

8th Central and Eastern European
Software Engineering Conference
in Russia - CEE-SECR 2012

November 1 - 2, Moscow



Evolution of Process & Product Metrics Based On Information Needs

Cenkler YAKIN



Presenter & Organization

Cenkler YAKIN

- Business Process Group Leader – 5 years
- Software Quality Assurance – 8 years
- CMMI-DEV ML-3 achievement (2006 & 2010)
- CMMI ML-5 achievement (2004)
- SW-CMM ML-3 achievement (2002)

STM provides process consultancy on

- CMMI-DEV
- Project Management
- Subcontract Management
- Risk Management
- Measurement & Analysis
- Software Quality Assurance

Outline

- Objectives of the study
- Establishment of measurement & analysis system
- Weaknesses in the measurement & analysis system
- Improvements to the measurement & analysis system
- Changes in the metrics
- Benefits & conclusion

Objectives

- Describing the evolution steps of STM's metrics based on information needs
- Sharing of decisions leading to ineffective organizational measurement system, lessons learned gathered, and responses of the stakeholders

Establishment of M&A System

- Key area for organization
- Based on information needs
- Certification in quality standards/model
 - CMMI Development
 - ISO 9001

The primary objective of the establishment of measurement & analysis infrastructure was to satisfy the requirements in quality certifications

Establishment of M&A System (cont.)

- Process metrics & product metrics definitions
- How to collect data
- Frequency/Period of data collection
- How to verify data
- How to keep and report data
- Analysis methods to analyze data
- Who are responsible

Weaknesses in the M&A System

- Unclear business objectives

SO

- MQG (Metric Question Goal) instead of GQM (Goal Question Metric)

THEN

- Some artificial business goals

ALSO

- Wrong interpretation of CMMI-DEV GP 2.8 (Monitor & Control the Processes)

THEN

- At least 18 metrics (# of Process Areas in CMMI Level-3) had to be defined according to our interpretation

ALSO

- Wrong Interpretation: Metrics are only way to monitor the processes & projects

THEN

- Many more metrics

Weaknesses in the M&A System (cont.)

RESULTS

- Artificial business goals
 - Is that real business goal we work for ???
- Too many metrics (52 metrics)
 - Huge effort spent on metrics
 - Very little benefit from metrics

NEWS

- We achieved CMMI-DEV Level-3 and ISO 9001 certifications

DECISION

- Process improvement in scope of CMMI-DEV and ISO 9001
- Measurement & analysis process was the potential candidate for process improvement.

Improvements to the M&A System

- Business goals, and information needs were updated, new quality policy was published
 - each metric can be traced to the quality policy or business goal
- Corrected interpretation of CMMI-DEV GP 2.8 (Monitor and Control the Process)
 - some useless metrics out of 18 eliminated
- New supporting solutions (reports, meeting, etc.) to monitor the process & projects
 - new metrics requests from relevant stakeholders prevented

Project Management Metrics

Old One:

- Deviation from milestones in days

New One:

- Earned value analysis

Why evolved?

- Deviation from milestones only include schedule data, and can be tracked only on major milestones
- Earned value analysis includes both schedule, and cost data and can be tracked any time.

Risk Management Metrics

Old One:

- # of risk items in the project

New One:

- Risk mitigation effectiveness in the project
(# of risks closed before turning to problem / # of risks above the risk threshold)

Why evolved?

- To be able to see performance of risk management process

Subcontract Management Metrics

Old One:

- Schedule deviation ratio of subcontractors

New One:

- Performance satisfaction score for subcontractors

Why evolved?

- To be able to evaluate subcontractors' performance not only with schedule but also with product quality and relationships with STM for future planning

Product Development Metrics

Old One

- Distribution of software requirements according to their types (functional, non-functional etc.)

New One:

- Software requirements volatility
($\frac{\text{Changed-added-cancelled software requirement number}}{\text{Total software requirement number}}$)

Why evolved?

- Software requirements volatility is a better indicator to understand the requirement stability, and to measure the requirement development process.

Customer Satisfaction Metrics

Old One:

- # of defects in the product after delivery

New One:

- Customer satisfaction score
(Calculated score from Customer Satisfaction Questionnaire)

Why evolved?

- To be able to analyze customer expectations from a broader perspective (not only with product quality, but also with other factors like budget, schedule, relations with STM, etc.)

PS: “# of defects in the product after delivery” is gathered by means of “Defect Removal Effectiveness” metric.

Quality Assurance Metrics

Old Ones:

- # of process noncompliances issues
- Status of process noncompliance issues either “open” or “closed”

New One:

- Ratio of corrective actions for process noncompliances evaluated as effective
(# of corrective actions evaluated as effective / # of corrective actions that effectiveness evaluation of them have been completed)

Why evolved?

- Information need changed from # and status to whether we apply corrective actions effectively or not (a new issue in ISO 9001:2008)

Verification & Validation Metrics

Old One:

- Effort spent to correct the defects found in document review

New One:

- Rework analysis

Why evolved?

- Rework is defined in accordance with STM needs. Effort spent to correct the defects found in document review is within preparation effort, not in the rework effort. Rework effort shall be used for both process improvement purposes and better planning purposes.

Training Metrics

Old One:

- # of training per person

New One:

- # of effective training per person

(Effective training: Such training that beneficial contribution to the participants are observed)

Why evolved?

- # of effective training is a better indicator to understand the training process performance

Benefits & Conclusion

52 mostly ineffective metrics → **39** effective metrics
Much & inefficient efforts → less & efficient efforts

- Senior management can be informed about the status of business objectives more effectively. They can use metrics data and metrics analysis in making critical decisions
- Project Managers can monitor project progress more effectively, and can take proactive action if deviation from the plan
- Process Owners can monitor process performance and can reflect it for future planning

cyakin@stm.com.tr
cenkler@hotmail.com

