SPOTLIGHT

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This IDC Spotlight examines the use of AI to enable autonomous testing within assurance organizations and explores the role that agentic AI–powered services can play in aiding organizations in enhancing and streamlining testing and quality engineering activities.

Using Agentic AI to Amplify Productivity and Supercharge Digital Assurance and Quality Engineering Requires Control

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Written by: Peter Marston, Senior Research Director, Worldwide Intelligent Application Services

Introduction

Agentic AI is rapidly reshaping how organizations approach and execute quality engineering (QE) and testing. Autonomous, goal-driven agents are in development, and organizations are adopting them to generate tests, orchestrate development pipelines, create synthetic test data, and improve and self-heal test scripts. However, organizations can struggle to capture favorable outcomes with autonomous testing if human resources are not overseeing and steering agents. While the benefits of self-healing tests — such as faster release cycles, broader test automation coverage, and reduced maintenance — have organizations excited about implementing and leveraging agentic AI, they can face challenges with hallucinations, false positives, privacy leaks, and fragile automation. As a result, organizations will need to devise agentic AI strategies that deftly synergize autonomous AI agents with trained humans to not only target and execute higher levels of automation within testing but also help elevate QE capabilities in planning and orchestration.

AT A GLANCE

KEY STATS

Quality engineering has become a strategic, top-tier priority for most organizations as rising application complexities, faster release cycles, and multicloud environments increase the risk of defects and performance issues. In detail:

- 76% of organizations rate digital assurance and quality engineering as a high or top priority today.
- 79% of organizations rate it as a high or top priority in the next 24-36 months.

This paper reviews the use of agentic AI to enhance organizations' testing and QE capabilities. It explores the role that agentic AI–powered testing services can play in helping organizations generate more value from their application testing and QE activities.

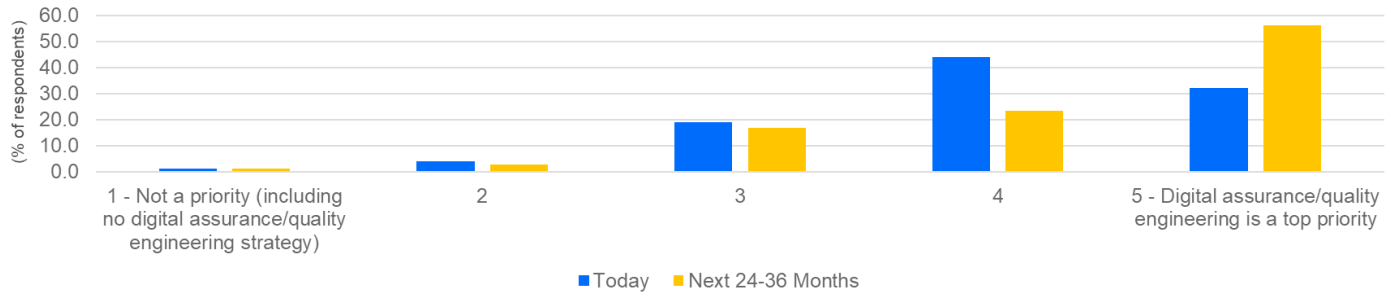
IT Imperatives Are Elevating Priorities for Quality Engineering

The key trends emerging in application life-cycle management (ALM) and modernization are contributing to the challenges that QE organizations face. They are also creating opportunities to approach testing in a more intelligent and streamlined fashion. IDC has observed that:

- **AI and hyperautomation are key IT imperatives.** Organizations are looking to accelerate digital transformation and improve operational efficiency at scale. AI and hyperautomation are critical elements of fulfilling those objectives, as they enable smarter, self-optimizing business processes that reduce manual effort, increase speed, and enhance decision quality. Along these lines, IDC has found that about 20% of enterprises view AI, machine learning, and hyperautomation as top priorities steering application modernization initiatives today and in the next five years.
- **Priorities for quality engineering are rising**. Organizations are facing increased pressures to deliver reliable, high-performing applications amid shorter release cycles. Application portfolio complexity, combined with multicloud architectures and disparate application environments, has created higher propensities for defects and performance issues. Thus enterprises are elevating quality engineering to a strategic discipline. IDC has found that 76% of organizations rate digital assurance and quality engineering as a high or top priority today and 79% rate it as a high or top priority in the next 24-36 months (see Figure 1).
- **Automation is no longer an option; it's a competitive advantage.** The use of AI to support application life-cycle management and modernization has increased to help organizations streamline application delivery. IDC has found that more than 99% of organizations are either exploring an AI strategy or using AI as part of application modernization efforts, with the top areas of AI use centering on documentation, technical engineering, code creation, and quality engineering.

FIGURE 1: ***Priority of Digital Assurance/Quality Engineering***

Q Using the following scale, please rate how much of a strategic priority application testing/digital assurance/quality engineering is at your company today and in the next 24-36 months?



n = 180

Note: The data is weighted by industry and employee size.

Source: IDC's Services Path, October 2025

The AI Frenzy Spawns New Challenges

The increased usage of AI in application life-cycle management, modernization, and quality engineering has helped organizations shorten cycle times for application deployment, but the increased levels of automation have created a set of new challenges that organizations must wrangle. The top challenges center on:

- **Agents grounded in telemetry, mitigating and controlling AI hallucinations.** AI models depend on high-quality, well-labeled, and compliant data, yet many organizations struggle with data hygiene and data quality, which are critical in powering and informing AI effectively. Fragmented data repositories, inconsistent metadata, and lackluster data management can hinder AI performance and create inaccuracies. Fragile data foundations and poor data hygiene limit model accuracy, challenge organizations trying to scale and enhance AI capabilities, and increase costs, especially for wrong or misinformed decisions or rework.
- **Strict data governance (to avoid false positives, privacy leaks, or fragile automation).** Organizations that use agentic AI for quality engineering can face data governance challenges that impact AI accuracy, data privacy, and automation and autonomous agent stability. Poor data quality, inconsistent assessments, and environment differences can lead to false positives, insubstantial automation, and privacy risks. In addition, data drift, evolving compliance requirements, and unclear ownership create further complications that challenge agentic AI's scalability and trustworthiness.
- **Human-in-the-loop controls.** Organizations using agentic AI in quality engineering face several challenges in implementing effective human-in-the-loop controls. Many struggle to define the right balance between human oversight and agent autonomy, often creating bottlenecks as reviewers become overwhelmed by the volume of AI-generated artifacts. Inconsistent review standards, unclear accountability, and limited reviewer training further complicate efforts to ensure quality and trust in AI-driven testing. In addition, legacy ALM and quality assurance (QA) workflows are not designed for seamless human-agent collaboration, making it difficult to integrate review loops without slowing delivery or increasing risk.

Augmented Autonomous Testing Is Where Enterprises Will Need to Head Next

Although more progressive methods for application delivery have increased the challenges for application testing, application delivery teams can overcome those hurdles by evolving their testing approaches. Delivery teams can rise above testing challenges by:

- **Expanding AI strategies to include observability from skilled talent.** While agentic AI can streamline test case development and speed up defect detection, it can be a flawed approach to fully navigating and minimizing risks. Augmenting AI agents with skilled professionals can help QE organizations establish the necessary oversight and domain knowledge to ensure that agentic AI outputs meet quality standards. Organizations will still need skilled talent to interpret results, understand and fix anomalies, and refine AI agents. This can help them develop scaled automation and harness the most value from AI-driven quality engineering.
- **Driving more predictability with testing.** Augmenting agentic AI testing with skilled talent helps organizations drive more predictability in quality engineering by combining the speed and consistency of AI with the judgment and domain expertise of humans. AI agents can rapidly generate tests, identify defects, and monitor system performance across complex applications, providing a steady, repeatable baseline of quality. Skilled professionals

can oversee the process, validate AI outputs, and address edge cases or anomalies, thus reducing errors and unexpected results. Together, the human-AI collaboration can help ensure more reliable testing outcomes, clearer metrics for performance, and greater confidence that application releases will consistently meet quality standards.

Augmented Agentic AI Benefits

Agentic AI combined with human resources in testing and quality engineering yields benefits that include:

- **Faster testing and release cycle times.** Incorporating skilled talent with agentic AI in application testing enables application delivery teams to proactively prevent defects versus finding and fixing them. High automation levels — combined with targeted analytics that spot code issues before tests are run and identify high-priority testing tasks — can also help improve upstream development activities, enhance resource utilization, and prevent unnecessary costs throughout application delivery.
- **Broader automated coverage and increased innovation.** Enhancing existing automation capabilities through agentic AI and skilled talent can refocus quality engineering and testing resources toward more value-added work and innovation and away from manual test case execution, monitoring, and defect detection. Shifting the role of testers, from test execution and monitoring to test strategy development and business risk mitigation, helps quality engineering teams drive more value for their organizations and fosters a culture of innovation.
- **Reduced maintenance from self-healing tests and improved risk mitigation.** Agentic AI can reduce maintenance tasks, enable self-healing tests, and improve risk mitigation in quality engineering by automating repetitive and error-prone processes while continuously adapting to changes in applications. Agentic AI can also automatically update or repair insufficient test cases, eliminating the need for manual intervention and reducing maintenance overhead. This self-healing capability can ensure that tests remain accurate and up to date, even as code and environments evolve, which can help lower the risk of undetected defects.
- **Control and oversight.** Human-in-the-loop oversight gives quality engineering teams tighter control over how AI agents generate tests, interpret results, and escalate ambiguous cases. It ensures that human judgment and domain knowledge guide critical decisions, preventing automation from producing errors or unsafe assumptions. Because of this, QE teams can ensure more stable pipelines, reduce the likelihood of errors, and promote more consistently positive outcomes across the testing life cycle.

Considering Tech Mahindra's Vector Squad Model and Agentic AI Services

Tech Mahindra helps organizations take advantage of agentic AI to enhance quality engineering through its vector squads. Tech Mahindra's vector squad model blends autonomous AI agents with skilled human talent to create a next-generation delivery engine for quality assurance and IT operations. Agents take on repetitive, rules-based, high-volume tasks while human resources are key stewards of the delivery model. Skilled professionals oversee the AI agents, handle exceptions, manage edge cases, and apply judgment, ethics, and domain expertise.

Humans and AI agents work as a coordinated team where agents deliver speed, scalability, and automation, while humans provide strategic direction, oversight, and nuanced decision-making. The vector squad model not only allows Tech Mahindra to offer clients a flexible and rigorous approach to transforming quality engineering with AI but also enables clients to capture benefits such as accelerated cycle times, reduced defects, improved application quality, and

reduced QE costs, without sacrificing trust and control or risking regulatory compliance. The operating model is flexible and can pair Tech Mahindra's talent with both commercially available agents — such as those from ServiceNow — and custom-built agents (that are not commercially available).

Tech Mahindra's vector squad differentiation lies in how the provider engages with clients. Tech Mahindra uses service tokens and a pay-per-token approach for its vector squad delivery. More specifically, it measures the units of service delivery in service tokens, which are end-to-end process outcomes, such as integration testing, performance testing, and mobile automation. The tokens deliver outcomes based on user stories or releases and are measured using key performance indicators such as coverage percentage, build success rate, defect escape rate, and mean time to complete.

Tech Mahindra uses a multiphase approach to help organizations onboard agentic AI and transform their QE practices. Engagements start with analyzing and decomposing QE processes to mimic current teams and procedures (i.e., roles, responsibilities, key tasks, dependencies, and practices). From there, the company leverages predefined human and agent squad templates to assemble appropriate vector squads and establishes appropriate service tokens based on an organization's requirements. The final component includes targeted pricing for the required service tokens and bundles.

Challenges

Rapid changes in business and technology environments are imposing greater pressure on service providers to perform exceptional service delivery, and organizations have elevated their expectations for application services performance. IDC research has found that application environments for development, testing, and production are becoming more complex and varied. Highly federated and convoluted infrastructure environments, including on-premises, host-based, hybrid cloud, and edge computing environments, have created new challenges for services providers. Providers such as Tech Mahindra must not only ensure application functionality and performance amid varied hosting and infrastructure environments but also be well equipped to support security testing, protect against security threats and vulnerabilities, and address security weaknesses that the more complex infrastructure and hosting environments may pose.

Conclusion

Implementing agentic AI as part of quality engineering helps organizations expand and unlock business capabilities and value. Through agentic AI–powered testing, organizations can be better positioned to reduce application and related business risks and can put application functionality into users' hands more quickly. IDC believes that embedding agentic AI as part of quality engineering will grow in importance over the next several years, helping organizations build competitive advantages. Thus IDC believes that organizations should:

Agentic AI in quality engineering helps organizations speed up delivery, reduce risks, and unlock new business value.

- **Define clear and measurable goals and objectives.** Outline specifically what agentic AI will and will not bring to quality engineering activities. Use these goals and objectives as the foundation for how the organization intends to be successful with implementing comprehensive QE across the various facets of application life-cycle management.
- **Assess the existing state of automation within their application testing and quality engineering.** Many organizations have broadened areas of automation within their testing and quality engineering functions, yet they continue to struggle with connecting these capabilities seamlessly across the broader application life cycle. With the emergence of agentic AI services, it has become even more important to gain a macrolevel view of where

autonomous agents can operate across critical testing activities and adjacent life-cycle processes to assess maturity, identify gaps, and prioritize where AI can deliver the greatest impact. By understanding these interdependencies, enterprises can pinpoint where agentic AI can amplify automation, orchestrate end-to-end workflows, and unlock greater value across the full application life cycle.

- **Initiate with key use cases.** Start with a narrow group of highly needed use cases. This can enable a foundation to explore where agentic AI may be best applied to key quality engineering tasks and processes. From these use cases and the performance of execution, organizations can observe successes and failures and begin to develop best practices and an operationalized model that enables scalability within quality engineering.
- **Develop a governance and overarching performance monitoring model.** Even as agentic AI drives greater autonomy in quality engineering, organizations must still establish strong governance and oversight models to monitor agent performance, manage risk, and identify opportunities for deeper automation across the application life cycle. While AI-powered quality engineering promises to accelerate validation cycles, improve coverage, and reduce manual effort and cost, enterprises must define clear escalation paths, success metrics, and guardrails to ensure that AI-generated tests and decisions consistently deliver value. Creating a dedicated governance structure — such as a steering or oversight committee, with representation from quality, development, security, and business stakeholders — helps maintain accountability, guide responsible use of agentic AI, and ensure alignment with enterprise objectives.

About the Analyst

Peter Marston, *Senior Research Director, Worldwide Intelligent Application Services*

Pete Marston is senior research director for IDC, responsible for the Worldwide Intelligent Application Services practice. He develops market research focused on modern application delivery and the life cycle of application services, which include custom application development (CAD), testing, application management (AM) also referred to as application development and maintenance (ADM), and hosted application management (HAM). Key areas of Peter's research investigate the impact that AI and modern application delivery practices (e.g., DevOps, CI/CD, SRE, and agile) have on enterprises as well as how service providers help enterprises transform their business through application modernization and migration services.

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IDC Research, Inc.
140 Kendrick Street
Building B
Needham, MA 02494, USA
T 508.872.8200
F 508.935.4015
blogs.idc.com
www.idc.com