WHITE PAPER

APPLICATION GRADING FOR COMPREHENSIVE QUALITY ASSURANCE

Abstract

This paper emphasizes the importance of test team involvement from the requirement stage of the project by empowering test team through Comprehensive Application Grading (CAG). Through CAG framework, the test team role will no longer be limited to reporting presence of bugs rather systematically monitor SDLC compliance, conformance & sustainability with requirements and early prediction of bugs in the application.

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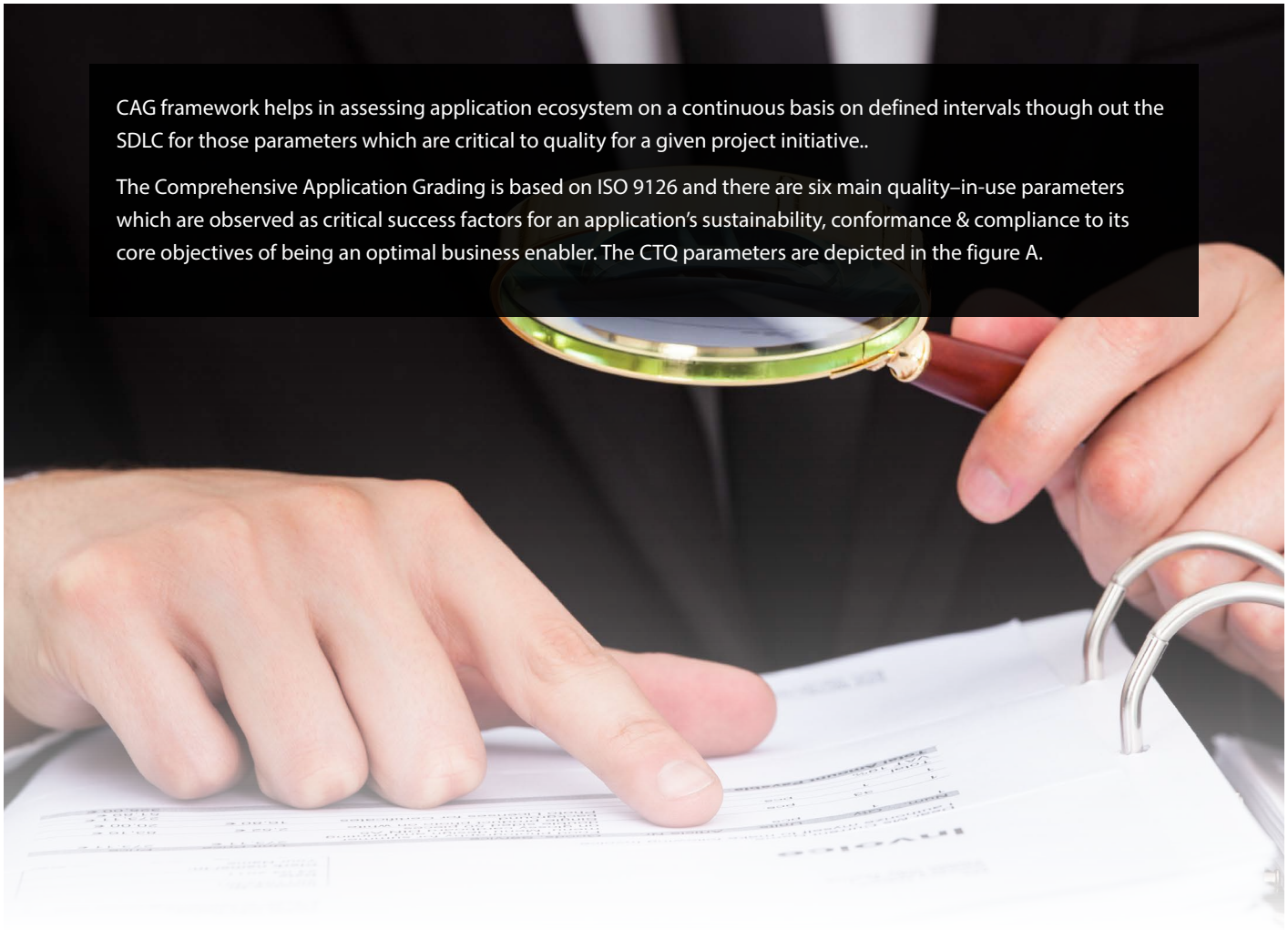
Introduction

Comprehensive Application grading or CAG is an evaluation framework based on product and process characteristics. Through CAG, testing team will grade the application in terms of the below software quality in use metrics at a highest level of abstraction to predict conformance & compliance to requirements by each stage of SDLC:

- Reliability (How reliable will be the application?)
- Usability (Will the application be easy to use?)
- Functionality (Are the required functions intact in the application?)
- Efficiency (How efficient will be the application?)
- Portability (How easy it would be to transfer to another environment?)
- Maintainability (How easy will it be to modify the application?)

CAG framework helps in assessing application ecosystem on a continuous basis on defined intervals though out the SDLC for those parameters which are critical to quality for a given project initiative..

The Comprehensive Application Grading is based on ISO 9126 and there are six main quality–in-use parameters which are observed as critical success factors for an application's sustainability, conformance & compliance to its core objectives of being an optimal business enabler. The CTQ parameters are depicted in the figure A.



Efficiency

How efficient is the software?

Maintainability

How easy is to modify the software?

Profitability

How easy is to transfer the software to another environment?

Functionality

Are the required functions available in the software

Reliability

How reliable is the software?

Usability

Is the software easy to use?

Figure A: CTQ parameters as per ISO 9126

The Approach

The CAG approach depends on the state of the application. If the application under test (AUT) is already in production it is recommended to grade the application before any new change requests are authorized. For AUT which is being built fresh, once the requirements are base lined the grading exercise is recommended to define the 6 key CTQ characteristics of AUT. Comprehending the 6 CTQ characteristics gives us the comprehensive application grade for an Application to be installed for business operations.

The CAG Framework is implemented through a process having each 4 key stages aligned to SDLC stages. They are Define, Plan, Evaluate and Report.

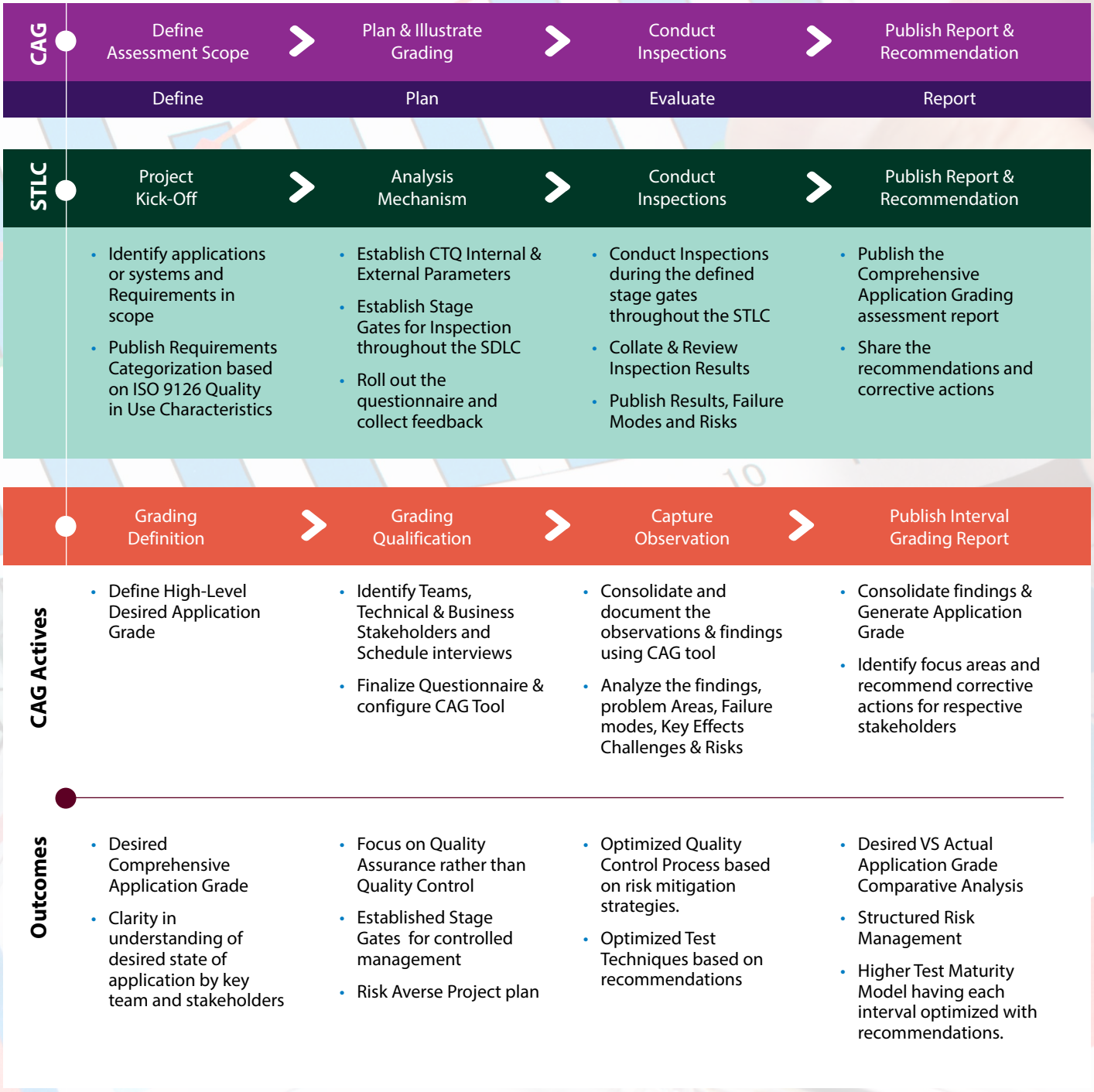


Figure B: CAG Approach & Implementation Model

The CAG tool helps in defining, evaluating, deriving the CTQ parameters for each interval and then helps in analysis with custom built comprehensive application grade to help a team track

CTQ	Metric	Target	Interval1	Interval2	Interval3	Interval4
Reliability	Estimated latent fault density	100	70	60	30	80
Reliability	Failure density against test cases	100	43	45	65	65
Reliability	Failure resolution	100	21	56	70	80
Reliability	Fault density	100	70	65	30	76
Reliability	Fault removal	100	70	60	30	80
Reliability	Mean time between failures (MTBF)	100	70	60	30	76
Reliability	Test coverage (Specified operation scenario testing during testing? coverage)	100	70	60	30	65
Reliability	Test maturity	100	70	60	30	80
Reliability	Breakdown avoidance	100	70	60	30	78
Reliability	Failure avoidance	100	70	60	30	90
Reliability	Incorrect operation avoidance	100	65	61	65	56
Reliability	Availability	100	70	60	30	80
Reliability	Mean recovery time	100	70	60	30	80
Reliability	Restartability	100	70	60	30	80
Reliability	Restorability	100	70	60	30	80
Reliability	Restore effectiveness	100	70	60	30	80

Figure C: Snap shot 1 of CAG tool depicting individual metric tracking

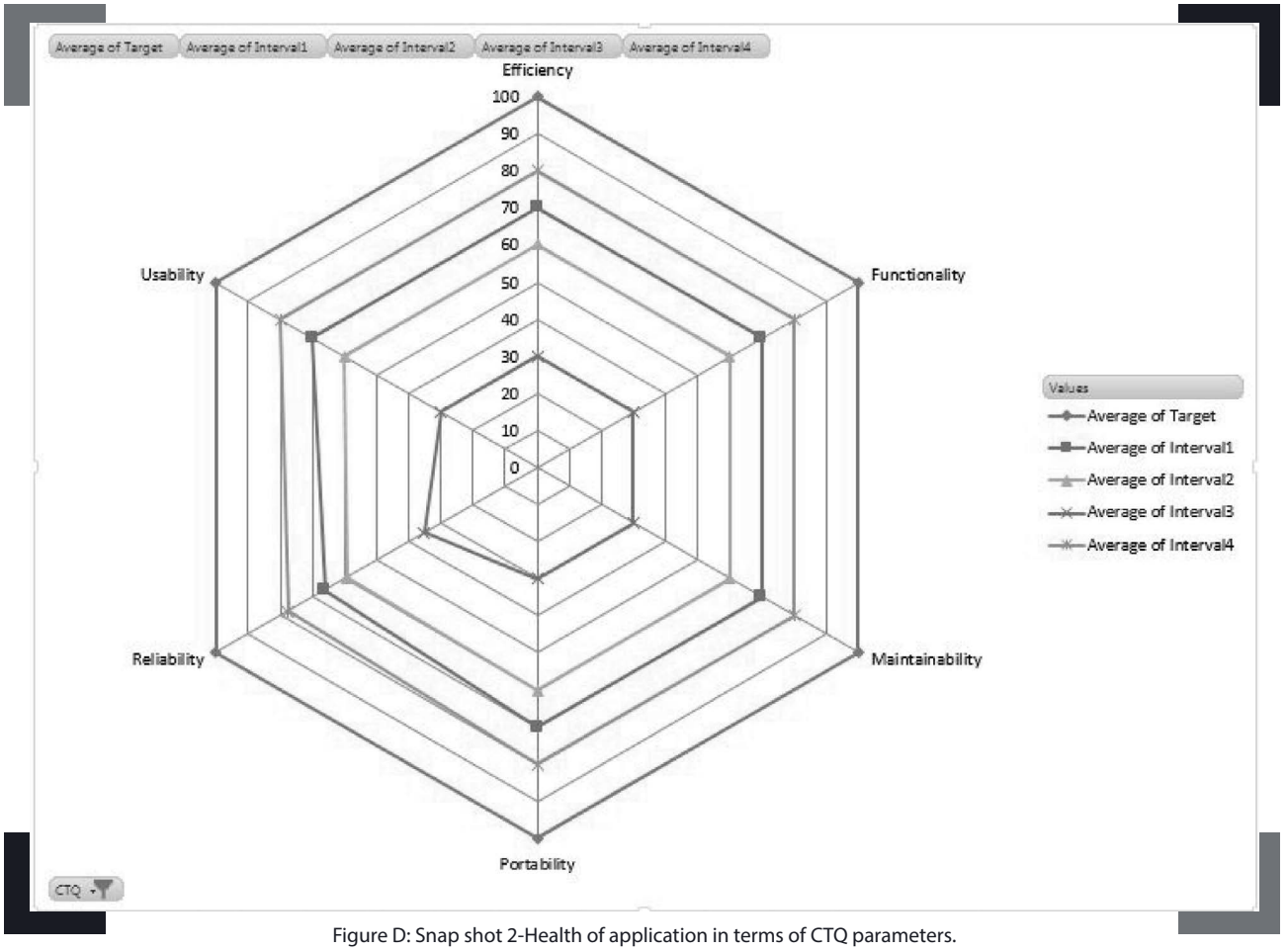
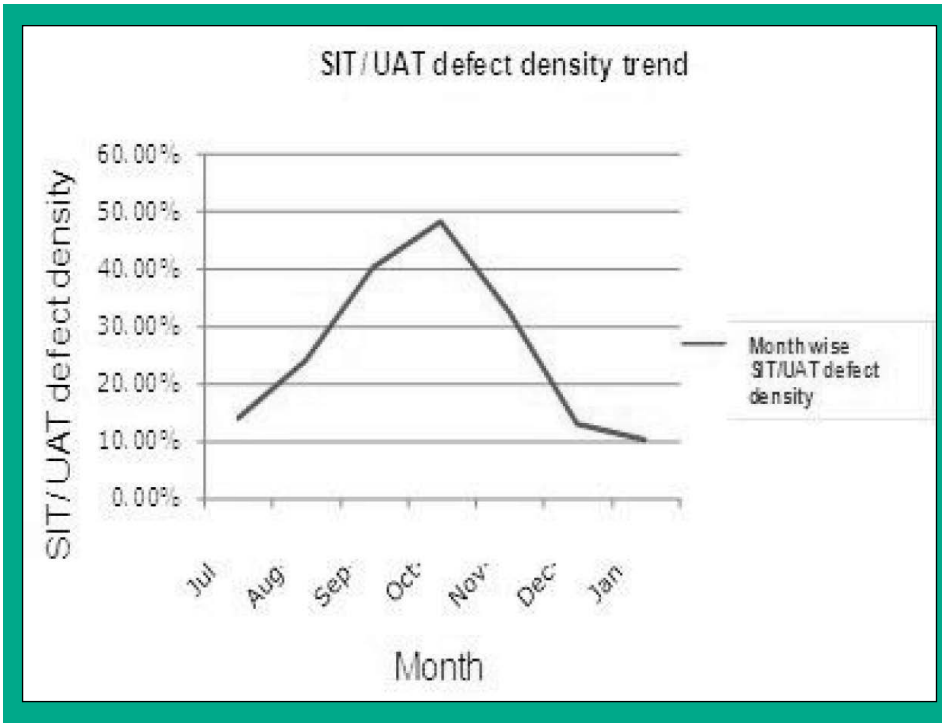


Figure D: Snap shot 2-Health of application in terms of CTQ parameters.

Benefits



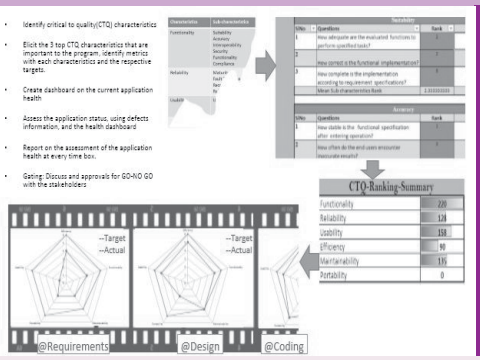
- Focus on Quality Assurance rather than Quality Control
- Reduced Defect Density (10-15%) in later testing stages due to early identification and resolution of issues(based on risks identified and appropriate metrics defined)
- Established Quality Control Stage Gates for rigorous adherence of entry – exit criteria
- Critical Failure Mode are addressed earlier resulting to increased stability in application gradually by phases.
- Reduced Cost to Quality by implementing risk averse test processes starting early during SDLC.

Figure E: Reduction in Defect Density in SIT/UAT (numbers are figurative)

Sample Case Study

Context	Leading insurance giant used CAG to address the opportunity related to revenue growth and the necessary horizontal growth in the field force of client's business.

Problem Statement	Infosys Solution	Benefits
Revenue tied with testing quality Inexperienced team of testers Shorter time for testing	• CAG was used to report the health of applications and forecast the areas with potential issues. • Early involvement of the testers in the lifecycle helped to identify issues through a collaborative approach	• Early detection of defects - 9% of total defects captured from requirement stage • High business confidence with risk based testing approach having rigor applied at right time during appropriate stages of risk identified



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References

- ISO 9126
- Infosys IVM Comprehensive Application Grading Guideline 1.0
- Infosys IVM CAG tool Version 1.1

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