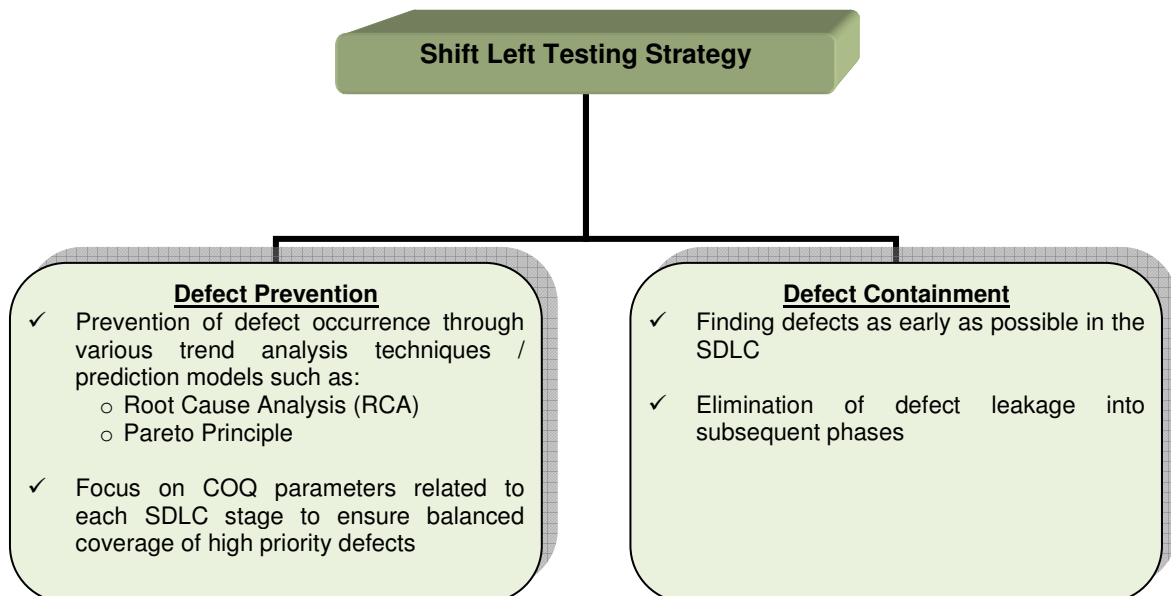# Cost-Of-Quality Optimization – a necessity for Independent Verification and Validation

Independent Verification & Validation (IV&V) is a synthesis of QC (Quality Control) and QA (Quality Assurance) for preventing defect occurrence in the software development life-cycle (SDLC) rather than only capturing them.

In today's world, most Information Technology (IT) organizations not only consider this essential to come out with superior quality products and services but also with optimized possible cost. Hence, it becomes imperative to reduce overall **cost of quality (COQ)** by identifying relevant factors and parameters affecting the same. The traditional process of calculating COQ classifies quality costs into three components viz. prevention costs (process related efforts), appraisal costs (review / inspection efforts) and failure costs (rework efforts). An understanding and increased focus on these components can help the IT management of any organization to realign its quality objectives and also help achieve multi-fold benefits in the longer run.

The **test driven software development approach** is an evolutionary change in mindset wherein there is increased involvement of the QC team very early in the SDLC as opposed to the traditional model where it used to play a distinct quality gate role, post development. In this approach, the development team works in close collaboration with the QC team right from the requirement analysis phase. This approach goes to the extent of development being driven by test design created upfront to ensure requisite functionalities of the software product are developed in strict accordance to specifications. In addition, implementing **test design optimization techniques** like Risk-based testing (RBT) & Orthogonal Array Techniques (OAT) can further enhance the effectiveness and efficiency of this overall shift-left testing approach.

This "**Shift Left Testing Strategy**" has helped many IT organizations bring rigor to testing processes and optimize overall cost of quality. The foundation of the "Shift Left Testing Strategy" revolves around two facets viz. defect containment and defect prevention.

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                    │   Shift Left Testing Strategy     │
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Defect Prevention
- ✓ Prevention of defect occurrence through various trend analysis techniques / prediction models such as:
  - Root Cause Analysis (RCA)
  - Pareto Principle
- ✓ Focus on COQ parameters related to each SDLC stage to ensure balanced coverage of high priority defects

Defect Containment
- ✓ Finding defects as early as possible in the SDLC
- ✓ Elimination of defect leakage into subsequent phases

The effective use of this new software development paradigm enables customers of IT services render agility, deliver flexibility and optimize costs for IT projects.

This workshop aims to enable the participants for a quick dive into the COQ optimization parameters, techniques to achieve defect prevention & early defect detection by implementing a test driven approach and will show them how to apply this in real life situations. It will focus on how to amalgamate QC and QA as a driving force of the software development lifecycle (SDLC) to minimize defects and reduce COQ.

Workshop Agenda:

Sl. No.	Session	Timeframe	Key takeaways for Participants
1	Defining IV&V, QA and QC	15 mins	✓ Clarity on IV&V, QA / QC foundation concepts
2	Sharing and analyzing sample artifacts generated by a traditional testing/QC approach	15 mins	✓ Shortcomings of the traditional approach
3	Identification of COQ parameters and COQ Calculation Methods	30 mins	✓ Appreciation of fundamental COQ concepts ✓ Identification of cost parameters associated to SDLC stages
4	Defect prevention, causal analysis (QA) techniques	30 mins	✓ Concept of QA ✓ Hands-on examples of relevant techniques
5	Brief introduction to Test driven development approach (QC)	15 mins	✓ Concept of test driven approach. Advantages of test driven approach over traditional approach
6	Role play for participants on test design in a test driven approach	15 mins	✓ Hands-on use of test driven approach in simulated practical situations
7	Test Design optimization techniques like RBT and OAT applicable in this environment	15 mins	✓ Hands-on examples of implementing the techniques
8	Q & A and Wrap up	15 mins	✓ Clarification of doubts ✓ Pointers on further exploration and application of concepts learnt in the workshop