.g., number written and number closed) Integration evaluation report aging (i.e., how long each problem report has been open)
VAL	Number of activities planned versus actual Validation problem report trends Validation problem report aging
VER	Verification profile (e.g., number activities planned versus actual, and the defects found) Number of defects detected Verification problem report trends Verification problem report aging

The CMMI Measurement Focus

The CMMI focuses on measures throughout the model. For example:

- In the Project Planning, and Project Monitoring and Control process areas, planning parameters and indicators (e.g., cost, effort, schedule, size, complexity, and weight) for the projects are defined, measured, and monitored.
- In the Measurement and Analysis process area, measurement capability is developed and sustained by establishing measurement programs to support information needs.

The CMMI Measurement Focus (cont).

- In the Verification and Validation process areas, results from reviews, tests, inspections, demonstrations, and evaluations are measured and analyzed.
- In the Organization Process Definition process area, the organization's measurement repository is established and maintained.
- In the Integrated Project Management process area, data from the organization's measurement repository is used for planning projects.
- In the Organizational Process Performance and Quantitative Project Management process areas, a quantitative understanding of processes is established.

The CMMI Measurement Focus (cont).

- Process Performance Baselines (PPBs) and Process Performance Models (PPMs) are established and used to manage quality and process performance objectives.
- In the Organizational Innovation and Deployment process area, a quantitative understanding, specifically PPBs and PPMs, is used to analyze prospective and piloted innovations.

The CMMI Measurement Focus (cont).

- Process Performance Baselines (PPBs) and Process Performance Models (PPMs) are established and used to manage quality and process performance objectives (see Chapter 19).
- In the Organizational Innovation and Deployment process area, a quantitative understanding, specifically PPBs and PPMs, is used to analyze prospective and piloted innovations.

The CMMI Measurement Focus (Cont)

The generic practices (GP) used in all of the process areas also support the expanded focus on measurement. For example:

- GP 2.8 Monitor and Control the process area. Actual process performance is measured against the plan.
- GP 2.10 Review Status with Higher Level Management. Measures support the “appropriate visibility” asked for in the GP and provide clear, objective status reporting.
- GP 3.2 Collect Improvement Information. Measures and measurement results are collected for the organization’s processes and products to support improvement.

Evolution of Measurement

- Level 2 primarily focuses on status measures (e.g., planned versus actual size, effort, cost, and schedule; number of changes, and number of nonconformances in products and processes).
- Level 3 adds measures for process improvement and quality, including defect density and productivity.

Evolution of Measurement (cont)

- Level 4 creates and uses PPBs and PPMs. While the introduction of these baselines and models looks like a drastic change, the data in these models are drawn from historical data found at the lower levels of the CMMI model. What changes is their analysis and depiction.
- Level 5 requires that quantitative improvements be made based on the baselines and models created. The PPBs and PPMs are used to plan and demonstrate actual improvement.

- Successful organizations have shown the value from lower level measures to justify the transition to more mature measures. They have created useful measurement specifications that work through all the levels.
- Successful organizations start using simple PPBs and PPMs early in their improvement efforts.
- Unsuccessful organizations have gone through the motions of collecting measures, without understanding the measures they need to collect or how quantitative analysis of the measures works.
- Unsuccessful organizations often just produce “pretty pictures.”

Summary

- Measurement should start on the first day of your process improvement journey.
- Successful organizations analyze how their measurement programs support business objectives and information needs.
- They invest serious time and effort into developing meaningful measurement specifications. They don't set unreasonable goals and then measure performance against those unreasonable goals. Measures are collected “painlessly,” that is, as automatically as possible, and as a side effect of performing work.

Summary (Cont)

- Successful organizations focus on a small number of PPBs and PPMs that are used to make real decisions to improve the projects and the organization. And they perform real, continuous quantitative improvement.