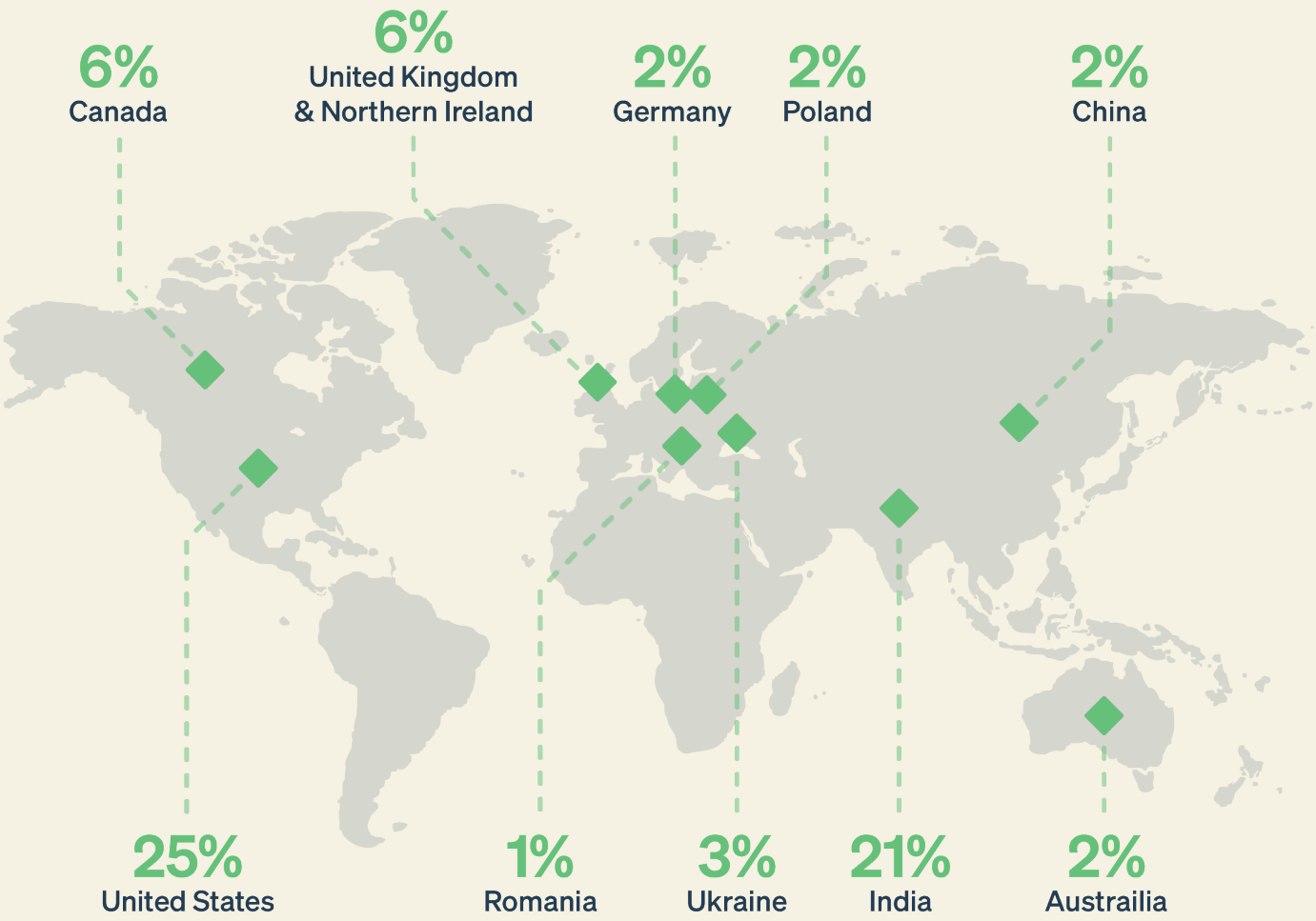
TestRail

THIRD EDITION

Software Testing & Quality Report

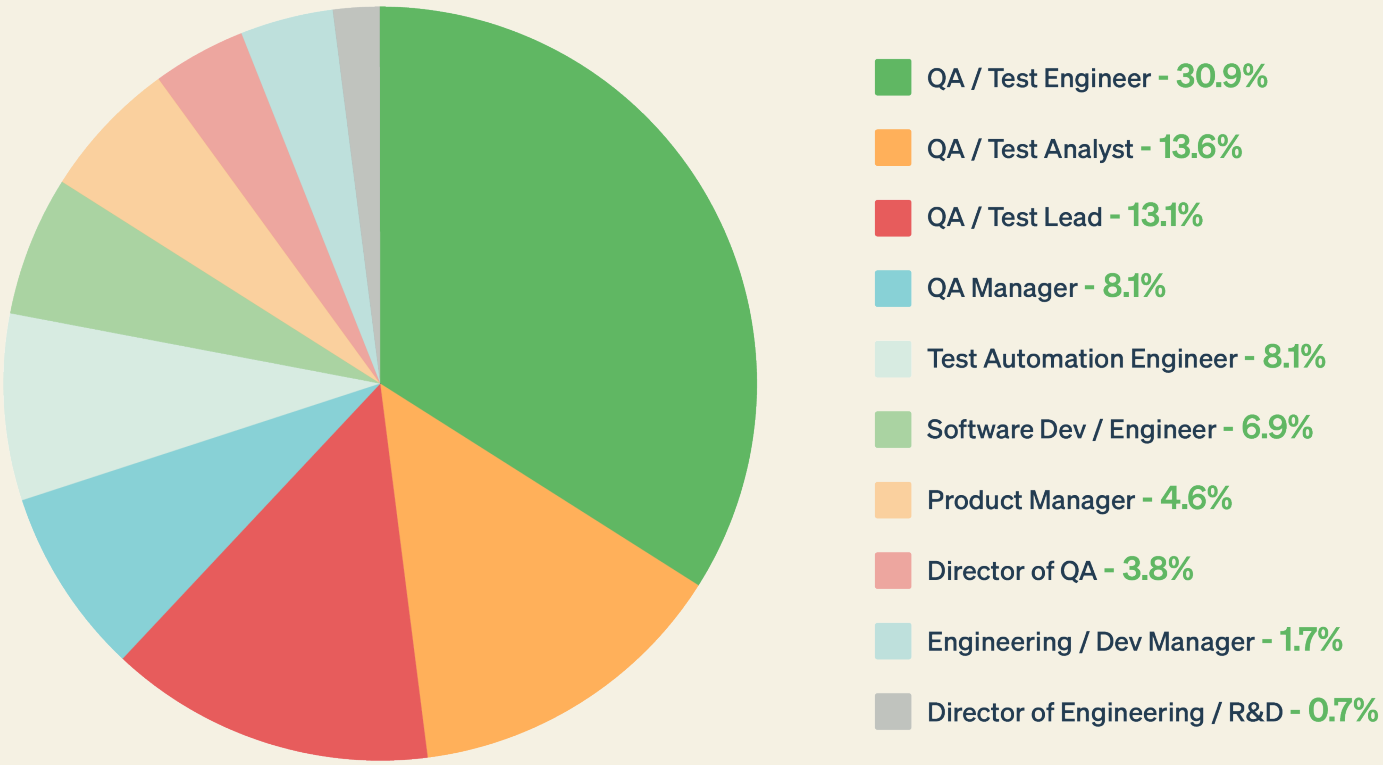
Contents



Drawing on insights from thousands of quality assurance (QA) teams worldwide, we present the findings from an in-depth exploration of current challenges, priorities, and emerging trends to offer a comprehensive look into the steady evolution of software testing in 2023.

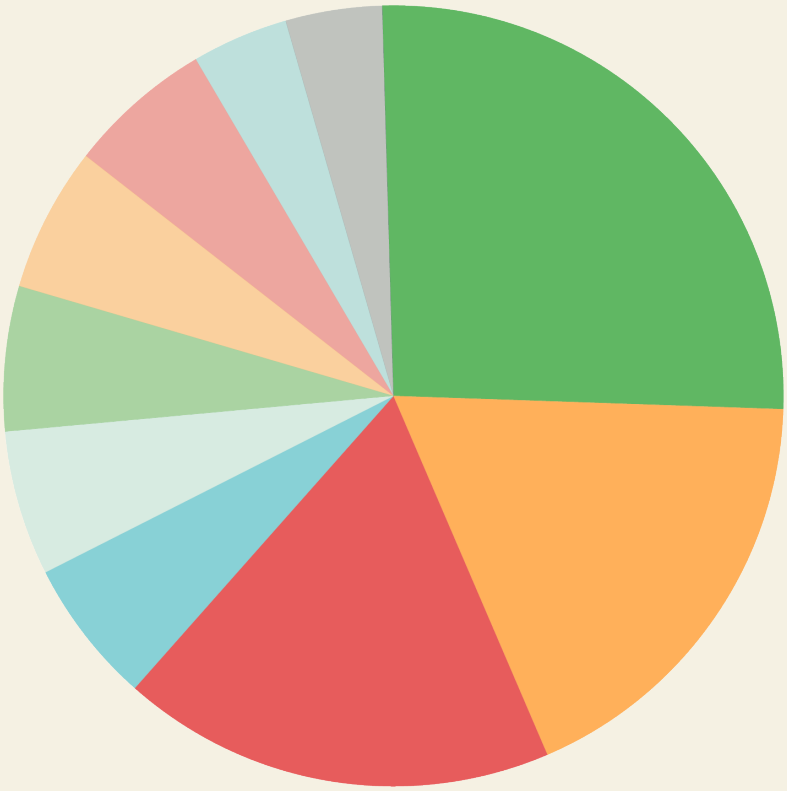
Since its inception in 2018, our annual user survey has played a pivotal role in our mission to understand and address the evolving needs of QA teams worldwide. By connecting with thousands of QA teams globally, we gain valuable insights into their current practices, challenges, and priorities, allowing us to deliver timely solutions and drive excellence in test management systems.

The survey for the Software Testing & Quality industry report gathered insights predominantly from professionals directly involved in testing processes. Knowing that the respondents are mainly hands-on testing professionals, such as QA/Test Engineers and Analysts, ensures that the insights derived from the survey are grounded in practical experience and are directly applicable to those in similar roles.



The geographical distribution of respondents, with a significant portion from the USA and India, indicates that the survey results are likely influenced by the practices and industry standards prevalent in these major tech hubs. This is vital for benchmarking global and regional practices and adapting strategies that cater to these influential markets.

The representation of key industries like computer software, healthcare, financial services, and game development highlights the sectors where testing and QA are most critical, guiding industry-specific analyses and improvements. The increasing size of QA teams reported in the survey underscores a growing recognition of the importance of quality assurance in product development, indicating a broader industry trend towards more robust testing practices.



- Other - 23.1%
- Software (Other) - 16.2%
- Software (B2B) - 14.5%
- Software (B2C) - 5.6%
- Healthcare - 5.5%
- Financial Services (Other) - 5.3%
- Game Development - 5.3%
- Entertainment & Media - 4.7%
- Consumer Products - 3.5%
- Retail - 2.9%

In line with our commitment to providing valuable insights, the third edition of the Software Testing & Quality report continues this tradition, equipping QA teams with actionable insights to navigate the complexities of testing in a steadily evolving landscape.

This report delves into the current state of QA, examining survey findings across three main areas:

- **Current trends in development, processes, and testing**
- **QA responsibilities, challenges, and priorities**
- **The future of testing**

SECTION 01

Forward

Forward

Now in its third edition, the Software Testing & Quality Report provides both user-sourced insights and expert analysis on critical operational areas of software testing and quality assurance experienced by our TestRail community. Our motivation to engage annually with our users aligns with the heuristics-based approach that TestRail uses to identify and confirm test management gaps and product-led enhancements while aligning with industry trends.

In many industries, rapid progression and dramatic shifts in technology are both experienced and expected. While many had expectations coming into 2023 that technologies such as machine learning (ML) and artificial intelligence (AI) would impact software testing, the reality of the users we surveyed indicates that these technologies still have a long way to go to live up to the hype. Now more than ever, organizations are focusing on proven tools and technologies that will allow teams to develop and deliver faster all while maintaining set standards of software quality. It's possible that one day AI and ML will revolutionize testing as we know it, but current practices indicate more "AI assisted" approaches that still require a human touch, such as AI-enhanced test case development.

One consistent area of both progression and evolution in the user survey is the increasing demand for organizations to ship releases faster, with higher quality, all while leveraging reduced engineering and testing resources. Given the global instability in the technology job market, many teams are leveraging pooled resourcing using centralized Testing Centers of Excellence (TCOE) or external contracting firms.

A byproduct of the lack of resources and the desire to increase agility and decrease time to market is an ever-growing QA tech stack. In many cases, this array of tooling lacks cohesion and leads to splinters and silos within QA teams—which continues to drive the need for a single source of truth in a centralized test management solution.

Overall, this year's user survey indicates that the QA is in a state of evolution rather than revolution. AI and ML didn't change the landscape of the industry overnight, but they are showing incremental promise. Organizations are focused on shipping releases faster, but even more focused shipping releases bug-free. Technologies like test automation and CI/CD have made testing more efficient, but now the challenge is finding cohesion in an increasingly siloed tech stack.

This is the state of QA: taking small steps forward wherever we can, but laser-focused on making the most out of the resources we have. We hope this report proves to be a useful resource itself—here, you have 4,000 other QA professionals on-hand, ready to tell you about their wins, their struggles, their goals, and their hopes for the future.

We hope you'll finish this report inspired by what you've learned, and as optimistic about the future of QA as we are.

Happy testing,
Simon Knight
Lead Product Manager

SECTION 02

State of Quality Report

Trends in Development and Testing

The “Trends in Development and Testing” section focuses on understanding trends in manual versus automated testing and the dynamic tooling landscape used by development teams. It’s divided into two parts to provide a comprehensive analysis.

In the first part, “Manual vs Automated Testing,” we analyzed survey data to understand the trends between manual and automated testing to provide insights into their usage and effectiveness as practices and tooling evolve.

The second part, “QA Testing Tools and Technologies,” explores the diverse tech stacks used by testing teams and the trends in tool adoption within the industry. From managing requirements and defects through industry-standard solutions like Jira, to embracing advancements in CI/CD tooling, respondents share valuable insights that reveal the current landscape of development and testing trends.

Continue exploring this section to uncover insights on the following topics:

- **Testing performed manually**
- **Testing performed with automation**
- **Automated tool tech stacks**
- **Tools used for requirement and defect tracking**
- **Tools used for CI/CD**

State of Quality Report

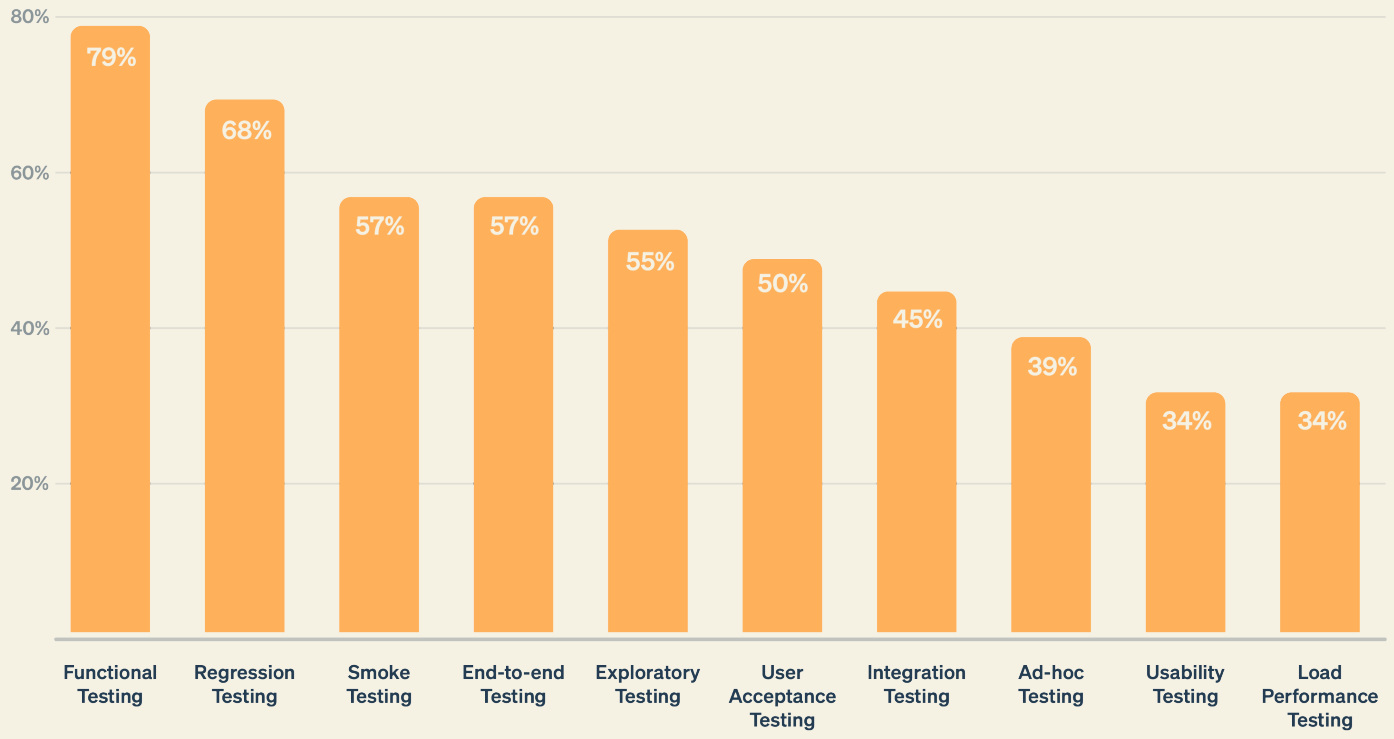
Manual vs Automated Testing

Section Questions:

- What kinds of testing does your organization currently do MANUALLY?
- What kinds of testing does your team run with TEST AUTOMATION?
- On average, how many automated tests does your organization run per day?
- What percentage of your tests are automated versus manual?

What kinds of testing does your organization currently do MANUALLY?

Total Respondants: 2,426



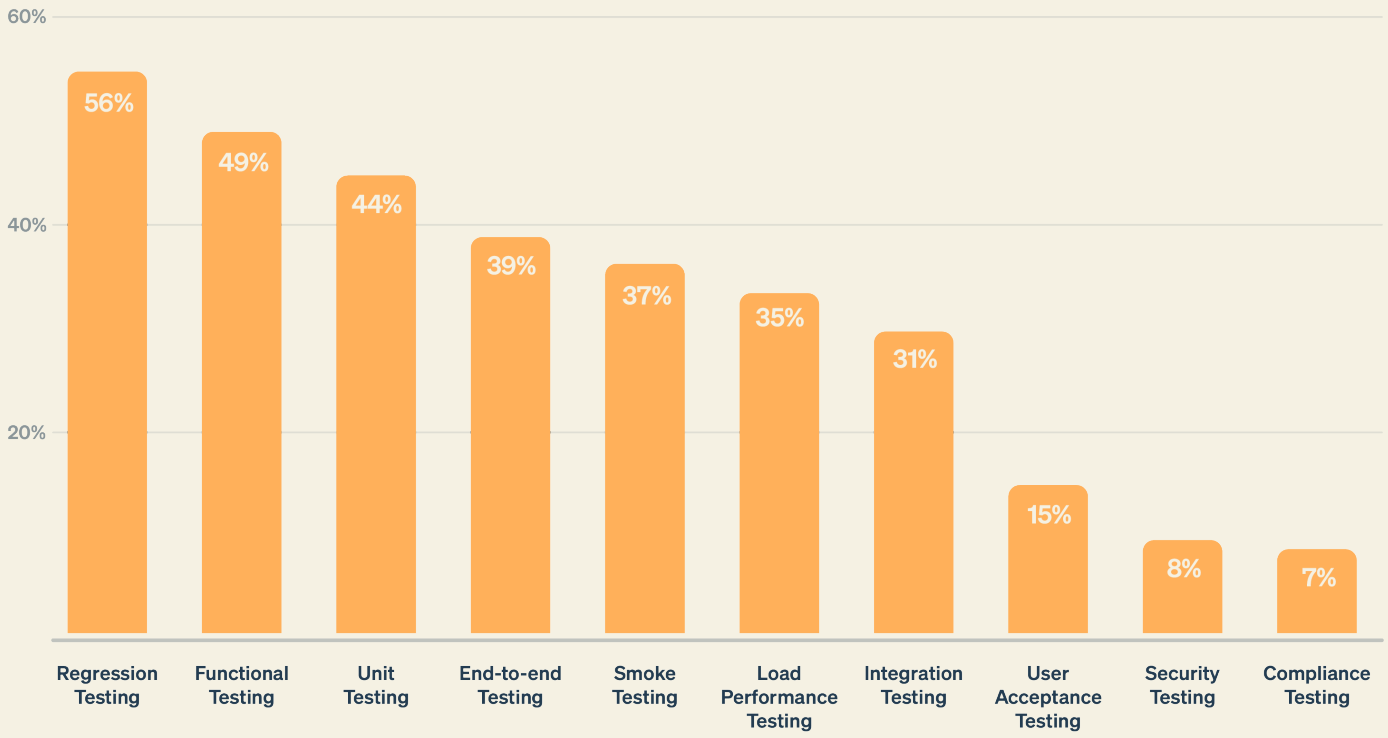
Key Findings

Manual testing remains the dominant method across various types of testing, with an increase compared to the previous year. Functional, regression, smoke, and end-to-end testing are most commonly performed manually, which is to be expected as these tests often establish the foundational success and performance of a build.

While the data shows a lift in manual testing across the board compared to previous years, two types of testing did not see an increase: regression and integration testing.

What kinds of testing does your team run with TEST AUTOMATION?

Total Respondants: 2,234



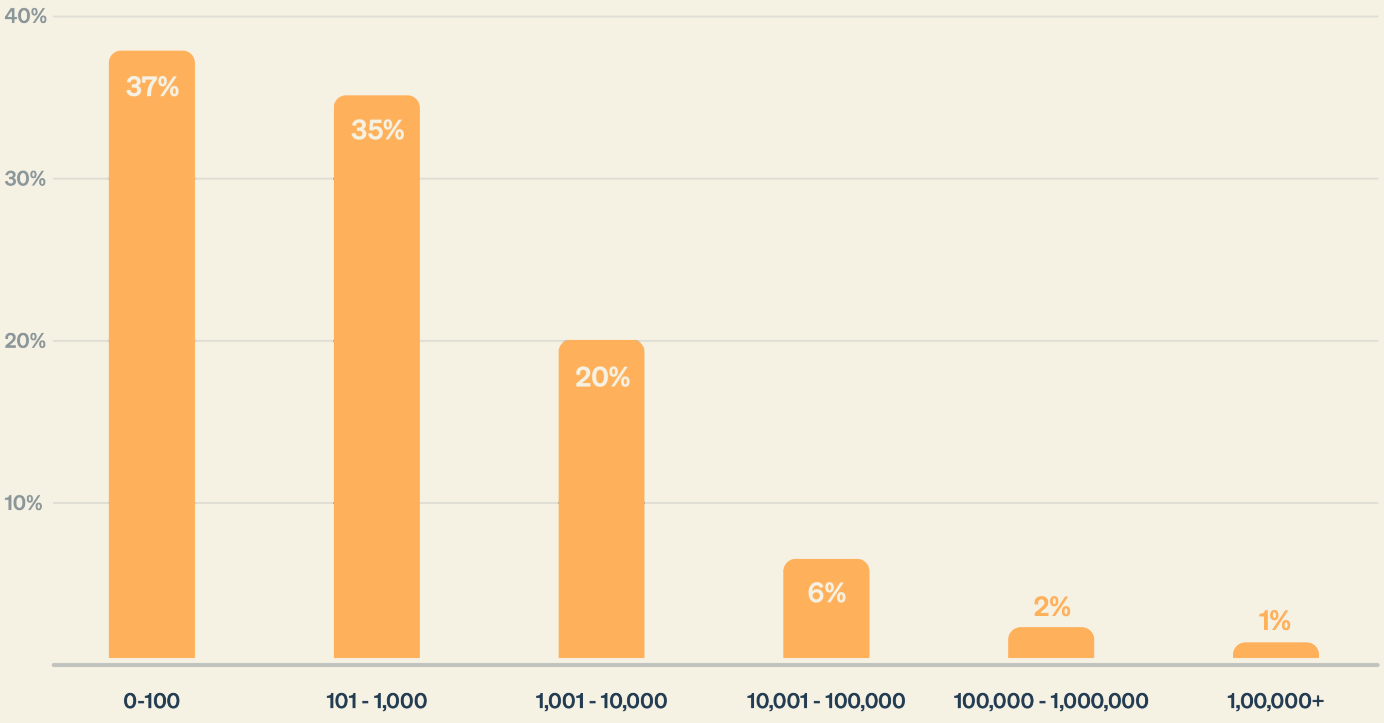
Key Findings

The top three automated testing types are regression, functional, and unit testing, reflecting the necessity of thoroughly validating builds before proceeding with additional testing.

Notable changes from the previous year include a decrease in integration and unit testing, alongside an increasing emphasis on automating functional testing.

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

Total Respondants: 2,288

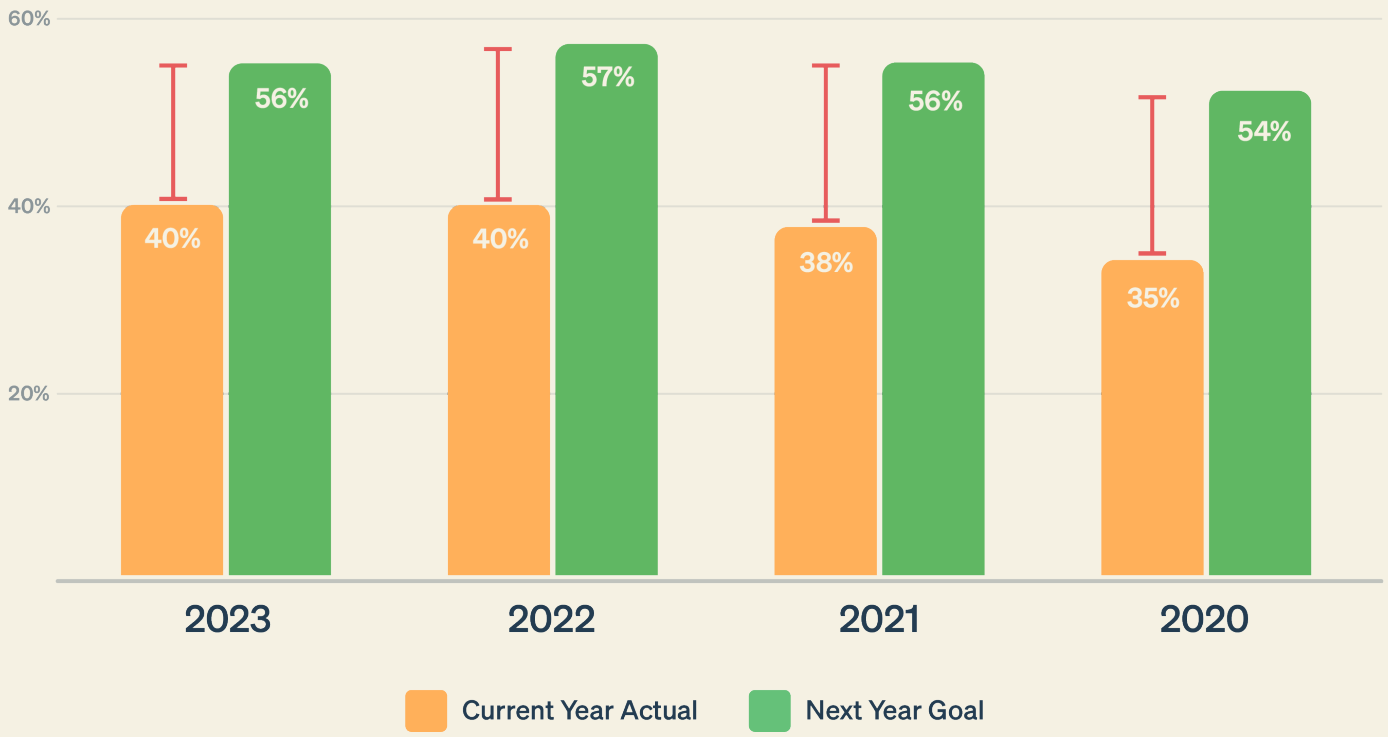


Key Findings

While it can be difficult to measure how many automated tests an organization is running, overall the data is showing that companies are increasing their number of automated tests. Specifically, the data shows shows that there has been a decrease in the percentage of teams conducting 0 - 100 tests per day year-over-year, with 64% of respondents reporting that they now perform more than 100 tests daily.

What percentage of your tests are automated versus manual?

Total Respondants: 2,190



Key Findings

Each year we ask respondents to share the percentage of tests they currently automate versus the percentage of tests they desire to automate in the future. In previous years, the gap between current and desired automation levels has been about 20%.

Slowly but surely that gap has narrowed with this year's results seeing just a 16% difference. On average, respondents reported automating 40% of their tests but aim to increase that to 56% next year. This trend suggests that teams are actively working to close the gap between current and desired automation levels.

State of Quality Report

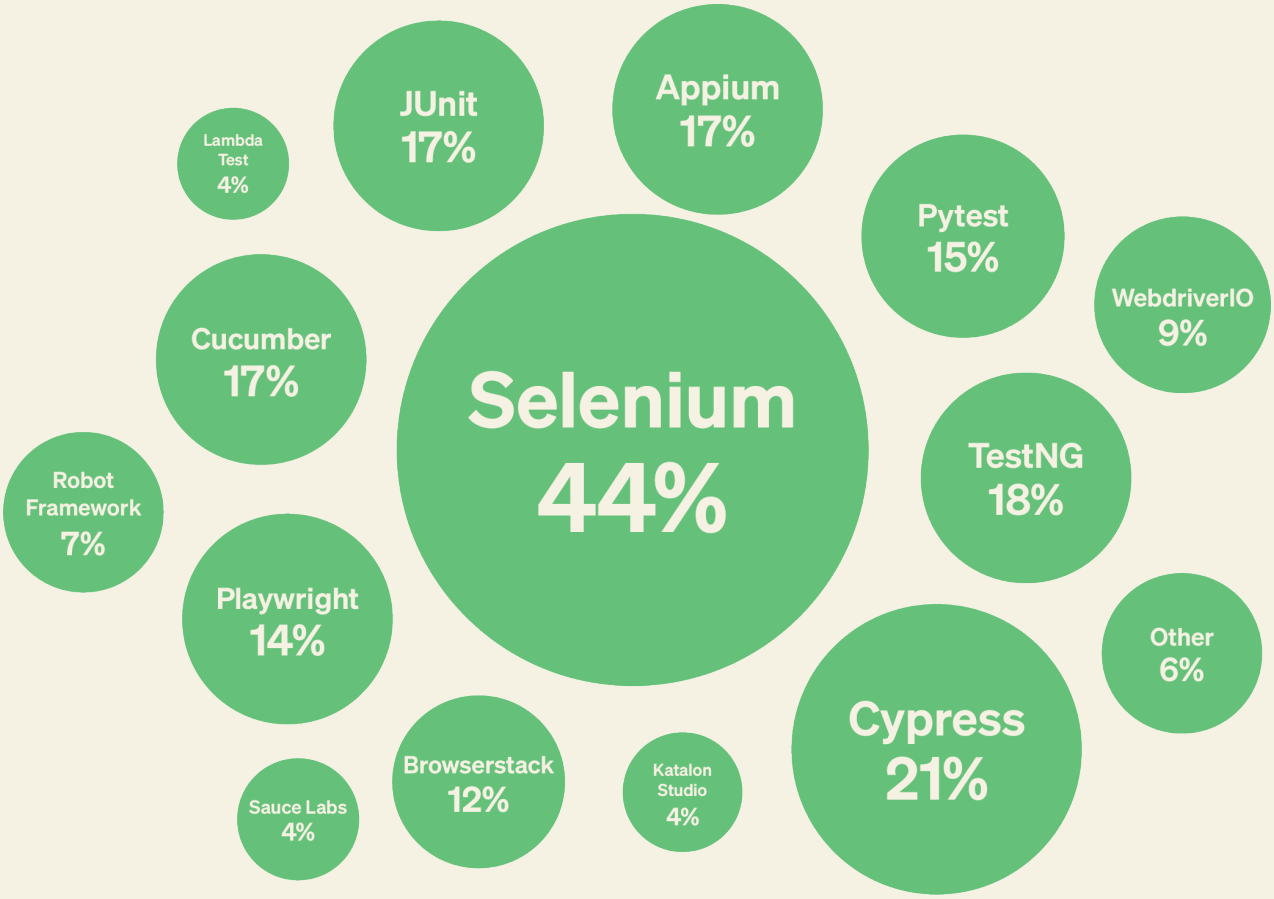
QA Testing Tools and Technologies

Section Questions:

- What test automation tools, suites, or frameworks do you use?
- How does your team document and track requirements?
- What tool does your team use to track defects/bugs?
- How many Jira users are in your organization?
- Does your team use continuous integration/continuous deployment (CI/CD) in your development process? If so, what tool or platform does your team use?

What test automation tools, suites, or frameworks do you use?

Total Respondants: 2,122

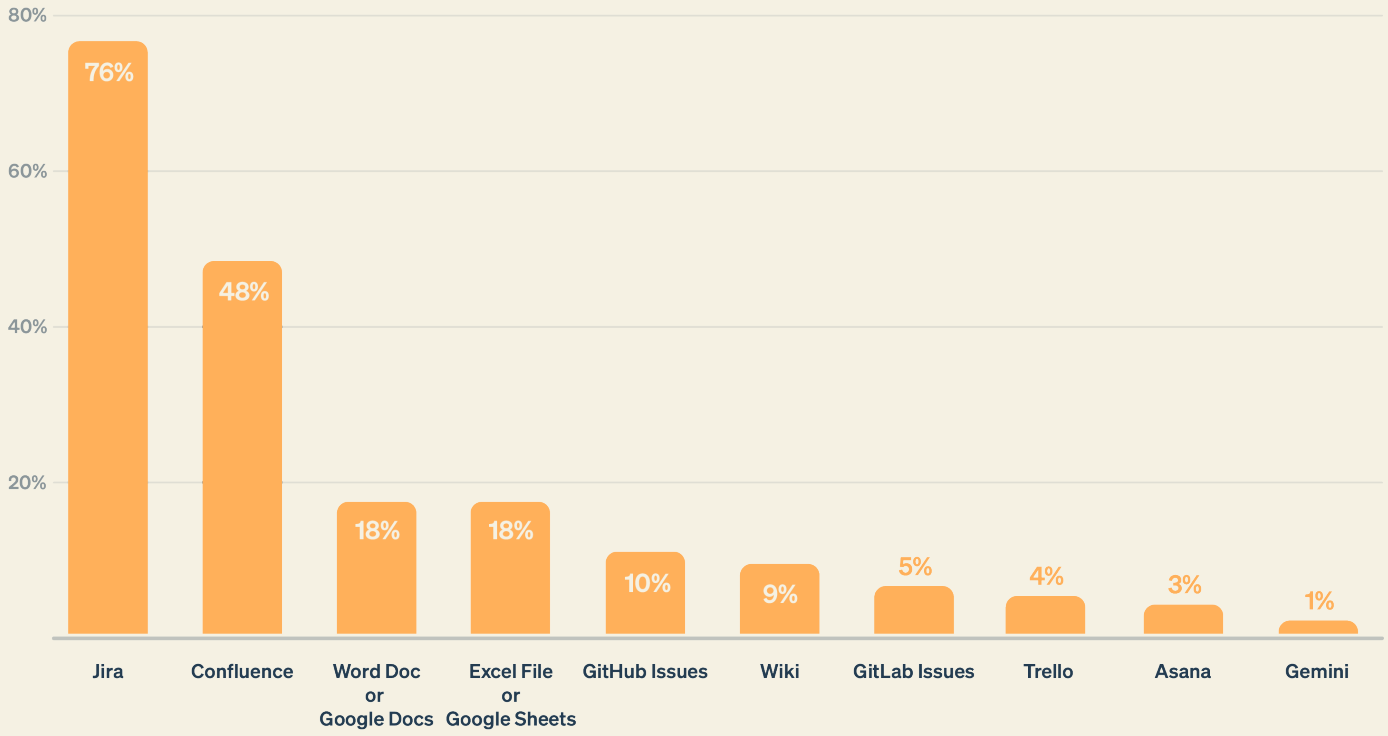


Key Findings

This year's survey found that QA professionals continue to prefer open-source frameworks and tools for test automation. 44% of respondents report using Selenium, then Cypress automation as the second most used tool, followed by Java frameworks leveraging TestNG.

How does your team document and track requirements?

Total Respondants: 2,122



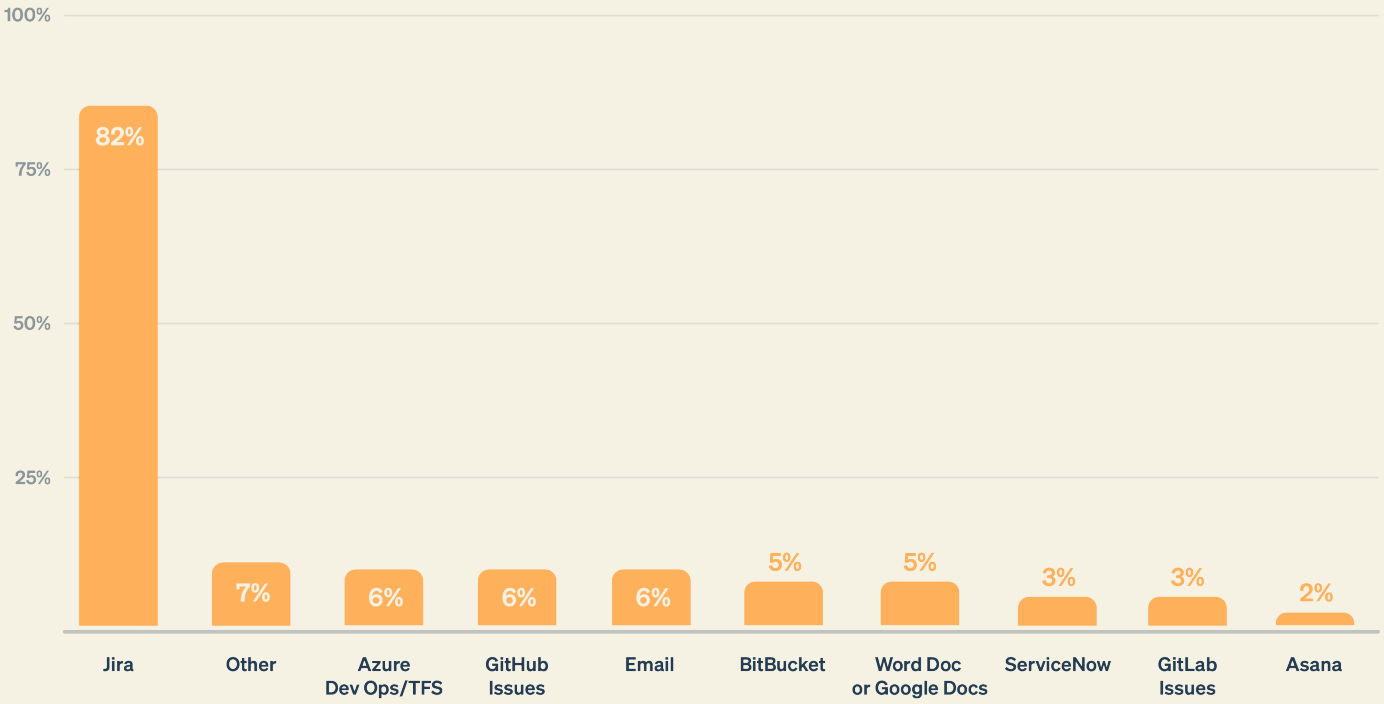
Key Findings

QA teams were also surveyed on the tools they use to document and track requirements. Jira maintains its popularity year-over-year with 76% of respondents reporting its use to track their requirements.

Notably, many of the tools respondents report using for requirement tracking are work management tools (such as Confluence, Word or Google Docs, and spreadsheets) rather than tools designed specifically for requirement tracking.

What tool does your team use to track defects/bugs?

Total Respondants: 2,164



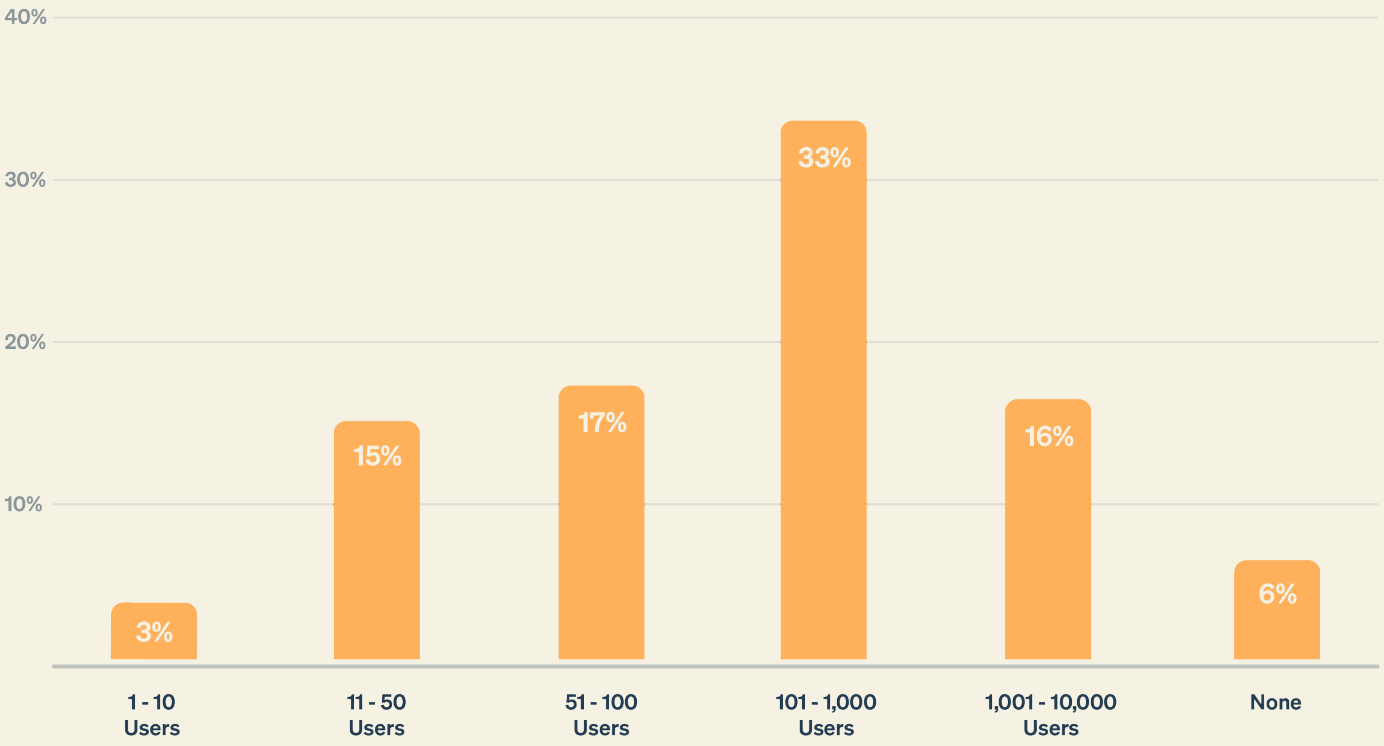
Key Findings

Jira is by far the most popular defect tracking tool, with the majority (82%) of respondents relying on it to track defects and bugs during testing.

While Azure DevOps and GitHub Issues are also notable tools used by testing teams, there is a significant gap between their usage and that of Jira, with less than 10% of respondents utilizing these alternatives.

How many Jira users are in your organization?

Total Respondants: 2,159

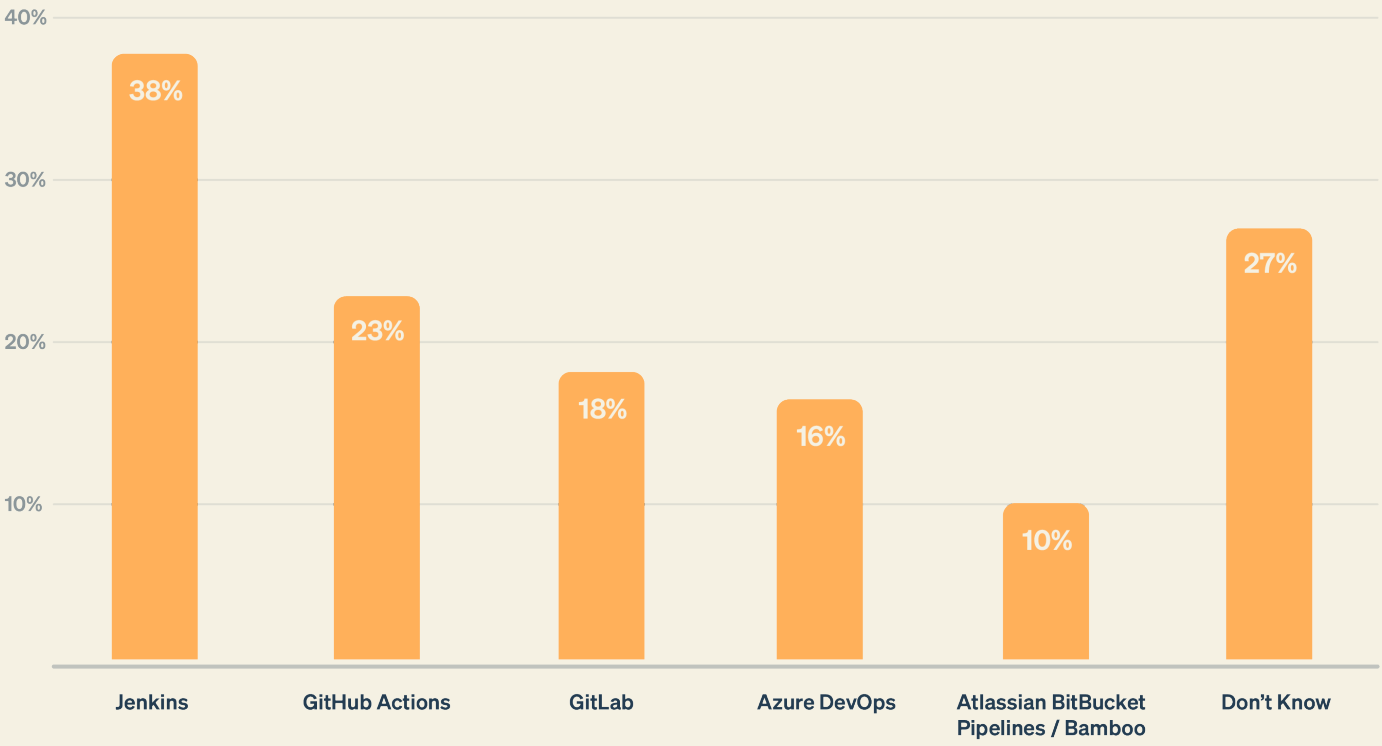


Key Findings

49% of respondents reported having over 100 Jira users in their organization. This Indicates a trend of increasing Jira users over time, as the categories for 1-10 users, 11-50 users, and 51-100 users seem to be decreasing annually.

Does your team use continuous integration/continuous deployment (CI/CD) in your development process? If so, what tool or platform does your team use?

Total Respondants: 2,059



Key Findings

CI/CD tools have become essential components of the development and testing process, particularly with the adoption of automation within DevOps practices. Jenkins has consistently maintained its position as the most popular tool among respondents for the past four years, with 38% still selecting it as their preferred CI/CD tool. However, GitHub Actions and GitLab CI/CD Pipelines are the second and third most popular tools, respectively.

The data indicates a rising adoption of GitHub Actions, GitLab CI/CD Pipelines, and Azure Pipelines among respondents. Conversely, there has been a decrease in adoption for Bitbucket Pipelines, TeamCity, CircleCI, and Travis CI.

Section Summary

The survey data provides valuable insights into the evolving landscape of development and testing, particularly concerning the interplay between manual and automated testing and the utilization of testing tools and technologies.

Despite the increasing emphasis on automation, manual testing continues to play a significant role in QA processes, with respondents indicating a rise in manual testing compared to the previous year.

The data reflects a positive trajectory in automation adoption, with an increasing number of companies running automated tests daily. Additionally, there is a narrowing gap between the percentage of tests currently automated and the desired future state, indicating a concerted effort by teams to bridge this divide and automate a larger portion of their tests.

Open-source frameworks like Selenium continue to dominate the testing tools arena , reflecting a preference for flexible, community-driven solutions among QA professionals. Similarly, Jira remains the go-to choice for requirement tracking and defect management.

The integration of CI/CD tools into the development and testing pipeline is on the rise, with Jenkins retaining its position as the most popular choice. However, there is a notable uptick in adoption for GitHub Actions, GitLab CI/CD Pipelines, and Azure Pipelines suggesting a shift towards more modern and integrated CI/CD solutions.

Overall, the survey data underscores a continued emphasis on automation, a preference for open-source tools, and a gradual evolution towards more streamlined and integrated testing processes.

SECTION 03

QA Process and Benchmarks

QA Process and Benchmarks

The “QA Processes and Benchmarks” section provides an in-depth analysis of current testing practices and benchmarks within the industry. It’s divided into two sections:

This first section “QA Practices” explores the testing landscape from test definition to release deployment, highlighting the importance of collaboration among internal and external teams across different methodologies.

The second “QA Benchmarks” section delves deeper into best practices, examining tasks and strategies utilized by teams to gauge their operational efficiency and performance.

Continue exploring this section to uncover insights on the following topics:

- **Who defines tests within organizations**
- **Release cycles**
- **Development and testing methodologies**
- **Partnering with external organizations**
- **Defect backlog management**
- **Compliance strategies**
- **Test planning in the development lifecycle**
- **Root cause analysis (RCA)**
- **Testing activities management**

QA Process and Benchmarks

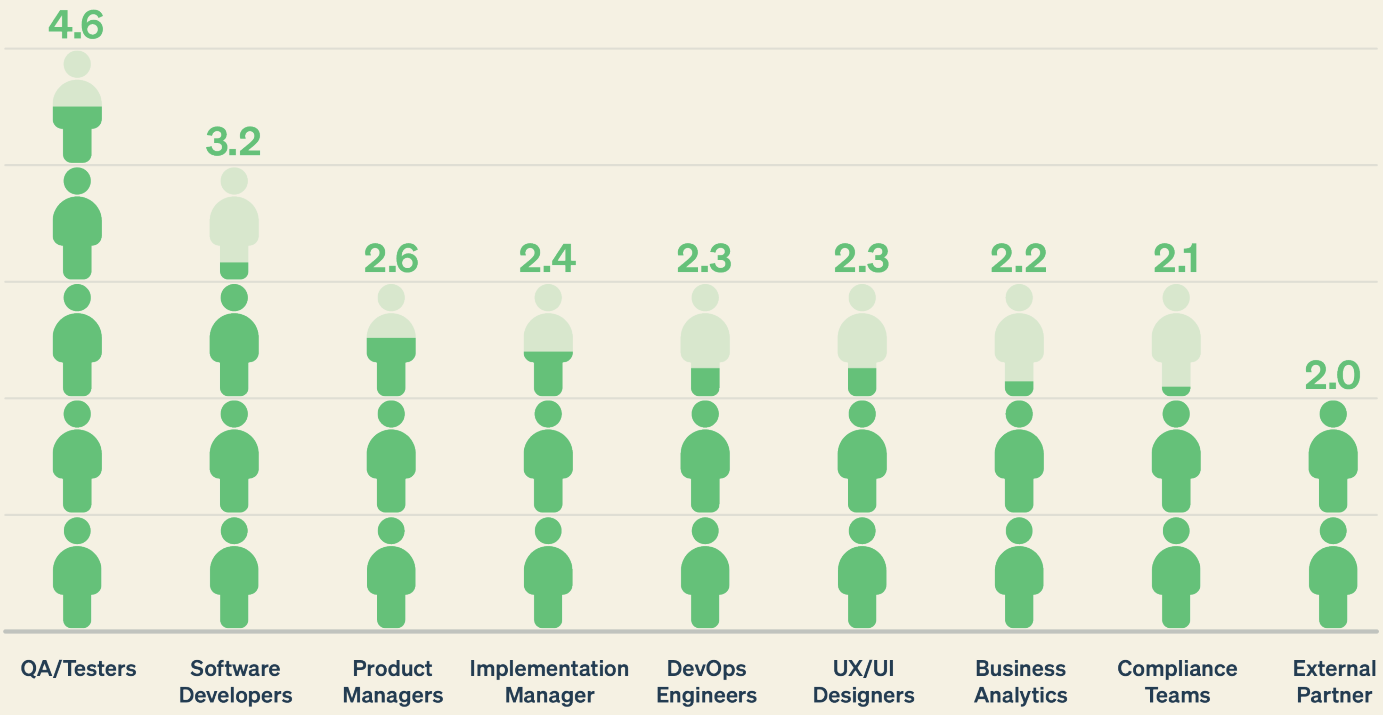
Manual vs Automated Testing

Section Questions:

- How often do these roles define tests in your organization?
- Does your team use the following development methodologies or techniques today?
- How often does your organization deploy new releases or ship new products?
- How many external organizations do you partner with to help with testing?

How often do these roles define tests in your organization? *(1 means they never define tests and 5 means they always define tests)*

Total Respondants: 2,261



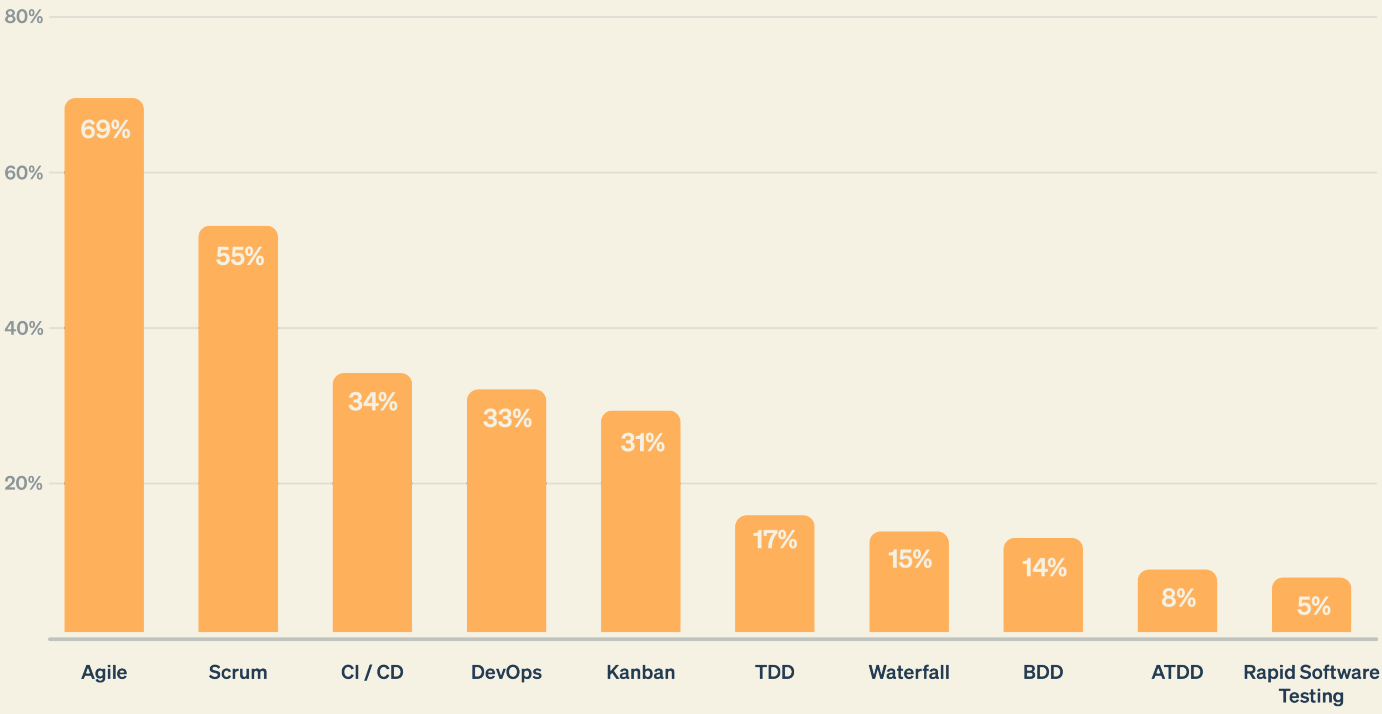
Key Findings

The primary team members defining tests are QA/Tester team members scoring an average of 4.6 out of 5. Following closely, software developers also commonly play a significant role in defining tests.

Other team members also contribute to defining tests albeit to a lesser extent. On average, non-QA team members are defining tests about half of the time scoring 2.4 out of 5. This group includes software developers, product managers, project/implementation managers, DevOps engineers, UX/UI designers, business analysts, compliance teams, and external partners.

Does your team use any of the following development methodologies or techniques today?

Total Respondants: 2,157

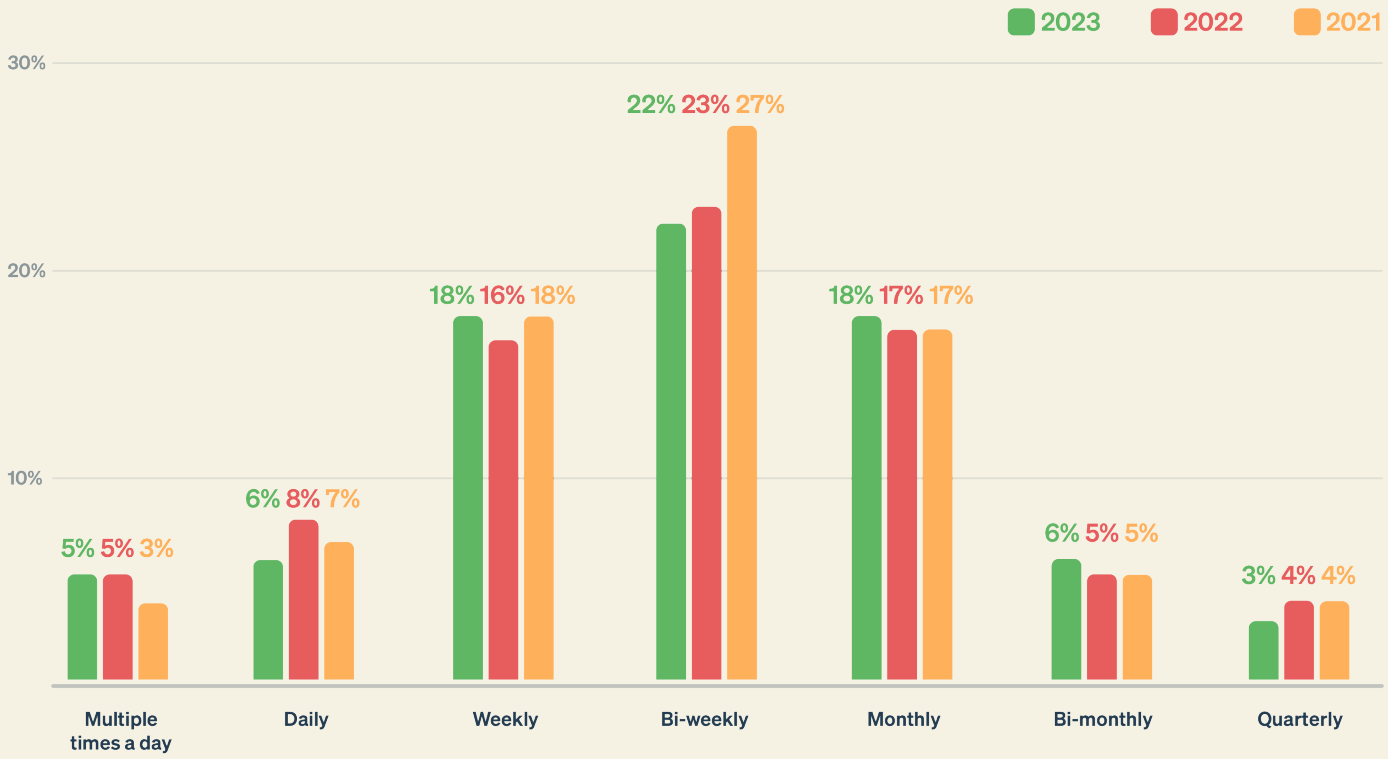


Key Findings

Development teams across the industry employ a diverse range of methodologies and techniques. The top three methodologies used by testing teams today include Agile (69%), Scrum (55%), and CI/CD (34%). The adoption rates of Agile and Scrum are notably higher, with at least 20% more usage compared to any other methodology.

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

Total Respondants: 2,195



Key Findings

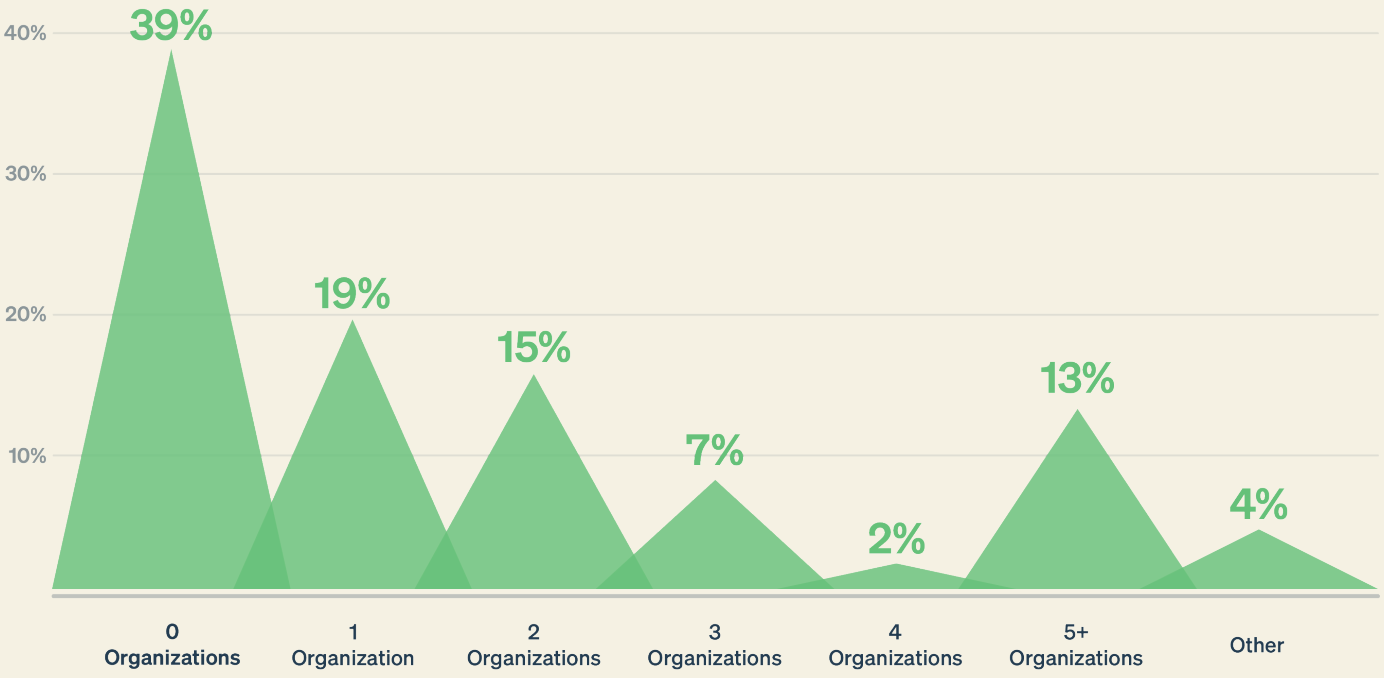
The decision on release cadence is often determined by an organization's specific needs, resulting in release cycles that vary from daily to quarterly or longer intervals. The majority (22%) of survey respondents indicated that their organization deploys bi-weekly.

Weekly and monthly release deployments are also prevalent, each accounting for 18% of responses.

Notably, 69% of organizations are deploying new releases monthly or more frequently. This suggests that companies continue to find value in deploying frequently.

How many external organizations do you partner with to help with testing your product(s)?

Total Respondants: 2,195



Key Findings

To address the demand for accelerated testing, many teams opt to augment their resources by partnering with an external organization like a consultant or contractor.

While 39% of respondents reported managing all testing in-house, a substantial 60% of respondents indicated that they are using at least one external organization to help them with testing. Additionally, 41% of respondents said they partner with at least two external organizations to help test their product(s).

QA Process and Benchmarks

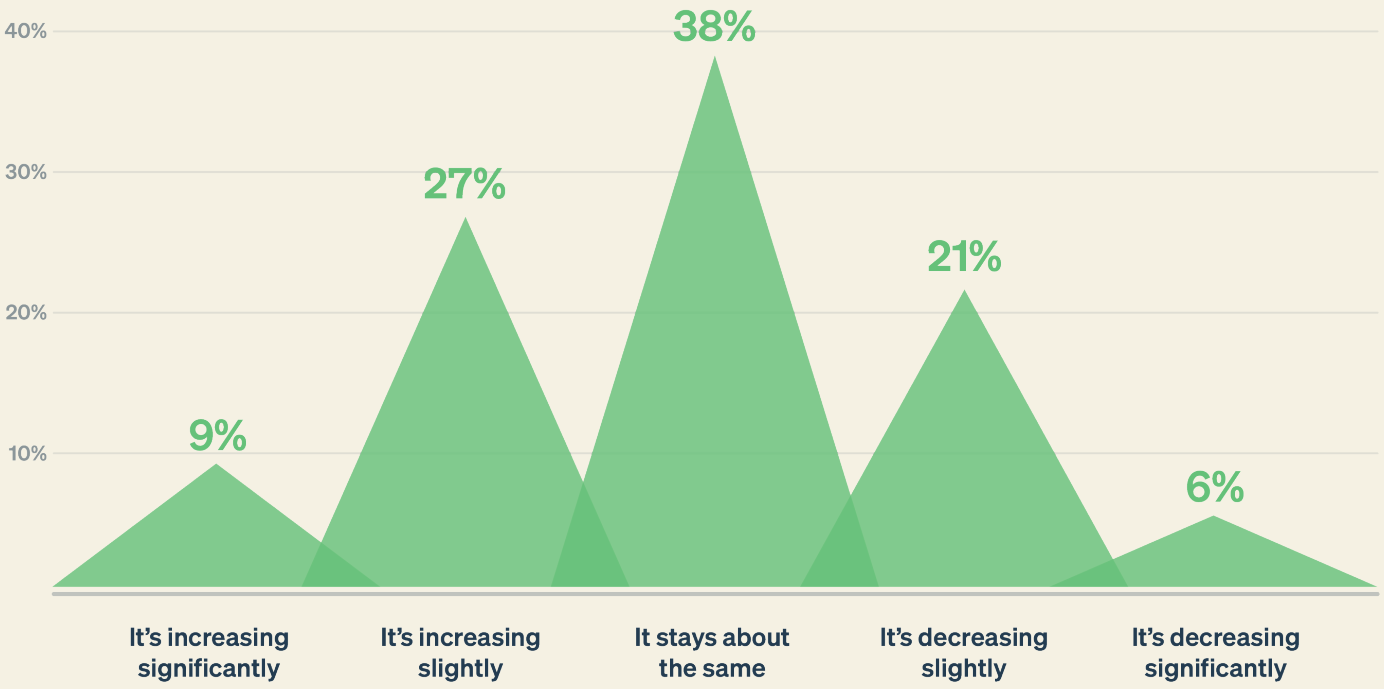
QA Benchmarks

Section Questions:

- What does your defect backlog trend look like?
- What strategies do you employ to ensure compliance with industry-specific regulations while maintaining efficient testing processes?
- At what stage in the development lifecycle does test planning start?
- Does your team conduct root cause analysis on escaped defects or issues?
- How are activities for testing, quality, and automation managed as part of a backlog?
- What would you consider the rate of your hotfixes versus your planned releases?

What does your defect backlog trend look like?

Total Respondants: 2,244



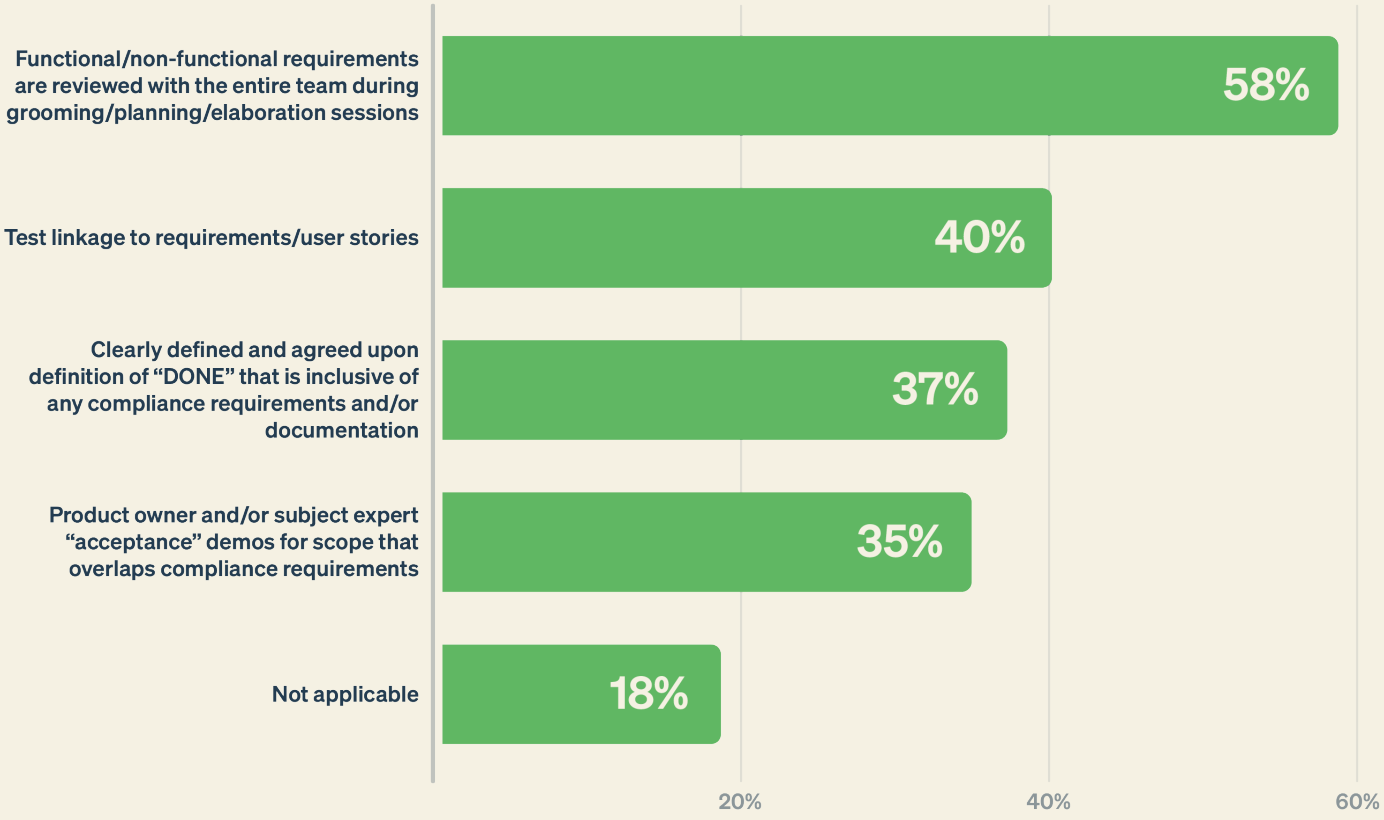
Key Findings

As testing teams develop and refine processes they also need to consider how to manage specific testing and automation activities. Often, this requires placing these activities in a backlog.

In an ideal world, backlogs would diminish over time. However, survey results show that 36% of respondents reported an increasing backlog, while 38% indicated that their backlog remained relatively the same, and 27% reported a decrease in their backlog.

What strategies do you employ to ensure compliance with industry-specific regulations while maintaining efficient testing processes?

Total Respondants: 2,317



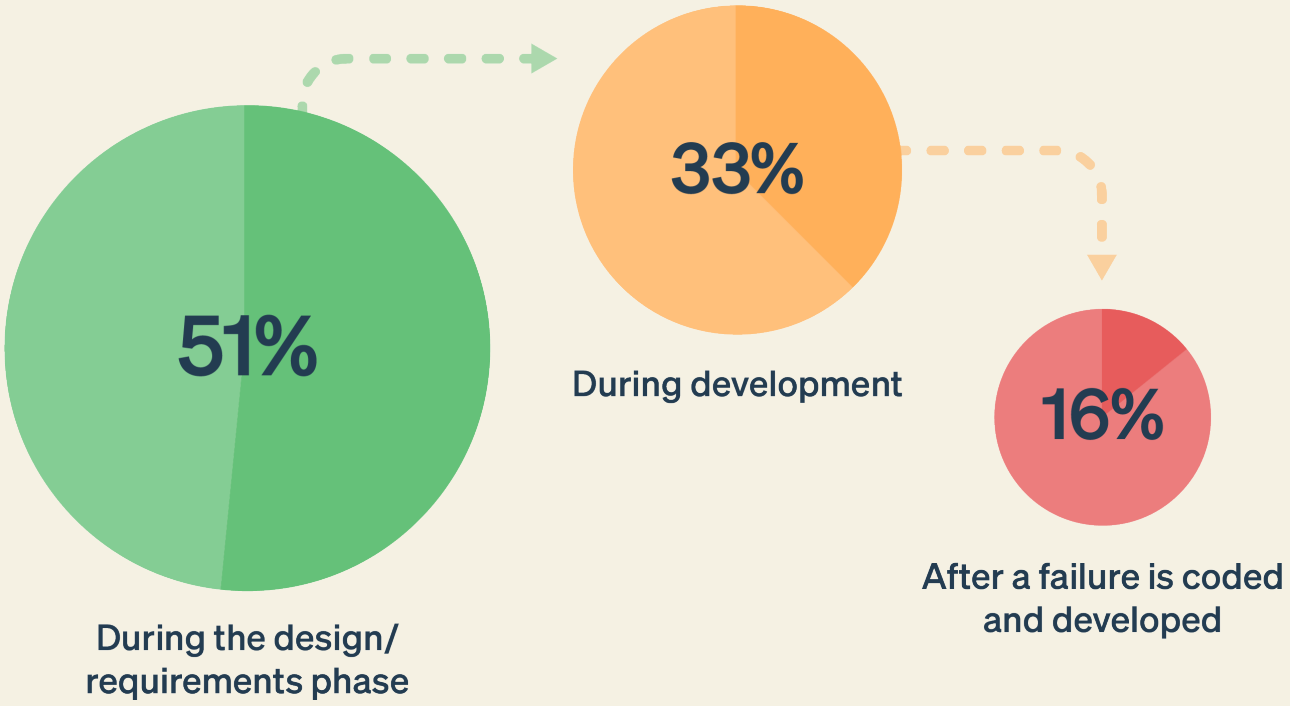
Key Findings

Testing teams operating in regulated industries like finance, healthcare, and energy must ensure compliance with industry-specific standards such as Health Insurance Portability and Accountability Act (HIPAA), General Data Protection Regulation (GDPR), or Sarbanes–Oxley Act (SOX). To ensure compliance with these standards, teams can employ various strategies.

Over half of the survey respondents responsible for compliance maintenance indicated they do this by reviewing requirements with the entire team during planning sessions. Additionally, common approaches include linking test artifacts to user stories (40%), clearly defining a 'definition of done' (37%), and having a subject matter expert provide acceptance demos for the project scope (35%).

At what stage in the development lifecycle does test planning start?

Total Respondants: 2,209



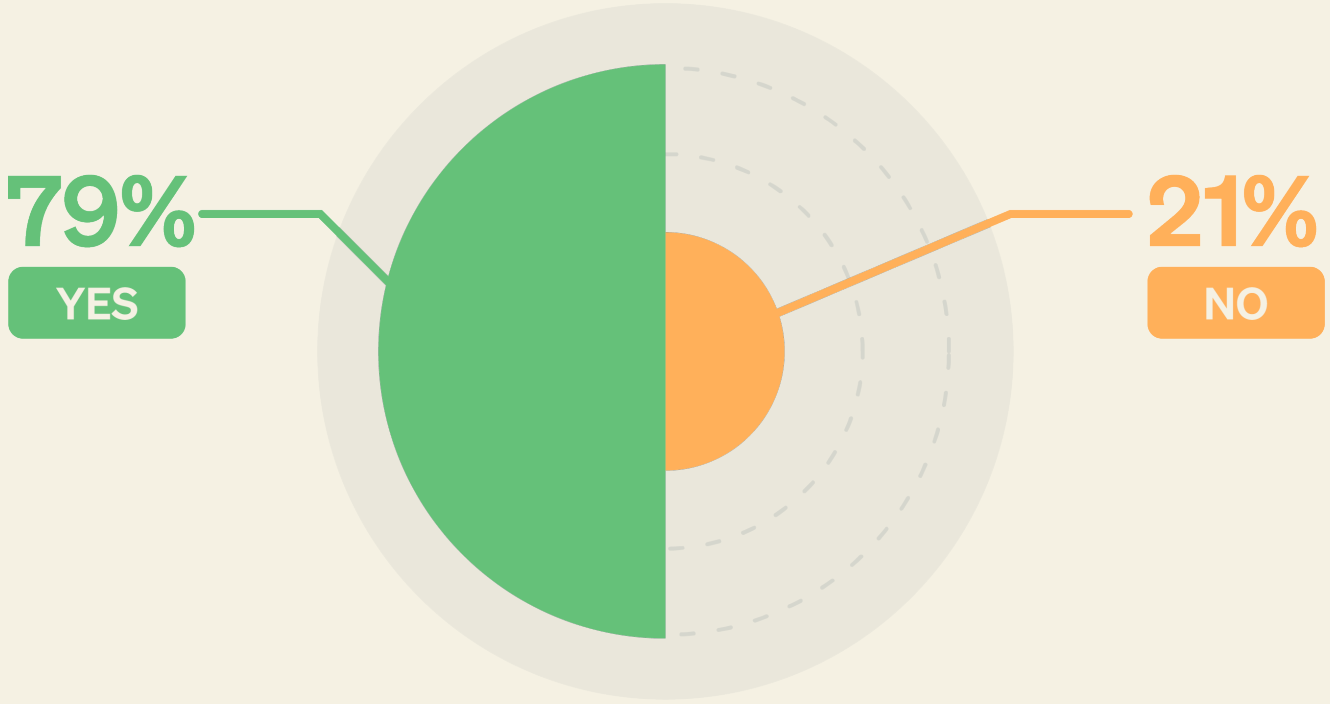
Key Findings

Test planning can begin at various stages within the Software Development Life Cycle (SDLC), but initiating it earlier is generally advantageous. The survey data shows that most respondents (51%) start test planning early in the development lifecycle, specifically during the design or requirements phase.

Additionally, 33% of respondents said they start test planning while code is actively being developed, while the remaining 16% initiate test planning after a feature has been coded and developed.

Does your team conduct root cause analysis on escaped defects or issues?

Total Respondants: 2,213



Key Findings

Root cause analysis plays a crucial role in identifying and addressing the actual cause of defects rather than just the symptoms. The survey results highlight the importance of RCA, with the majority (79%) of respondents stating that their teams perform RCA on escaped defects. Conversely, significantly fewer (21%) respondents indicated that their teams do not conduct any kind of RCA.

How are activities for testing, quality activities, and automation managed as part of a backlog?

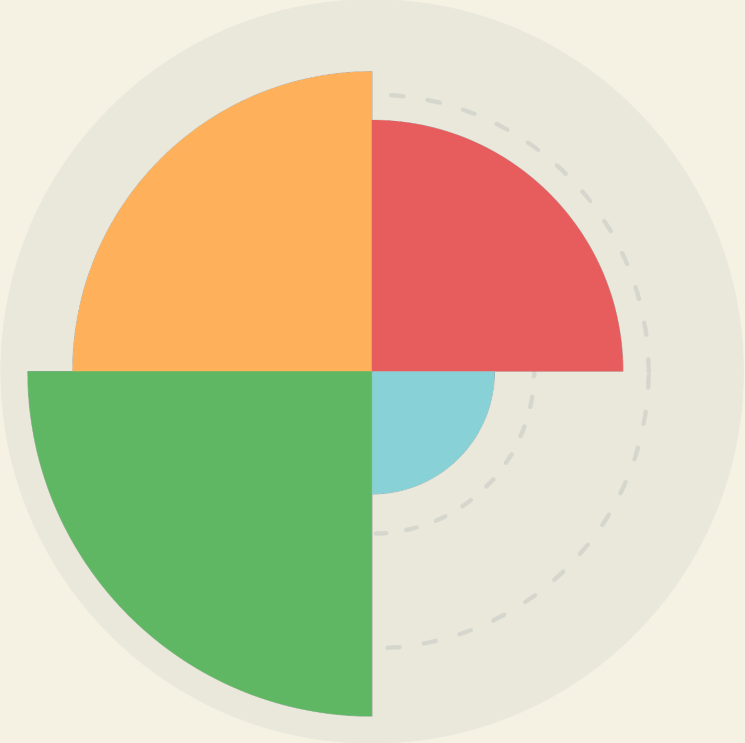
Total Respondants: 2,166

29% We plan to automate most

25% We need to design them

11% We plan to addess tech debt

35% We are tracking, managing, and addressing tech debt



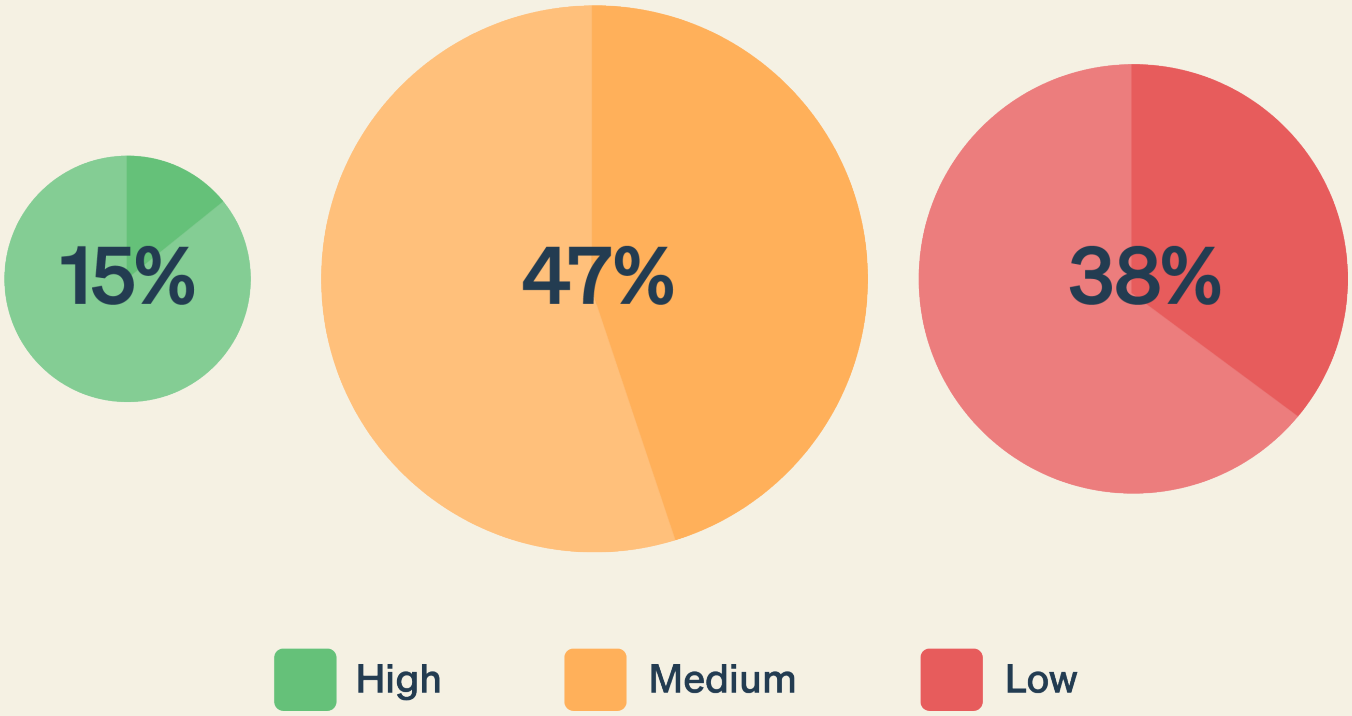
Key Findings

Testing organizations often need to employ a strategy to manage a variety of activities beyond test execution. These activities may encompass plans for automation, addressing technical debt, or even determining necessary actions.

According to survey data, 75% of respondents have some activities planned as part of a backlog. Among these activities, 29% of respondents plan to automate most activities, 11% have plans to address tech debt, and 35% are actively tracking, managing, and addressing tech debt.

What would you consider the rate of your hotfixes versus your planned releases?

Total Respondants: 2,258



Key Findings

The survey data reveals a distribution of hotfix rates among respondents. Notably, 15% reported a high hotfix rate, suggesting frequent issues requiring immediate attention. This could potentially signify areas for improvement in software stability or deployment processes.

Meanwhile, the majority (47%) reported a medium hotfix rate, indicating a balance between occasional issues and overall stability—a common scenario in software maintenance.

Interestingly, a significant portion (38%) reported a low hotfix rate, suggesting a relatively stable software environment with fewer urgent issues.

Section Summary

The survey data provides valuable insights into the state of QA processes and benchmarks within the industry, illustrating the crucial role of QA and tester team members in test definition, augmented by significant contributions from software developers.

The prevalence of Agile, Scrum, and CI/CD methodologies reflects the adaptability of testing teams to modern development practices. Moreover, a diverse range of release cadences, spanning from daily to quarterly, underscores the importance of flexibility in deployment strategies.

To enhance testing efficiency, many teams are leveraging external resources, with a majority partnering with at least one external organization for testing purposes. This collaborative approach allows teams to augment their capabilities and effectively address resource constraints.

Early test planning in the development lifecycle emphasizes the importance of proactive testing strategies, while widespread adoption of root cause analysis demonstrates a commitment to quality improvement.

Despite the challenges in backlog management, with a significant portion experiencing an increase in backlog size, the prioritization of activities within backlogs reflects a strategic approach to managing testing-related tasks, with automation and tech debt emerging as key focus areas for many teams.

The distribution of hotfix rates among respondents suggests varying degrees of software stability and deployment efficiency, indicating potential opportunities for improvement.

Overall, the findings underscore the paramount importance of collaboration, both internally and externally, along with a proactive approach to the strategic management of testing-related activities.

SECTION 04

Challenges, Priorities and KPIs

Challenges, Priorities, and KPIs

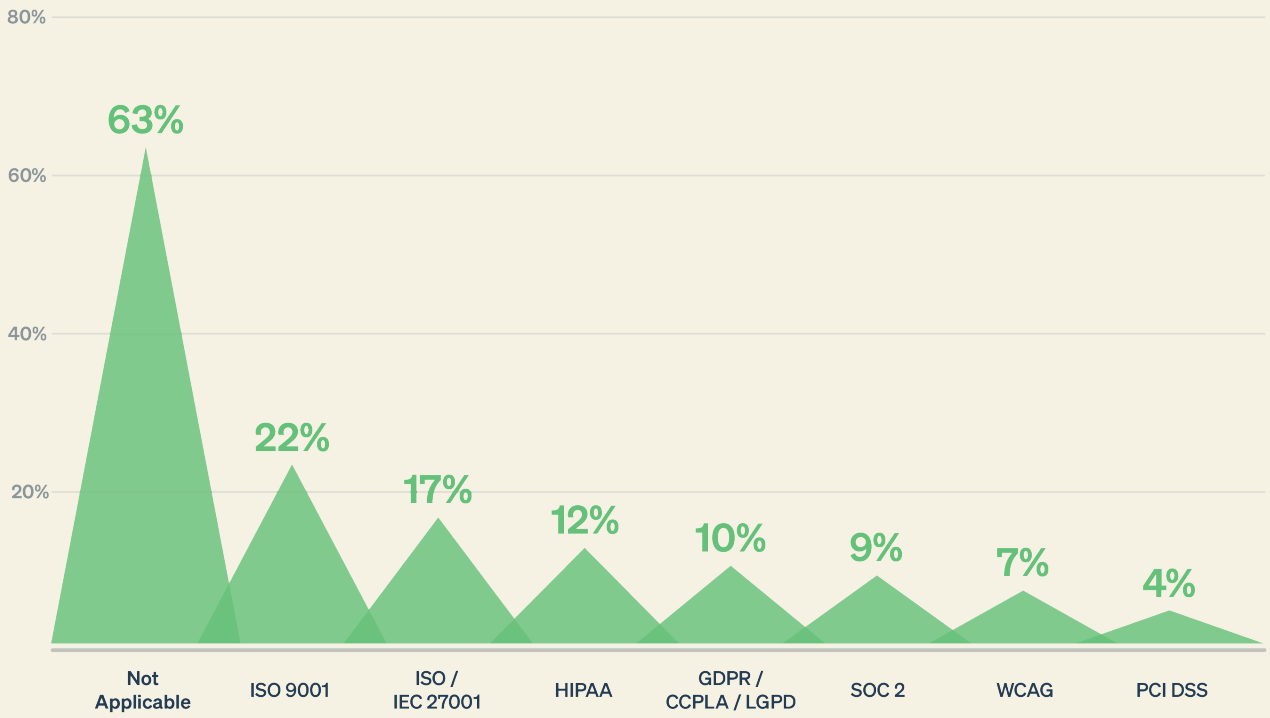
Challenges in Testing

Section Questions:

- What kinds of compliance or regulatory standards does your QA team have to abide by?
- What are your/your team's biggest challenges around testing & QA right now?

What kinds of compliance or regulatory standards does your QA team have to abide by?

Total Respondants: 1,973



Key Findings

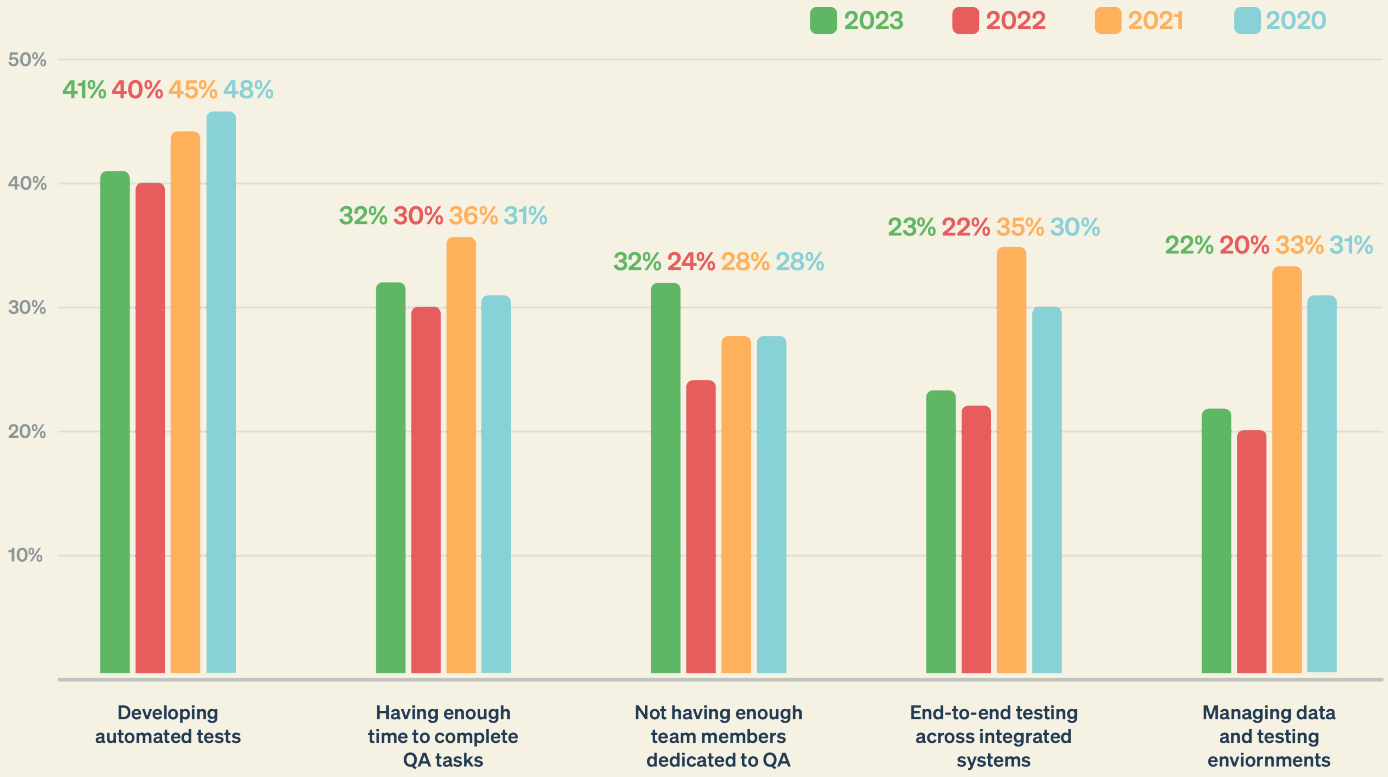
A majority (63%) of respondents report that their teams are not governed by specific compliance or regulatory standards. This suggests a diverse project landscape and potentially varying levels of risk management strategies in place. Among those who are required to navigate compliance-related complexities, ISO 9001 (quality management systems standards) emerges as the most prevalent standard (22%), emphasizing its significance in quality management processes. Close behind, ISO/IEC 27001 (international standard for information security management) is adhered to by 17% of respondents, underscoring the critical nature of information security management in today's digital age.

Furthermore, HIPAA (12%), GDPR/CCPA/LGPD (10%), and SOC 2 (9%) reflect the increasing focus on data protection and privacy in healthcare and general business practices. Interestingly, less common standards like PCI DSS, FedRAMP, FDA GxP, HITRUST, FISMA, and GAMP5 demonstrate the wide-ranging and specific compliance needs across different sectors.

This diverse regulatory landscape highlights the importance for QA teams to remain agile and well-informed, ensuring their testing strategies effectively meet compliance requirements while maintaining efficiency.

What are your/your team's biggest challenges around testing & QA right now?

Total Respondants: 1,856



Key Findings

While the challenge of developing automated tests remains a concern, its prominence has slightly declined from 48% in 2020 to 41% in 2023. This suggests improving adaptability or the maturation of automation tools, even as the issue remains prominent.

Time constraints continue to pose a significant hurdle, with 32% of respondents in 2023 expressing difficulty finding enough time to complete testing tasks, a slight increase from 31% in 2020. This pressure underscores the constant demand for development teams to deliver quality results swiftly.

Moreover, ensuring adequate staffing for testing roles has become more concerning, rising from 28% in 2020 to 32% in 2023. This may indicate some economic disruption in the technology sector and a growing recognition of the importance of testing roles.

End-to-end testing and managing data/testing environments have seen some fluctuation in concern but remain significant issues. In 2021, end-to-end testing was a concern for 35% of teams, dropping to 23% in 2023, possibly reflecting advancements in integration testing tools and methodologies.

Challenges, Priorities, and KPIs

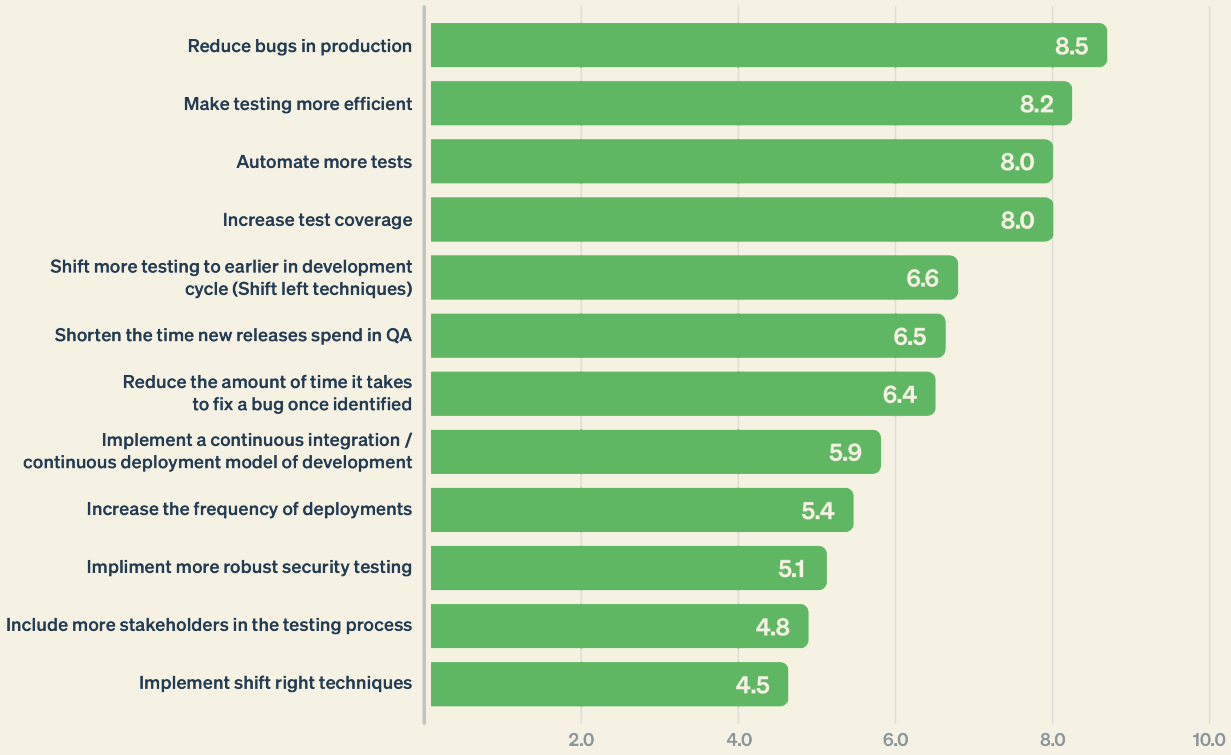
Testing Priorities and KPIs

Section Questions:

- What are your/your team's top objectives around testing & QA right now?
- how important each of the following priorities is in your QA processes?
- Which metrics or KPIs does your team track and report on?

What are your/your team's top objectives around testing & QA right now?

Total Respondants: 1,640



Key Findings

In 2023, reducing bugs in production emerged as the top priority with a score of 8.5, indicating a continuous effort to improve product reliability. Streamlining testing processes and expanding test automation closely followed, scoring 8.2 and 8.0 respectively, signaling a shift towards more efficient and automated test environments.

Comprehensive test coverage retained its significance, tied with automation at 8.0, indicating a commitment to thorough testing across all aspects of software.

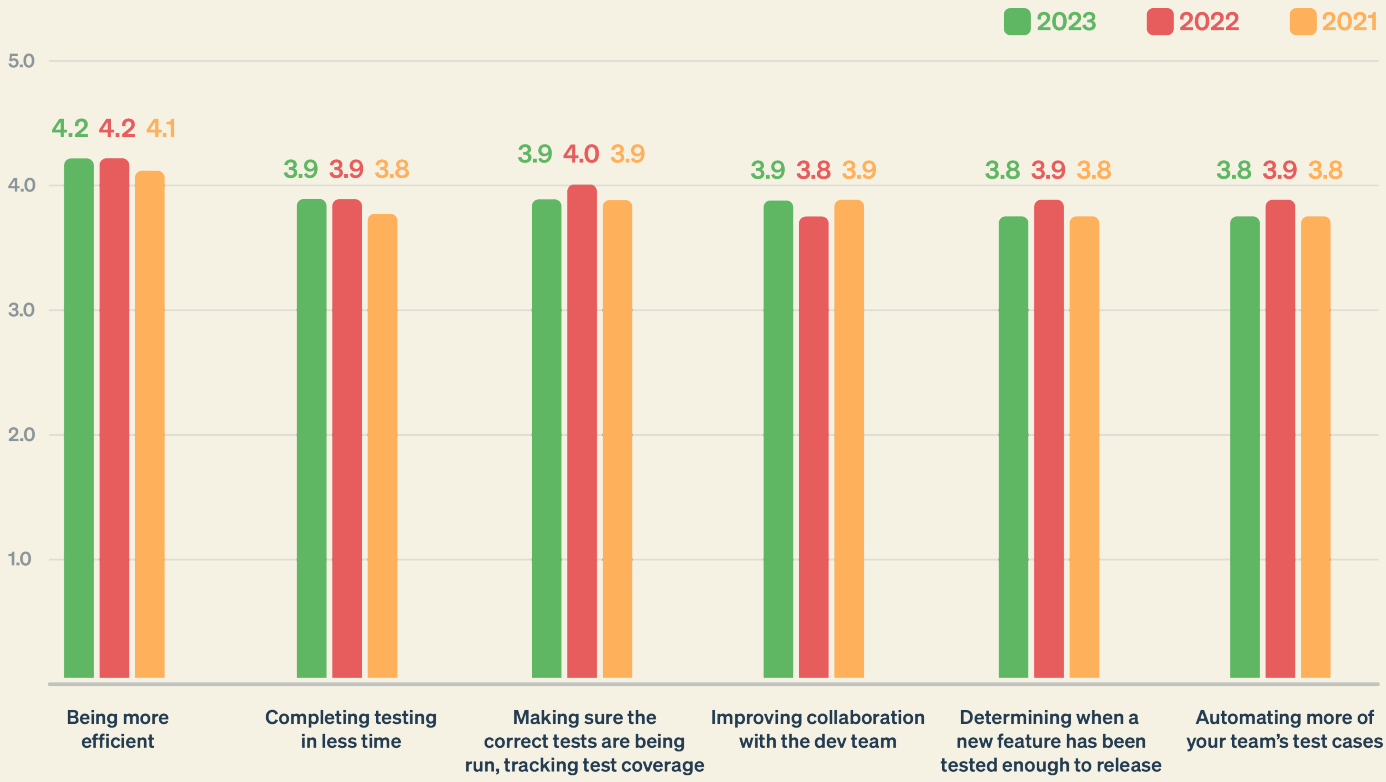
Notably, incorporating testing earlier in the development cycle, a practice known as "shift left," scored 6.6, reflecting a growing adoption of proactive testing strategies. Other areas, such as reducing the testing cycle for new releases and expediting bug resolution times, also received considerable attention, emphasizing the importance of speed in the testing process.

Involving a broader range of stakeholders in testing processes was the least prioritized objective, with a score of 4.8, pointing towards a more targeted engagement strategy in testing activities. These insights reflect an evolving landscape where quality, efficiency, and automation are key drivers in testing strategies.

On a scale of 1 to 5, rate how important each of the following priorities is in your QA processes.

(Rank from highest [1] to lowest [12] priority.)

Total Respondants: 1,855



Key Findings

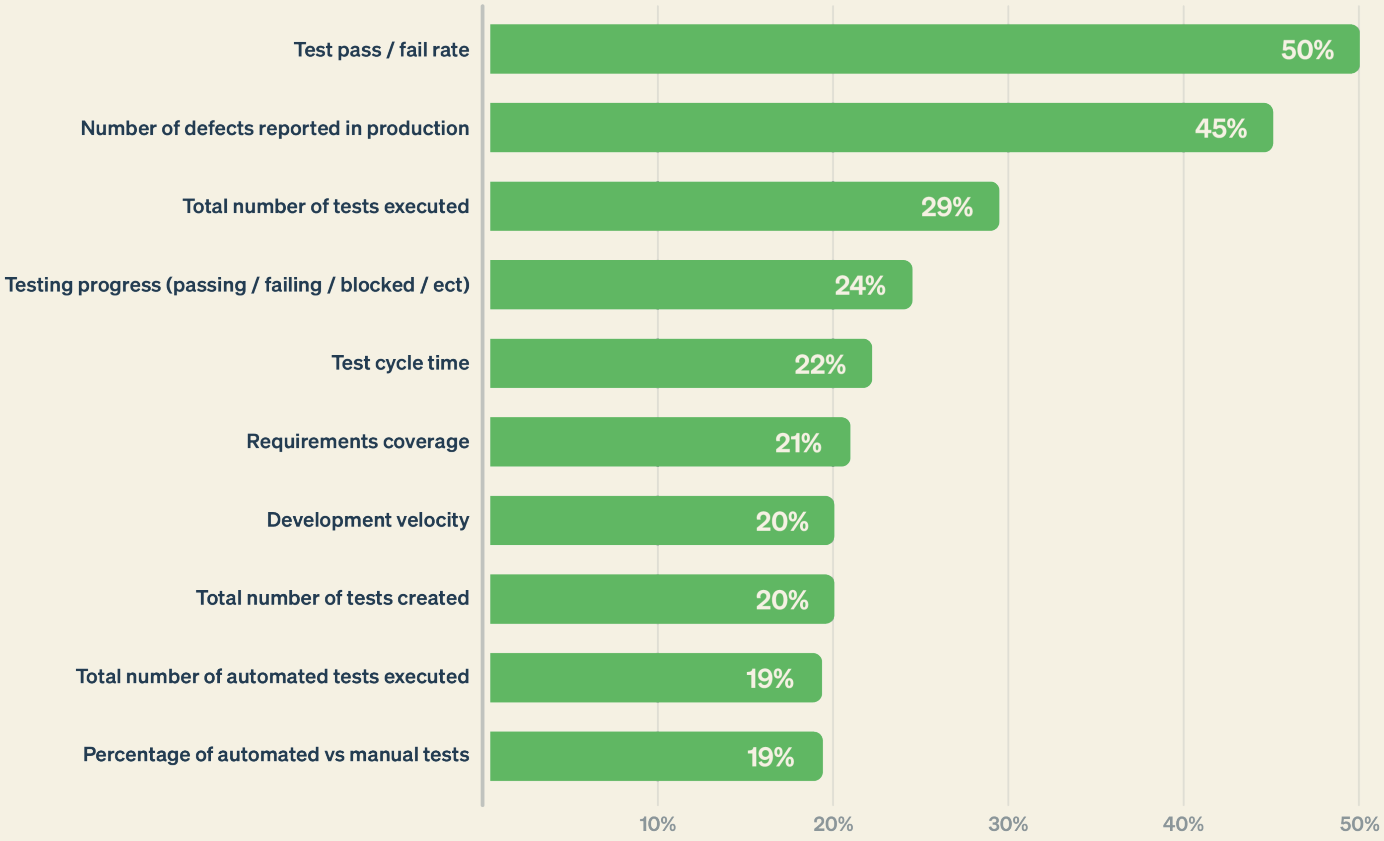
"Being more efficient" consistently emerges as the top priority, with a weighted average of 4.2, emphasizing a continual push for streamlined processes. Completing testing promptly and ensuring test relevance also hold significant importance, both maintaining a weighted average of 3.9 in 2023.

There's a noted increase in the value placed on "Improving collaboration with the development team," rising to 3.9, indicating a heightened drive for integration between QA and development teams.

Conversely, areas such as "Automating more of your team's test cases" and "Maintaining traceability between requirements, tests, and defects" saw slight decreases, suggesting evolving challenges or shifts in both testing and overall quality assurance. "Maintaining compliance with regulatory requirements" saw a dip to 3.4, hinting at a stable yet less critical concern compared to other areas.

Which metrics or KPIs does your team track and report on?

Total Respondants: 1,941



Key Findings

The survey results uncover insightful trends regarding the metrics and KPIs prioritized by QA teams. A significant 50% of teams focus on test pass/fail rate, underscoring its importance in assessing the immediate success of testing efforts.

45% of respondents prioritize tracking the number of defects reported in production, emphasizing the significance of identifying issues before they impact end-users. Operational efficiency and effectiveness are further illustrated by the 29% of teams tracking the total number of tests executed, with other crucial metrics like testing progress, test cycle time, and requirements coverage following closely behind.

Interestingly, the survey points to a balanced approach between traditional testing metrics and the growing recognition of automation's role in QA. This is evident in respondents tracking automated tests executed (19%) and the percentage of automated versus manual tests (19%). Such findings reflect an understanding of QA's evolving landscape, blending efficiency with comprehensive test coverage.

Section Summary

This year's survey data provides a comprehensive overview of the challenges facing QA teams and their evolving priorities. Concerning challenges, the diverse regulatory landscape underscores the need for teams to remain agile and informed, ensuring their testing strategies are both effective and compliant. Persistent time constraints and staffing issues indicate the constant pressure QA teams face to deliver quality results swiftly and the growing awareness of the importance of QA roles.

In terms of priorities, our respondents' focus is squarely on enhancing software quality and operational efficiency. Top priorities include reducing bugs in production, streamlining testing processes, and expanding test automation, reflecting a shift towards more efficient and automated QA environments. Additionally, there is continued interest in proactive testing strategies like "shift left," emphasizing a trend towards integrating testing earlier in the development cycle and making quality an ongoing process.

In terms of metrics and KPIs, there is a balanced approach between traditional testing metrics and the growing recognition of automation's role in the overall testing and quality assurance strategy. Key indicators such as test pass/fail rate and the number of defects reported in production highlight the immediate success of testing efforts and the importance of identifying issues before they affect end-users. This nuanced understanding of QA's evolving landscape emphasizes efficiency alongside comprehensive test coverage.

SECTION 05

The Future of Testing

Trends in Development and Testing

In “The Future of Testing” section, we begin exploring technological adoption and strategic integration within QA processes.

This exploration begins by examining whether teams are considering the adoption of various testing types in the next 12 months. This reveals emerging trends and priorities that are set to shape the future landscape of software testing.

Following this, we delve into the role of artificial intelligence (AI) in software testing, a topic at the forefront of innovation in the field. We uncover how teams are currently integrating AI into their workflows, from automating routine tasks to enhancing the precision of test cases. This section not only highlights the progressive shift towards more advanced and efficient testing strategies but also captures the industry’s pulse on embracing AI-driven solutions to address the challenges of modern software development.

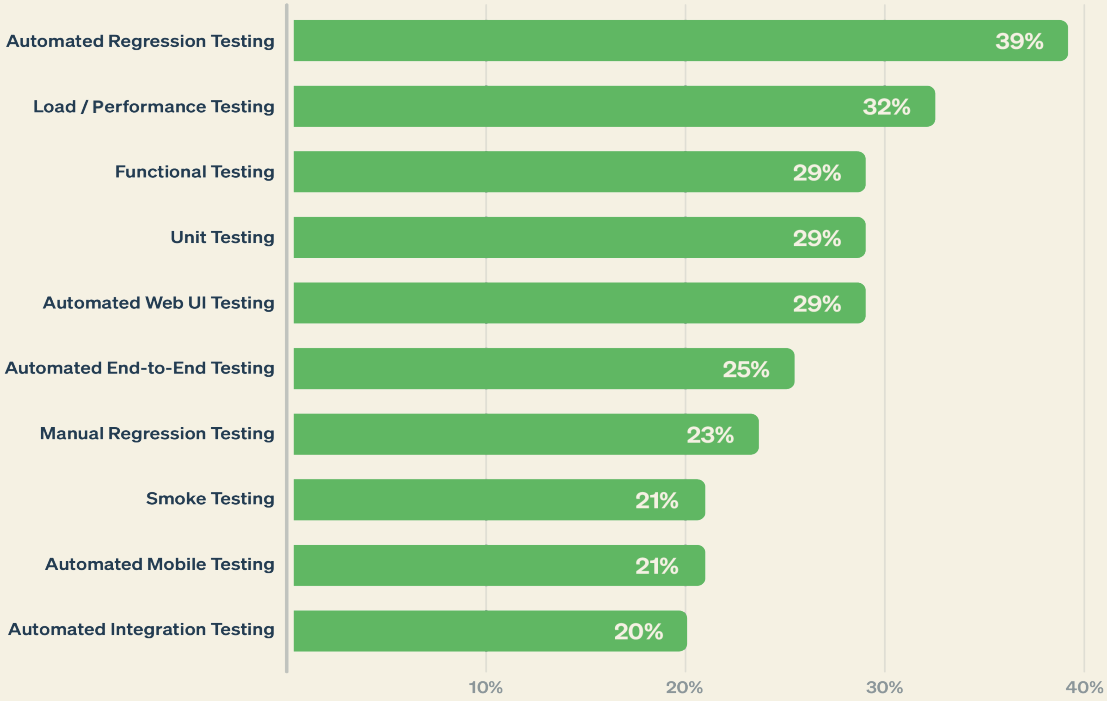
Through this analysis, we aim to provide a comprehensive outlook on how development teams are positioning themselves for the future, underscoring the technologies and methodologies poised to redefine the standards of quality and efficiency in testing.

Continue exploring this section to uncover insights on the following topics:

- **Future adoption of testing types/methods**
- **Use of AI in software testing and quality assurance**

Is your team considering adopting any of the following kinds of testing in the next 12 months?

Total Respondants: 1,866



Key Findings

The survey results reveal an emphasis on automation across various testing types, with automated regression testing being the top priority for 39% of respondents. This underscores a growing recognition of the efficiency and reliability benefits that automation brings to testing and quality assurance processes.

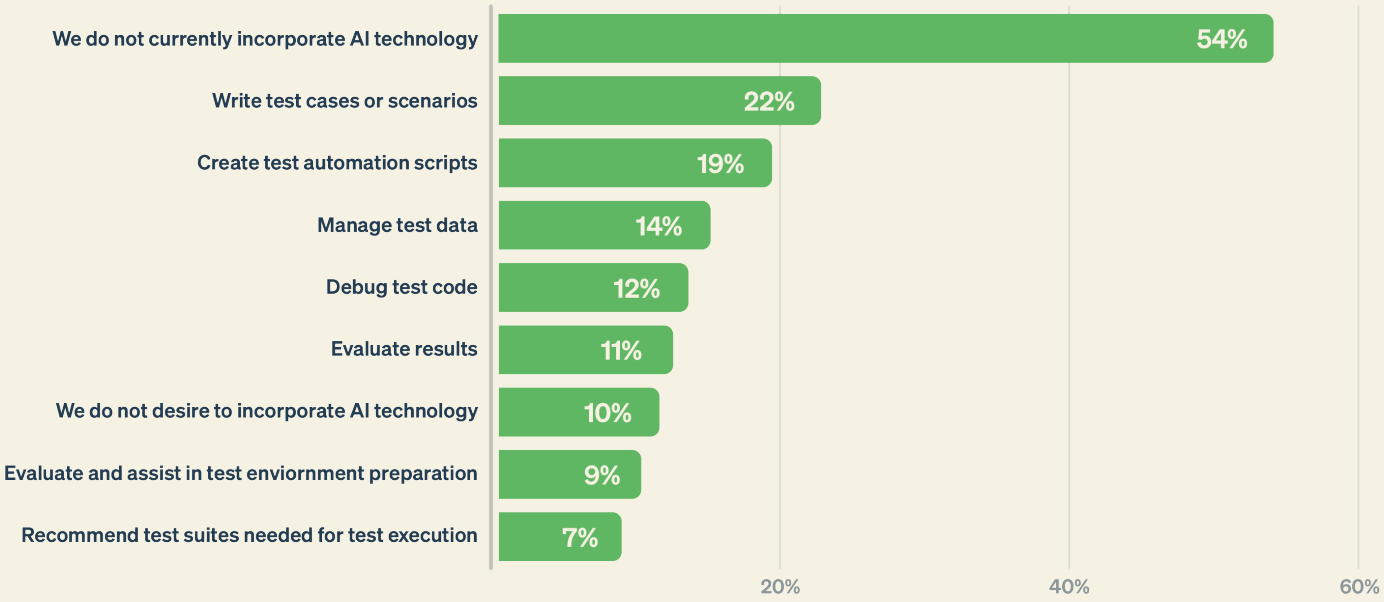
Following closely behind is load/performance testing, indicating a heightened awareness of the importance of ensuring software performance under varying workloads. Functional and unit testing are also prominent, suggesting a commitment to maintaining core functionality and code integrity.

Notably, there is considerable interest in automated UI testing and automated end-to-end testing, reflecting the industry's focus on delivering seamless user experiences. However, the relatively lower percentages for manual regression testing and smoke testing indicate a shift towards automated solutions, possibly driven by the need for speed and scalability in modern development environments.

Overall, these findings reveal a concerted effort among QA teams to leverage automation technologies to enhance testing efficiency, accuracy, and ultimately, software quality.

How do you incorporate AI into your quality assurance processes?

Total Respondants: 2,134



Key Findings

This year, we included a question on how QA teams are leveraging AI within testing and QA processes to benchmark exploration into this evolving area. More than half (54%) of respondents indicated that they do not currently incorporate AI technology into their quality assurance efforts, highlighting a considerable portion of the industry still on the verge of AI adoption. However, 22% of teams are leveraging AI to write test cases or scenarios, while 19% use it to create test automation scripts, demonstrating an open-mindedness within the industry towards AI's potential to streamline and enhance testing.

A smaller but noteworthy fraction of respondents (14% and 12% respectively) are employing AI for the management of test data and debugging of test code, indicating a recognition of AI's capability to address more nuanced aspects of modern software testing. Additionally, evaluating results and assisting in test environment preparation were noted uses, albeit by a smaller fraction of respondents, highlighting emerging areas where AI could significantly impact testing efficiency.

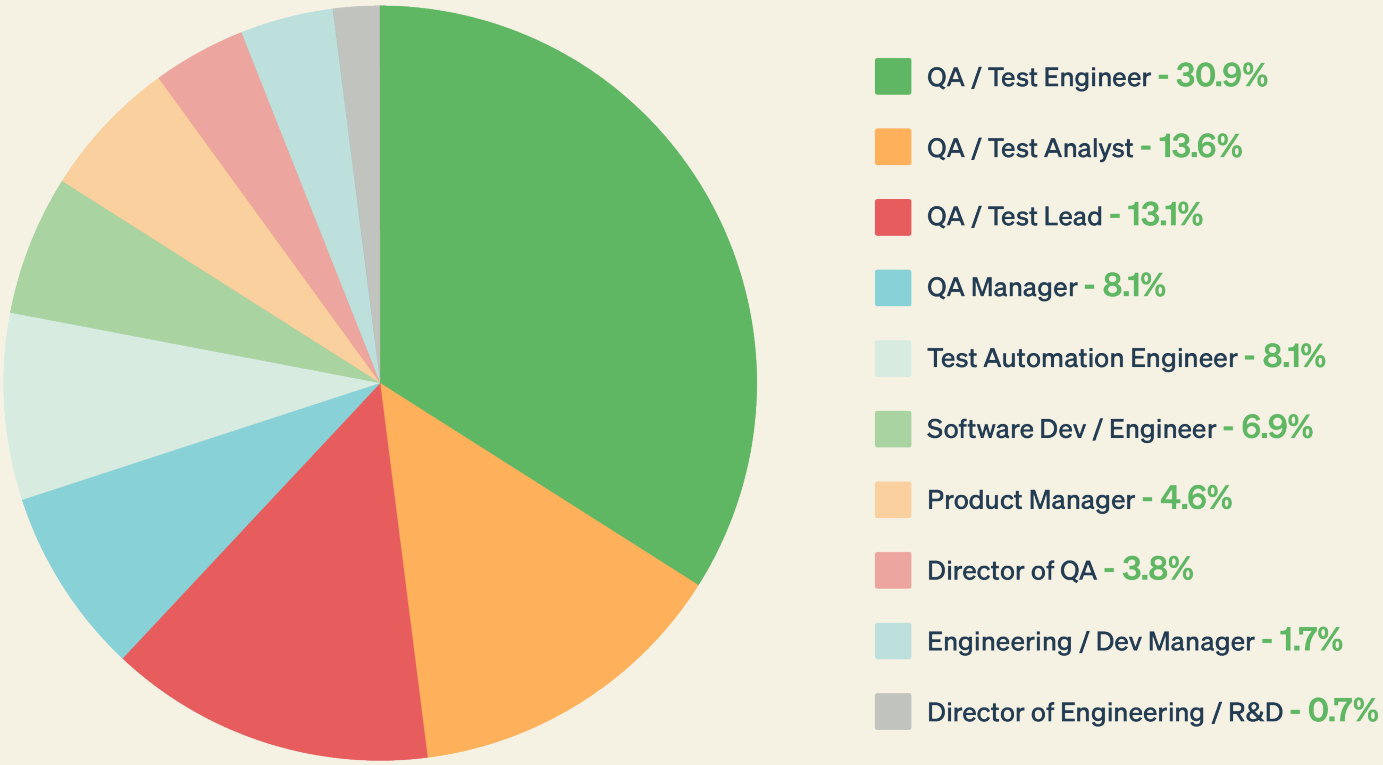
Notably, 10% of respondents express no desire to incorporate AI technology, pointing to a resistance or perceived lack of necessity among certain segments of the testing and quality assurance community.

SECTION 06

Survey Details

Which of the following best describes your job responsability and title:

Total Respondants: 4,214



Key Findings

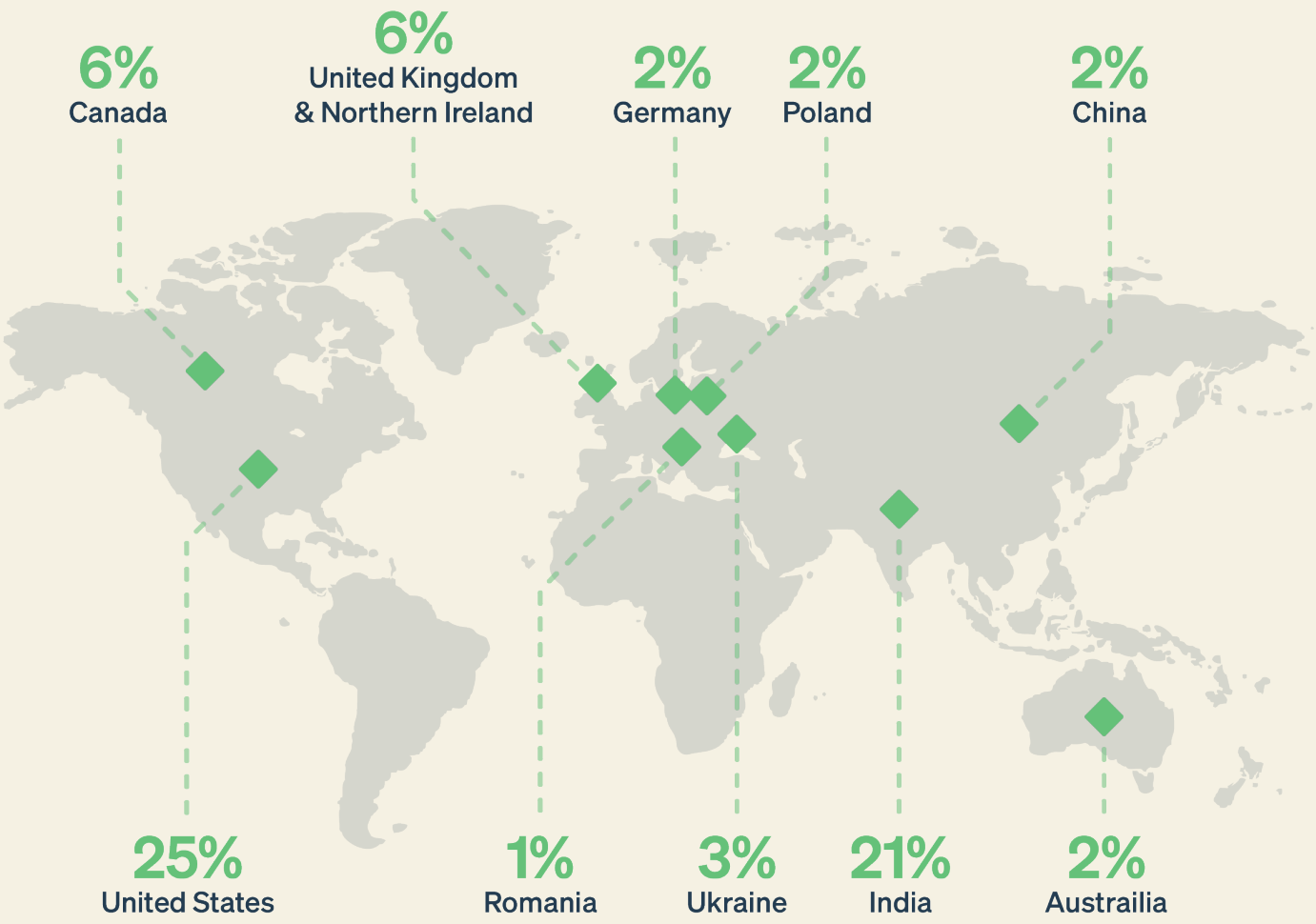
We've surveyed our users annually since 2018, and this year marks the third edition of the Software Testing & Quality Report. This report compares and contrasts survey results from 2020–2023 to better understand trends, changing work styles, and shifts in focus and priority across QA teams globally.

Each year, we extend an invitation to every TestRail user to complete our annual survey. The most recent survey received a total of 4,214 responses.

The largest group of survey participants identified their role as "QA/Test Engineer," comprising 30.9% of total responses. Following closely, "QA/Test Analyst" represented the second largest group, at 13.6%. "QA/Test Lead" and "QA Manager" accounted for 13.1% and 8.1% respectively. These findings suggest that our feedback primarily comes from actual testers—those using TestRail to create, execute, and analyze tests on a daily basis.

What country are you based in?

Total Respondants: 4,156



Key Findings

The responses to “Which country are you based in?” have been roughly consistent year-over-year. The United States of America and India make up nearly half of survey participants, with 25% and 21% respectively. Other top countries include Canada, the United Kingdom, and Ukraine.

How would you rate your level of proficency regurding software testing?

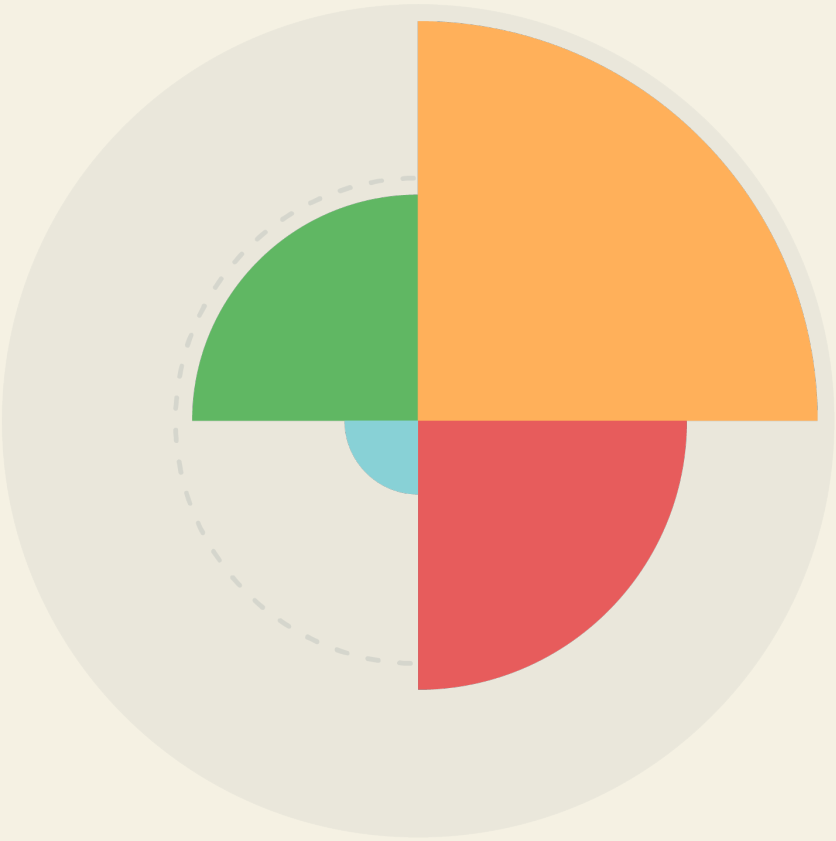
Total Respondants: 4,192

24% Expert

46% Advanced

26% Average

4% Low



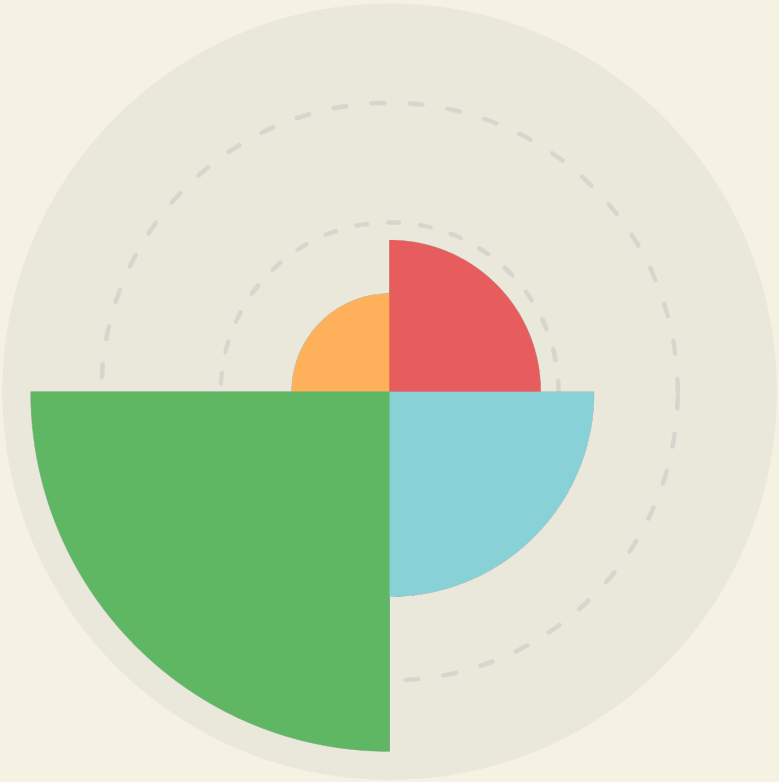
Key Findings

This year, we added a question to gauge survey participant's self-assessed testing proficiency. 70% of respondents consider themselves to have an above average level of proficiency regarding software testing.

Summarize your SDLC or Agile Maturity:

Total Respondants: 2,186

9%	Not very agile, mainly waterfall
14%	Transforming from waterfall to agile
21%	Mostly agile
57%	Seasoned team with a high level of agility

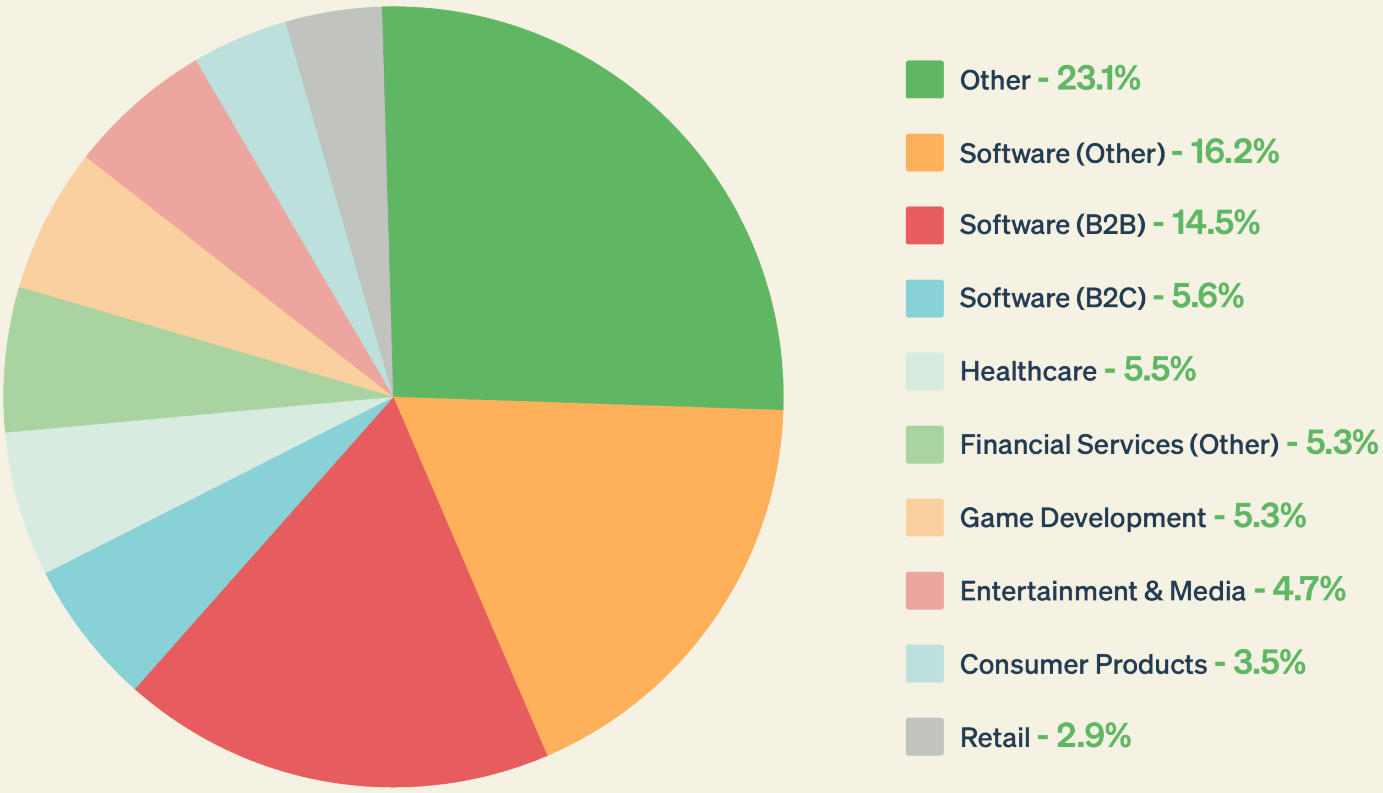


Key Findings

We also asked respondents to gauge their team's maturity level within an agile software development lifecycle. Among them, 57% reported being "mostly agile" and 21% described their team as "seasoned" with a "high level of agility." These responses suggest a significant shift in the industry away from the waterfall model of development. While most teams still don't consider themselves agile veterans, the majority are actively adopting agile methodologies.

What industry does your organization work in?

Total Respondants: 3,477

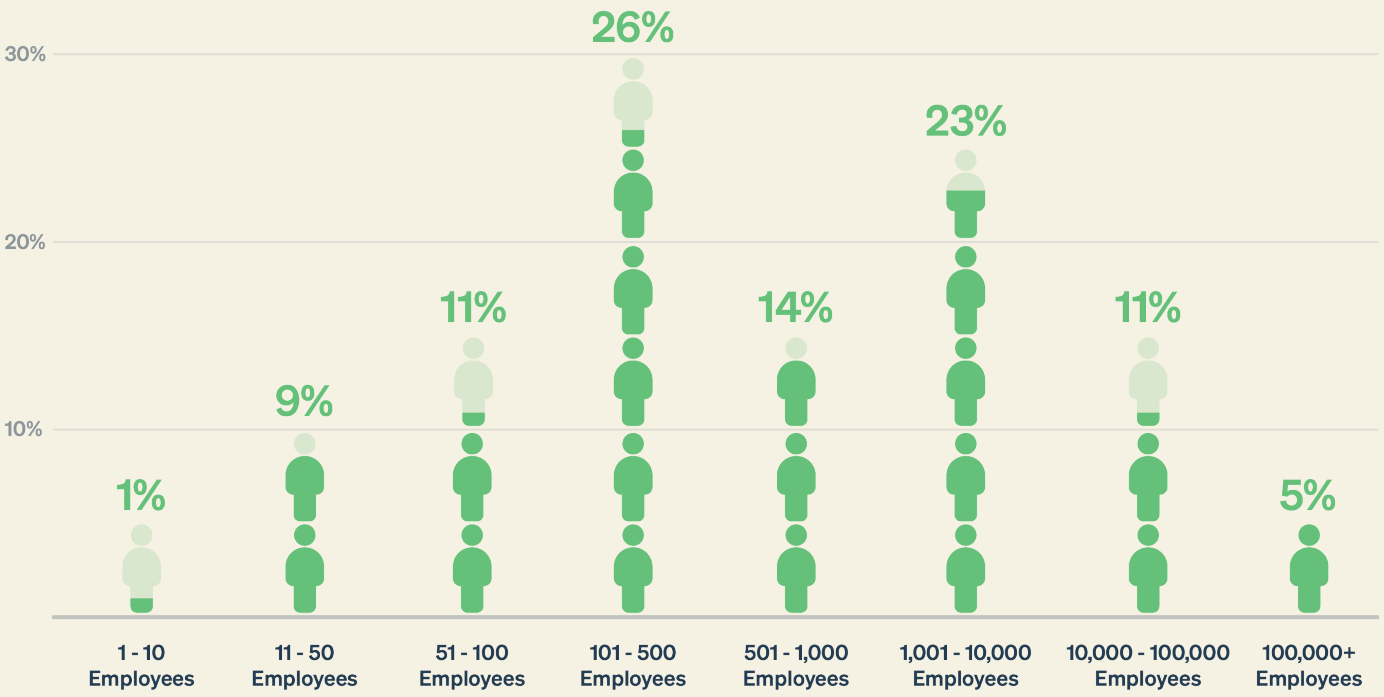


Key Findings

As seen in prior years of our user survey, the top 4 industries represented continue to be computer software, healthcare, financial services, and game development.

How large is the company you work for?

Total Respondants: 3,951



Key Findings

The survey results reveal a wide range of company sizes. 21% of respondents said they work for smaller companies made up of 100 or fewer employees.

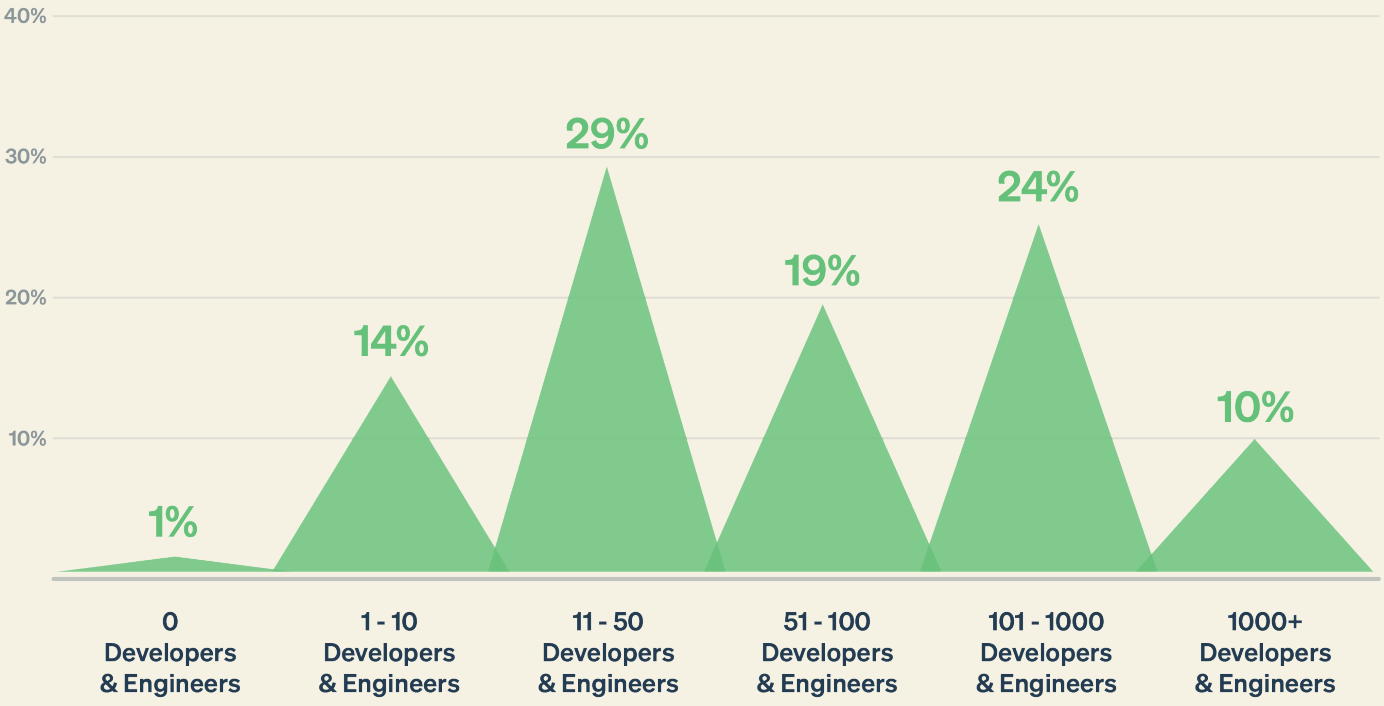
Nearly 40% of respondents reported working for large organizations with 1000 or more employees.

Respondents working for larger companies often have more structured processes and tools while smaller companies might face more resource constraints.

Survey Details

How large is your organization's software development and engineering team?

Total Respondants: 3,571

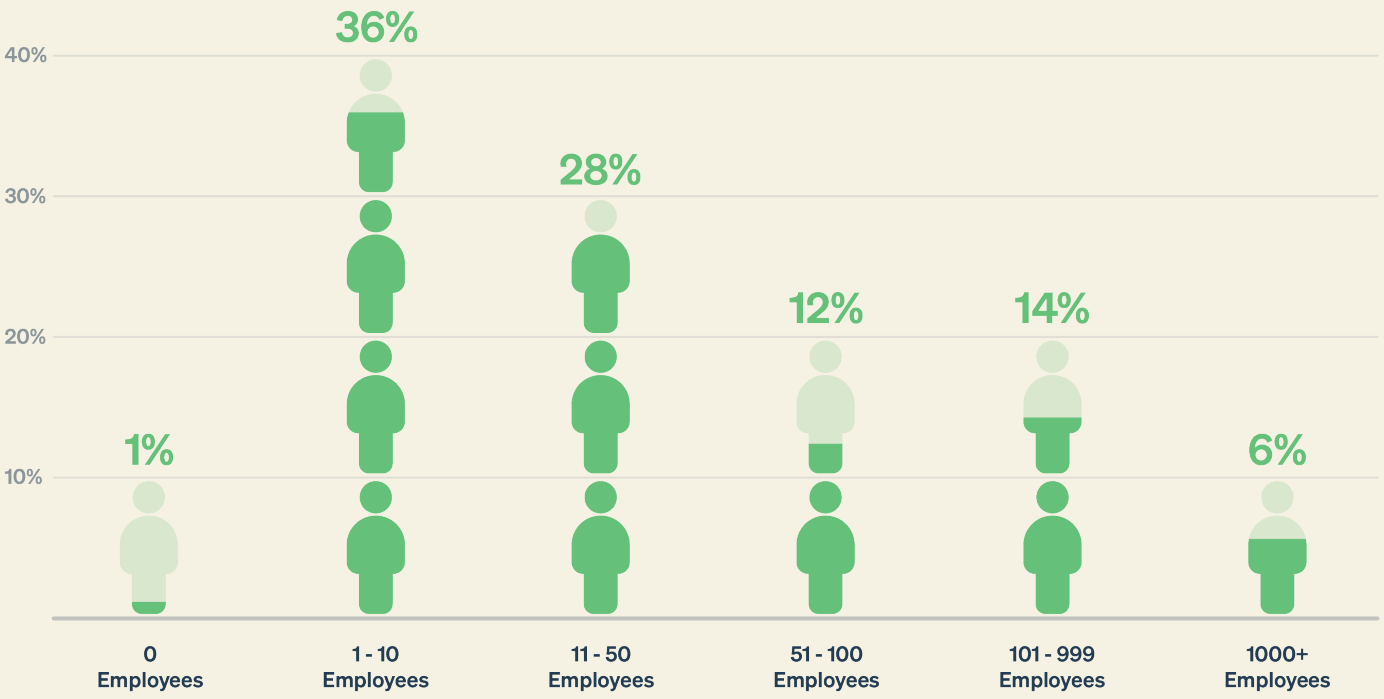


Key Findings

82% of respondents reported working with a software development team of more than 10 people.
24% of respondents work with a development team of more than 100 but less than 1000 people.

Approximately how many individuals are dedicated to QA in your organization?

Total Respondants: 3,567



Key Findings

Very few survey respondents reported 0 employees dedicated to testing and QA at their organization. The QA team size represented in our annual survey has been steadily increasing year-over-year, most notably in the 51–100 employee range.

SECTION 07

Conclusion

Summary of Key Trends

The data from the third edition of this report offers valuable insights into the current landscape and emerging trends shaping the field of QA. Teams must continue to embrace efficiency and streamlined processes to deliver high-quality products with speed, accuracy, and confidence.

The report highlights the following

- **Continuing investment in automation**
- **Collaborating internally and externally**
- **Identifying strategic testing objectives**
- **Preparing for the future**

A notable emphasis emerges on continuing automation investments while retaining the value of human expertise through manual testing. As teams navigate the increasing complexities of the software testing environment, collaboration emerges as a cornerstone, both within organizations and through external partnerships. This collaborative effort enables the pooling of resources, ensuring comprehensive testing coverage while addressing staffing constraints.

The report stresses the importance of defining clear testing objectives and metrics to drive quality assurance efforts. By establishing clear goals and performance indicators rather than focusing solely on activity metrics, teams can accurately measure progress and prioritize efforts effectively. This proactive approach also extends to fostering a cohesive team environment.

Looking ahead, the adoption of AI in testing and quality assurance holds promise for enhancing testing methods and efficiency. There is a growing recognition of AI's potential to streamline test automation, test case creation, and test data management. As teams explore AI integration, they stand to redefine the quality processes and efficiency in testing as they seek to adopt new methodologies and techniques.

The State of Quality report offers a comprehensive overview of 'where we are and where we're going'. By leveraging actionable insights from thousands of development teams worldwide, organizations can strategically shape their testing strategies, prioritize initiatives, and embrace emerging technologies to drive excellence in software quality assurance. As the industry continues to evolve, collaboration, innovation, and adaptability will be key drivers of success in navigating the complexities of modern software development.

TestRail

About TestRail

Gurock Software was founded in 2004 and now has offices in Frankfurt, Dublin, Austin, and Houston. Our flagship test case management solution, TestRail, is used by more than 100,000 members of development and QA teams to build rock-solid software—including companies like Amazon, NASA, Adobe, Sony, PayPal, and Siemens.

TestRail is the only platform that empowers QA teams to build, connect, and optimize all their testing processes. TestRail's Quality OS centralizes manual and automated test management and gives you visibility into your entire quality operation so you can manage your team more flexibly and build repeatable, scalable workflows. And, with a unified platform that integrates with your DevOps pipelines, you can share testing timelines, data, and insights across your whole organization.

TestRail is a leader in the G2 Grid for Test Management and Software Testing, with top ratings year-over-year for best results, most implementable, and overall enterprise leader. For more independently verified research and reviews, visit the TestRail page at G2 or Capterra.

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