



# 2023 Software Testing and Quality Report

Insights from more than 8,000 QA professionals across  
100 countries and 35 industries

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# Executive Summary



# Executive Summary



## Each year we speak to thousands of QA teams and just finished surveying over 8000 teams for 2022.

Each year we speak to thousands of QA teams across the world to better understand trends around how teams test today, their current challenges and key priorities, and how they anticipate testing changing in the future.

Over the years we have conducted this survey, many of the trends have stayed the same: business and market conditions continue to pressure QA teams to test more efficiently and quickly with fewer resources, spurring many teams to prioritize the automation of certain key areas of their current test program. In this report, you will find many data points illustrating the ways teams are experiencing this challenge and how they are responding to continue delivering high-quality products to their customers.

That said, each year we see signals of new shifts in the quality practices that teams employ across industries. For example, in this year's report you'll find:



The metrics and KPIs that QA teams use to report on testing continue to shift away from activity-based metrics like the number of tests executed to results- or value-based metrics like test status or the number of customer-reported defects



Companies are shifting more responsibility around testing to software development engineers in test (SDET) or test automation engineers



As test automation technologies continue to evolve, businesses are trusting increasingly complex types of testing (like end-to-end and integration testing) to automation platforms, while performing more smoke and exploratory testing by hand as part of a continued emphasis around making the testing process more agile

You will find the findings in this report broken down into three primary categories:

- 1. Current Trends in Development, Testing, and Tooling**
- 2. QA Responsibilities, Challenges, Priorities and KPIs**
- 3. The Future of Testing**

By leveraging the insights and findings in this report, you and your team can effectively shape testing strategies, prioritize initiatives, and establish centralized, scalable processes. This report serves as a valuable resource to reflect on current practices, identify areas for improvement, and ultimately achieve the goal of building, connecting, and optimizing testing efforts. With this data-driven knowledge at hand, your team can gain more control over their testing processes, bring order to chaos, and pave the way for successful development.

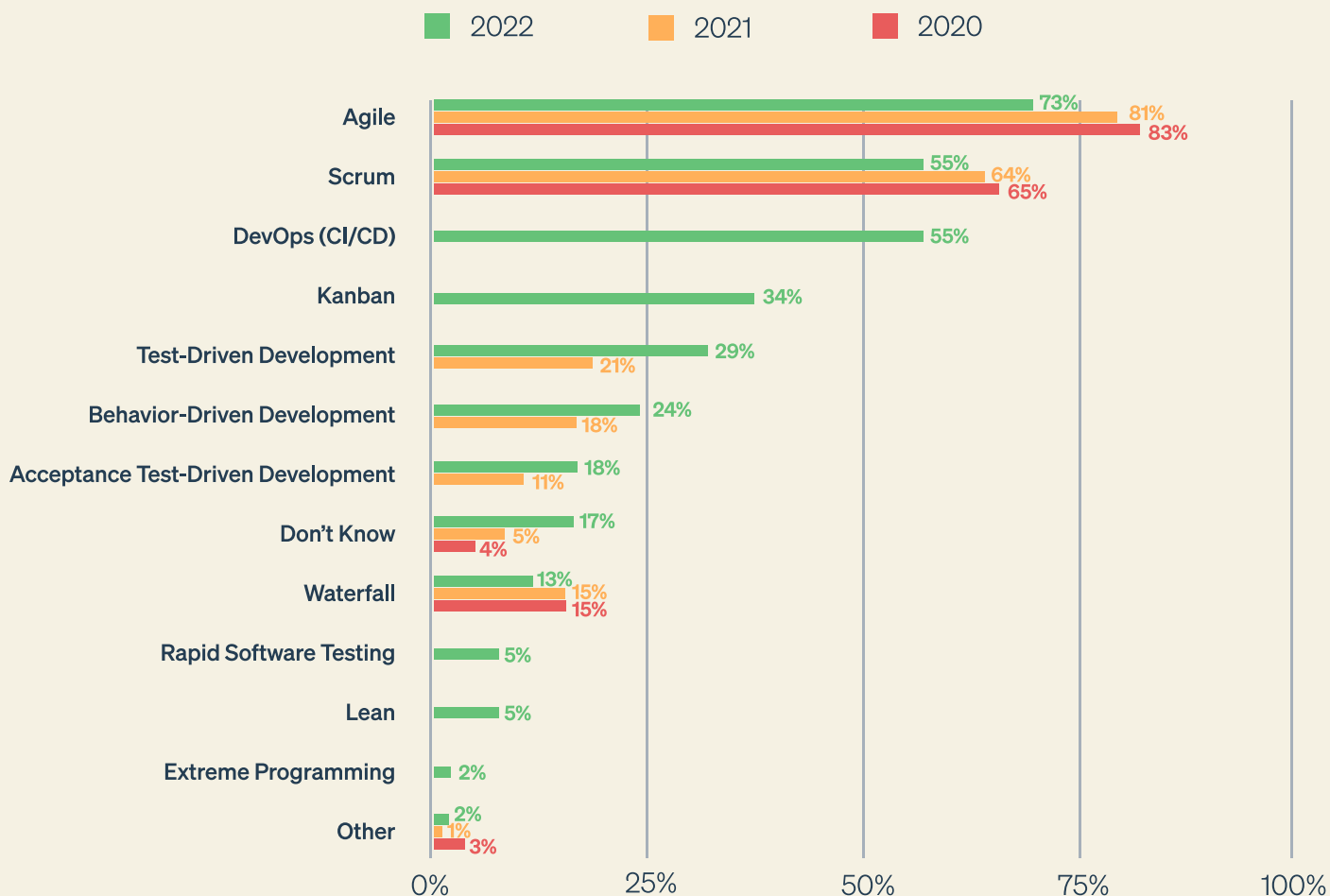
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# Current Trends in Development, Testing, and Tooling



# Development Methodologies

## Does your team use any of the following development methodologies & techniques?



### Key findings:

Although Agile and scrum methodologies are still the most widely used, the data shows a decline in their adoption. DevOps (CI/CD) adoption is growing (+10%YoY) and is now disputing the second place in this graph with 55% of teams reporting having adopted the development tactic.

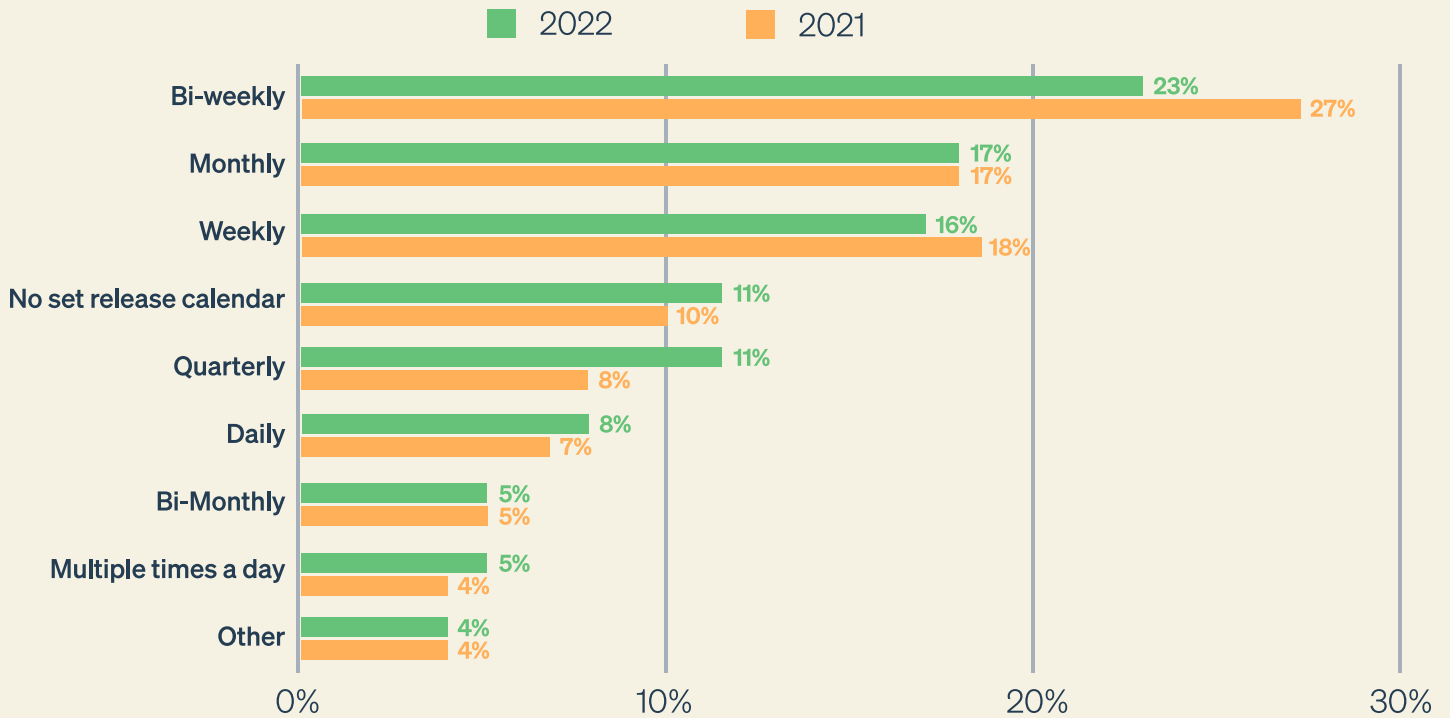
This is unsurprising given the many benefits it offers to software development teams. CI/CD helps organizations reduce the overall time to market, increase efficiency and productivity, and improve software quality. By automating various stages of the software development lifecycle, teams can focus on delivering value to end-users and improving the user experience, rather than spending time on manual and repetitive tasks.

Therefore, it's no surprise that there has been a rise in its adoption as it offers a range of benefits that help teams to work more efficiently, deliver software faster, and improve overall software quality.

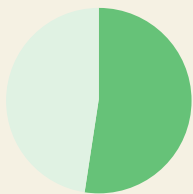
# Release Frequency



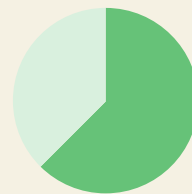
How often does your organization deploy new releases or ship new products?



## Key findings:



**52% release every two weeks**



**69% release once a month**

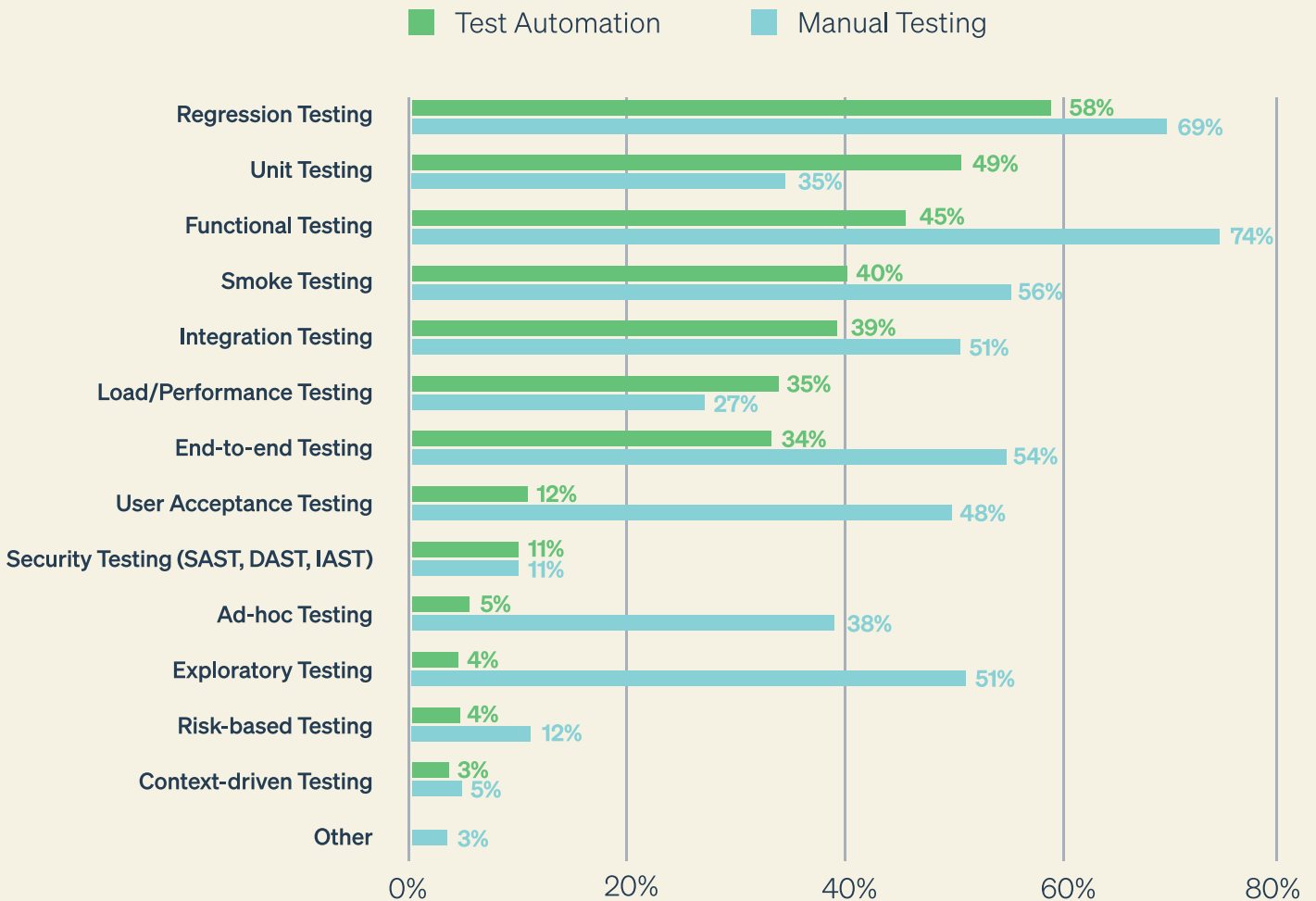
The frequency of software releases is a highly debated topic. Some argue that releasing more often can lead to faster feedback loops and better collaboration between teams. On the other hand, others argue that releasing too frequently can lead to decreased stability and quality, and can overwhelm customers with too many updates.

Ultimately, the decision on how often to release should be based on the specific needs of the company and its customers. Companies should aim to find a balance between delivering value to customers and maintaining a high level of quality and stability. This may mean releasing more frequently in some cases, and less frequently in others.

# Types of Testing



What kinds of tests are you running manually and what kinds of tests are you automating?



## Key findings:

**Most types of testing are predominantly carried out manually. The types of testing that are mainly handled by Test Automation are Unit testing and Load/performance testing.**

Fantastic insight and benchmark into how thousands of QA teams split their testing efforts between manual and automated testing.

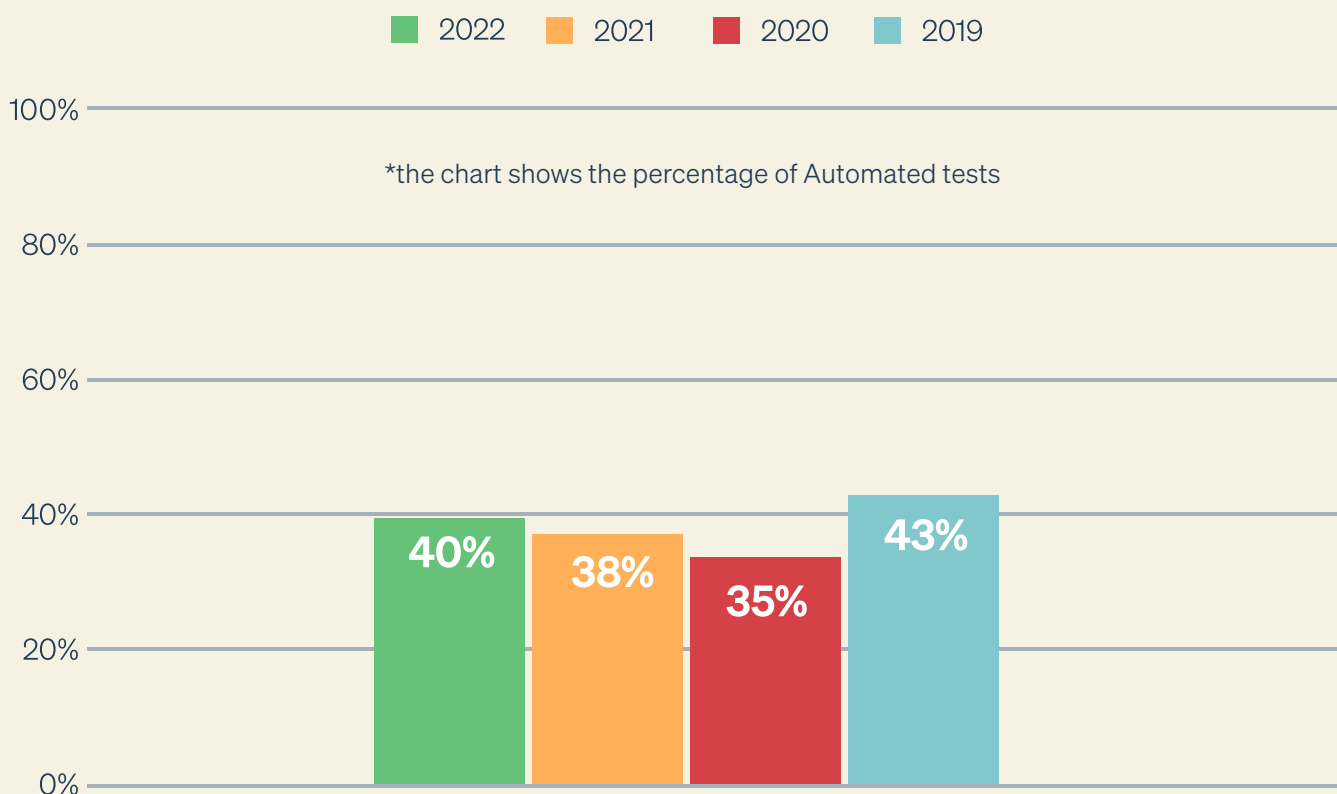
Manual testing is still predominant but if we come back to the team's focus of "Automating more" and wondering how to best allocate effort and what type of tests to start with, the chart shows that "regression testing" is the number 1 type of automated testing. Unit testing and Load/performance testing efforts are preferably handled by test automation.



# Manual vs Automated Tests



## What percentage of your tests are automated vs manual?



### Key findings:

**40%** vs **60%**  
Automated testing vs Manual testing

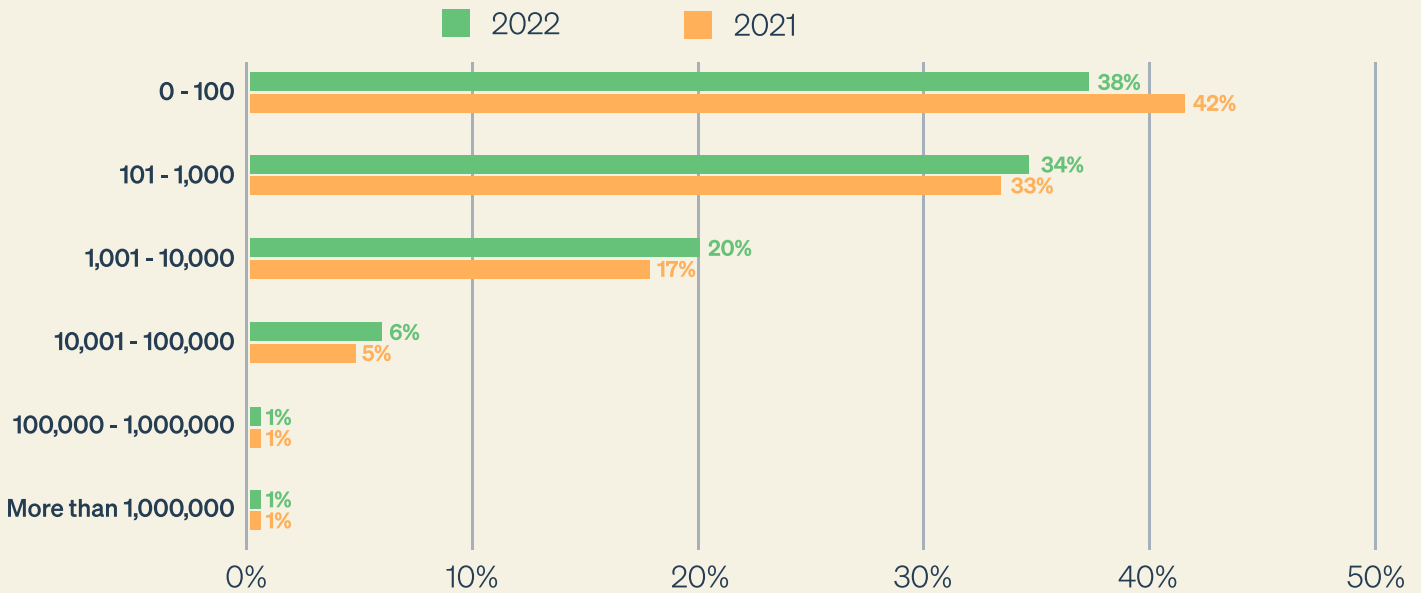
### Steady increase year on year

Aligned with all the survey findings until this point, this chart shows that there's a steady increase year over year in the percentage of tests that are automated. This aligns with companies' top priorities of being more efficient, automating more tests, and completing tests in less time. In the next chapter (Looking Forward), expect to find out what this split looks like for companies in the next 12 months.

# Automated Testing Volume



On average, how many automated tests does your team run per day?



## Key findings:



**62% of companies run more than 100 automated tests per day**

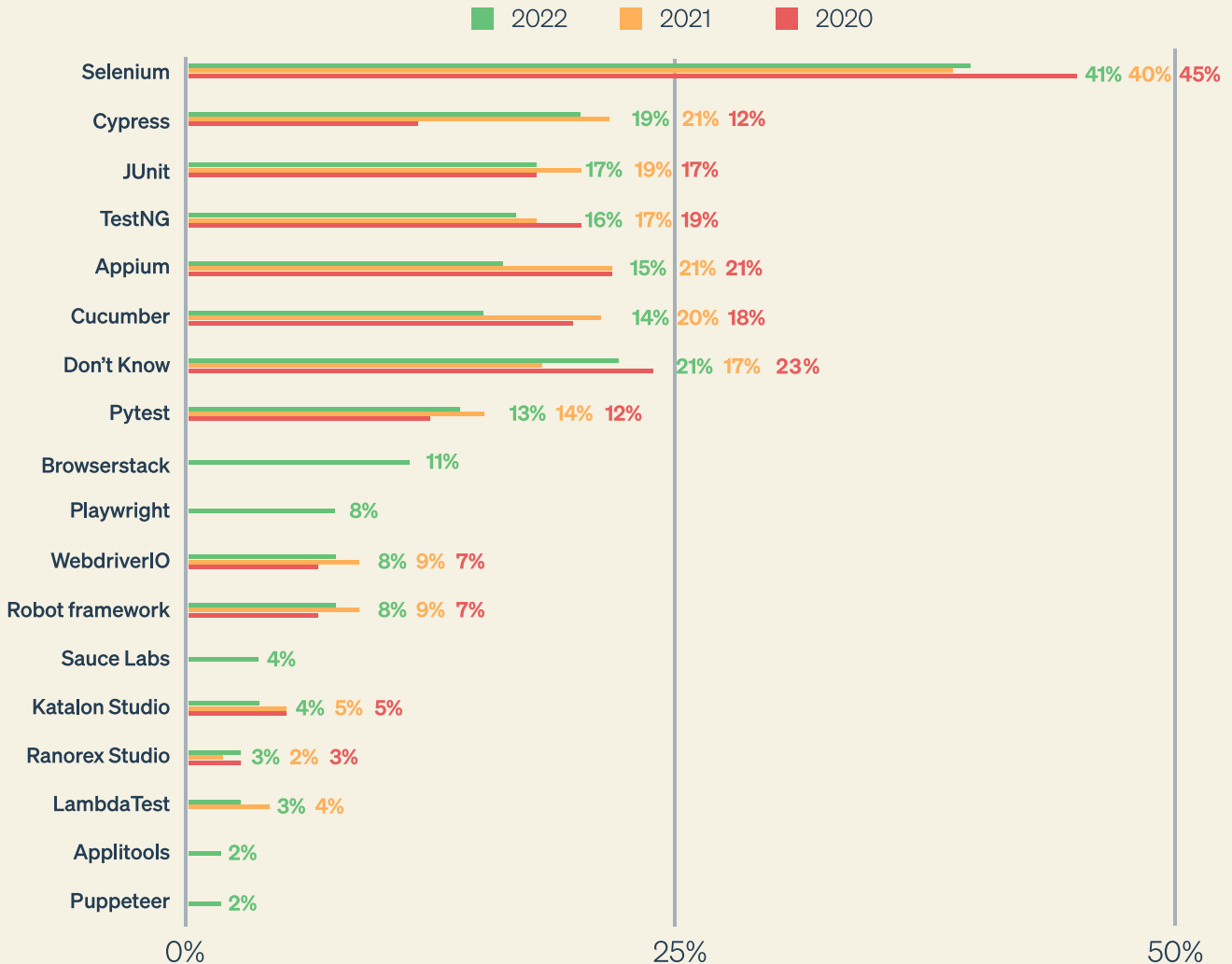
According to the survey data, a majority of companies (62%) run more than 100 automated tests per day. This highlights the growing importance of automated testing in the software development process.

The assumption is that by automating certain testing processes, companies can benefit from faster and more reliable testing. That may not always be true for all scenarios so it's important to note that automation should not be seen as a silver bullet solution and companies should carefully consider which tests to automate and continuously assess their testing strategy to ensure it aligns with their goals and objectives.

# Automation Tools, Suites and Framework



## What test automation tools, suites, or framework do you use?



### Key findings:

**Selenium continues to be one of the most widely-used automation frameworks, followed by Cypress**

**Cucumber and Appium appeared to decline in usage over the last year, while usage of JUnit and TestNG appeared to hold steady**

**Browserstack and Playwright—two new options included in our 2022 survey—merit mention, with almost 10% of survey participants responding that they used one or the other (or both)**

The results highlight the continued popularity of open-source frameworks and tools with QA professions, even on large enterprise teams, with open-source technologies like Selenium, Cypress, JUnit, TestNG, Appium, Cucumber, and Pytest appearing to be the most used across the industry. These tools have proven their value in enabling automation across a wide range of testing scenarios, from regression testing to improved UI and API testing and more. However, the rise of commercial tools like Browserstack, Sauce Labs, and Katalon Studio indicates a growing appetite for more comprehensive, modern, cloud-based solutions that offer greater support, speed, and ease of use.

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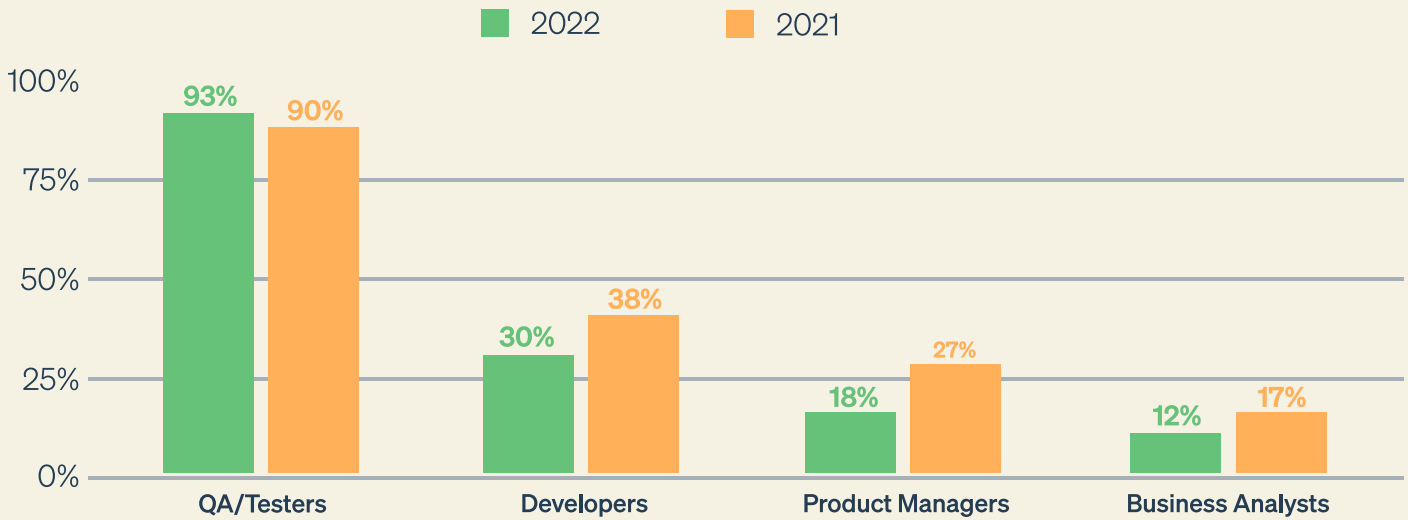
# QA Responsibilities, Challenges, Priorities and KPIs



# The Role of Quality



## Who is responsible for defining tests in your organization?



### Key findings:

Quality engineers and software testers are taking the lead amongst the roles that own most responsibilities in testing, and it's a trend that's only going up. As software development methodologies like Agile and DevOps continue to grow in popularity, it's no surprise that dedicated testing roles are becoming increasingly important.

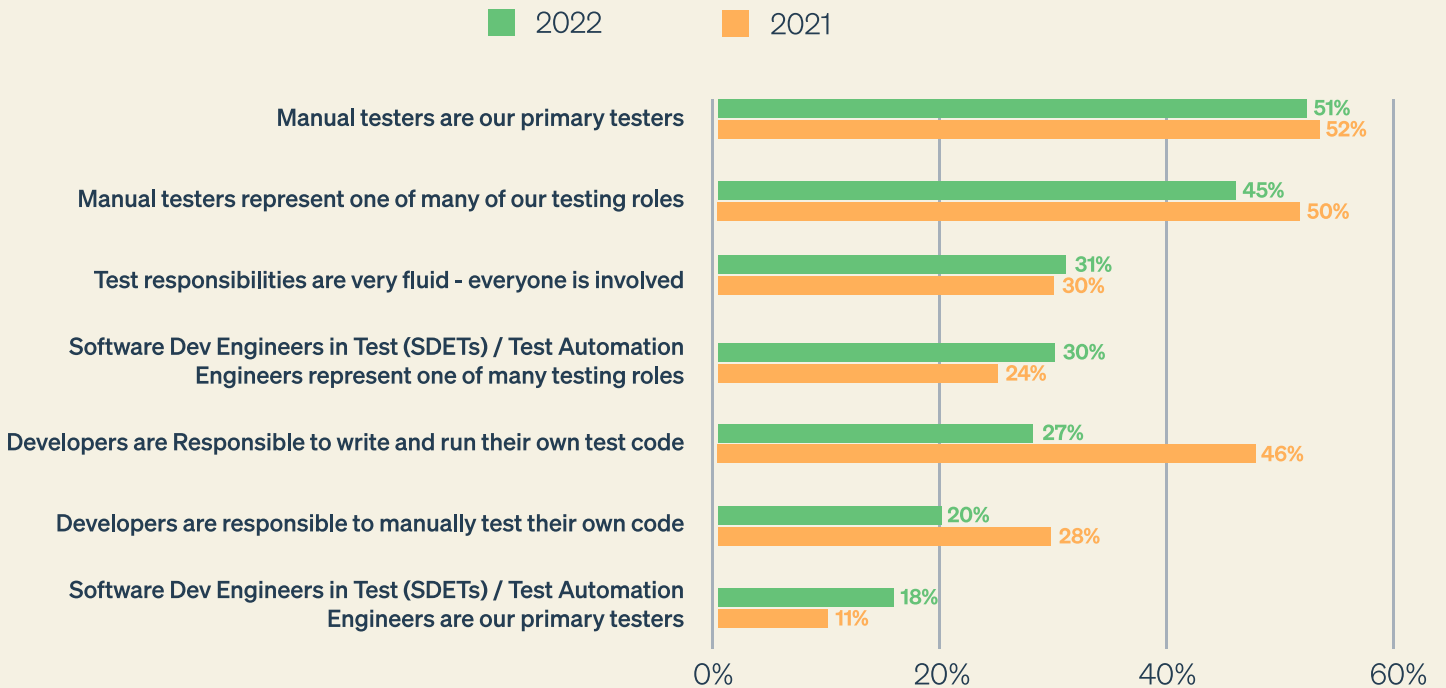
The data is clear: developers are increasingly less involved in actual testing. This change reflects the growing recognition of the importance of quality assurance and software testing in delivering successful software products.

As we look to the future, it's clear that quality engineers and testers will continue to play a critical role in aiding the production of top-quality software products.

# The Role of Quality



## Who's primarily responsible for testing?



### Key findings:

## What are the top common traits of efficient and happy teams?

They have a robust, yet simple and well-defined process, and team communication is paramount.

**“We have a robust mix of manual and automation testers. Our feature development and testing pipeline is well-designed. Opinions of QE / QA are given importance in the initial stages of feature development and QE gets enough time to explore new approaches.”**

- Test Automation Engineer at a Large Enterprise in High tech - Hardware

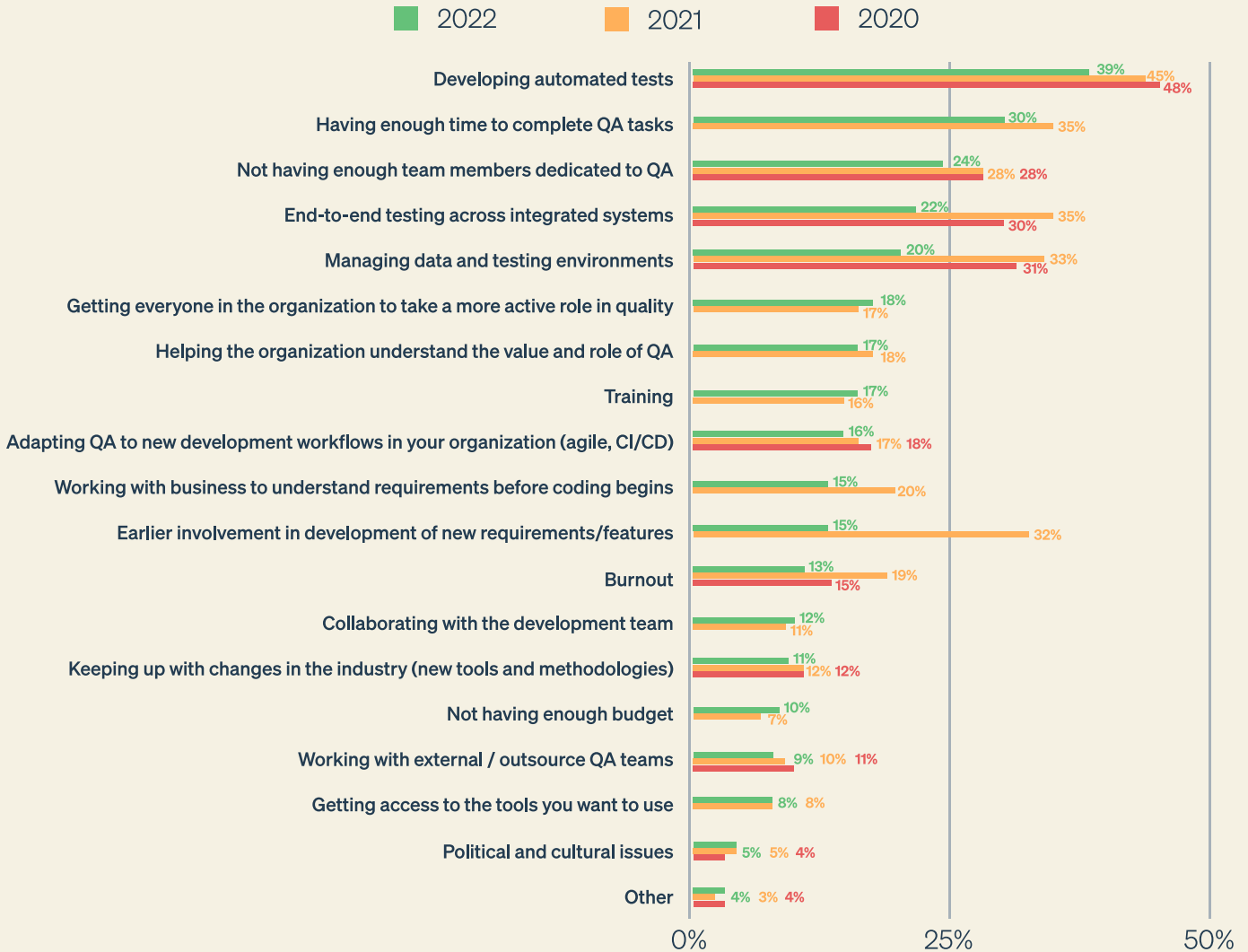
**“With input and involvement from Product, Dev and QA, we get multiple perspectives that help make our testing strategy more comprehensive, resulting in fewer bugs getting past initial testing.”**

- QA/Test Engineer at Enterprise Fintech

# Key Challenges



## What are the top 3-5 biggest challenges?



### Key findings:

The data on the top challenges faced by QA professionals shows a worrying trend: not having enough team members dedicated to QA has jumped from 6th place to 3rd place in just one year. This highlights a growing problem in the industry where QA teams are struggling to keep up with the increasing demand for testing, while not having enough time, people, or skill sets to perform their tasks effectively.

In addition, the need to increase automated testing adds another layer of complexity to the situation. While automated testing can help increase efficiency and speed up the testing process, it requires a significant investment in terms of time, money, and human resources to implement and maintain.

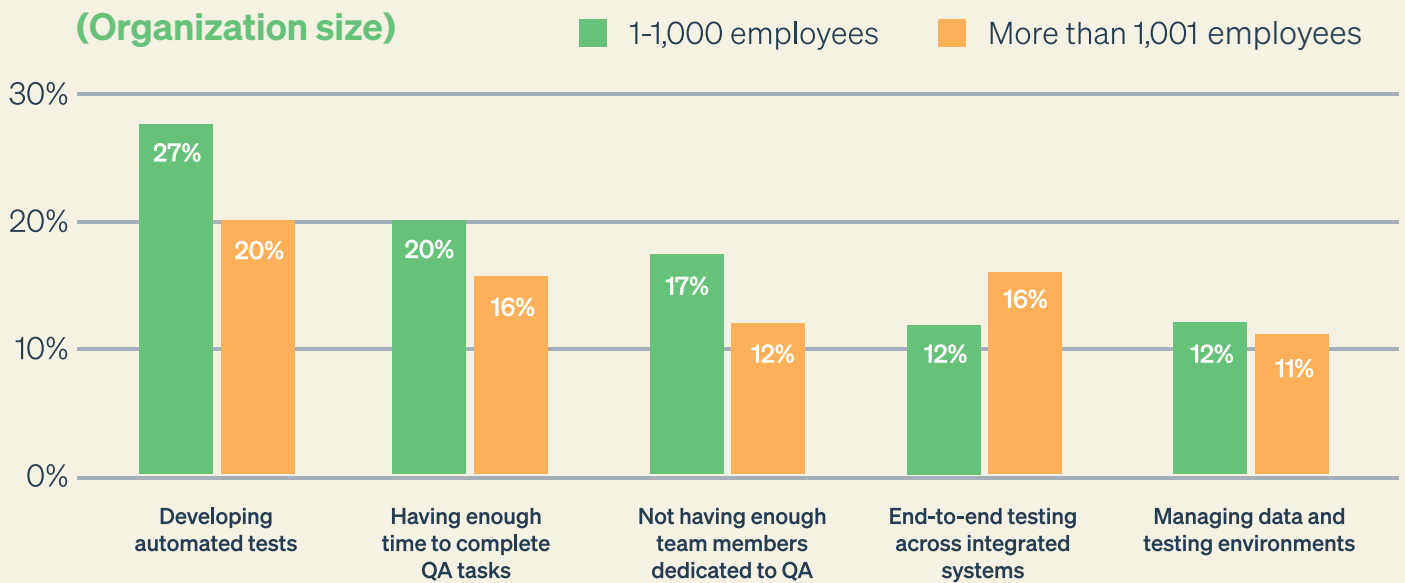
# QA Challenges Across Companies and Roles



## QA challenges across company sizes

We wanted to understand if QA challenges varied based on organization size and team roles. Our research reveals a surprising consistency in the obstacles encountered by QA teams.

### What are your team's top 3-5 biggest challenges around testing & QA right now?



### Key findings:

The first chart presents a simple analysis of QA challenges encountered by companies of varying sizes. Despite the differences in resources, budgets, and infrastructure, our findings indicate a similarity in the top challenges faced by QA teams. This suggests that certain hurdles in the QA landscape are universal and require attention, regardless of the organization's size.

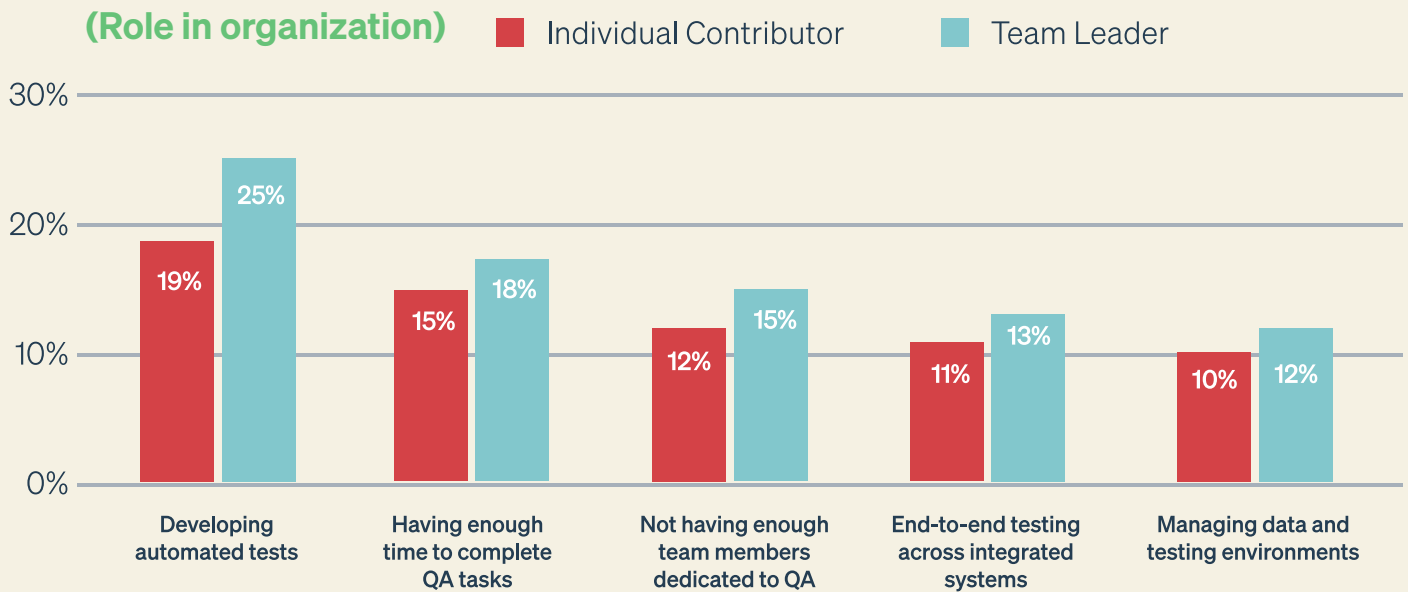


# QA Challenges Across Companies and Roles



## QA challenges across roles

What are your team's top 3-5 biggest challenges around testing & QA right now?



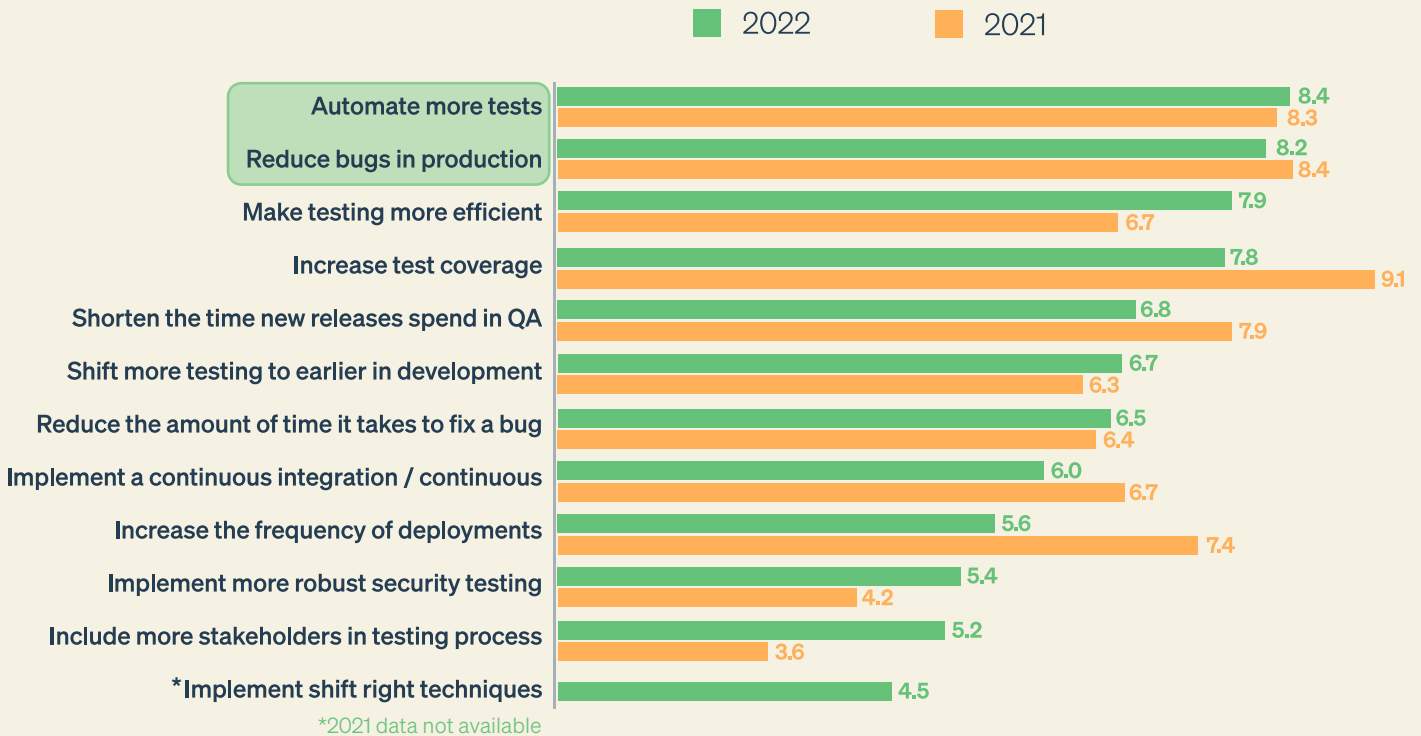
### Key findings:

The second chart sheds light on the challenges faced by individuals in different roles within QA teams, splitting their answers as individual contributors and those in leadership positions. Surprisingly, our research reveals a striking convergence in the key obstacles faced by QA professionals, irrespective of their position within the team hierarchy. This highlights the collective nature of QA challenges and emphasizes the need for collaborative efforts to overcome them.

# Top Objectives



## What are your team's top objectives?



### Key findings:

**Automating more tests is the highest rated priority for teams. Followed by reducing bugs in production and making testing more efficient.**

The data closely follows the previous year's scores but there are noticeable differences:

- “Increase test coverage” dropped over 14%
- “Increase the frequency of deployments” dropped almost 24%
- “Make testing more efficient” increased by over 18%

The top two still remain the same:

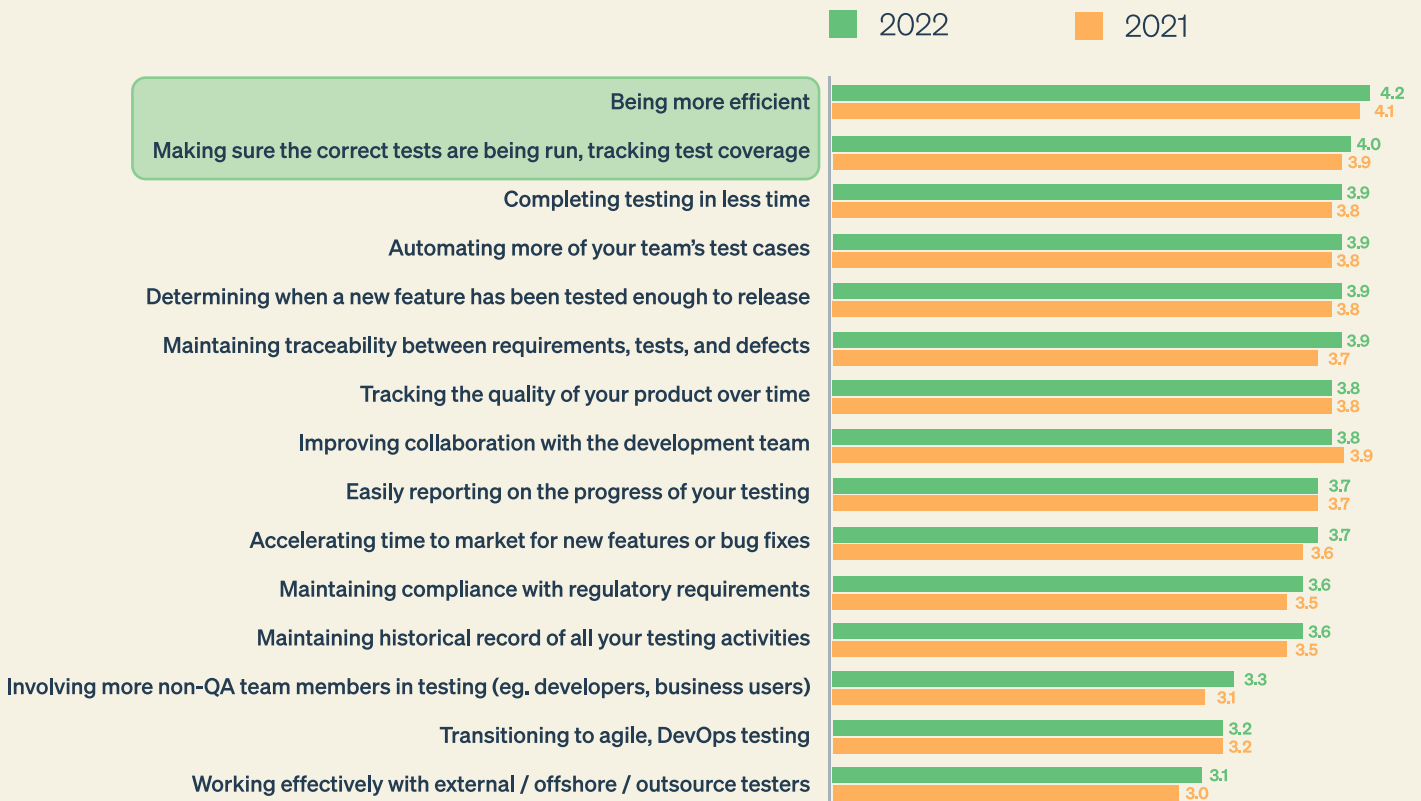
1. Automate more tests
2. Reduce bugs in production

These are the top objectives on a strategic level. The next page reveals how teams propose to achieve them by ranking them by importance.

# Top Priorities



## What are your team's top priorities?



### Key findings:

**Being more efficient is the highest rated priority for teams. Followed by making sure the correct tests are being run and completing testing in less time.**

The chart shows that the most important priorities for QA professionals are centered around efficiency, ensuring the correct tests are being run, tracking test coverage, and completing testing in less time.

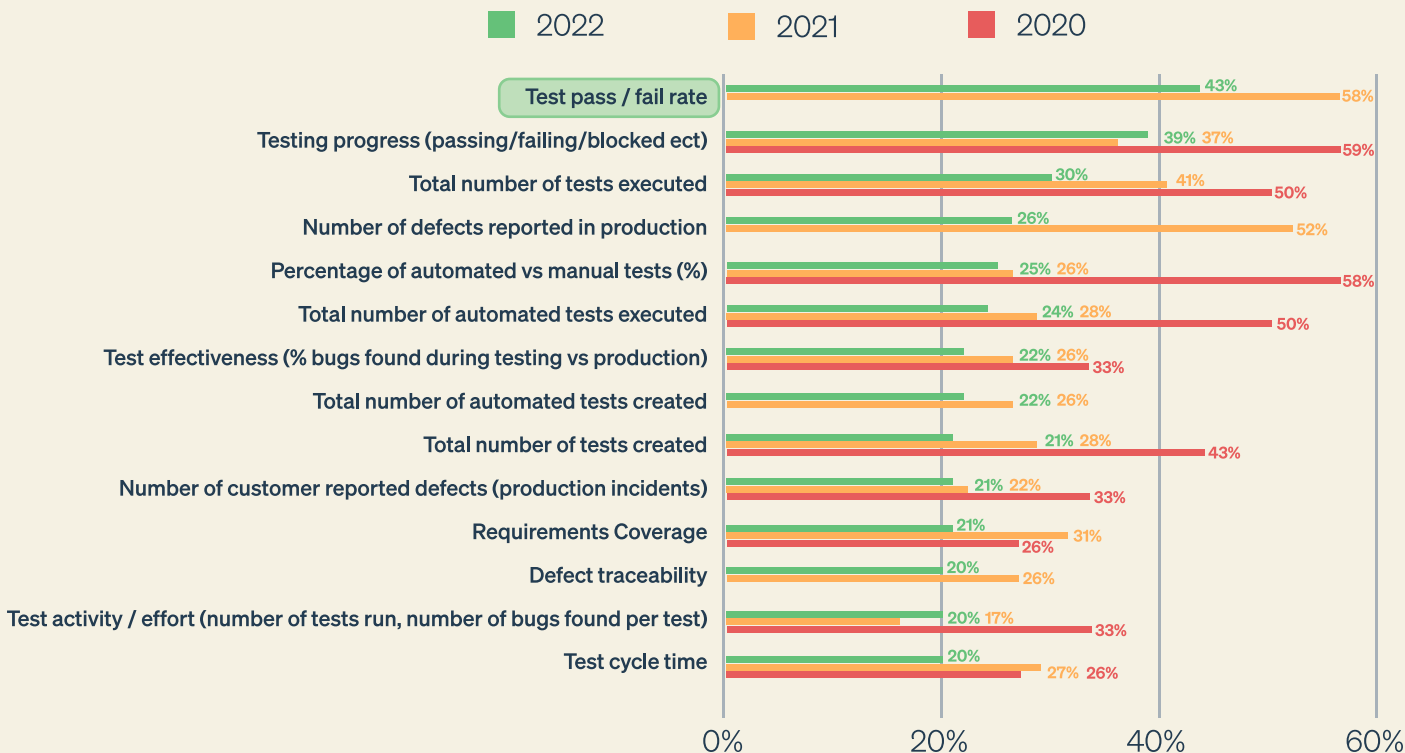
We don't see any significant change in these rankings across the 2 years. Unsurprisingly, great QA teams focus on what matters most: Repeatedly measurable actions that compound tremendously over the long term.

Striving for efficiency speaks to the challenges teams face with not having enough time and people to perform QA tasks. By streamlining their processes and prioritizing efficiency, teams hope to simultaneously overcome such lack of resources while continuing to release better software, faster.

# Metrics & KPIs



## Which metrics or KPIs does your team report on?



### Key findings:

**Test pass/fail rate remains the top KPI that teams report on!**

**The metric “number of defects reported in production” dropped 50% year over year.**

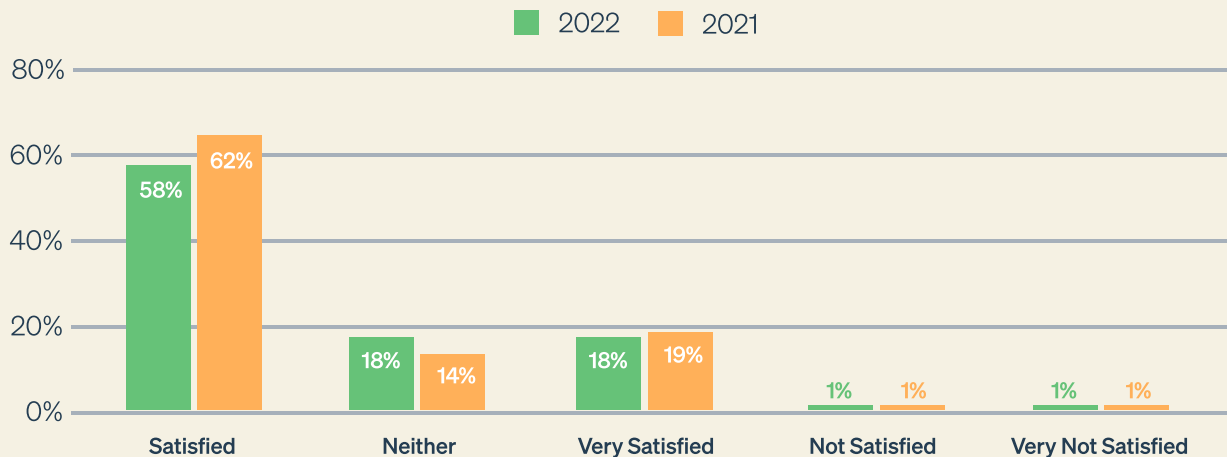
The choice of metrics tracked and reported on will always depend on the specific needs of the project but overall, “Test pass/fail rate” and “testing progress” are the top two. A surprising finding is that the “number of defects reported in production” is at an all-time low from the last 2 years, with the number of QA teams reporting on this metric dropping from 52% to 26%.

This seems to indicate a shift in how teams approach and measure the success of their testing efforts.

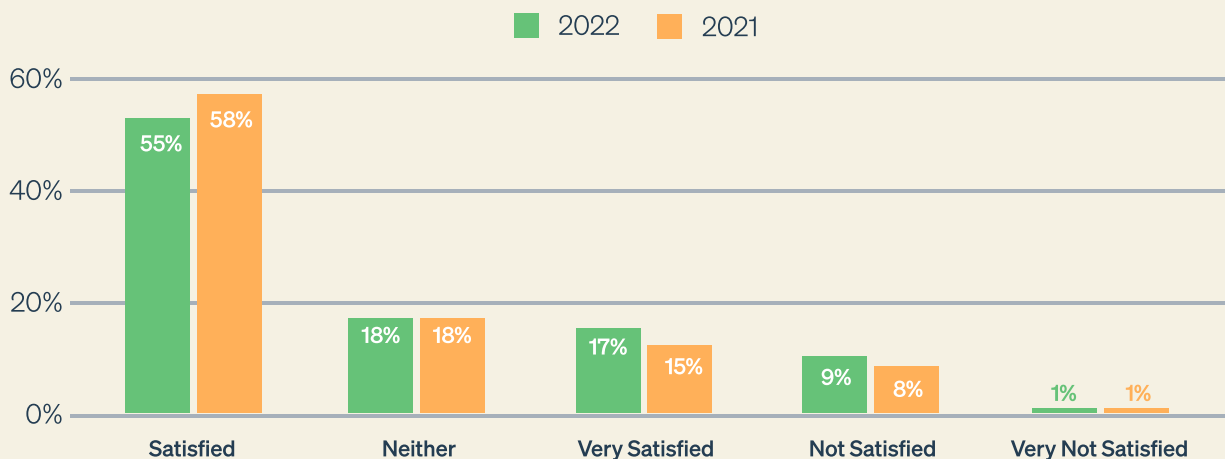
# How Satisfied are you with your Testing Techniques?



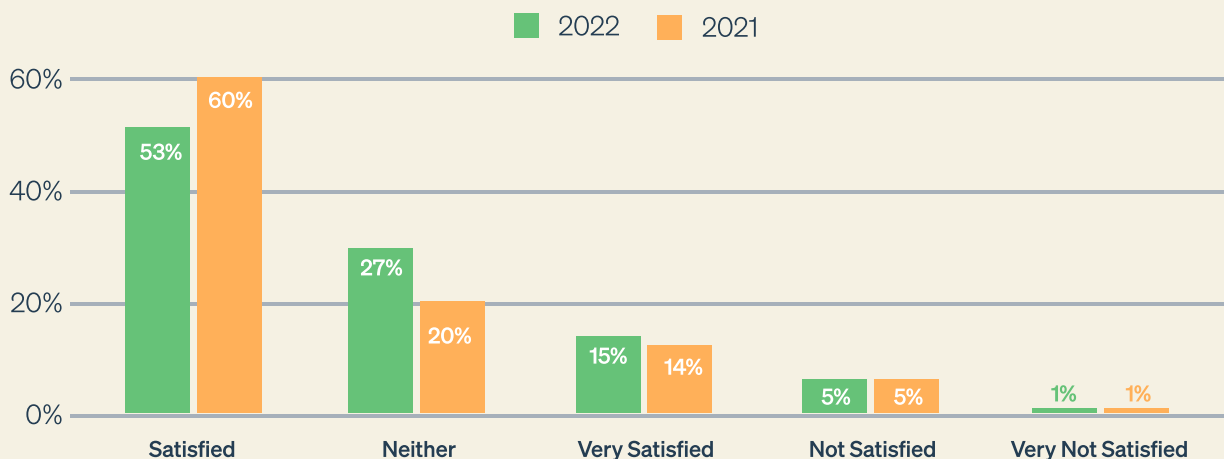
## How satisfied are you with your current development methodologies & techniques?



## How satisfied are you with your current testing process?



## How satisfied are you with your current testing toolset and framework?



# How Satisfied are you with your Testing Techniques? (Continued)

## How satisfied are teams with their Methodologies, Techniques, and Processes? Is change needed?

### Key findings:

Most are satisfied: Roughly 70% of teams are satisfied with their current methodologies, processes, and frameworks if we aggregate the Satisfied and Very Satisfied options. Teams are overall happy with what they're doing but there's a lot of room for improvement, approximately 30% to be exact.

So we can expect teams will continue to experiment with a variety of QA variables like toolsets, processes, and methodologies, and look for the next greatest thing to help them achieve peak efficiency.

### But what can be improved?

Teams that aren't satisfied with their current situation reveal that there's too much to test and not enough automation.

Collectively, the way forward, besides automating more, would be to change to more risk-based testing (vs "test everything") and improve the definition of test cases.



**Too much manual testing; Should invest more heavily in automated testing to free up QA resources to do other more important tasks than repeatedly run manual tests every release**



*- QA Engineer at Enterprise Fintech*

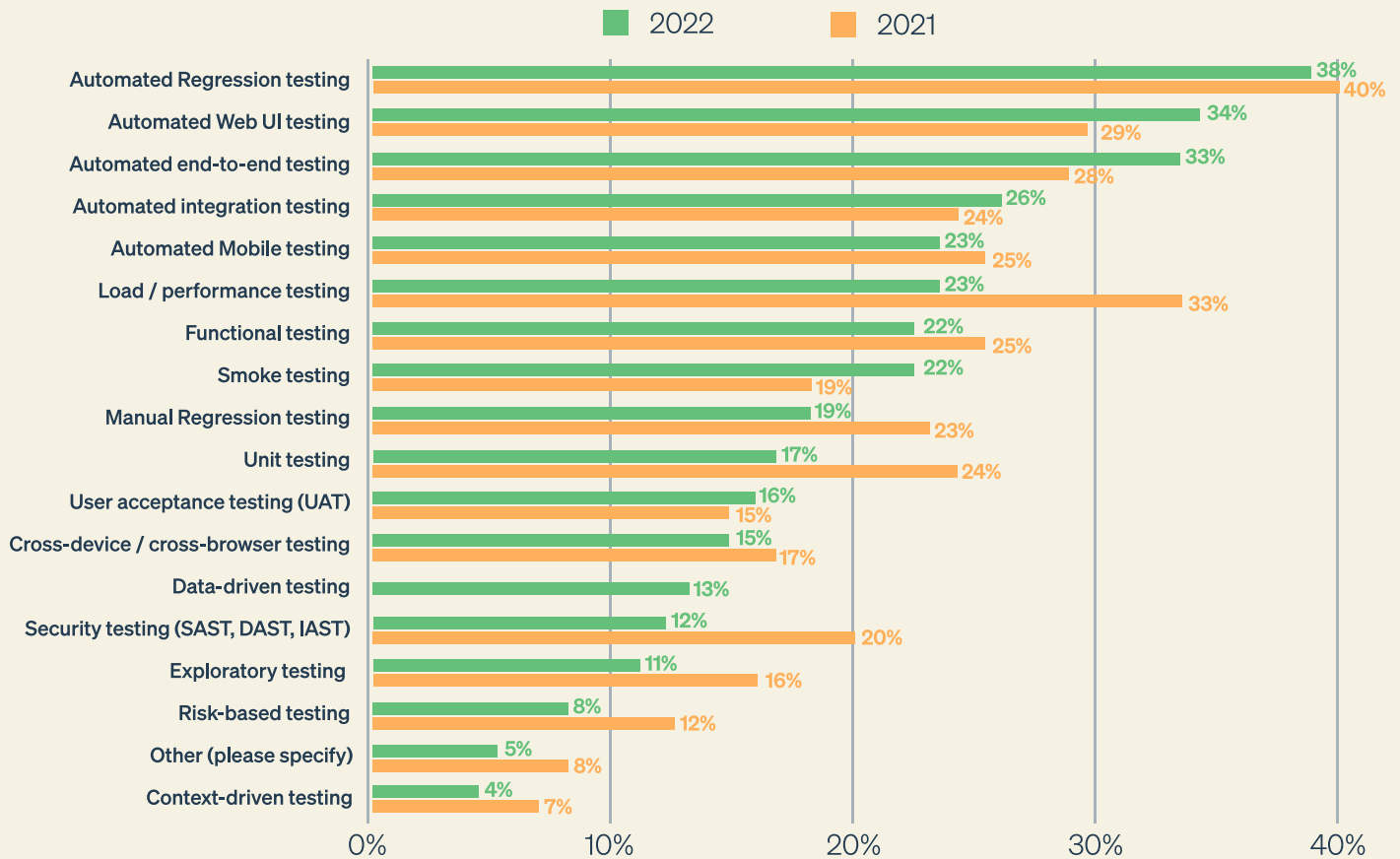
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# The Future of Testing



# Strategic Plans for Test Approaches

What types of testing are you considering adopting in the next 12 months?



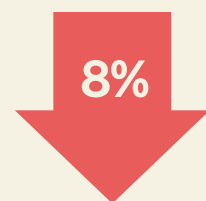
## Key findings:



Top five testing methods are all automated testing



Load and performance testing had a 10% drop



Security testing has taken also a significant 8% drop

Making progress and achieving company priorities means increasing automated testing. The top 5 tests that are a priority to automate are regression, web UI, end-to-end, integration, and mobile types of testing.

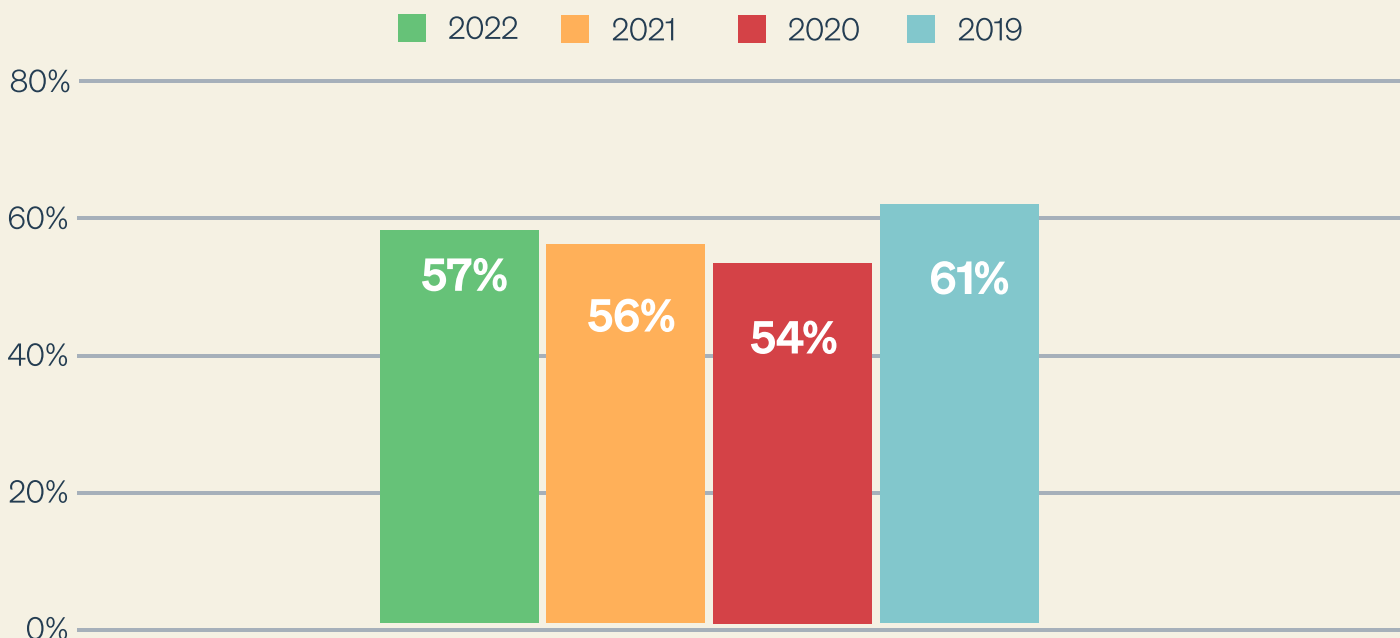
The significant year-over-year 10% drop we see in load/performance testing could suggest teams have already adopted/are well on their way to adopting these types of testing and are moving on to the next type of test they want to adopt.



# Future of Test Automation



What percentage of your tests do you expect to be automated vs manual in the next twelve months?



## Key findings:

This chart is consistent with what the report has shown to be companies' priorities. Teams have reported that the current split of Manual vs Automated testing is at 40% for automated tests and they are looking to increase that to 57% in the next year.

# Conclusion



# Conclusion



Without further ado, here are the main takeaways:



## 1. Dedicated QA roles are not going away

We see that clearly in the second section of the report - QA Responsibilities, Challenges, Priorities and KPIs.

Cross-team cohesion coupled with a simple while robust testing process is the absolute key to success. The report shows that dedicated testing roles remain integral to the way teams ensure the quality of their products, even if teams are taking a more whole-team approach to testing or teams are shifting more responsibility to QA roles around test automation.

Indeed, one of the biggest challenges for QA teams being able to deliver high-quality releases continues to be a shortage of dedicated team members. Even with teams constantly finding ways to innovate and test more efficiently, the lack of resources can make it difficult to keep up with the increasing customer demand for perfection.

Companies need to be strategic with their objectives, focusing on high-value activities for QE/QA professionals that help prevent issues from arising in the first place, rather than just reacting to them once they've occurred. Not only does this influence



## 2. More and more teams are automating more tests, but no one is using automation to run 100% of their testing

It is evident that automation has become an integral part of the testing landscape. The report's finding that more testing teams are automating a greater number of tests aligns with the industry's shift towards more efficient and effective testing practices. However, it is crucial to recognize that even with the increasing adoption of automation, running 100% of software testing efforts solely through automation is not a viable approach.

While automation offers numerous benefits, such as faster test execution, improved accuracy, and enhanced test coverage, it is not a panacea for all testing challenges. There are certain aspects of software testing that still require human intervention, expertise, and critical thinking. Manual testing allows testers to assess subjective factors, detect complex issues that automated scripts may overlook, and simulate real-user interactions that cannot be easily replicated through automation.

Additionally, test maintenance is a crucial aspect to consider when discussing automation. As software evolves and requirements change, automated tests need to be regularly updated and maintained. Failure to do so can result in false positives or false negatives, diminishing the overall effectiveness of the automated testing suite. By striking the right balance between automated and manual testing, teams can ensure that their efforts are focused on the most critical areas while allowing for flexibility and adaptability as the software evolves.

# Conclusion



In summary, while automation undoubtedly plays a significant role in modern testing practices, it is important to acknowledge that it cannot replace the human element entirely. Striving for 100% automation may overlook the value that manual testing brings, such as critical thinking, subjective analysis, and exploratory testing. By leveraging the strengths of both automation and manual testing, testing teams can maximize the efficiency, accuracy, and effectiveness of their testing efforts while delivering high-quality software to end-users.



### 3. Testing teams need to test as efficiently as possible, now more than ever

In today's rapidly evolving technological landscape, the need for testing teams to operate efficiently has never been more critical. The findings of the report reinforce the urgency for testing teams to build streamlined and scalable processes, connect seamlessly with the rest of the tech stack, and identify areas for optimization.

As software development methodologies like Agile and DevOps gain prominence, testing teams are under increasing pressure to deliver high-quality software products at an accelerated pace. The report reveals that testing teams are automating more tests and embracing tools and frameworks that enhance efficiency. However, it also highlights the fact that no one is relying on automation alone to run 100% of their testing efforts, underscoring the continued relevance of efficient manual testing.

To meet the demands of today's fast-paced development cycles, testing teams must focus on building centralized and scalable processes. By streamlining testing procedures, eliminating duplication of efforts, and standardizing workflows, teams can significantly improve their productivity and responsiveness. Efficient processes enable teams to allocate their time and resources effectively, ensuring that testing efforts are targeted towards critical areas that require the most attention.

Furthermore, establishing seamless connections with the broader tech stack is vital for testing teams to fully understand the impact of changes and updates throughout the software ecosystem. Integration with development tools, version control systems, and project management platforms enables teams to collaborate effectively, synchronize their efforts, and gain real-time visibility into the software's quality. By fostering strong connections and collaboration, testing teams can identify issues earlier in the development cycle, preventing them from snowballing into larger problems that are costlier and more time-consuming to address.





Optimization is another key aspect that testing teams need to prioritize. The report highlights the top challenges faced by testing teams, including a lack of dedicated QA resources and insufficient time. By identifying areas for optimization, such as improving test coverage, enhancing test efficiency, and implementing effective test prioritization strategies, teams can maximize their testing efforts within the given constraints. This ensures that testing activities align with business priorities and deliver the greatest value in terms of risk mitigation and product quality.

# Conclusion



Ultimately, as technology continues to advance at a rapid pace, testing teams must embrace efficient testing practices more than ever before. By building streamlined and scalable processes, connecting seamlessly with the rest of the tech stack, and continuously identifying areas for optimization, testing teams can deliver high-quality software products with speed, accuracy, and confidence. The adoption of efficient testing methodologies and practices is not just a choice but a necessity for organizations aiming to stay competitive in today's dynamic market.

In conclusion, the report highlights

-  The importance of being more strategic and clear with testing objectives, focusing on high-value activities;
-  Setting up a robust, well-defined testing process;
-  Investing more in automation with talent and resource allocation;
-  Common traits in successful teams, such as cross-team involvement, optimal communication and ownership.

We believe that analyzing where you currently stand is the first step toward progress. We hope you can leverage the key findings in this report to help identify areas for improvement on your own team.

Finally, we couldn't do this without the many thousands of respondents to our surveys. To them—and the more than 11,000 companies that choose to use TestRail in support of their quality and testing efforts—we say thank you.

P.S. If you have any requests for additional questions to include in next year's report, [please let us know here.](#)

# About TestRail



# About TestRail



TestRail helps quality assurance (QA), engineering, and development teams speed up testing, improve product quality, and ship releases faster. More than 10,000 organizations like NASA, Apple, Microsoft, Activision Blizzard, and Amazon trust TestRail to power their QA and test management processes.

TestRail is the flagship product of Gurock Software GmbH. Gurock was founded in 2004 and our globally distributed team focuses on building and supporting powerful tools with beautiful interfaces to help software teams around the world ship reliable software.

Gurock is part of the Idera, Inc. family of DevOps tools, which includes Xray, Ranorex, Kiuwan, Travis CI, Assembla, and PreEmptive. Idera, Inc. is the parent company of global B2B software productivity brands whose solutions enable technical users to do more with less, faster.

