White **PAPER**

Performance Engineering: Augmenting User Experience with Speed and Performance

Performance engineering is the need of the hour! In today's highly competitive times, performance engineering can jumpstart the product development process and helps an organization stay ahead in the competition. In this whitepaper, we have discussed holistic approach for performance engineering adoption.

Introduction

Today, the world has moved to digital and internet crowd is growing exponentially. But in this era, business organizations struggle to capture even 9 seconds of user attention (Adweek, 2016). In this little time, they have to catch user attention, engage them and display their advertising message. This whole activity has to be conducted in least possible time, before the user loses his interest and goes elsewhere on the web. Hence, digital applications have to perform very well to exploit the potential of growing digital crowd.

Several performance indicators are being used to judge a mobile applications' performance-delay time, error, service interruption and waiting times. In this time, a bad performing application is immediately punished with bad user ratings. The app store's ratings are public and business organizations lose significant amount of business with bad application ratings. Today, the businesses have no room for delay and rectification. It has not ended here, and the user expectations are growing sharply with time. In this time, the yesteryears practices of piecemeal software development are not feasible. To deliver superior user experiences and application performance, we need performance engineering approach from the beginning of application lifecycle.

A Path headed towards Performance Engineering

Performance engineering goes beyond application testing. It emphasizes building performance in the first design. But, the transition towards performance engineering is not easy.

It requires transformation of work culture. The performance teams need to abandon past practices of running performance test scripts at the end of software lifecycle and start understanding system performance to create more value. It requires a deep understanding of the software, hardware, security and performance and creating an efficient and responsive system with them in the first go. Performance engineering is about collaboration and organization culture. In essence, these are the steps for a successful performance engineering adoption:

•   **Cultural Transition:**

    Performance engineering is strongly dependent on team collaboration and performance optimization. Building such type of environment will advance performance engineering values.

•   **Performance engineering tools:**

    Performance engineering requires a new way of working. Therefore, new tools and capabilities are required in addition to existing technologies. Several technologies such as service virtualization, network virtualization and data virtualization can be used to accelerate performance engineering.

•   **Defining a performance metrics:**

    The performance metrics should contain the key performance indicators, which matters most for the organization. The metrics will be a great way of ensuring high quality results and project progress.

- **Start small and start early:**

  It is important to start small so that in adoption process, personnel can learns more about the transformation. It will create more clarity towards the performance engineering approach. Further, performance engineering approach works best when it starts from the beginning of the lifecycle.

Next-generation Performance Engineering Framework

The performance engineering optimizes the software applications for extreme load conditions. It focuses performance optimization and reducing performance related failures. There are four elements in the performance engineering framework:

Predictive Performance Modeling	Performance testing and simulation
Performance evaluation	Performance Tuning

Predictive Performance Modeling: Predictive modeling can accurately identify performance issues before they can impact bottom line operations. These algorithms analyze how the application behaves in real-time. They can measure the application performance in real-time under extreme load conditions. Predictive simulation is also used to test the application design and performance before incurring cost and other investments. With simulation, real time data can be gathered to train software agents for actual user behavior. Their movements and behavior can be used for system analysis.

Test Stimulation: It determines the system performance under extreme load conditions. Several factors such as response time, reliability and scalability are used to evaluate a system's performance. Different test approaches such as baseline and load testing, benchmark testing and performance debugging are used for test stimulation.

Performance Evaluation: The performance evaluation is conducted by evaluating the test results, identifying the performance bottlenecks and metrics reporting.

Performance Tuning: In performance tuning, the performance bottlenecks identified previously are rectified. Performance tuning is marked by elements such as fixing performance bottlenecks and change validation.

In the last few years, the value of performance engineering has drastically increased. Today, most of the organizations have incorporated it as a core cultural value. The rise in the performance engineering's importance is due to practical reasons: An IT outage can cause a business $5million an hour. But, performance engineering has not stopped here yet and is constantly evolving.

Performance Engineering: What Lies in Future?

Performance engineering is building an ever-changing array of testing tools, software test strategy, and testing goals. In our observation, this evolution will result in more levels of test automation, and amalgamation of evolving technologies such as Artificial Intelligence (AI) and cloud.

Have a look at Test Triangle's insight on the future state of performance engineering:

- **Automation**

  In upcoming days, not only test execution, but complete performance testing will be automated. It is predicted that there will be smarter automation with self-remediation features. The systems will be able to restore themselves in case of any failure. Looking ahead, there lies a possibility of more resilient systems with smarter scaling capacity.

- **DevOps**

  Performance engineering will allow automated performance feedback earlier in the CI pipeline. It will also leverage high-level performance monitoring.

- **Artificial Intelligence (AI)**

  Machine learning and big data can be used for better performance advisory. AI can also be used for better and efficient management of test data. Soon AI will be used for setting up the test environment and conducting test data analysis.

- **Cloud Services**

  Today, most of the organizations are moving towards cloud; however, the testing methods are needed to be examined for the new technology. In future, new testing tools will emerge for more visibility in cloud based platforms.

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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