

Testing Transformation: A viable option for all companies



It begins and ends with your
willingness and drive to change the
way you perform testing today

Executive Summary

Businesses today are characterized by technology solutions where software quality plays a central role. This trend has led to an increased focus on quality assurance and testing processes that are key to software development and ensuring quality of products. Organizations are under immense pressure to deliver applications with high quality in shorter turnaround time. Despite the growing demand and criticality of testing, most organizations still follow conventional methods of testing which makes it challenging for them to keep pace with the changing times. They are yet to adapt to the idea of transforming end-to-end testing services. Added to this, the complexity of managing the change and a lack of in-depth knowledge about tools and accelerators, makes it difficult to derive expected results. All these add up to rather poor returns on the heavy investments made by organizations to improve process maturity.

An end-to-end test transformation model helps organizations successfully achieve growing expectations of quality, in the face of shrinking testing timelines and budgets. A comprehensive suite of transformation solutions, using readily available accelerators and tools, helps offer cost-effective solutions while providing access to industry-specific solutions from niche players. Leveraging testing best practices and methodologies helps optimize processes and resource utilization, and improve test efficiency across various phases of software testing.

In this paper we discuss the need for a comprehensive test transformation model. We discuss how it can help align your testing practices with business priorities and what you should look for in a testing services partner.

About the Author

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Software Quality Crisis – Are You Equipped to Transform Your Testing?

Explosive growth of smart technology is transforming the way we interact and connect today. Rapidly evolving technology is making connectivity pervasive and is enabling businesses to create and sustain innovative ways to engage with consumers and enhance profitability. Innovative software forms the backbone of this always connected world. The changing context of technology is putting significant pressure on organizations to develop quality software products and solutions quickly and efficiently. In response, organizations need to transform their conventional testing and quality control approach to improve quality and time-to-market for products.

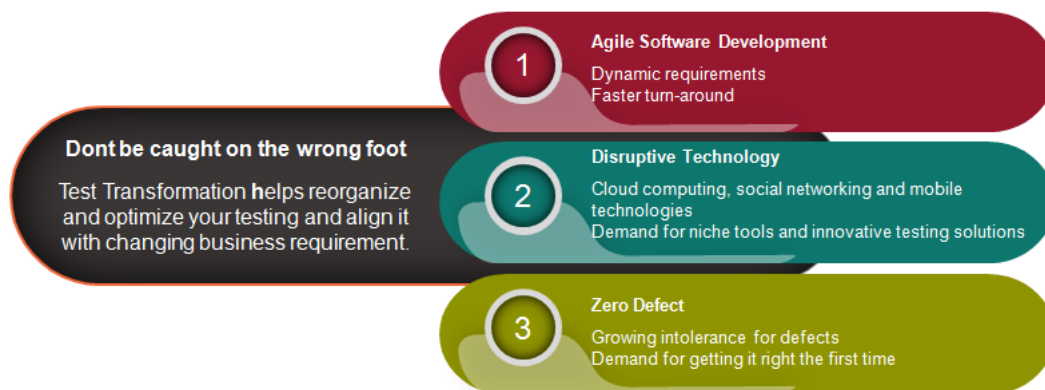
Key factors driving test transformation

Software failure significantly impacts cost and profitability. The need to reduce cost, enhance quality and accelerate testing cycle time has become a change agent, driving testing processes and quality improvement. Moreover, the innovations in testing industry to manage unique testing domain requirements are also reshaping the testing landscape.

Evolution of agile software development: Today software testing is all about staying relevant with the changing dynamics of marketplace, coupled with faster turn-around times. With the rapid evolution of agile software development, organizations need to adopt testing and QA processes that are appropriate for agile practices.

Rise of disruptive technology: Businesses today are characterized by technology innovations. Organizations are increasingly using cloud computing, social networking, mobile technologies and analytics to optimize customer engagement and profitability. To meet these areas of demand it is critical to have niche tools and innovative testing solutions.

Getting it right the first time: Every customer and user demands 'zero defects'. As quality has significant cost, resource and reputational impact, customers expect IT organizations to get it right the first time. It has become central to SDLC today and companies need to focus on exact project requirements and develop processes that can provide an integrated view of quality.



Drivers Compelling Test Transformation ▲

Conventional Testing Process – Falling Short in Addressing Testing Complexities

Despite huge investment in testing, the existing quality assurance practices lack efficiency and effectiveness, often failing to meet the zero defect objective or the timelines. Organizations are striving hard to improve the maturity level of their software development and testing processes. However, they often end up taking a 'one-size-fits-all' approach to testing, irrespective of the specific priorities or requirements of the project.

Test requirements drive the entire project, but current practices fail to clearly define test requirements leading to missing, inaccurate, ambiguous or unstable requirements. Moreover, they often fail to specify verification methods to successfully trace requirements and test outcomes. This results in software behaving differently under test conditions vis-à-vis once live.

Test planning and scheduling is another issue that remains completely unaddressed in conventional test processes with test case descriptions often misconstrued as test plans. If done, scheduling is often inadequate; falling short of the amount of testing that is required to be done especially when it is manual. Perhaps the most exasperating issue is that a significant portion of testing is often done too late in the development cycle leading to major cost, time and budget implications.

While organizations are trying to use off-the-shelf commercial testing tools, they are failing to select and use the right and relevant tools. These tools are either insufficient or too complicated, making it difficult for the testers to leverage them to their full potential. It is imperative for organizations to have flexible testing models, with right tools and level of process maturity.

Transform to Stay Current

We believe that test transformation can help overcome the challenges posed by conventional testing methods. Test transformation changes the way testing is done, managed and measured through a well-defined multi-pronged approach. It helps transform complex, large, disparate and siloed testing processes into organized, centralized and role-based testing, thus optimizing software testing and enabling you to achieve tangible business results.

Test transformation introduces new test paradigms to help prioritize, plan and schedule testing in-line with business requirements and priorities. It helps build highly effective quality assurance processes and embeds them throughout the SDLC to detect and fix bugs early in the cycle. Thus, enhancing the overall quality of the product while reducing cost and cycle time.

Key levers of testing transformation

Transformation relies on four key levers - process, resources, tools and methodologies and governance/performance evaluation. Let us understand these four levers and how they influence effective testing.

Process: Process enhancement ensures consistent delivery of quality products. Deploying standardized processes helps integrate disparate and siloed testing systems. It involves assessing the current process maturity and then articulating guidelines, standards and developing mechanisms for validation and continuous process improvements, along with techniques to predict and prevent bugs.

Resources: It is critical that all the stakeholders take individual as well as collective responsibility. Accountability is key to driving change management. Dedicated testing resources need to be trained to manage end-to-end test management processes. This enhances scalability and flexibility of the resource pool thus reducing defect rate and cost of quality (CoQ).

Tools and methodologies: The next aspect in focus is enhancing the efficiency of the testing processes by upgrading or integrating testing tools. Adopting specific commercial tools and techniques in an agile environment can greatly help accelerate testing cycle, enhance flexibility and provide transparency across SDLC.

Governance/performance evaluation: Adopting a transformational approach is all about aiming for a better outcome by optimizing processes and tools. This means that organizations need standardized measurement and reporting to govern and measure the effectiveness of the deliverables, and trace them against project requirement. This helps better manage the quality throughout the development cycle.

Transformation Journey Begins with an Innovative Testing Approach

Model-based testing (MBT) is an effective test transformation approach that helps create and automate testing based on a desired behavior (usually functional) model. It begins with discovering hidden/missing details through a comprehensive review of the test requirements that helps document granular details of test specifications. The test model is then automated as per these specifications or behavioral requirements. It not only helps in generating test cases automatically, but also in modifying test scripts as per the changes made in documentation within a matter of seconds. Thus, eliminating the need for writing new test cases.

MBT helps maximize coverage, which significantly enhances performance quality. It allows developers to embed quality in test requirements, thus streamlining various phases of testing and facilitating early detection of bugs in the cycle. Using MBT significantly reduces testing time by generating and executing automatic test cases. Thus, it significantly enhances the reliability of the system under test at a reduced cost.

Testing Solution – A Roadmap for Testing Transformation

Testing transformation focuses on improving productivity and streamlining costs within the testing practices in conjunction with implementing an integrated 'shift left' approach. This helps organizations derive year-on-year quality and cost benefits.

The key objectives of transformation are reducing development cycle time and cost, and lowering business risk, while enhancing overall product quality. It begins with devising an end-to-end solution that combines designing a methodology around the concepts of standardize, optimize, improvise and automate. A robust methodology combines tools and methodologies along with multiple processes, and process aids to help accelerate transformation from current to targeted state.

Standardize: Entails employing industry standard tools and best practices to assess the level of maturity and identify gaps in the current testing environment. Organizations need to strategize the transformation road map as per business priorities and establish test processes and best practices to standardize the subsequent test phases. The governance and control measures should also be determined and defined in this phase to ensure complete visibility into test functions throughout the SDLC.

Standardize all the phases of project lifecycle to help provide 360° visibility into defect and test management activities.

Optimize: Facilitates test automation and configuration management of data with the help of appropriate testing tools. These highly flexible tools provide a rich set of testing functions, and reduce redundancy while increasing test coverage.

Optimize test efficiency to help reduce defect, time, cost and effort.

Improvise: Manages, controls and improvises testing through dedicated interventions such as establishing a Quality Centre of Excellence (QCoE). The use of robust test metrics and intuitive dashboards enhances control, visibility and predictability of test processes. Advanced governance and project management enhances productivity and reduces defect ratio.

Improvise test efficiency to enhance productivity, governance process and project management.

Automate: Accelerates the adoption of test automation across the organization by using industry best practices and standardized frameworks. This scales up existing test practices and enables you to offer new products with enhanced quality at a shorter time and lower cost.

Automate enterprise-wide testing to help enhance quality assurance capabilities.

Smart Delivery Models for Change Management

Most of the organizations especially small and mid-size are still grappling with the concept of test transformation. It remains a largely unexplored area, owing to complexities and cost implications. An ideal testing solution should leverage numerous point solutions, test accelerators and tools, and virtualized testing to provide end-to-end test transformation at an optimized cost. Such tools and accelerators are available from niche players and open source platforms. A robust transformation delivery model should comprise:

- **Thorough quality management processes:** These include comprehensive test quality management by leveraging processes standardization. They help deliver optimized and relevant solutions aligned with business requirements. Such processes also enable test optimization to establish traceability, reduce coverage gaps and redundancy increasing test efficacy. This also ensures a thorough defect analysis and reduction since defects are detected earlier in the cycle and proactively fixed to prevent recurrence.
- **Quality Centre of Excellence (QCoE):** Such an initiative helps focus testing efforts and adopt industry standards and emerging best practices easily. It can be used to virtualize testing and application interfaces to help deliver complex test environments to enable teams to perform integration testing earlier and frequently in the SDLC. It can also help facilitate continuous process of improvement through collaborative efforts and parallel development efforts thus improving software quality and accelerating time-to-market.
- **Comprehensive governance model:** This is the most important aspect that helps developers and business users track performance on a day-to-day basis. An intuitive dashboard provides a comprehensive management framework with a focus on test metrics and business priorities. An effective model spells out a range of metrics to track and analyze resource performance, end-to-end test activities along with defect leakage and management processes. A comprehensive and customizable dashboard provides actionable insights that facilitate proactive and data-driven decision-making. Thus it helps improve and optimize performance in line with project requirements.

Choosing the Right Partner for Testing

In a number of cases organizations are unable to transform testing themselves. This could be due to various factors such as budget constraints or lack of sufficient skill in-house. In such cases it is easier to partner with an expert who can provide the best solutions. However, it is advisable to look beyond cost benefits while choosing a partner and seek:

Process standardization and resource optimization: An appropriate testing services provider should be able to establish scalable and flexible test automation programs across domains and applications. It is important to ascertain that the provider has the expertise and bandwidth to build and operate a QCoE

that delivers standardized processes and methodologies to help accelerate transformation, enhance quality and lower cost.

Domain expertise: Testing solutions providers require in-depth domain expertise to provide consistent and uniform testing solutions across sectors and domains. They also must possess thorough knowledge about and accessibility to niche industry-specific testing tools and accelerators. These help ensure comprehensive application portfolio analysis. Finally, the ability to combine the right best-in-breed tools is necessary, as it helps manage defects early in the cycle to ensure resilient, secure and quality throughput.

Resources: The partner must have a talent pool of skilled and dedicated testing resources, trained in industry standard testing methodologies and best practices. The provider also must be able to ramp up and down the team size as per business requirements to ensure cost optimization.

TechArcis Helps You Take the Leap of Transformation

We have designed and developed a comprehensive transformation suite that leverages multiple enablers and best practices to facilitate continuous improvements and efficiency gains. Our MagnaQ (MQ) Transformation suite combines:

MQ – Process Standardization: This enabler is used to effectively facilitate demand management, resource optimization, process and tools optimization. Using techniques such as Lean and Six Sigma remove waste or unwanted activities in the work packets to optimize end-to-end process. Clearly defined scope and effective project planning helps optimize delivery and reduce requirement churn.

MQ – Test Requirements Analyzer: Industry-standard commercial test case management and in-house developed tools and frameworks are used to evaluate, identify and document test requirements and specifications. This enabler empowers us to accurately determine functional requirements and non-functional structural requirements and testing priorities. Well defined scope of validation and verification of software application helps lower the risk of failure.

MQ – Test Strategy Optimizer: Test Strategy Optimizer is used to customize and align test strategy to suit the unique business requirements. We document test methodologies, types and definitions, test environments, entry/exit criteria, defect handling procedures, execution best practices, automation strategy, test repositories (for test plans, cases, and automation scripts) and defect tooling. Test Strategy Optimizer establishes test objective, automation strategy and tools, test environment, and risk analysis with a contingency plan

MQ – Total Test Coverage Optimizer: Total Test Coverage optimizer combines our solutions and tools that are used to optimize test and eliminate gaps in testing coverage. Using mathematical algorithms we remove redundant test cases and enable more coverage with minimal test cases.

MQ – Test Case Optimizer: MQ-Test Case Optimizer combines multiple best-in-class tools to optimize test cases as per quality parameters. It helps establish traceability between test requirement and test cases by evaluating and eliminating redundant test cases to ensure 100% test coverage. The enabler reduces manual effort and associated costs, and accelerate testing activities resulting in shorter product development cycles.

MQ – Code Analysis: The enabler is used for measuring the software quality of complex systems, built by multiple teams, various developers and comprising numerous components. It checks code quality and establishes the rigor and testing required to prevent errors from getting into the production system. It combines drill down root cause analysis of the source code by categorizing each business function into a measurable unit. MQ Code Analysis helps assess and clearly understand the defects generating from the interactions between components of a complex system.

MQ – Defect Analytics and Reduction: This accelerator is used to reduce and eliminate defects unlike convention approach that entails defect management. The real time analysis classifies all the defects to better understand defects caused in the past. It helps then define and specify checkpoints and actions to prevent the occurrence of similar defects in the future.



MagnaQ Transformation Solutions Suite

Driving Quality
Inspiring Transformation

MagnaQ (MQ) Quality Dashboard

MagnaQ (MQ) Transformation Suite

MQ – Process Standardization

MQ – Test Requirements Analyzer

MQ – Test Strategy Optimizer

MQ – Total Test Coverage Optimizer

MQ – Test Case Optimizer

MQ – Code Analysis

MQ – Defect Analytics and Reduction

MQ – Test Virtualization

TechArcis Solutions, Inc.

Quality Assurance | Testing Transformation | Outsourcing

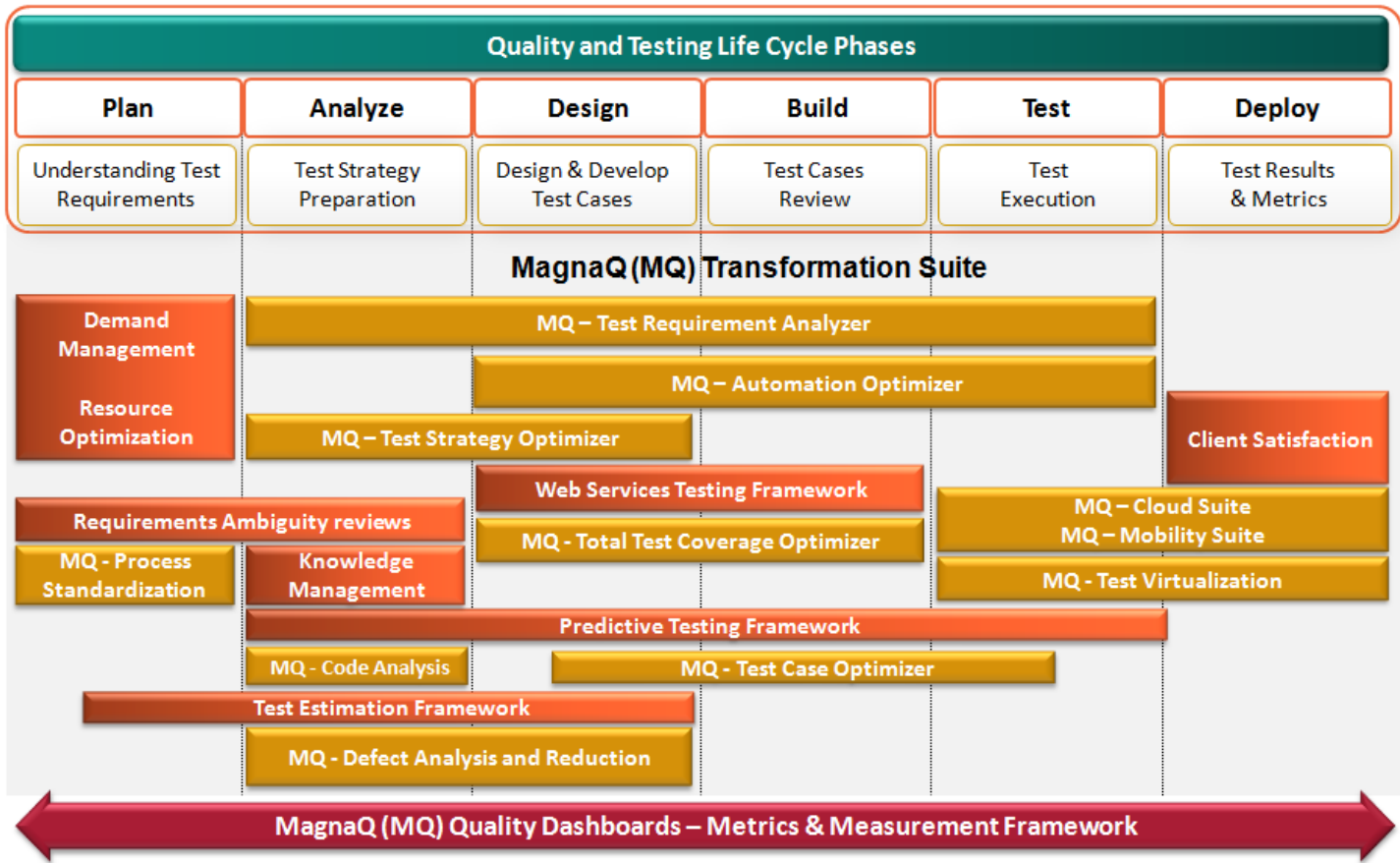
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TechArcis
Driving Quality
Inspiring Transformation

MagnaQ Suite Transforms All Quality and Testing Life Cycle Phases ▼



MQ – Test Virtualization: This enables us to test early in software development life cycle (SDLC) by setting up parallel testing for all the stakeholders in the SDLC. Test virtualization simulates data, behavior and performance characteristics of constrained systems making them accessible/available across SDLC. Parallel development, easy traceability and shared test environment helps accelerate testing cycles and embed 'Shift left' across development cycle.

MQ – Quality Dashboards: A management framework used to establish complete visibility into the progress of the project. MQ - Quality Dashboard is intuitive and combines powerful metrics and real-time insights into test activities that enables comprehensive test management. It helps track, verify and manage the status of testing activities on a day-to-day basis. Use of cutting edge test management tools help customize reports that helps extract insightful information on application and product quality and optimize productivity in line with organizations quality goals.

Automated testing tools and embedded continuous improvement processes help derive several benefits besides streamlining testing process. Adequate and focused test planning, execution and metric based tracking can reduce and prevent errors and defects effectively. By transforming the quality management process organizations can standardize test processes and derive several operational and business benefits.

Enhances application quality

Heterogeneous transformation models help enhance testing maturity, enhance test efficiency and improve test coverage to deliver exceptional product quality and reliability.



Reduces year-on-year costs

Enhanced defect management helps reduce overall defect rate, which in turn reduces cost of maintenance of high quality application. Test virtualization further reduces cost of infrastructure and processes thereby helping optimize cost across board.



Improves time-to-market

Use of automated tools, infrastructure and resource optimization and embedded quality assurance mechanism within each testing phase helps standardize and optimize processes. It helps improve early life cycle quality thereby reducing time-to-market.



Optimizes ROI

End-to-end testing transformation solution entails test management, functional and performance testing to ensure testing is optimized and aligned with business requirements. This helps ensure delivery excellence thereby maximizing ROI.



Test Transformation – Adding Value beyond Testing ▲

Change is the Only Constant in Technology Evolution

As technologies continue to evolve and become pervasive, IT organizations need to transform testing to meet the complex and evolving business and system requirements. An effective test transformation approach can greatly benefit the testing function through analytical focus, change management techniques and comprehensive management frameworks. Test transformation can help developers analyze difficult issues that impact test functions through the development cycle. The organization and service provider working together can use insights gained to continuously optimize testing and prevent reoccurrence of defects.

These collaborative efforts and industrialized approach can help build-in quality earlier in the SDLC thus delivering what business actually strive to achieve – reduced time-to-market, greater flexibility and enhanced quality.