



WHITE PAPER

THE ROLE OF TESTING & QA IN DIGITAL ENGINEERING

A RESEARCH REPORT BY APEXON

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EXECUTIVE SUMMARY

DIGITAL IS THE NEW NORMAL

And it's putting increasing pressures on Test/QA teams.

New digital technologies are enabling enterprises to re-think business processes, modernize the way they engage with customers, increase operational efficiency, and create new products and services.

The opportunities are endless, but success in digital requires new ways of thinking, and equally important, new ways of executing in the software development lifecycle. This is especially true in software testing and QA, where delivery teams need to move faster and more flexibly – without sacrificing quality or customer satisfaction. This means integrating development and QA efforts, automating manual processes wherever possible, and being ready to meet the unknown Testing and QA requirements of the latest digital technologies like IoT and AI.

In late 2019, Apexon surveyed QA/Test professionals and executives in the US and UK to assess the impact that digital engineering is having on their efforts. We wanted to understand the key challenges they face as well as the strategies they are implementing to keep pace in the world of digital.



Some of the key takeaways from the survey include:



DIGITAL ENGINEERING

Digital engineering continues to put increasing pressure on Test/QA teams to adapt to new innovations and use cases while also ensuring high levels of software quality and customer satisfaction.



ACCELERATE TESTING

There are also abundant opportunities for Test/QA teams to leverage AI to accelerate their test automation efforts, but to date, this has not been embraced by most.



BUSINESS OUTCOMES

Test/QA teams are not linking their efforts to business outcomes as closely as they could. This is especially true as pressure increases for faster cycle times and more significant business outcomes from digital initiatives.



AGILE SQUADS

Continuous Testing is another big area of opportunity for Test/QA teams to align their testing strategies with the faster pace of digital engineering. It offers a way to make testing processes smarter by delivering more timely user feedback throughout the development lifecycle.



IOT AND AI EXPERTISE

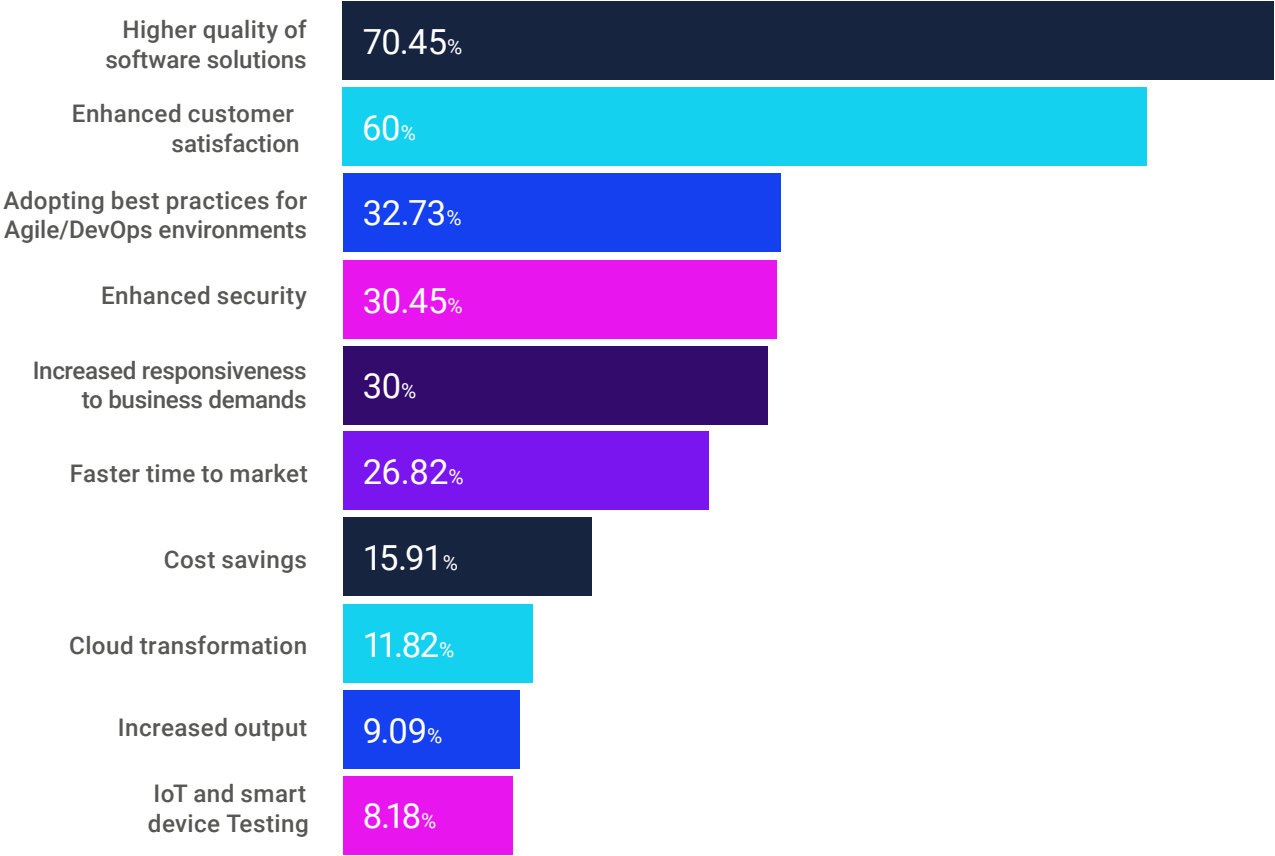
As IoT and AI initiatives continue to gain traction in the enterprise, many Test/QA organizations are struggling to keep up due to a lack of knowledge and expertise.

OUR QUESTIONS AND FINDINGS

What are your organization’s top three QA & Testing objectives?

Despite the increased time pressures created by digital, software quality and customer satisfaction remain the top priorities for Test/QA teams.

- 1 These results may be driven by the fact that organizations are more focused on customer- facing considerations that have immediate impacts – both pro and con.
- 2 Interestingly, only 30% of the respondents considered security a top priority – at a time when new digital technologies are creating a lot of security unknowns for CISOs – new opportunities for bad actors.
- 3 We think it’s also essential to look at some of the longer-term needs that are being created by digital, e.g., adopting a secure, cloud-based infrastructure that enhances the speed and flexibility of digital development efforts.



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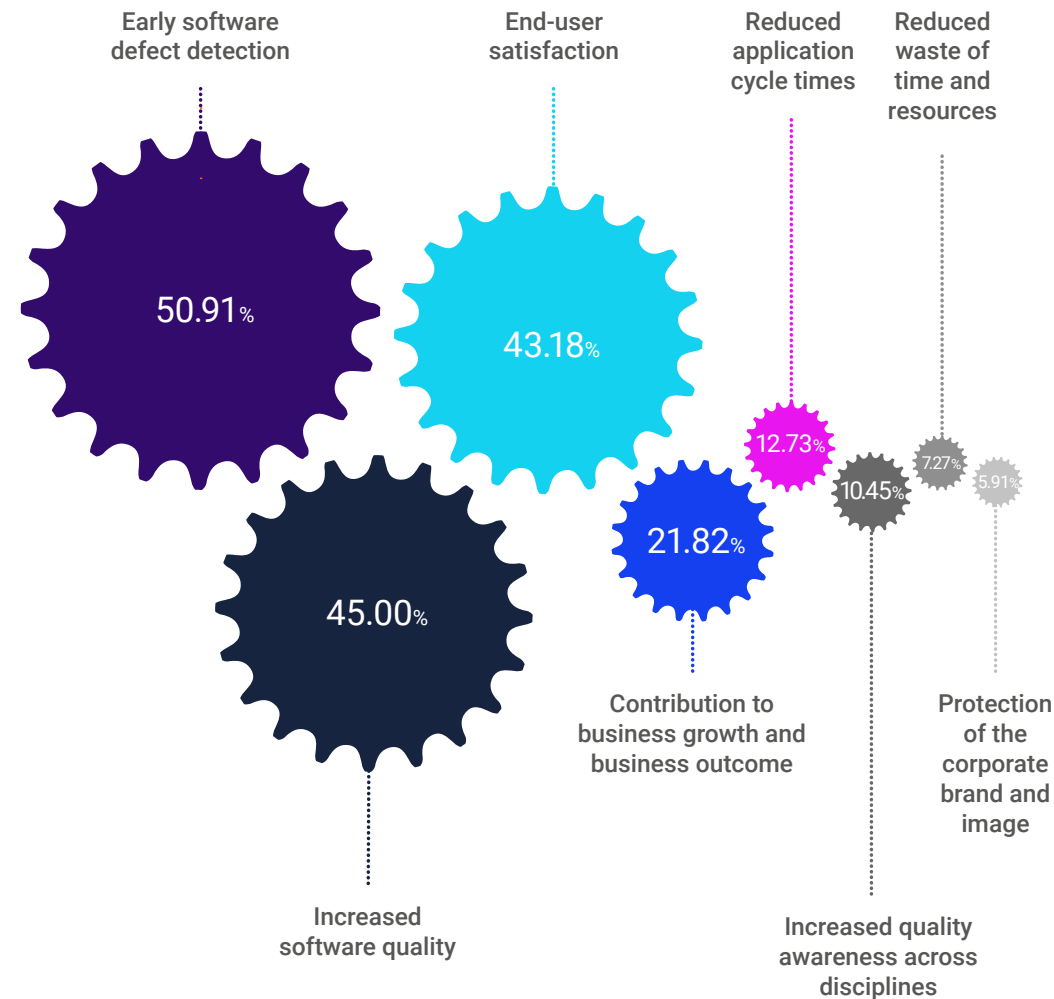
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What does your company's executive management team expect from the QA & Testing team?

Executive expectations are well aligned with test/QA team priorities.

- 1 Early software detection, increased software quality, and end-user satisfaction are the clear priorities for executives.
- 2 Contribution to business growth and business outcomes, reduced application cycle times, and increased quality and awareness across disciplines were ranked much lower.
- 3 Alignment between Test/QA and the business is a positive thing, but how much of this is shaped by pre-existing views and limited expectations of the breadth of the Test/QA team's role?
- 4 What if the Test/QA team could demonstrate their ability to have a more direct impact on product cycle time, operational efficiency, and business growth and outcomes? In the world of digital, the need to develop and test with business outcomes in mind is crucial.



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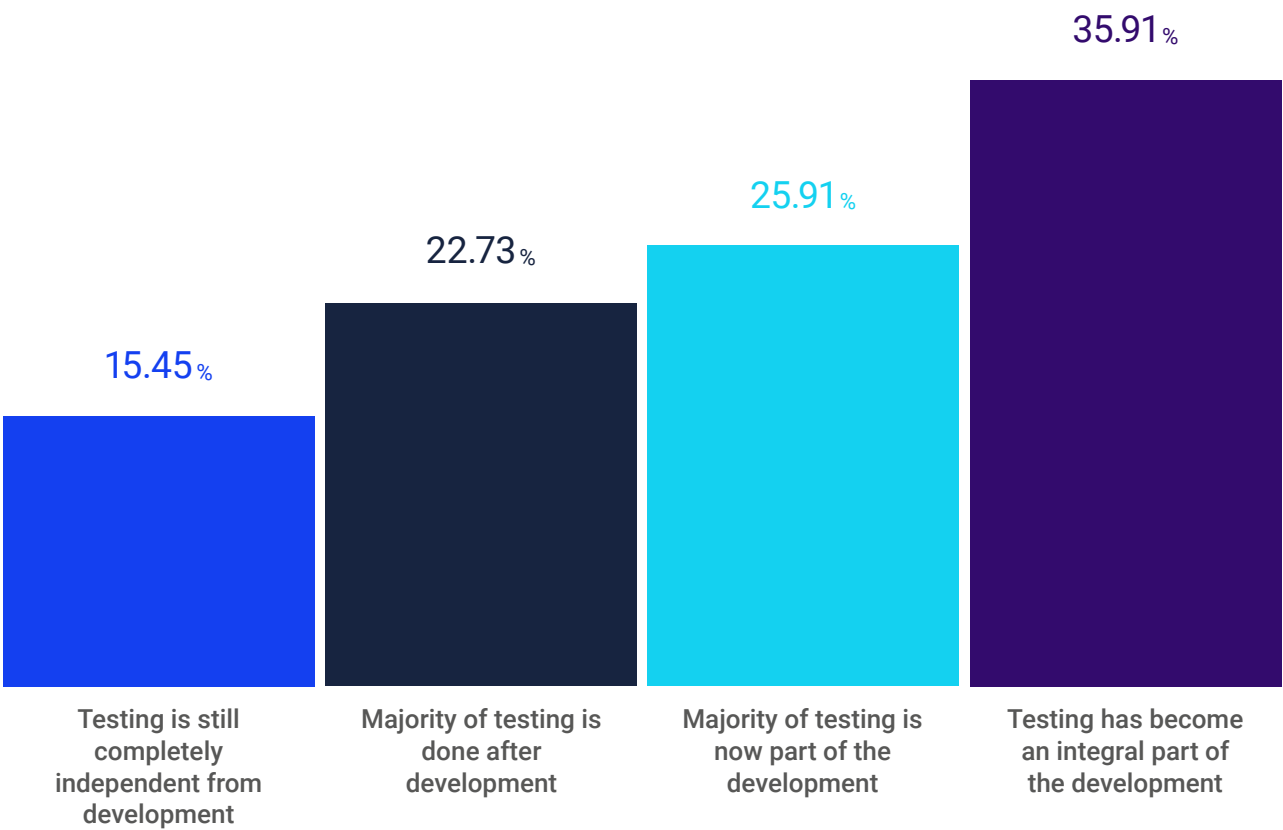
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How is the increased adoption of DevOps changing the role of QA and Testing in your organization software development lifecycle?

The integration of development and Test/ QA is now the standard, but some organizations still have a ways to go.

- 1 Over 60% of respondents incorporate Testing into development at some level.
- 2 With all the attention on DevOps in the last 10+ years, it's surprising to still see over 35% of respondents still conducting most or all of their software testing after development has been completed.



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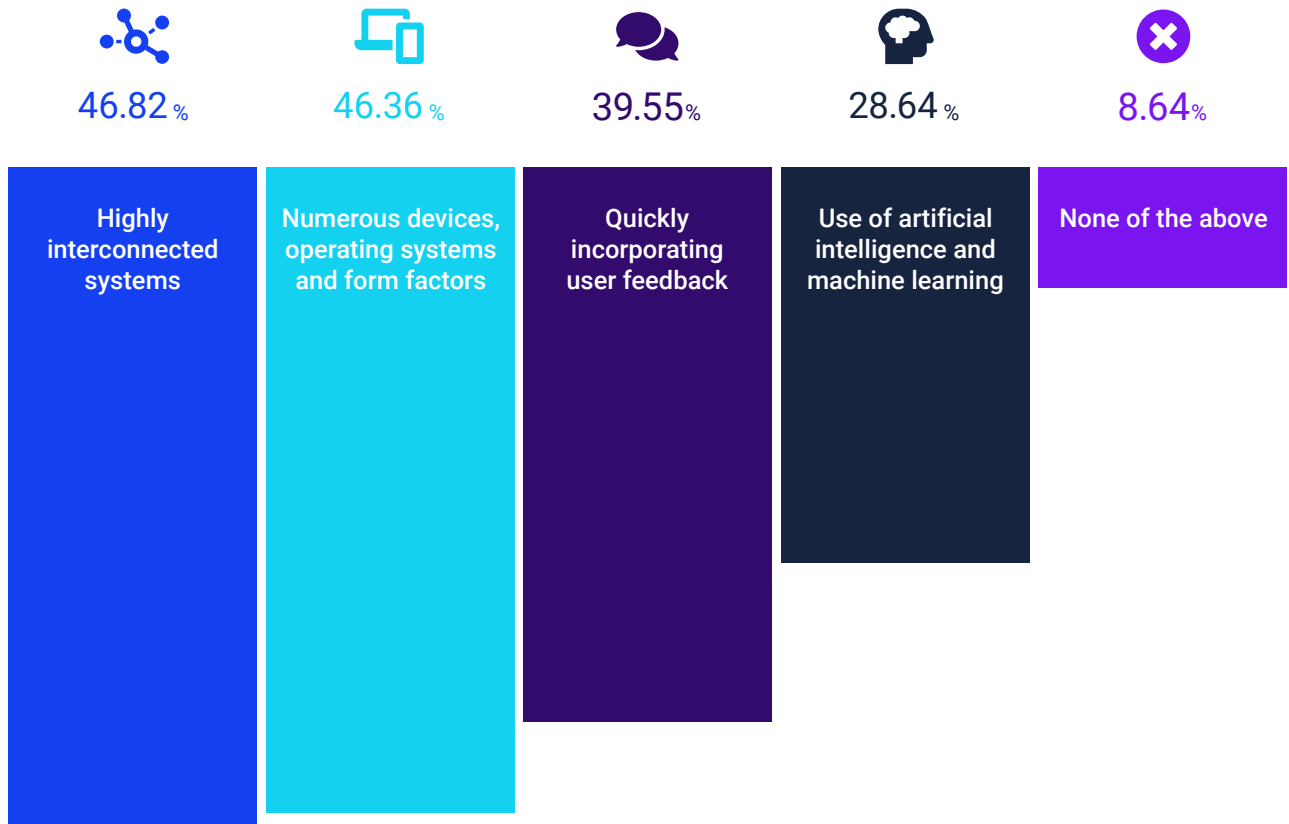
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With the evolution of digital, which of the following factors are becoming inevitable for your QA teams?

Long testing cycles, tighter testing windows, and increasing complexity continue to challenge Test/QA teams in the age of digital engineering.

- 1 Interconnected systems and the plethora of devices, operating systems, and form factors make the Test/QA professional's job more challenging.
- 2 Putting best practices into action and not having the right processes in place are also problematic.
- 3 Despite the fact that cycle time and speed were not determined to be top priorities for Test/QA teams, time-related issues are still at the top of the list of their challenges.
- 4 As digital innovation presents new use cases for mobile and multi-channel applications, we're likely to see a lack of proper tools and testing methods become of even greater concern.



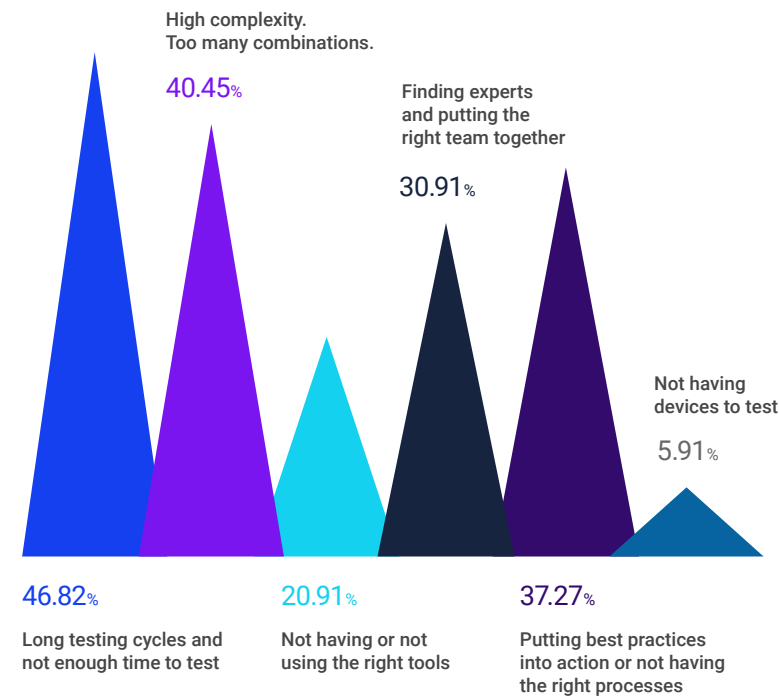
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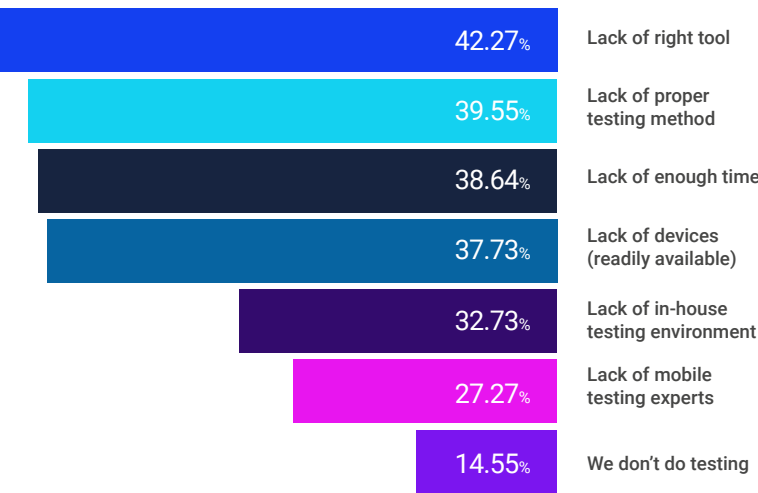
Digital is evolving at accelerated speed. Moving forward we must ensure that testing is integrated into the development process, rather than after development has been completed.

What are some of the major QA challenges in your company?



What challenges do you face when testing mobile and multi-channel

(Mobile, Wearable, Social, Traditional) applications?



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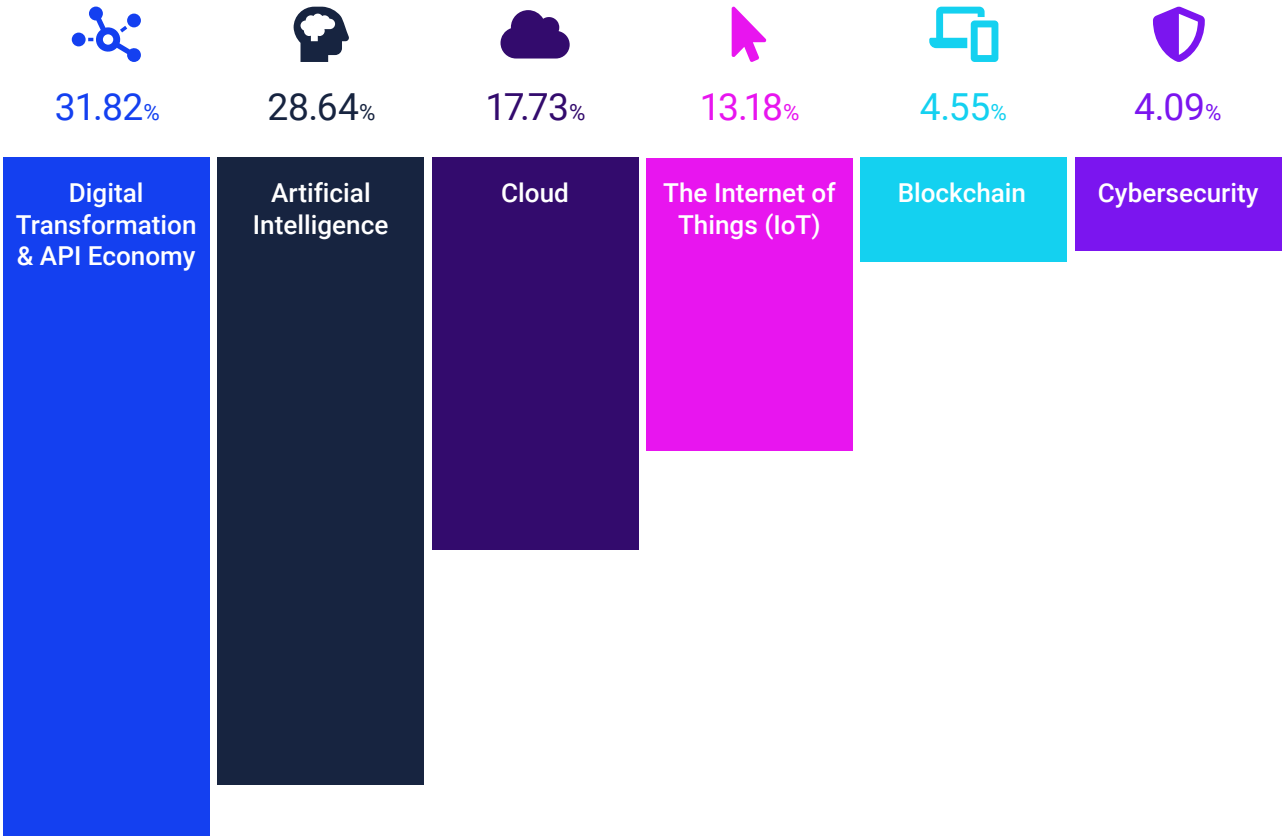
What (in your opinion) will have the greatest impact on how QA and Testing evolve over the next two to three years?

Despite not being mainstream yet, many still expect AI to have a big impact on Test/QA in the future.

- 1 Nearly a third of respondents believe the digital transformation and the API economy will have the most significant impact, but AI is not far behind.
- 2 Cloud and cybersecurity are ranked surprisingly low, but that may be a function of both being seen as mainstream already, negating their potential impact in the future.

33%

Respondents believe Digital Transformation & API will have the most significant impact on QA and testing



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Which of the following best describes your organization's position?

In relation to having specific test strategies for testing products in an (IoT) environment?

- 1 IoT, as much as any area, requires new approaches to Test/QA.
- 2 In many cases, teams are being asked to come up with ways to test functionality that's never been attempted before.
- 3 Some organizations need help putting effective strategies (and infrastructure) in place.



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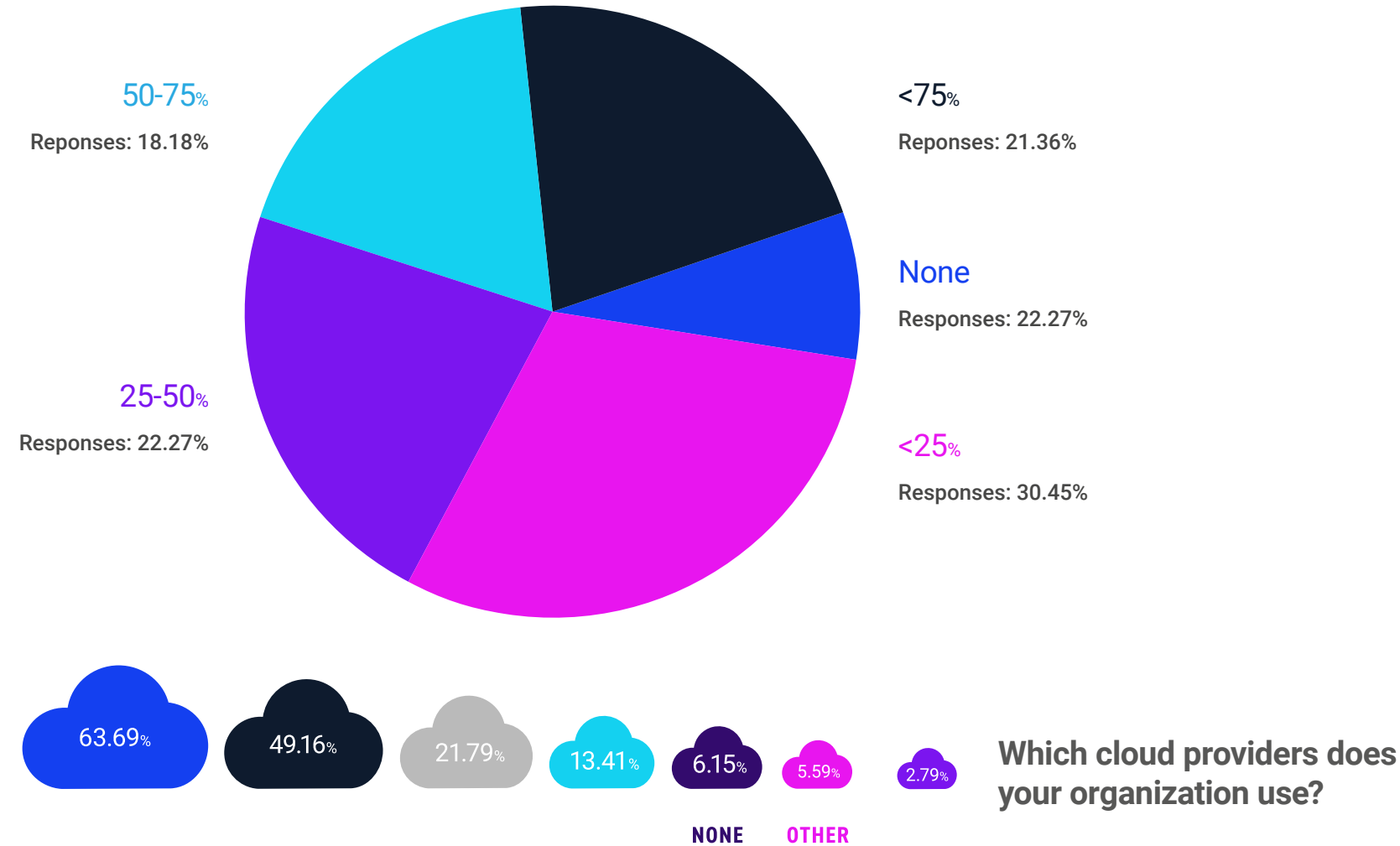
How to Tell if Your IoT Strategy is Rock Solid

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What percentage of your total applications are currently hosted in the cloud?

Cloud is the infrastructure of choice, with AWS and Azure leading the way.

- 1 Cloud is an essential enabler for the speed and flexibility required in digital engineering.
- 2 Users have much flexibility to which model they use – private, public, on-premise, and hybrid.



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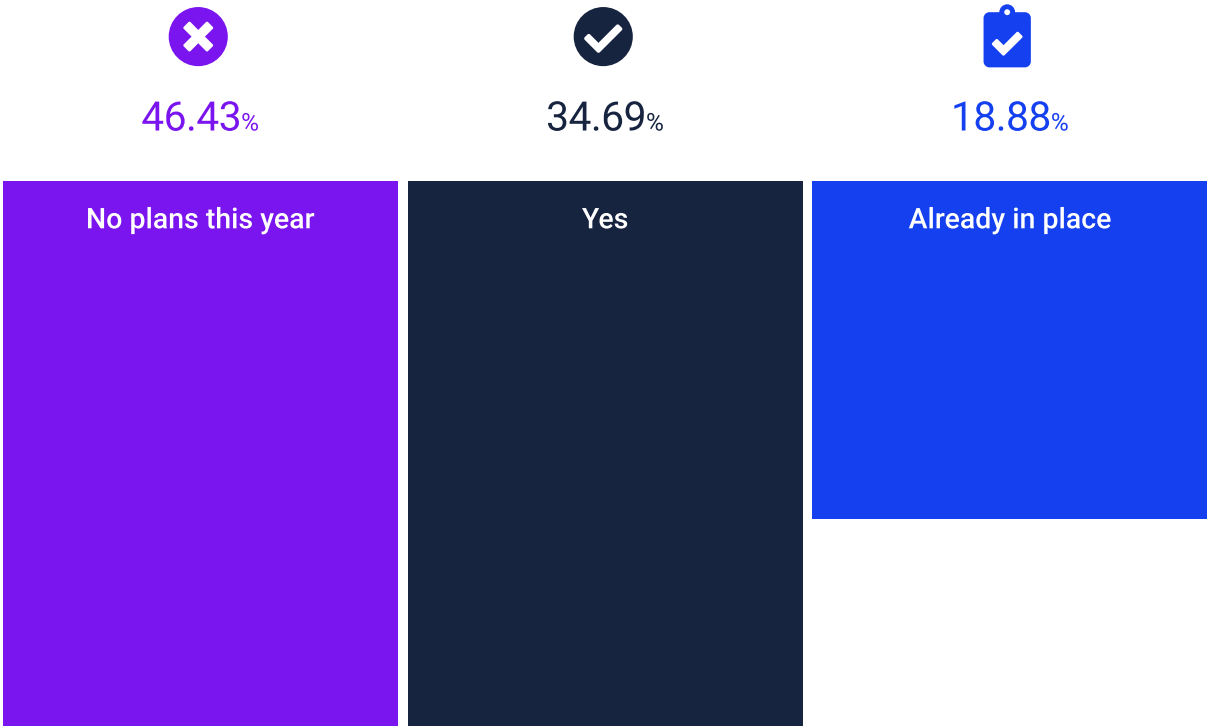
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Is your organization planning for any artificial intelligence projects in the coming year?

Artificial Intelligence projects are well underway in many enterprises and are likely to grow in importance as use cases mature.

- 1 Banking, smart plant (mfg.) management and automation are the most common use cases cited.
- 2 Yet, almost half of those surveyed did not have plans for an AI project in 2020.



Cloud is considered essential in digital engineering due to its ability to enable speed and flexibility.

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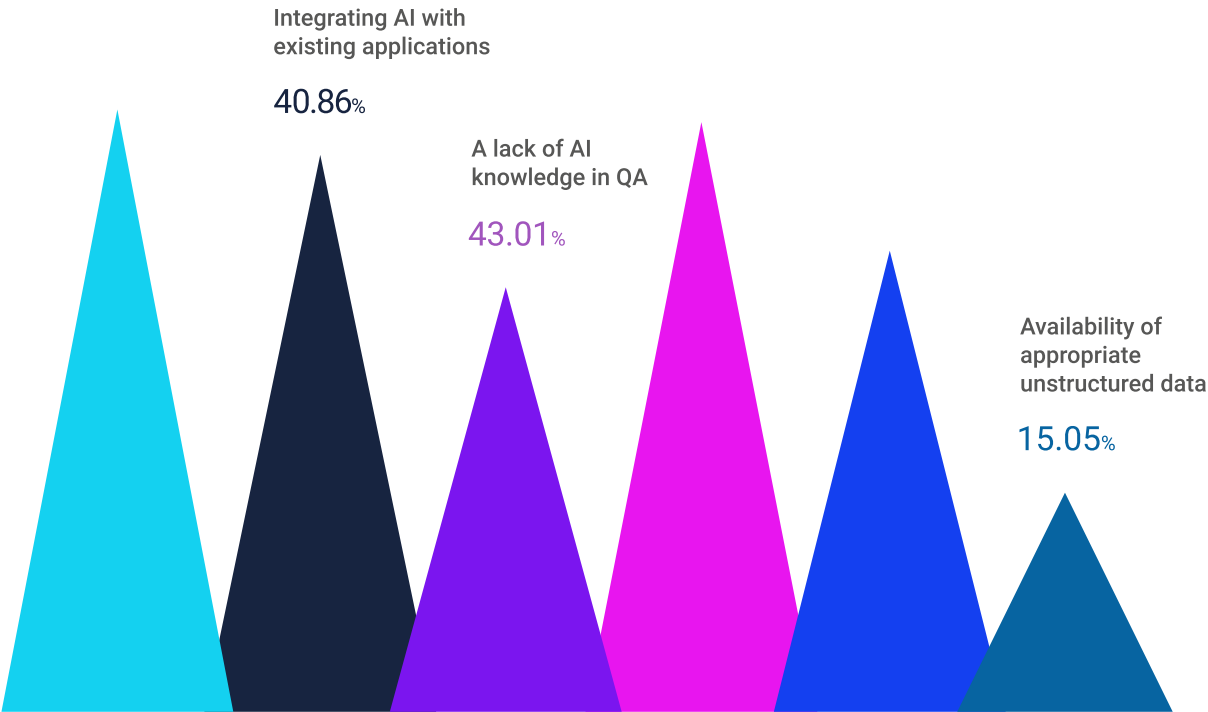
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What challenges did you encounter, or expect to encounter when setting up an artificial intelligence project?

Success with artificial intelligence is hampered by a lack of knowledge and expertise in multiple areas.

- 1 Connecting AI projects with clear business use cases is still the biggest challenge for enterprises. This is entirely consistent with other recent industry analysis.
- 2 In addition, the lack of knowledge in both development and QA is also hampering enterprise deployments of the technology.
- 3 The challenge of integrating AI technologies with other enterprise applications is also a factor.



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Does your organization currently use artificial intelligence to optimize quality assurance?

AI can help enterprises teams optimize their QA efforts, but adoption is still limited.

- 1 Over half the respondents are not doing anything with AI to support QA.
- 2 There are tremendous opportunities for AI—especially in the areas of test automation and predictive analytics, but Test/QA teams need guidance on how to move their AI efforts forward.

54%

Organizations are planning or have already planned for AI projects in the coming year



44.09% No, we don't use AI to optimise QA efforts

23.66% Yes, for intelligent automated testing

9.68% Yes, for predictive analytics

8.60% No, our data quality does not allow this

7.53% Yes, for self-learning, cognitive platforms

4.30% Yes, for cross-application dashboards

3.23% Yes, for intelligent testing/automated testing

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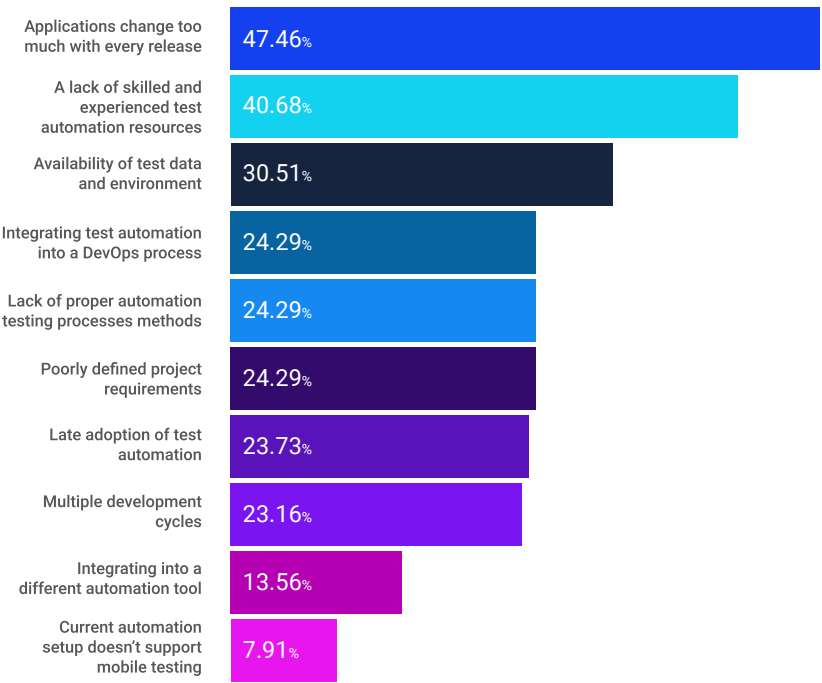
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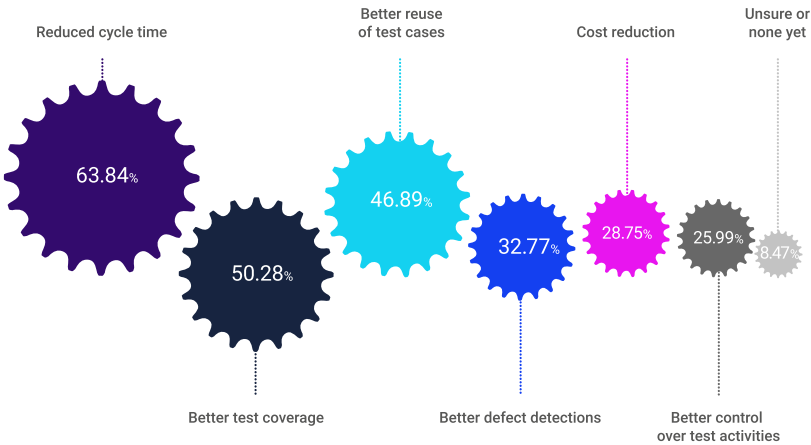
What (in your opinion) are the biggest challenges in achieving the desired levels of test automation?

Test Automation offers significant benefits, but realizing them is a challenge.

- 1 Reduced test cycle time, better test coverage, and better reuse of test cases are a few of the significant benefits cited by respondents.
- 2 But they also cite several obstacles that prevent them from taking advantage of those benefits, including frequent changes to application code and a lack of skilled and experienced resources.



What benefits has your organization realized through test automation?



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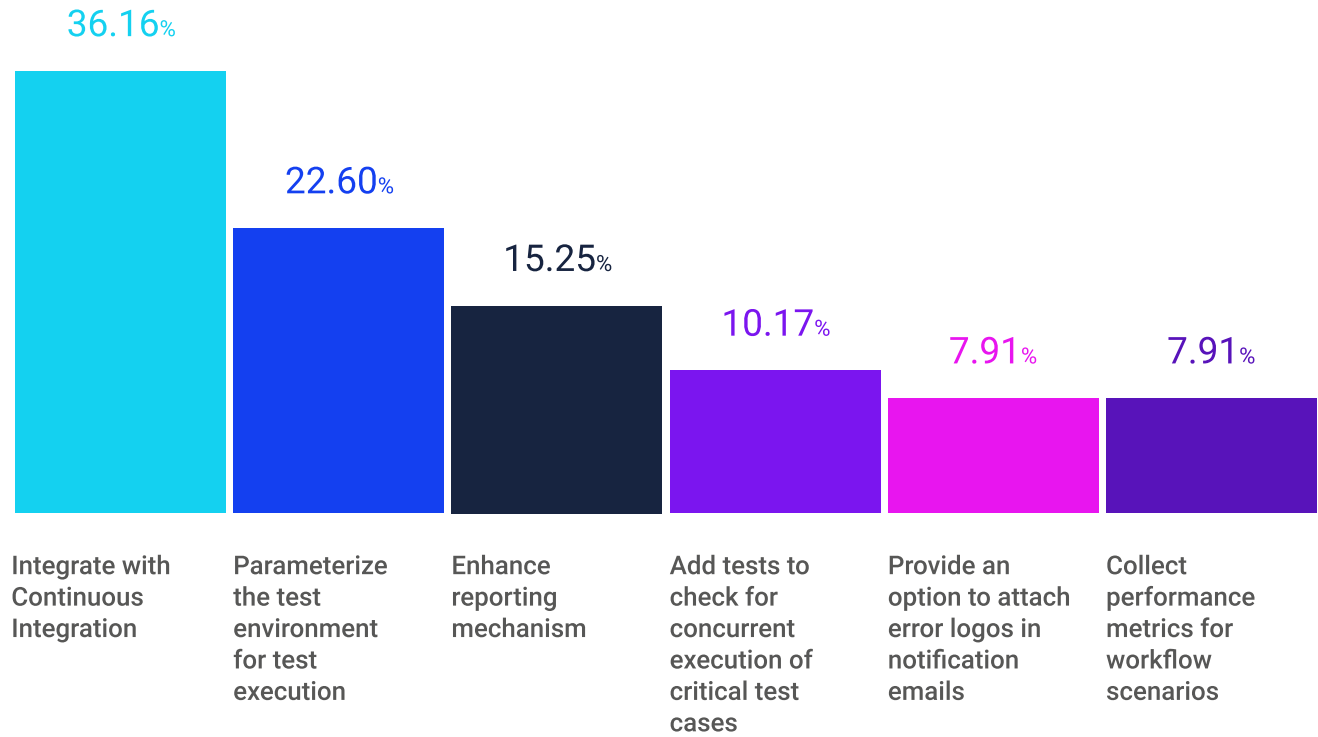
How to Flip your Test Automation Pyramid for Agile

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What is your current approach to maintaining the health of your test cases?

There are a variety of approaches to maintaining the health of test use cases.

- 1 Continuous integration is key to keeping test cases aligned with the latest versions of digital applications.
- 2 Others are parameterizing the test environment for test execution.



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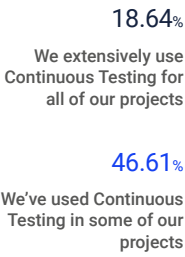
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Are you familiar with Continuous Testing?

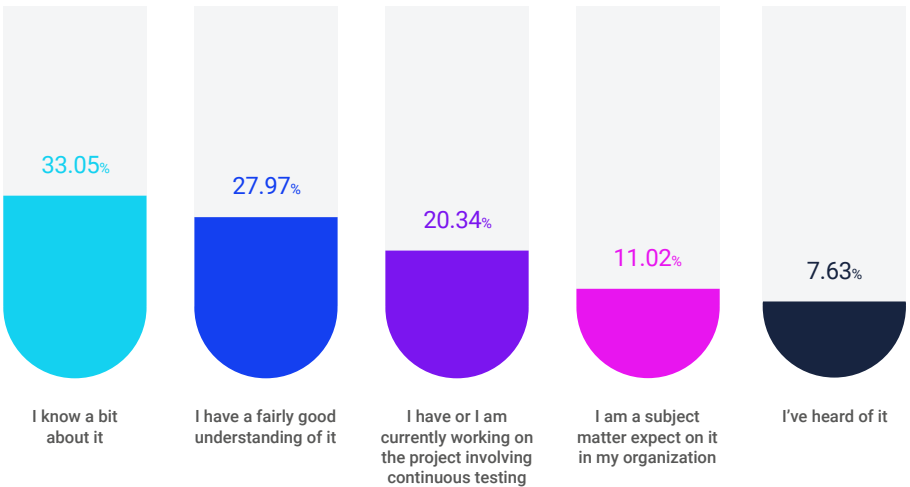
Continuous Testing is another opportunity that enterprises are struggling to take full advantage of.

- 1 While there is broad awareness and use of Continuous Testing and its many benefits, less than 20% of respondents are using it extensively.
- 2 Users cite a lack of QA automation, DevOps, and skills as roadblocks.

Which of the following best describes your organization's position?



Are you familiar with Continuous Testing?



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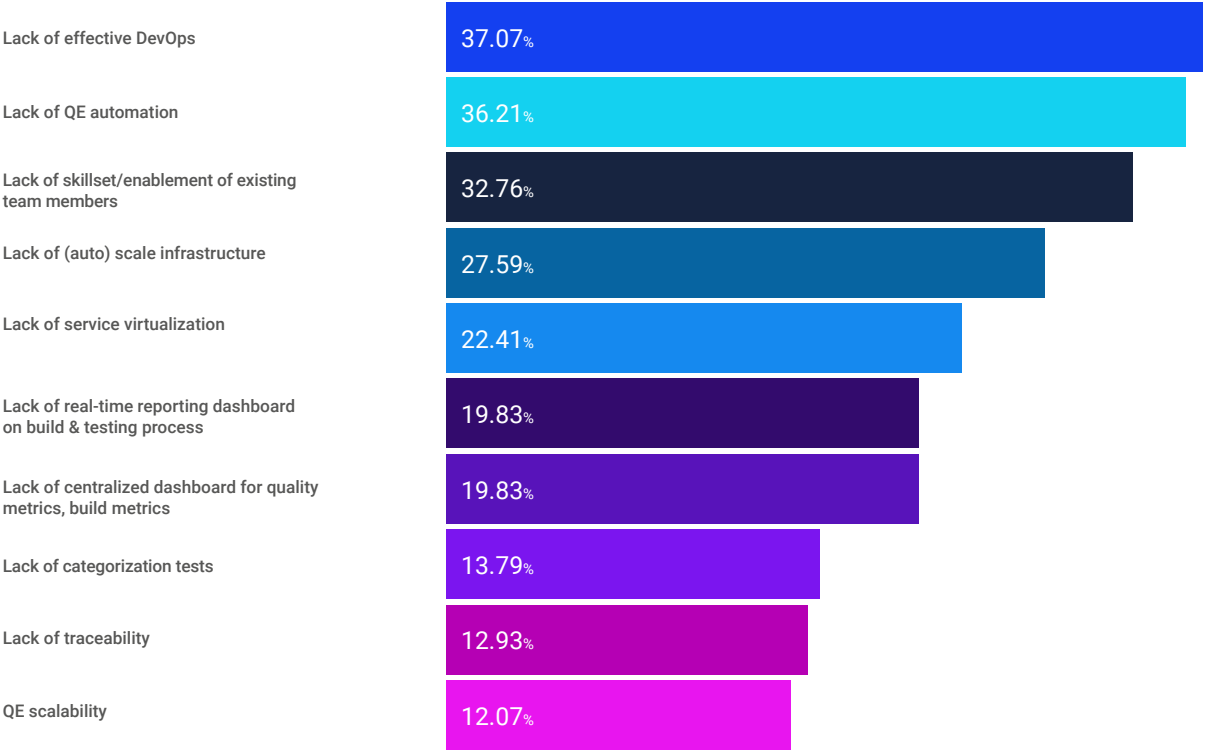
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Continuous Testing is still unfamiliar territory to many organizations.

Over one third of respondents believe this is due to a lack of effective DevOps.

What has been the major roadblock in evolving towards Continuous Testing?



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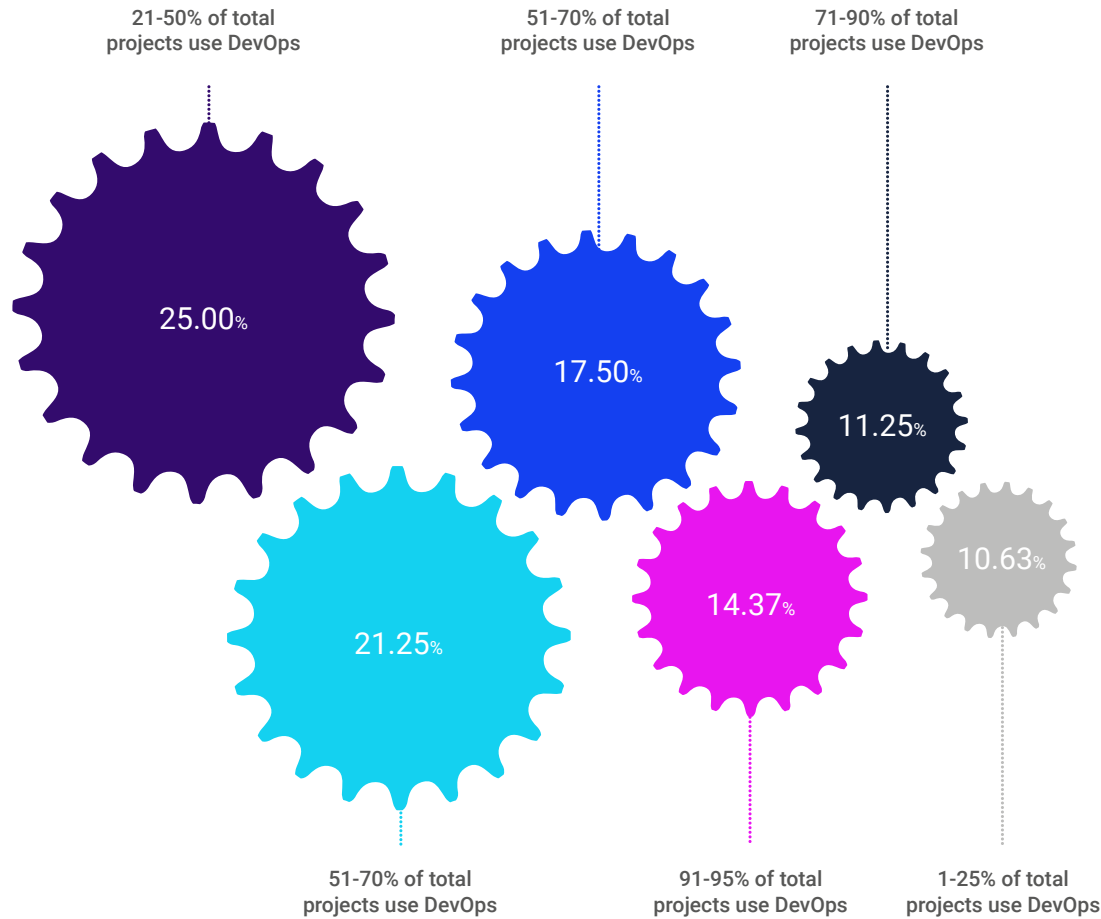
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What is the scope of DevOps adoption in your organization?

DevOps has become a core requirement for enterprises pursuing digital engineering strategies.

- 1 Nearly half of the companies we spoke with have deployed DevOps on at least 50% of their development projects.
- 2 As a result, they are deploying code much more frequently.



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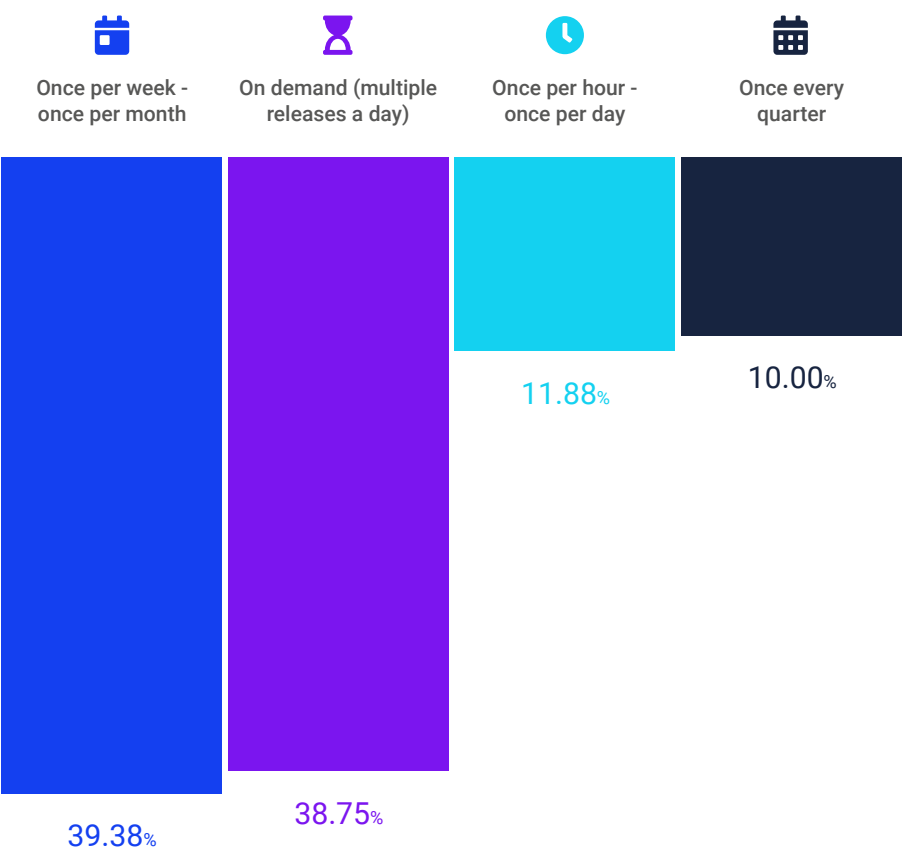
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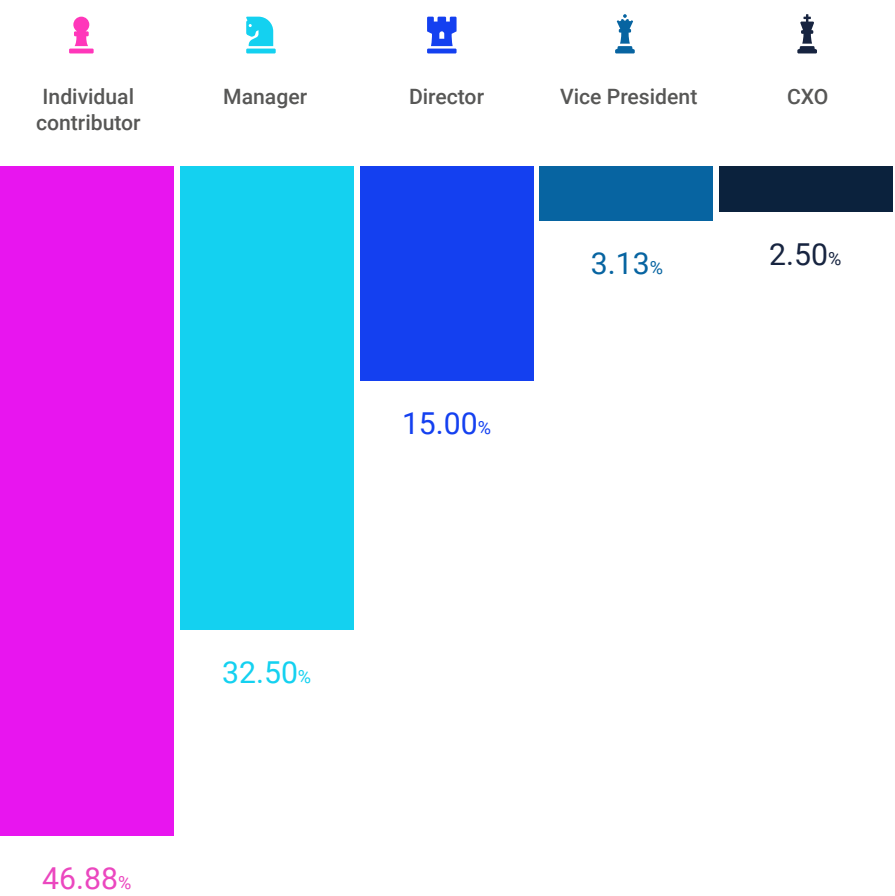
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How often does your organization deploy code?



Respondent profile



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TO SUMMARISE

INTEGRATING QUALITY INTO THE DEVELOPMENT PROCESS IS KEY

CONCLUSION

SUCCESS IN DIGITAL REQUIRES QUALITY AT THE CORE

The ability to get innovative new digital services to market more quickly while assuring optimal performance, functionality, and quality is a fundamental requirement for almost every business today at some level.

But this creates real pressures on delivery teams in the way of demand for more features, faster release cycles, tighter budgets, a constant stream of new variations and devices, and the need to incorporate new analytics and intelligence.

This requires delivery organizations to integrate and automate quality into their development processes more deeply than ever. The ability of organizations to make this shift across their delivery organizations will be the difference between success and failure in their digital efforts.





APEXON IS A PURE-PLAY DIGITAL ENGINEERING SERVICES FIRM FOCUSED ON HELPING COMPANIES ACCELERATE THEIR DIGITAL INITIATIVES FROM STRATEGY AND PLANNING THROUGH EXECUTION.

We leverage deep technical expertise, Agile methodologies and data-driven intelligence to modernize systems of engagement and simplify human/tech interaction.

We deliver custom solutions that meet customers' technology needs wherever they are in their digital lifecycle. Backed by Goldman Sachs and Everstone Capital, Apexon works with both large enterprises and emerging innovators — putting digital to work to enable new products and business models, engage with customers in new ways, and create sustainable competitive differentiation.



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