

Organizational Process Performance

**Version History**

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# SCOPE

The scope of this document covers the organizational level analysis on different processes and process measures selected based on the organizational objectives. It also covers what to collect, and how to collect the data, basis and frequency of collecting the data for Organizational wide analysis. This document also covers the steps/method for analysis, type of control charts and their calculations.

# USERS OF THE DOCUMENT

* QA and Senior Management

# ENTRY CRITERIA

* Projects closed or currently running in the organization.
* Capability of sub processes to be defined

# INPUTS

* List of projects selected for data collection and analysis
* Causal Analysis Reports if done related to PCB metrics
* Project tailoring details if any tailoring done
* Guidelines for PCB preparation
* Measurement data from projects

# EXIT CRITERIA

* Approval of Process Capability Baseline at Organizational Level.
* Capability measurement for sub processes to be defined.

# OUTPUTS

* Reviewed and Approved Process Capability Baselines
* List of processes or process measures to be focused for improvement (part of metrics baseline report)

# PROCESS DESCRIPTION

## Establish organization goals and business objectives

**(REFER Quality Manual for Quality Objectives)**

Establish and maintain the organization’s quantitative objectives for quality and process performance, which are traceable to business objectives. When establishing quality and process performance objectives, consider the following:

* Traceability to the organization’s business objectives
* Past performance of the selected processes or sub processes in context (e.g., on projects)
* Multiple attributes of process performance (e.g., product quality, productivity, cycle time, response time)
* Inherent variability or natural bounds of the selected processes or sub processes

## Select the Processes and Process Measures

Prior to establishing the process baselines and models, it is necessary to determine which processes are suitable to be measured at organization level. Senior management along with Head Quality will select some of the process to be measured at organization level as per the business needs and objectives. The following steps will show the method of selecting the processes and process metrics for organizational capability baselines.

### Clarify business goals:

Understand how your business goals, objectives, strategies, and plans related to your software processes. Business goals based on cost, schedule, and quality must be addressed to provide competitive products and services to customers and to meet customer commitments. These objectives are further drilled down to software processes and metrics.

### Identify and Prioritize issues:

Identify the critical issues that determine whether or not your processes succeed in meeting the goals that you have set forth. Processes that have experienced problems or issues in the past or that are executed for the first time or across various projects or organizational boundaries may serve as prime candidates for study or investigation.

### Select and define measures:

Select measures that will help you to characterize your processes or products. Create an operational definition for the measure(s) that you have selected. To have an operational definition, you must know what the data represents and how the data is to be collected. The primary objective of measuring is to control and improve your processes. Refer to Metrics plan for operational definitions of different metrics

## Select the projects:

QA Head will collect the list of projects, which are currently running or completed from the previous baseline. Head Quality will take a decision on which are the projects to be included for PCB analysis based on projects characteristics like Process tailoring, Process stability, Project phase, data available, etc.

## Collect data:

QA head shall collect data of identified projects from the project managers. Consolidate the details of different metrics for different buckets like Development and maintenance. Verify the data for completeness and accuracy.

## Review and Assess Collected Data:

This is one of the important steps for preparing the process capability baseline. Because all the further calculations depend on the validity of the data, which are very important for organization and as well as for projects that are going to use this data for their process performance predictions.

## Analysis Methods

Different process will need different kind of analysis methods like control charts, line charts, histogram etc. Senior management along with QA identifies these methods. If any project is not using these methods they need to define the same in their projects.

## Analysis and Results:

Use the following steps for analyzing the data before finalizing the process capability. QA will conduct the data analysis.

### Identify Process Stability

Steps for identifying the stability of the process are given below. QA shall conduct the stability analysis of the selected process metrics for each baseline release (i.e., once in a quarter for each project type)

1. Select the process metrics from the Process Capability Baseline to be evaluated for stability
2. Measure product and/or process characteristics over a period of time.
3. Calculate the centerlines and control limits of variations both for Individual and Moving range charts.
4. Plot the measurement data obtained from step 2 on the XmR control charts
5. Compare the values plotted in step 4 to the centerline values and limits
6. If all plotted values are distributed randomly above and below the centerlines and within the control limits, conclude that the process has been stable at least for the period starting form the last baseline release which is once in a quarter for each project type. Continue measuring and plotting the data to ensure that the process remains stable
7. If any plotted value exceeds the limits or if the pattern of values exhibits other than random behavior, conclude that the process is not stable. The reasons for such observations must be investigated. If any Special cause is found then the process must be repaired so that it cannot happen again.
8. If there is any positive trend observed reasons for this trend are analyzed to retain the process improvement.

### Calculate Control limits

Once the stability is verified (i.e. special causes are removed) calculate the final control limits for the selected metrics.

### Evaluate Process Performance

Senior management, Quality head will evaluate the processes performance measurements plotted on control charts (process behavior charts), the results will likely point to one of three directions: removing assignable causes, changing the process, or continually improve the process. During this evaluation they will identify the processes/sub processes that need to focus for improvement and also the processes which needs to be changed.

### Process Performance Baselines

QA shall prepare the following reports once the analysis is complete

* Metrics baseline report: This report contains the definitions of the metrics, selected metrics for PCB analysis based on the current needs, projects that are considered for the current baseline, list of special causes and their mitigation actions, Control charts and the results.
* Process Performance Baseline Snapshot: Which is a dashboard which gives the final process capability baseline values
* Calculation report: This is an excel sheet (or tool reports) where all the calculations are being done.

Place all these reports in VSS, which is configuration management tool. Maintain the version control for each baseline release.

### Review Organizational Performance Baselines:

QA, along with management, will review the Organizational capability baselines for correctness and completeness before releasing the results to the organization.

## Communicating the Results

Reviewed and approved Process Capability Baseline results are communicated to all the project managers by Quality Head in SEPG meeting. Results are also placed on QMS server.

## Revising the baselines:

Consider the following guidelines for revising the baselines

* If the process is observed to have shifted, or if a deliberate change has been made to the process then recalculate the limits by using the newly collected data plus the old measurements. When the process has shifted or when you have made a deliberate change to the process previously collected data may no longer applicable.
* Identify the projects, which are tailored to their needs and prepare a separate baseline if the same or similar kinds of tailoring getting repeated which is leading to some process improvement, which can be taken to the organization level by process change.
* Major Changes in the processes like digitization etc.
* Frequencies of revising the baselines are quarterly.

## Establish process performance models

* Based on the process capability baselines and prioritized organization objectives, QA shall establish process performance models for predicting quality and process performance.
* Process performance models shall be calibrated based on the past results and current needs.
* Process performance models will be reviewed with relevant stakeholders for their agreement and buy-in.
* Process performance models will be piloted to validate the results.
* QA shall facilitate the use of process performance models in projects.
* Revise process performance models as necessary.

# FORMATS AND GUIDELINES

* + Org metrics plan
  + Tracking sheets/tool
  + Causal Analysis template

# REFERENCES

* + Guidelines for PCB and PPM