

This Technology Spotlight examines the use of continuous testing within assurance organizations and explores the role such services can play in helping organizations enhance and streamline their application testing activities.

# Using Continuous Testing Services to Reduce Risk and Accelerate Time to Market

September 2018

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## Introduction

IT organizations face elevated expectations with application delivery. Pressures to develop and release applications faster so that business users can drive value out of the applications more quickly have forced many IT organizations to adjust their approach to application development and application life-cycle management activities. However, while many organizations have adopted agile and DevOps methodologies to speed up their application development, they've struggled to evolve their testing processes. As a result, organizations find themselves facing increased application delivery risks, reduced test coverage, and increased testing and deployment costs. To better support modern application delivery, IT organizations must employ alternative methods for application testing and involve testing earlier in the life cycle. Testing must be ingrained in all application life-cycle phases to ensure continuity across application teams, accelerate delivery cycles, eliminate defects, and raise quality. This paper examines the use of continuous testing and explores the role such services can play in helping organizations enhance and streamline their application testing activities.

## AT A GLANCE

### KEY TAKEAWAY

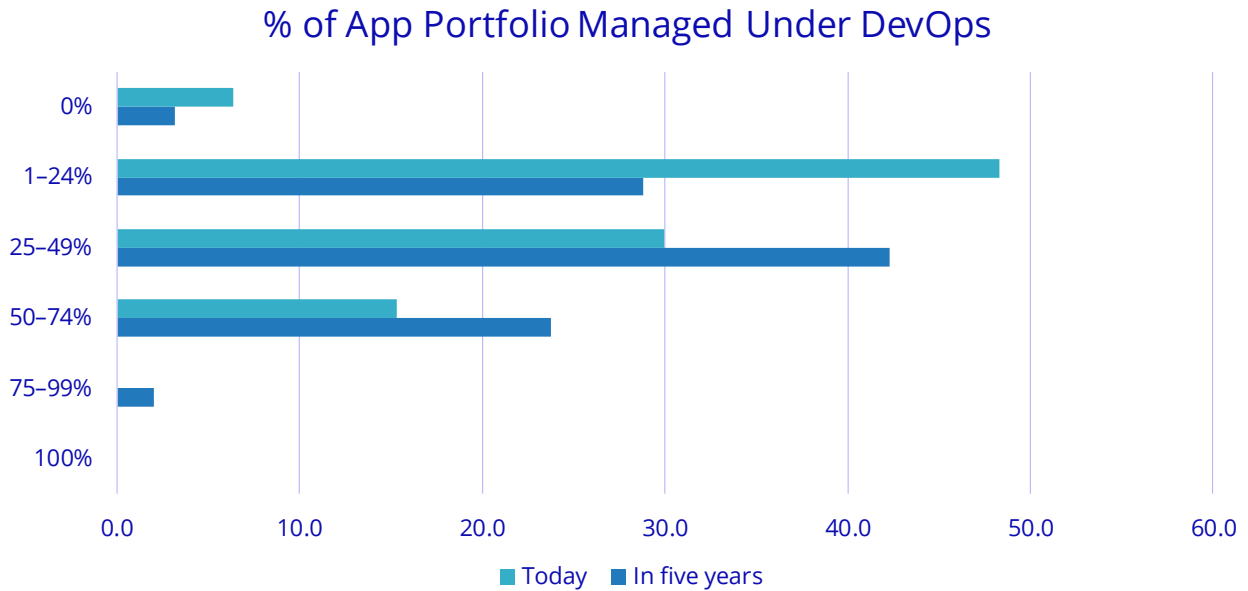
IDC believes automation and continuous testing as part of application life-cycle management will continue to grow in importance over the next several years as organizations seek to drive higher levels of speed and cost savings in application delivery.

## The Shift to More Progressive Application Delivery Presses Forward

In the past, many organizations relied on testing and assurance personnel to ensure application quality and mitigate defects that might be exposed to application users. However, while conventional waterfall approaches for application testing have helped mitigate application defects, these approaches were hampered with matching the time-to-value demands of users. IDC has found that to combat the time-to-value challenges, organizations are evolving their approaches to application life-cycle management and driving more agile and DevOps delivery into their application portfolios (see Figure 1).

FIGURE 1: **Percentage of Application Portfolio Managed Under DevOps (Today and in Five Years)**

**Q What percentage of your company's total business application portfolio would you estimate is being managed under a DevOps methodology today, and what would you estimate that percentage to be in the next five years?**



n = 403

Base = all respondents

Notes:

This survey is managed by IDC's Quantitative Research Group.

Data is weighted by industry and by employee size.

Source: IDC's U.S. Application Services Survey, 2Q 2017

Organizations' approaches to application delivery are being shaped by:

- » **Rapid pace of business change.** Newer communication channels such as the web and social media are accelerating information consumption and exchanges. The speed with which information becomes available and is disseminated and consumed requires organizations to respond to urgent matters quickly or risk the loss of reputation or business. Organizations face increased pressures to respond to unplanned business needs. According to IDC research, 53% of businesses need to respond to urgent events within a 48-hour period. Organizations must possess not only measures and mechanisms that enable rapid response but also methods to automatically and predictively detect application runtime dangers to ensure customer-facing or internal business applications are always available to support users in times of unexpected need.

- » **Heightened time-to-value expectations for application deployment.** Organizations are increasingly pressed to complete full application life cycles more quickly. For example, IDC's 2Q 2017 *U.S. Application Services Survey* revealed that more than 50% of organizations expect their service provider to deploy a mobile application within 10 days or less. Businesses are clearly growing more intolerant of application deployment delay. Organizations must have rapid testing cycles to ensure applications are available and running quickly to ensure business continuity.
- » **Increased expectations on application return on investment (ROI).** Much of an application's value is rooted in the productivity gains the application generates for its users. When an application is being serviced — whether for patches, enhancements, testing, or upgrades — downtime due to testing and maintenance directly affects user productivity levels and the resulting cash flows drawn from productivity. For example, IDC's research shows that nearly 50% of organizations expect their mobile applications to generate a 10–25% ROI over a five-year period. Organizations expect capital used for application testing and deployment to generate business value and not simply be a use of cash. Cash flow benefits (i.e., productivity gains, cost savings, or revenue generation) must be delivered.

### ***More Progressive Application Delivery Has Created a New Set of Challenges***

As organizations advance their application deployment methods to match evolving business climates and needs, quality assurance (QA) faces significant challenges. The increased adoption of DevOps and agile is forcing QA to shorten testing cycles. The shortened cycles and increased expectations for faster application deployment mean that QA must devise ways to ensure test coverage and speed up cycle times or risk:

- » **Insufficient test coverage.** While pressures on application time to value have risen, QA organizations still need to ensure proper test case coverage across areas such as security testing, functional testing, usability testing, integration testing, regression testing, and performance testing. Failure to cover all necessary testing areas can lead to unrealized application value and higher overall application costs; it can also damage an organization's brand reputation and trigger legal ramifications in cases of data breaches and cyberattacks.
- » **Higher development and application maintenance costs.** Shorter time frames to execute testing tasks can result in QA organizations doing fewer tests to more quickly make applications available to users. Reducing the number of test cases executed can lead to applications being released with vulnerabilities; it also causes post-deployment rework that can increase costs versus fixing the same issue in pre-deployment.
- » **Poor business decisions based on insufficient tools and fragmented information.** Adding tools to the application portfolio to enable progressive application delivery may assist organizations with enhancing their continuous development and integration capabilities. However, a lack of cohesiveness across the tools and full application life-cycle processes can lead to error-prone decisions. The inability to integrate tools along the application life-cycle process value chain can hinder an organization's ability to see holistic operational performance across the application life cycle and mask the root causes of defects discovered in testing. As a result, organizations may choose defect remedies that don't resolve core issues.

### ***Benefits of Continuous Testing***

Changes in application development and deployment techniques mean that testing methodologies also must evolve. Traditional testing methods — used in conjunction with more progressive application development and deployment — can drive quality assurance risks higher and undermine overall application delivery objectives. Organizations need to

consider altering their testing methodologies to harness the full value of progressive application delivery. Continuous testing — where testing activities are executed in lockstep with development, integration, and deployment — can help organizations maintain the full benefits of DevOps and agile application delivery. To achieve this, companies must institute high levels of automation across various facets of quality assurance. While automation in testing is not new, it has evolved. Historically, automation tools only injected new manual configuration and maintenance steps that ultimately offset the benefits of what was being automated. Today, however, the manual aspects of automation have been drastically improved with further automation, which relieves IT departments of the need to manage test scripts and integrations. Utilizing the appropriate continuous testing techniques, tools, and methodologies can help organizations:

- » **Reduce application defects, increase quality, and reduce risk.** Testing earlier and more often lowers the number of defects that reach each progressive stage of the application life cycle. Injecting testing disciplines in application requirements, design, and development stages can help organizations mitigate defect risks. Potential issues with functionality, performance, and security can be spotted through code quality checks and architectural design, adding a layer of assurance before test cases are run. Early detection not only can be positioned as a tool to help development teams refine their engineering processes to create higher-quality code but also can help spotlight potential coding errors that could undermine compliance standards and cause business disruption.
- » **Drive faster iterations, more velocity, and higher volume and throughput.** Earlier detection and mitigation of defects help accelerate application life-cycle activities. In contrast to waterfall testing approaches where activities are highly segregated and siloed, continuous testing leverages automation across a variety of areas including test script generation and maintenance, test environment setup, and regression testing. By leveraging automation across multiple testing facets, continuous testing can help organizations speed up testing tasks, execute application sprints more quickly, and expand the capacity of testing resources as well as increase testing throughput.
- » **Decrease costs and increase environment capacity.** Continuous testing can help organizations drive more testing volume and free up test environment capacity. By using simulated test environments and automation to create test data, test scripts, and test cases, organizations can jump-start testing activities and initiate functional tests once code is committed from development. In cases where organizations' traditional test environments need to be queued for projects, simulated test environments can be used to run other aspects of testing, such as performance and regression tests, which frees up the testing environment from being used for those types of activities.

## Trends

IDC has witnessed several trends within the application services arena that are causing organizations to evolve their approach to application testing as well as their overall application life-cycle management:

- » **App portfolios are growing and forcing quality assurance organizations to evolve.** According to IDC's *U.S. Application Services Survey* conducted in 2Q 2017, 19% of organizations estimate they have 250 or more applications in their portfolios today, while 43% of organizations expect their portfolios to have 250 or more applications in five years. As a result, the growth in portfolio sizes means that QA will need to fulfill an expanded role in monitoring and spotting risks from integrating more applications into the portfolio and minimizing any impact to application production environments.

- » **Use of open source is growing, and testing needs have become more expansive.** IDC has found that organizations are leveraging open source more within their application portfolios. IDC's 2Q 2017 *U.S. Application Services Survey* found that, on average, a fifth of the application portfolio within organizations is custom developed on open source today. Organizations expect that percentage will rise to one-third of their application portfolio in five years. Further progression in using open source will force organizations to approach application testing more dynamically and to devise new methods and support for regression testing, back-end code packaging, and unit/functional testing.
- » **Automation is gaining a greater foothold.** As organizations add more applications and extend the use of open source within their application portfolios, they seek to drive more automation and cognitive computing as part of their business and application life-cycle management. Nearly 20% of respondents in IDC's 2Q 2017 *U.S. Application Services Survey* rated implementing custom cognitive applications within their organization's application portfolio as a high or very high priority today and more than 50% rated it as a high or very high priority in the next five years. This means that as organizations increase the size of their application portfolios, they will need to leverage intelligent automation within their application delivery to cover more testing scope while driving faster testing cycle times.

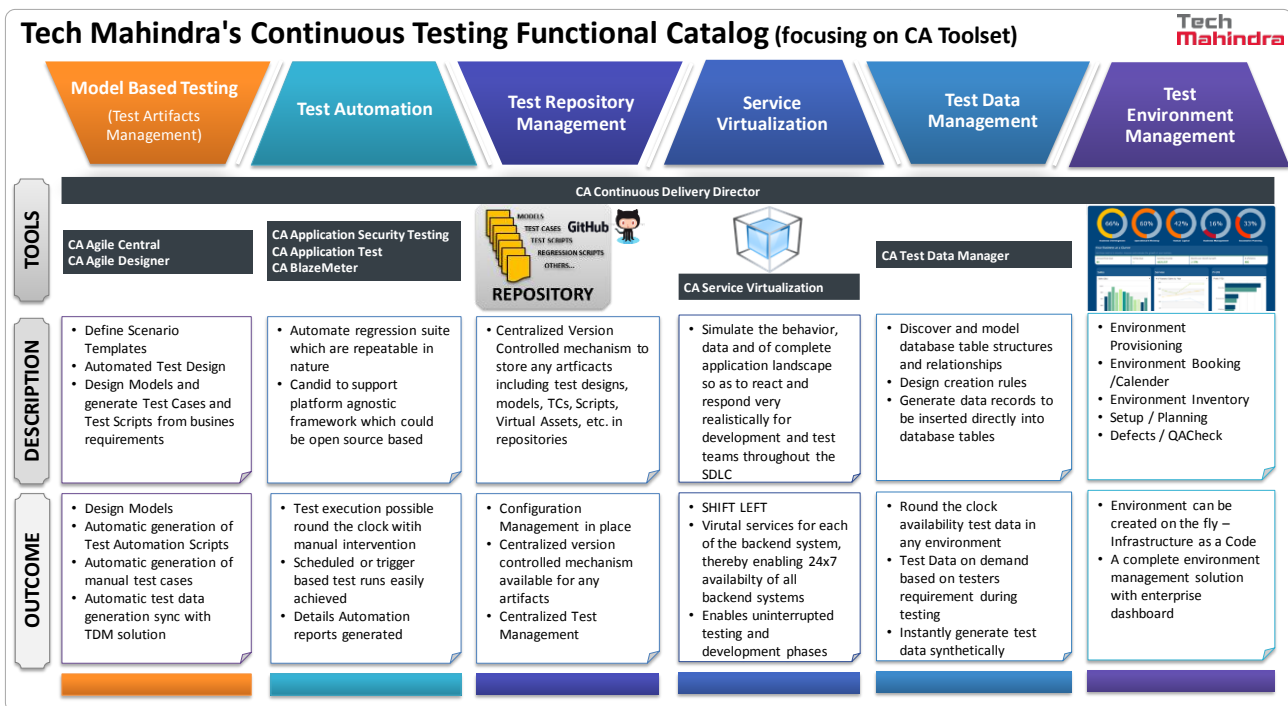
### Considering Tech Mahindra Assurance Services

Tech Mahindra, in partnership with CA Technologies, has developed a solution for continuous testing that helps organizations drive more value out of their DevOps capabilities. The solution is a framework combined with services and technology products that helps QA organizations unlock more automation, velocity, and throughput with their testing activities. It consists of nine ecosystem components integrated with a test environment as well as dashboards and reporting that support continuous planning, integration, deployment, and monitoring. At the framework's core is a self-service model that allows QA organizations to administer a continuous testing spectrum that ranges from agile planning, automated test design, test data management and automated provisioning, and virtualized services to a continuous feedback loop and pipeline visibility. Tech Mahindra's continuous testing functional catalog harnesses CA tools such as CA Agile Central, CA Agile Requirements Designer, CA Service Virtualization, CA Test Data Manager, and CA Continuous Delivery Director that enable model-based testing, test automation, service virtualization, test data management, and automation orchestration, respectively. A recent survey by CA Technologies of customers using its continuous testing solutions shows organizations have reduced production defects, reduced testing costs, and improved the speed of testing by 35–75%.

The offering contains a multistage framework and workflow to facilitate continuous testing. The workflow is initiated as backlogged user stories are moved to the "in progress" stage. User stories are imported as requirements into a design model in CA Agile Requirements Designer, which ties automation scripts to the requirements model. This tool also integrates with CA Test Data Manager and CA Service Virtualization. It then generates optimized test cases and automation scripts containing the appropriate test data as well as any required request-response pairs for each test case and stores them in the source code management (SCM) repository and automation library. The orchestration tool triggers and executes batch jobs to create virtual services and kick off automation scripts. Testing can now run constantly using virtual services instead of physical services. Orchestration tools continuously monitor tests to ensure that the entire test workflow operates 24 x 7.

What makes the offering unique is how the continuous testing framework and features support an organization's existing QA environment (see Figure 2). The solution's open architecture enables seamless integration with an organization's existing life-cycle management, source code management, continuous integration, defect tracking, and analytics and monitoring tools. Automation features reduce the setup time for testing prep, which dramatically shortens testing cycles. The combined strength of CA's products and Tech Mahindra's services and framework enables higher levels of automation, flexibility, and agility as well as faster testing cycles. The solution helps organizations drive faster time to market for their applications, reduce defects that surface during application development, and lower infrastructure costs.

FIGURE 2: *Tech Mahindra Continuous Testing Functional Catalog*



Source: Tech Mahindra, 2018

### Challenges

Rapid changes in business and technology environments are imposing greater pressures on service providers to perform exceptional service delivery, and client expectation levels for application services performance have increased. IDC research has found that application environments for development, testing, and production are becoming more complex. Highly federated and convoluted infrastructure environments — which are extending from on-premise to host-based and hybrid clouds and edge computing — have created new challenges for service providers. Providers not only must ensure application functionality and performance amid varied hosting and infrastructure environments but also must support security testing, protect against threats, and address weaknesses posed by more complex infrastructure and hosting environments. Providers that continually invest and reinvest in their solution offerings to span a wide range of testing disciplines and that possess deep, integrated expertise through the application stack stand to gain competitive advantage.

## Conclusion

Employing continuous testing as part of application life-cycle management helps organizations expand and unlock business capabilities. Through continuous testing, IT organizations better position themselves to reduce application risks and put application functionality into users' hands more quickly. IDC believes automation and continuous testing as part of application life-cycle management will grow in importance over the next several years as organizations seek higher levels of speed and cost savings in application delivery. Therefore, IDC believes organizations should:

Organizations need to consider altering their testing methodologies to harness the full value of progressive application delivery.

- » **Define clear and measurable goals and objectives.** Organizations need to outline specifically what continuous testing will and will not bring to their application testing and progressive application delivery activities. They should use these goals and objectives as the anchoring foundation for how they intend to succeed with implementing comprehensive quality assurance across application life-cycle management.
- » **Assess the state of automation within application testing.** Many organizations have "pockets" of automation within their application testing, but they fail to link automation to many facets of their application life-cycle management. It's important to get a macro-level understanding of where automation can be applied within key testing functions and adjacent application life-cycle functions to understand maturity levels and help spot opportunities where automation and continuous application testing can drive more value in other areas of application life-cycle management.
- » **Develop a governance and overarching performance monitoring model.** Even with increased autonomous computing in application testing, organizations still need a governance and oversight model to monitor performance and explore areas for further automation and deeper adjacencies to other application life-cycle management cycles. While the goal of continuous testing is to enhance efficiencies, speed up application testing cycles, and eliminate overhead and excess costs, organizations still must develop escalation paths and define measures of success to ensure continuous testing activities and tools provide value. Organizations should also establish a steering or management committee to ensure line-of-business representation and buy-in.

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