This Technology Spotlight discusses the strategic importance of leveraging performance engineering and software quality validation to accelerate implementation and adoption of digital transformation and to decrease risk. Strategies must involve the full IT stack inclusive of infrastructure, quality, and applications as well as people and processes.

Performance Engineering Helps Organizations Meet the Demands of Digitization

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Introduction

The accelerated pace of change and increased demand for infrastructure and application performance and quality are unrelenting. Enterprises and communication SPs alike require continuous uptime and velocity while meeting agile requirements and providing security to meet digital demands.

AT A GLANCE

KEY TAKEAWAY

Performance testing is key to improving application speed and access and to helping enable software ROI.

As organizations migrate to cloud and XaaS models, establishing underlying infrastructure and automation to support quality assurance and performance becomes more critical. Infrastructure must mirror production and projected software deployment needs to address business demand. Testing cycle times must be accelerated to meet the on-demand requirements of a digital world. Continuous visibility into application performance, quality, and security is paramount to meeting service-level agreements (SLAs) and to helping ensure faster delivery of high-quality services and effective resource usage with increased agility to help scaffold exceptional, responsive customer experiences.

Mobility and the Internet of Things (IoT) also present new and unique challenges for customers. Mobility's requirements for volume and velocity that are widely distributed across varying form factors are driving complexity and performance capacity issues as well as demand for high-quality user experience with speedy, continuous data and application access. IoT solutions present their own greenfield requirements and issues, such as endpoint and interface management across widely variant devices; quality, security, communication and network concerns; and selecting the right cloud partners as well as other partners with domain expertise. Cloud, XaaS, mobile, and IoT solutions demand defined strategies and testing environments to deliver strong performance, quality, security, compliance, agility, and new business growth. Many companies do not have the resources to test these solutions themselves.
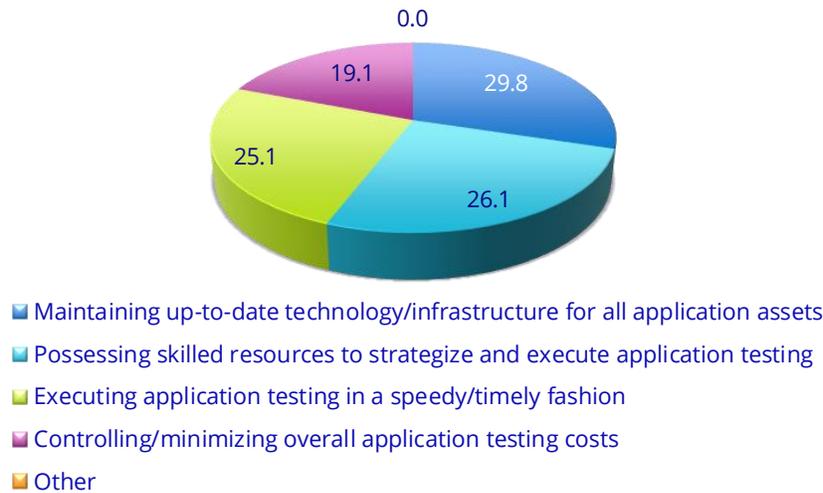
As organizations engage in digital transformation, CXOs state that effective management of their resources is critical for both business and technology success. According to an IDC study, utilization of engineering services can improve IT staff efficiency by 29% and network staff productivity by 40%; it can also reduce network operating costs by 16%. The same study illustrated improved business benefits of service adoption, highlighting an improvement in customer experience (10%) as well as internal user satisfaction (17%). IDC research also shows that top software testing challenges include maintaining up-to-date technology and varied infrastructure for application assets; lack of experienced and skilled staff with domain expertise who are capable of strategizing and executing software testing in these increasingly complex, agile environments; and executing application testing quickly and efficiently to be responsive/timely and to cut testing costs (see Figure 1). Challenges are intense for organizations engaged in digital transformation efforts. Building mobile applications that use data from disparate sources inside and outside the organization, and/or modernizing and replatforming core business applications to operate on cloud infrastructure, creates new performance and user experience demands. Performance testing is key to improving application speed and access and to helping enable software ROI. IDC surveys show that network, security, software quality, and hardware performance testing are increasingly targeted as specialized domains for which many buyer organizations seek third-party assistance, support, and augmentation of internal staff.

Additionally, IDC research finds that IT professionals in the United States and Western Europe highlighted core spending priorities that focus on cloud initiatives, improving network security, and upgrading network infrastructure. However, respondents also state that they spend too much time on tasks that limit their ability to innovate and stay competitive. Data shows that IT staff spend 20.7% of their time on software installs, patching, and updates and 15.9% of their time on monitoring, management, and troubleshooting. Against this backdrop, IT can clearly benefit from utilizing third-party services such as performance engineering and testing in support of these kinds of initiatives. Strong services provide demonstrated expertise, best practices, defined methodologies, and lab capacity to help ensure the success of new initiatives, which are vetted and tested in support of new solutions that can drive competitive advantage. At the same time, customer oversight and coordination across initiatives with visibility into service execution are also key.

FIGURE 1: *TOP CHALLENGE WITH APPLICATION TESTING*

Q. WHICH ONE OF THE FOLLOWING BEST DESCRIBES THE BIGGEST CHALLENGE YOUR ORGANIZATION FACES WITH APPLICATION TESTING?

■ Maintaining up-to-date technology/infrastructure for all application assets
■ Possessing skilled resources to strategize and execute application testing
■ Executing application testing in a speedy/timely fashion
■ Controlling/minimizing overall application testing costs
■ Other

n = 403

Source: IDC's U.S. Application Services Survey, 4Q 2016

Benefits of Performance Engineering

Performance engineering services encompass consulting, testing, application performance management, and capacity management. These services, which can be delivered by a third party for both enterprises and communication SPs, provide a holistic approach to ensuring the success of digital initiatives across cloud, infrastructure, applications, people, and processes. By utilizing defined best practices, tools, and repeatable methodologies surrounding key digital solution areas, a provider can deliver the resources needed (including people, processes, and even labs) to help an organization meet business requirements.

Digital solutions are complex. Hoping that the systems will operate seamlessly once deployment happens is wishful thinking. Having early visibility into the solution prior to deployment provides assurance that the solution is viable, scalable, and secure. Additionally, performance engineering services can highlight system gaps and provide recommendations for more efficient manageability, capacity planning, and availability to mitigate unforeseen risks and reduce downtime as well as accelerate time to market for new services and revenue streams.

Early insight and visibility into software architecture and its projected performance can reveal how it will scale, how it can be effectively managed, and how it will be supported. This knowledge can help reduce IT costs and downtime and improve capex and opex, including the potential reduction of hardware and network costs. Performance engineering also helps the CXO with planning, resource allocation, and deployment of new technology and business initiatives, as well as with making predeployment adjustments to improve end-user experience.

Within the communication SP sector, digital transformation initiatives are driving a wave of investments in new technologies as operators reevaluate the suitability of their existing network architectures for supporting current and future customer demands. Drivers behind these initiatives include the need to create a more flexible and agile infrastructure, improve operational efficiency, accelerate time to market for new offerings, and be more responsive to customer demands.

Use Cases for Performance Engineering

Use cases for performance engineering services exist across a broad spectrum of industries including telecommunications; financial, banking, and insurance services; healthcare; automotive and transportation; and energy. For example:

» In a large global telecom, performance engineering services (specifically performance as a service) were utilized to scale from 8,000 to 20,000 concurrent users. Testing, analysis, and tuning were performed to ensure the telecom company could successfully scale and meet the launch date SLAs without disruption of service and with an enhanced customer experience.

» For an IoT deployment in the healthcare sector, a company leveraged testing and monitoring services to improve API response times from 42 seconds to 2 seconds and server utilization by 30% by detecting and fixing errors more efficiently. Moreover, this service also helped the customer gain up-front visibility into the benchmarks on this platform and sign up cloud subscripts.

» A bank reduced customer frustration and dissatisfaction with continuous monitoring, management, and problem isolation. The result of the service was reduction of the mean time to resolution (MTTR) from days to two minutes.

Industry Trends

The use of tools, processes, frameworks, and technologies is an integral part of the performance engineering and solution validation market. IDC believes businesses require an ecosystem approach to meet the unique architecture, application, and cloud mix demands of enterprises or communication SPs. Having the ability to emulate test environments regardless of manufacturer requires investment and partnership.

In addition, the ability to execute quickly and efficiently is just as important as breadth of technology expertise. Establishing repeatable processes and developing assurance frameworks allow engineering teams to work efficiently and with less risk. Organizations that leverage automation where possible, move repeatable configurations into containers as needed, and standardize on reference architectures as defined can improve agility and competitive differentiation. Additionally, this repeatability can help reduce human error and speed time to market, thereby reducing costs and improving ROI for new solutions.

In the telecom sector, as service providers invest in areas such as software-defined network/network functions virtualization (SDN/NFV), analytics, and IoT, they are finding that the implementation and ongoing management of these technologies and their interoperability with legacy infrastructure are complex endeavors. Ensuring high predictability on how these technologies will perform at scale is critical to guaranteeing service levels to customers. Subsequently, communication SPs are increasingly looking for performance testing solutions that help minimize the risk associated with deploying new technology and provide insight into service management and operational support for these technologies.

When evaluating a performance engineering solutions provider, IDC believes it is essential that the provider can demonstrate its investment in process, tools, and methodologies surrounding performance assurance, as well as its ability to coordinate and partner well, to enable visibility/transparency into quality service execution, and to support (and as needed, to transition) existing internal teams.

Considering Tech Mahindra

Tech Mahindra's Performance Engineering (PE) business unit provides cross-domain and cross-technology engineering, solution validation and testing, consulting, application performance management, and capacity management to service providers and enterprise customers globally. The unit has more than 1,200 employees as well as labs, information life-cycle management (ILM) tools, and a capability factory for co-innovation with its partners. It also has an extensive alliance strategy across a spectrum of technology partners including Neotys, AWS, CA, Microfocus (earlier HPE), Cisco AppDynamics, Dynatrace, and Informatica. The unit also invests significantly in the development of its own intellectual property for the creation of tools, methods, processes, and frameworks (SPARTA, PT-MAP, Conpass) as well as its engineering expertise.

The Tech Mahindra PE portfolio provides solutions in five key areas, as shown in Figure 2, by delivering consulting, design and development, testing, and post-production services.

- » **Cloud:** The use of a multi-geography load simulation ensures performance of cloud-hosted applications by focusing on quality, accuracy, and transparency.

- » **Mobility:** This solution ensures an end-user experience that delivers high availability and performance of mobile applications as well as networks.

- » **IoT:** Designed for greenfield implementation, the solution ensures loads across varied geographies and IoT platforms (mobile, cloud, and big data).

- » **Digital User Experience Management:** This ecosystem solution enables full visibility across all user types, applications, devices, locations, and networks, as well as their analytics and conversion/churn.

- » **Automated Performance:** This toolset delivers continuous, automated testing and performance monitoring across development, test, and operations.

FIGURE 2: *DIGITAL PERFORMANCE ASSURANCE – SOLUTIONS*
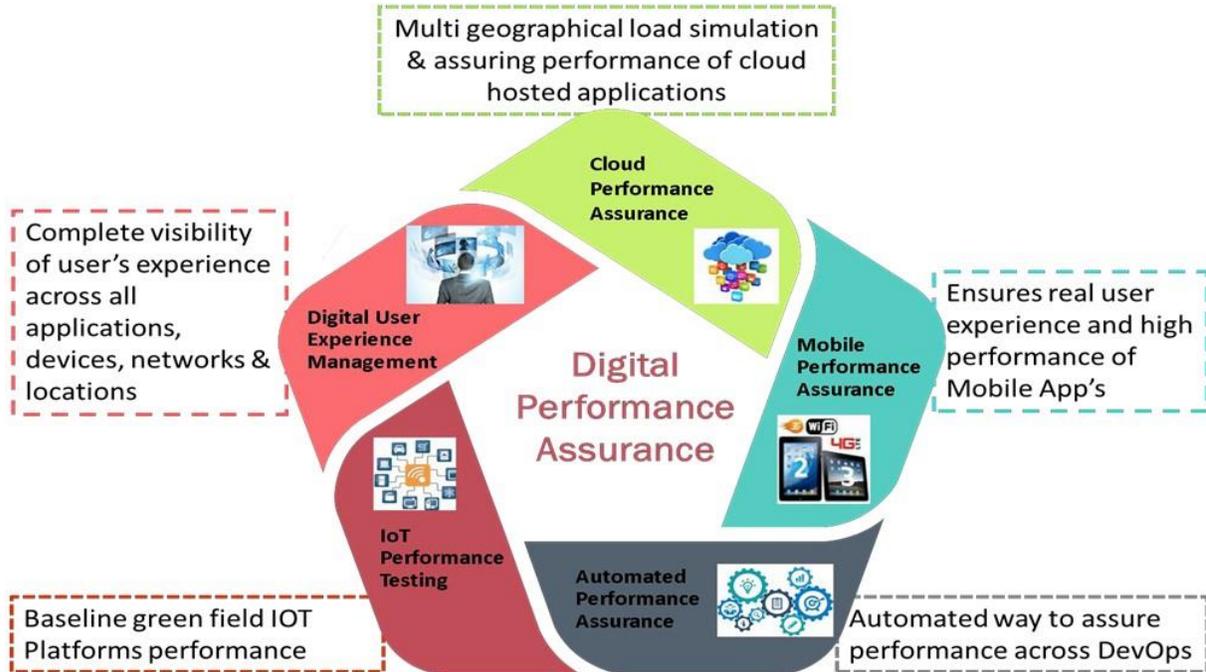
Source: Tech Mahindra, 2018

Tech Mahindra PE has also created its own defined and repeatable processes. Examples of these processes and frameworks include:

» **Consultancy Services:** Tech Mahindra offers a suite of consulting services and a customer IP that includes the end-to-end (E2E) assurance framework, the early performance assurance framework, and the Performance Stub framework.

» **Design and Development Capability:** This capability provides defined services for assessment and strategy surrounding performance engineering for digital transformation, including information life-cycle management and data performance assurance.

» **Performance Testing:** This open source, tools-based IP PT-MAP (performance test, monitor, and analysis platform) is provided "as a service."

» **Post-Production:** Services such as the iPerform framework can be used proactively to arrest issues and effectively provide feedback to design, development, and support teams.

These frameworks, processes, tools, methods, and alliances allow Tech Mahindra PE to provide a holistic offering that allows for detailed insight, solution validation, testing, implementation, monitoring, and capacity management of any new architecture, application, or load to help de-risk the investment and accelerate its time to market.

Challenges

It is important for organizations to understand the ramifications and cost of doing nothing when it comes to monitoring or continuously testing the infrastructure and applications. It is incumbent on service organizations such as Tech Mahindra to clearly communicate the benefits of performance engineering and continuous testing as well as the risks of inaction. Downtime is just one example of a negative outcome, but loss of reputation, employee productivity, and customer loyalty and trust is equally costly and potentially devastating.

Organizations should be prepared to evaluate the benefits and challenges of leveraging performance engineering solutions and even tap into the consulting resources that many service organizations provide to create an ROI model for these services. Creating a defined long-term strategy that maps to business initiatives for engineering and testing should be part of the plan, and IDC recommends evaluating and, as appropriate, utilizing these services.

Conclusion

Pressures are increasing for organizations to ensure their applications are always available and accessible. Creating an exceptional end-user experience (both internal and external) is a top priority for all CXOs. To achieve this goal requires examining efficiencies throughout the full digital stack from network through application and all the infrastructure and middleware in between. The challenge for most enterprises and communication SPs is finding the right resources with the right methodologies, tools, and people to continuously engineer and test the full stack to keep pace with the business requirements.

The accelerated pace at which organizations are migrating to cloud and as-a-service models means that the critical infrastructure must be designed and deployed right the first time to avoid costly downtime and mitigate reputational and financial risk to the business.

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IDC believes leveraging services from a third-party provider that demonstrates expertise as well as resources, such as lab and configuration best practices, and visibility into service execution can help accelerate time to market with new products and services and help enable the business to outpace competitors. To this end, IDC believes performance engineering woven into infrastructure and application life-cycle management will continue to grow in importance over the next several years as organizations seek to drive higher levels of quality in their application delivery and to seed internal execution. IDC believes organizations should:

> » **Define clear and measurable goals and objectives.** Outline specifically what performance engineering will and will not bring to your organization's application assurance program. Use these goals and objectives as foundational metrics for how your organization intends to (and will) be successful with implementing comprehensive quality across the various facets of infrastructure and application life-cycle management and to evaluate service providers. Ensure transparency into execution, and delineate clearly between those who are hired to create software and those who are enabling quality assurance and control.

> » **Assess the existing state of quality within infrastructure and application testing.** Many organizations have instituted quality assurance programs within their infrastructure management and application delivery, but they have done so in fragmented ways. It's important to get a detailed understanding of assurance gaps across the IT stack

within QA and adjacent application life-cycle functions to assess risk areas, as well as spot opportunities where performance engineering can further unlock value in other areas of infrastructure and application life-cycle management.

» **Develop a governance and overarching performance monitoring model.** Even with increased levels of assurance through performance engineering, organizations still need to develop a governance and oversight model to monitor performance and continuously improve quality. While the goals of performance engineering are to bolster quality, to speed up testing cycles, and to eliminate overhead and excess costs, organizations still must develop escalation paths and define measures of success to ensure performance engineering programs are providing value. Establish a set of resources that will help guide, direct, and manage the program, such as a steering or management committee including performance consultants, and ensure that the program has line-of-business representation and buy-in.

About the analysts:

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Pete Marston is Research Director for IDC, responsible for the Application Development, Testing, and Management Services (ADTMS) practice. He develops research focused on the life cycle of application services markets, which include Custom Application Development (CAD), Testing, Application Management (AM), also referred to as ADM (Application Development and Maintenance), and Hosted Application Management (HAM).

IDC Custom Solutions