

# White **PAPER**



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## **Beyond testing: How quality engineering is transforming software quality**



The explosion of devices and digital applications is creating plethora of challenges for the testing organizations. Constantly decreasing 'time-to-market' and increasing customer expectations are also making the matters worse. Is Quality Engineering answer to these issues?

## The need for Quality Engineering

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The development of agile methodologies and shift left testing has made it necessary for the software testers to participate in early software development lifecycle. [According to Gartner 2015 report, by 2020 more than 50% of the organizations will shift towards agile and shift left methodologies.](#) Therefore, there is an increasing requirement for quality professionals, who can assure product quality right from the product inception stage.

The quality engineering is a new paradigm, wherein the software testers are introduced to the early development cycle. Equipped with advanced skills, the quality engineers are more capable of working in advanced software development environment.



# Impact of Quality Engineering Services on Software Quality

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In the traditional software development methodology, the software testers analyzed the software quality just before the software deployment. However, the changing expectations of major stakeholders and changes in market dynamics are propelling the business enterprises to move beyond existing quality testing. Quality engineering is an innovative approach, which can drive this transformation. In simple terms, it is an approach to defect prevention rather than defect measurement. The quality engineer work alongside cross-functional teams to assure that quality is embedded before the onset of product development. Quality engineering embraces all the quality improving attributes and goes beyond the traditional software engineering and software testing concepts. It merges the boundaries between software development and software testing and uses their collaboration for the development of a defect-free product. The quality engineering approach has a significant impact on the overall QE transformation process

## QE Transformation Approach

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The QE transformation approach should be comprehensive and integrate the technology, professionals and the business processes. The basic elements of the quality engineering transformation approach are:

**Enterprise quality:** In QE adoption, it is important for business organizations to adopt QE tools and methods, which can align with business goals and aspirations. The business enterprise should also take into consideration the current QA strategy and organization maturity.

**Enterprise automation:** In the present, 'time-to-market' has become a critical factor in determining the testing methodology. Enterprise automation reduces the 'time-to-market' by a significant margin. The selected automation strategy should improve the testing strength of the organization.

**Aligning Business priorities and technology:** The QE strategy should be well-suited for recent technologies such as mobile commerce, IoT and cloud adoption. Developments in QA technologies such as test-driven development, analytics-driven development, virtualization, and performance engineering can meet the objective of managing the product quality.

**Agility:** Most of the organizations have embraced agility and DevOps to advance their business goals. With the help of industry best practices, the business organizations can accelerate the adoption of QE agile process.

# Quality Assurance to Quality Engineering Transformation

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The quality engineering possesses the ability to adapt to the latest technologies such as intelligent automation, machine learning, machine to machine communication and IoT. In the below section, best QE transformation practices are discussed:

- **Designing Quality Strategy:**  
It should encompass a detailed description of the quality assurance activities, associated objectives, and risks. It should also describe the testing tool, which must be selected according to time and budget constraints. In Quality engineering, testing is conducted throughout Agile/DevOps cycle. Testing success will depend on engineered quality.
- **Code validation:**  
It is important to revise the code for improvement. There are various tools such as SonarQube, which can be used for code analysis and identifying the bugs in the code.
- **Performance Test Engineering:**  
The performance engineering ensures that the mobile and web applications are consistent, available, scalable and fast. Performance test engineering encompasses several activities such as performance audits, application scalability assessment, performance benchmarking and load prediction modeling.

- **Dual Shift Strategy:**

The shift left strategy allows the testers to work along with the development team for performance and security testing. Similarly, shift right ensures that continuous quality is maintained across Dev & QA deployment. The integration of quality engineering and DevOps is dependent on right approach and the right tools such as Service virtualization and release automation.

- **Developing CI/CD (Continuous Integration/continuous deployment) environment:**

All the parts of software system, which are automated, should be kept in a CI/CD environment with the help of appropriate tools. Jenkins is the most common CI tool

- **Adopting a business-oriented vision:**

A QE becomes different from the test engineers as he has an in-depth understanding of the business and can transform technology to business-oriented results

- **Data Analytics:**

The data, applications and information channels are growing exponentially, which is increasing the amount of test data. To cope up with the large amount of data, QE should emphasize on the quality of data rather than data quantity. Several data-driven frameworks and data quality platforms should be designed, which can offer predictive modeling and real-time insights about the product defects. Synthetic data vault is a generative modeling system, which can develop realistic insights from the test data. It uses multivariate approach to model the database. Another method to improve software quality is mining application repository, wherein, static analysis is used for obtaining information about patterns and dependencies in the pattern code.

- **Novel Frameworks:**

In the upcoming times, QE will move from DevOps to other advanced frameworks, which will be more focused towards the business needs. Many organizations have adopted DevOps and shift left testing, which has created a need for integrating security in DevOps (DevSecOps) in which security will be embedded in the application engineering. Novel frameworks will require high automation and monitoring for robust application performance. The new frameworks will emphasize on user behavior, business value and AI-enabled automation.

- **Real-time AI monitoring and process integration:**

With the thirst for highest speed and quality, the QE will drift towards AI-base CI and application monitoring. It will also impact on enterprise interaction and which will require more virtual and augmented reality collaboration.

# About Test Triangle

Originally founded in 2012, Test Triangle has become a leader in IT consultancy services providing services in application testing, DevOps, RPA, Custom software development, mobile app development, Atlassian consultancy, niche IT staff augmentation and training in advanced technologies. Test Triangle is headquartered in Ireland; but it also has branch offices in London, United Kingdom, and Hyderabad, India. We have exponentially grown to become a team of 200+ members providing services in different verticals such as Banking & Finance, Utilities, Pharma, Retail, IT & Education etc.

Test Triangle's R&D department has created a propriety platform, Test Outsourcing Dashboard [TOD] which can be used to manage software testing lifecycle using collaboration tools like email, live chat, video conferencing. We have also launched a self- service testing platform (the premium version will be released as SaaS solution), which can provide a project overview and real-time updates of the software development lifecycle.

Over the years, we have established the reputation of being a 'trusted partner in IT consulting'. Test triangle is an agile software company, which constantly strives to exceed the expectations of its clients. We adopt the software testing and software application lifecycle to meet the customer's demand in an efficient and reliable manner. With a global workforce, we have proved ourselves in delivering tight-deadline projects.

We are proud to declare ourselves a client of Enterprise Ireland and European commission.



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