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Measuring Software Quality: Three Innovative Metrics That Matter




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How are we doing?

“How are we doing?” can take on so many meanings for a quality manager. Is the software stable? Are defects up or down? Is the testing effort ahead of schedule, or behind? Are we doing a good job testing? *Will we make it?*

Our typical response to these questions is to provide an overwhelming volume of metrics that --- somehow – are intended to relate progress. The most common of these include:

- » Number of open defects & Defect Trending
- » Defect density
- » Test coverage planned
- » Test coverage achieved
- » Open vs. close rate of defects
- » Schedule variance



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Metric – Requirements Stability Index

Formula:

(Total number of Original Requirements + Cumulative number of requirements changed (till date) + Cumulative number of requirements added (till date) + Cumulative number of requirements deleted (till date)) / (Total number of Original Requirements)

Formula Definition: Sum of all requirements added,deleted and changed till date

Objective: To determine the ability of initial Requirements gathering process

Applicable Level: Completion of Test Execution / Overall Request Level

Frequency of Reporting : Monthly (for stages completed)/ Stage End

Applicable Testing Request Type:

- Functional Testing – Manual/Automation
- Performance Testing



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Test Effectiveness



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Metric – Test Effectiveness %

Formula:

$$\left(\frac{\text{Total no of application defects found by system testing team} - \text{Total number of application defects rejected}}{\text{Total no of application defects found by system testing team} + \text{Total number of defects found by business users during UAT \& production}} \right) * 100$$

Objective: To determine the effectiveness of testing

Applicable Level: Completion of Test Execution/Request End

Data Source: Excel Sheet/ Project Specific Tool

Frequency of Reporting : Completion of Test Execution/Request End

Applicable Testing Request Type:

- Functional Testing – Manual



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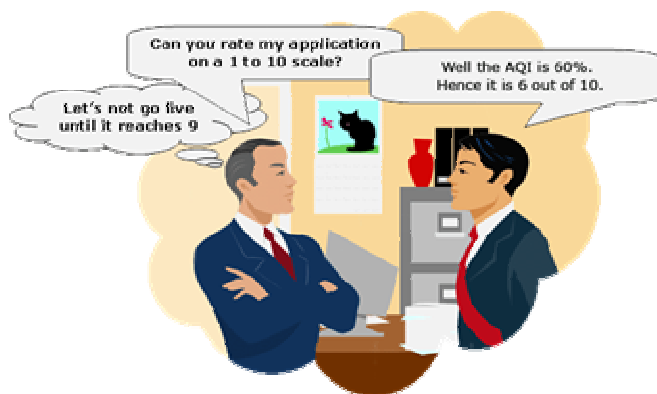
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Application Quality Index



Why AQI?



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1.0 Objective

- To effectively **Calculate and report the stability** of an application under test, using an innovative and dedicated tool.
- To **Identify risk prone areas** that might impact the business requirements and to **provide a quick snapshot** of the **system stability** to the client.
- To determine the stability of each of the modules on a **weekly** basis.



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2.0 Key Features

- Application Quality Index (AQI) innovated and implemented by Cognizant Testing Services involves the usage of factor values for determining the stability of each of the modules on a **weekly** basis.
- Stability holds the merit of being one of the major metrics in **Weekly Status Report** and has significant role in improvisation based on the stability factors of various modules.
- The **Risk and Safety** factors for the various modules of the project can be determined based on the Base Values and then consolidated summary of **Stability Vs Risk** percentages could be obtained.
- System Stability Trend** can be analyzed from the graph which is generated from the determined component values for each of the factors.

System Stability Summary				
Module	Safety Factor	Risk Factor	Stability %	Risk %
Sample 1	2.1	2.2	48.4	51.6
Sample 2	4.5	0.3	93.8	6.2
Overall Summary	3.3	1.3	71.1	28.9



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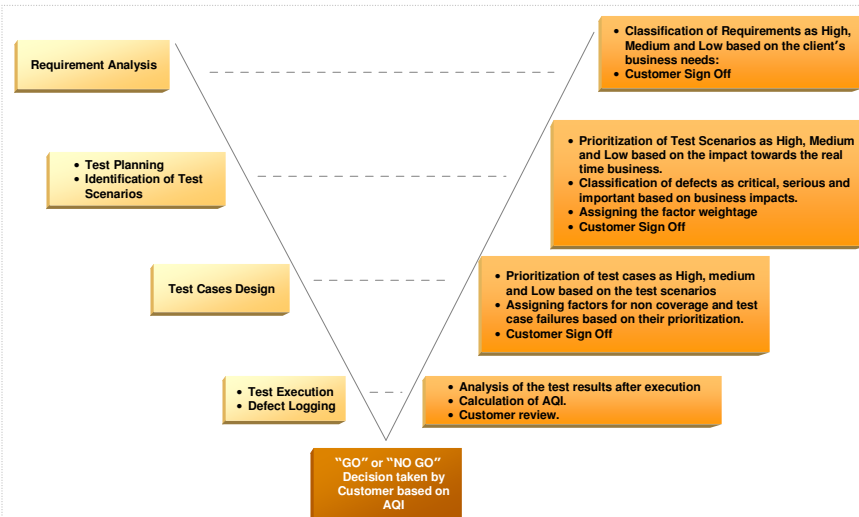
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2.0 Key Features – AQI Implementation Model



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2.0 Key features

Factors considered:

- **Test Coverage Factor** : Test Coverage provides a significant update on the number of test cases executed among the total available test cases in that particular build/round.
- **Test Case Success Factor** : Test Case Success factor gives an update of the number of test cases successfully passed among the test cases executed.
- **Outstanding Defects Factor (Based on Business Impact)**:
 - » Critical, Serious and Important
- The outstanding defects can be assigned with different factor weightage values. The table shows the factor values for defects based on the Client's business needs.
- **Non Coverage Factor**: This highlights the uncovered business functionalities that might have a negative impact on the client's business.
- **Failed Test Case Impact Factor**: The failed test cases can have varying impacts on the client's business as listed:
 - » Critical, Very High, High, Medium, Less, Negligible and No Business Impact

S.No	Description	Factor Weightage
1	Test Coverage Factor	0.50
2	Test case Success Factor	0.50
3	Outstanding Critical Defects Factor	0.50
4	Outstanding Serious Defects Factor	0.40
5	Outstanding Important Defects Factor	0.30
6	Non Coverage Factor	0.50
7	Failed Test Case Impact Factor	0.50



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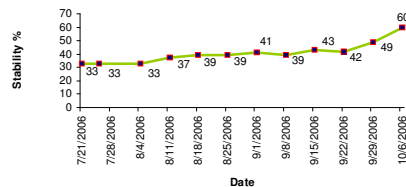
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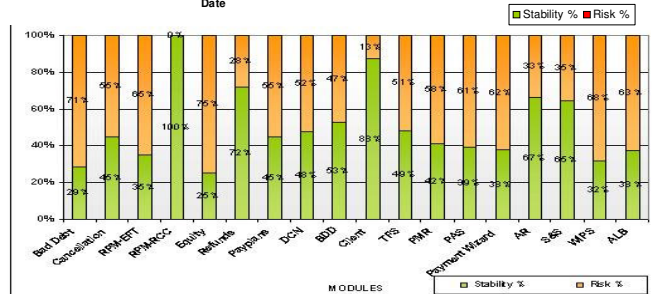
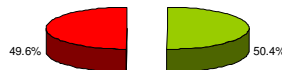
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2.0 Key features – AQI Reporting

System Stability Trend



CLIENT A SYSTEM TESTING - OVERALL STABILITY Vs RISK



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3.0 Benefits of Implementation

- **Quick snapshot:** The AQI served as a quick snapshot for the team to consolidate the percentage of stability of each module. AQI proved to be an excellent tool for assessing test coverage.
- **Status Reporting:** The AQI sheet was used as an efficient reporting tool in the **weekly status report** about the system stability .This was greatly appreciated by the client. There was an eager wait from the client's side every week end for referring to our AQI data to assess their System's application's performance. The **trend in stability** was also assessed. The impact of "outstanding" defects on the clients business was projected in the correct manner.
- **System Stability:** The **Risk and Safety Index** of the individual modules were significant in determining the stability of individual modules.
- **Focus on module-wise defect fixes:** AQI has contributed as an efficient tool for the client and the team for focusing on **module-wise defect fixes** based on the priority determined from the stability percentage.



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3.0 Benefits of Implementation

- **Decision making Tool:** AQI served as a decision making tool for the senior management. It provided a **valuable input for making future investments** on the application under test.
- **Results before and after the usage of AQI:** Before AQI was used, there was no proper tool for indicating the module-wise stability and as a whole the stability of the system on a weekly and current basis. Since its inception AQI has provided solid answers to all these gaps.
- **Weekly Status Report:** Stability was one of the metrics in Weekly status report. This enabled the efficient improvisation of the execution process.




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Thank You



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