Measurement Guidelines

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**Revision History**

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Table of Contents

[1 Purpose 4](#_Toc383781268)

[2 Scope 4](#_Toc383781269)

[3 Guidelines Description 4](#_Toc383781270)

[3.1 Base Measures 4](#_Toc383781271)

[3.2 Tasks Granularity 6](#_Toc383781272)

[3.3 Derived Metrics 6](#_Toc383781273)

[3.4 Operational Definition 7](#_Toc383781274)

[4 References 12](#_Toc383781275)

# Purpose

The purpose of this document is to serve as a guideline for Measurements during the lifecycle of a project. The document addresses the measures and Metrics to be captured for the projects and help to Baseline measures made at the organizational level.

# Scope

The Guidelines are applicable to all projects managed and controlled at Name.

# Guidelines Description

## Base Measures

Broadly the metrics can be classified into basic measure and derived metrics. Measurement is the Process of Assigning number to a variable based on predefined set of rules.

Common Basic measures are

* Effort
* Defects
* Size
* Review
* Schedule

**Defects :**

The attributes of Defect are given below. This needs to be captured for all lifecycle stages

* Injected stage
* Detected stage
* Severity
* Cause
* Priority
* Type

The attributes of the defect can be identified by different persons. Here the preferable role for identifying the attributes for defects are given below so that the time spent is minimized.

|  |  |  |
| --- | --- | --- |
| Sl. No. | Attribute | Best identified by |
| 1 | Injected stage | Author for testing defects, Reviewer for Review defects |
| 2 | Detected stage | Reviewer, tester |
| 3 | Severity | Reviewer, tester |
| 4 | Type | Reviewer, tester |
| 5 | Priority | Team lead, Project Manager |
| 6 | Cause | Author |

**Size:**

Basic Measure of Size

1. For development and large enhancements:

* FP
* LOC
* Project specific sizing model based on complexity (normalized simple objects, normalized simple components) where standard sizing models (FP/ LOC) can’t be applied , or Number of requirements (initial and Final)

In case of reviews: Size of artifacts in reviews - Number of pages

Irrespective of the phase wise different sizes (like Pages, Screens etc), used in requirement and design phases, only the overall application size to be used for computing the project level productivity and overall defect density measures. However project using these measures at the phase level for tracking the phase level performance can use the individual stage size for the same.

**Reviews:**

The attributes of reviews are given below

* Review Type – One person or Group
* Preparation effort
* Review effort
* Size of the work product
* Number of defects found

**Schedule**

The attributes of schedule are planned date and Actual date

## Tasks Granularity

Effort for a task is ideally 8 hours and max for 24 hours.

In scenarios where the effort for a task is up to 48 hours Project Manager needs to define what 50 % completion of the task is.

In scenarios where the effort for a task is up to 96 hours Project Manager needs to define what 25 %, 50 % and 75 % completion of the task is.

No task can exceed 96 hours.

These % completion need to be unambiguous to all the team members and the project should define in the quality plan.

## Derived Metrics

Derived metrics are quality indicators that are calculated using Basic measures, to gain insight into process and product quality characteristics.

Some of the derived metrics are:

* Productivity
* Delivered defect density
* Overall defect density
* Defect Removal Efficiency
* Cost of Quality (COQ)
* Requirements stability index
* Customer Satisfaction Index

E.g. Why Productivity, Delivered defect density is a derived metric?

Productivity

Productivity = Size in FP / Effort in person months. As such the measures Size and Effort does not make much of meaning unless we express it as a ratio.

Delivered defect density

Delivered defect density = No of System Test defects / Size in FP or Effort in person hours. 50 defects in System Test may look much higher. But a Project that has delivered 5000 FPs as size the System Test defects is low. Hence the Ratio delivered defects conveys more useful information.

## Operational Definition

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Metric | Formula | Unit | Description | Analysis |
| Schedule Variance | Schedule variance % on days =[(Actual end date- Approved / Committed end date) / Estimated schedule in days] x 100 | % | Client Facing Metric | 0 is ideal  Higher the value, greater is the schedule variance |
| Effort Variance | Effort variance = [(Estimated effort - Actual effort) / Estimated effort] x 100 | % | Internal Efficiency Metric  Indicates the variation in estimation  Indicates the Technical/Domain knowledge of team | Can have +ve and –ve values  Both +ve and –ve are OK within the Range as specified in Quality Management Plan.  Very high +ve values depict Over estimation |
| Productivity | Productivity = Size / Total Effort | (FP/LOC/no of screens) / Person days | Internal Efficiency Metric  Project capability depends on Team expertise, Technical/Domain knowledge, risk involved in project, tools used and optimized processes | Always +ve  Higher the value greater is the Productivity |
| Coding & Unit Testing Productivity | Productivity = Size / Total Effort for Coding & Unit Testing | (FP/LOC/no of screens) / Person Days | Internal Efficiency Metric  To identify the capability of the team, as most of the projects have partial life cycle | Always +ve  Higher the value greater is the Productivity |
| Overall Defect Rate | (Total Defects / Total effort) | Defects/Person days | Internal Efficiency Metric  Project capability depends on Team expertise, Technical/Domain knowledge, risk involved in project, tools used and optimized processes | Always +ve  Lower the value, better it is |
| Cost of Quality | ((Review effort + Test Effort + Training effort + Rework effort + Effort for Prevention Activities) / Total project effort) x 100 | % | Internal Efficiency Metric  Indicates the Appraisal, Preventive and Failure costs | Always +ve  OK within the Band |
| Review Effectiveness | Number of defects detected during review/(Defects injected in that stage + Defects slipped from earlier stages) x 100 | % | Internal Efficiency Metric  Indicates the effectiveness of the review done | Always +ve  Higher the value, greater is the review effectiveness |
| Test Effectiveness | Number of defects detected during testing/( Defects slipped from earlier stages) x 100 | % | Internal Efficiency Metric  Indicates the effectiveness of the testing done  Environment set up defects are the defects injected in this stage | Always +ve  Higher the value, greater is the test effectiveness |
| Delivered Defect Rate  Delivered Defect Density | This is measured wrt Size and Effort  Effort : No. of Defects detected after delivery/Total Effort  Size: No. of defects detected after delivery/Size | Defects/  Person days  Defects  /(FP/LOC/no of screens) | Client Facing Metric  Measures the effectiveness of QC activities | 0 is ideal  Lower the value better is the quality of the product |
| Defect Removal Efficiency | Total Number of defects detected before delivery/ (Total Number of defects detected before delivery + Defects found after delivery) x 100 | % | Client Facing Metric  Indicates efficiency of reviews | 100% is Ideal  Higher the value, greater is the DRE |
| Requirements Stability Index | No of unchanged initial requirements  /Total No. of requirements x 100  Total number of requirements = Unchanged initial requirements + Added requirements + Deleted requirements+ Modified requirements | % | Client Facing Metric  Indicates the effectiveness of the requirements gathering process | 100 is Ideal  Higher the value, higher is the stability |
| Overall Defect Density | Total number of defects in project / Size | Defects /(FP/LOC/no of screens) | Indicates the defects injected | Lower the better |
| Customer Satisfaction Index | As captured using customer satisfaction survey report |  | Client facing metric  Indicates the measure of satisfaction | 5 is Ideal |
| Review Efficiency | This is captured as one person review as well as Group review  Review Efficiency One person Review = No. of defects detected during review/ Review Effort  Review Efficiency Group Review = No. of defects detected during review/Total Preparation Effort + Review Meeting Effort | Defects/  Person days | Internal Efficiency Metric  Indicates the efficiency of review | Always +ve  Low Defects and High effort depicts either the review efficiency is not good or that the quality of work product is good. One may need to relook at the review process.  High Defects and Low Efforts depicts that the deliverable may need to undergo a rework and a re-review.  High Defects and High effort – Cannot derive anything a causal analysis may need to be done |

# References

None