

BUYER'S GUIDE:

Evaluating Test Automation Solutions

eggplant

Test Automation Software



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Software test automation is rapidly becoming a business-critical asset in our digital-first world.

Overview

The dramatic shift to online services witnessed during the pandemic has forced enterprises to become more adaptive than ever. 80% of business leaders across all industries are moving quickly to improve agility, speed to market, and stability [1].

Software test automation is rapidly becoming a business-critical asset in our digital-first world, as companies struggle to deliver unbeatable user experiences at DevOps speed. This raises the stakes for buyers looking for the right test automation solution for their organization.

Manual testing sits awkwardly in a context of continuous delivery and high-quality user expectations. Unable to cover the ever-expanding test surface, it is the bottleneck of this newest stage of digital transformation.

Meanwhile, the test automation industry is a hothouse of innovation, drawing on artificial intelligence (AI), machine learning (ML), and analytics to ramp up the speed and scope of testing, and deliver high-quality experiences. Leading vendors are storming ahead, automating the software test process from planning to maintenance and test analysis, using self-learning capabilities to loop back and self-heal.

Is your organization losing out on the competitive advantage, agility, and innovation that test automation offers? Gartner predicts that by the end of 2024, three-quarters of large enterprises will be using AI-enabled test automation tools to support continuous testing across the DevOps lifecycle [2].

Gartner urges leaders to invest in AI- and ML-based testing technologies right now, starting with an assessment of available solutions and their benefits [3]. Only by building the foundations today can you remain competitive in an uncertain future.

1 The Future of Business Resilience. Microsoft, 2020.

2 Magic Quadrant for Software Test Automation. Gartner, 2019.

3 Innovation Insight for Autonomous Testing. Gartner, 2020.

5 signs you need a test automation platform

1. Your teams are distributed across the globe, impairing visibility and communication

Even with a DevOps state of mind, siloed testing and system monitoring teams remain commonplace. Development and operations remain divided in many organizations, and separate testing teams may also exist for different systems, business functions, and geographical areas.

If your testing function is fragmented, are you missing out on the intelligence teams can share by communicating the issues and insights they identify?

A siloed approach can also give rise to gross inefficiencies, with duplication of test script production across development and production environments, for example.

The opportunity to streamline various testing processes—by leveraging DevOps and reusing assets—is significant. Without a systematic way to communicate across siloes, however, both quality and efficiency will take a hit, ultimately compromising the user journey.

2. Your teams are expected to deliver multiple, simultaneous releases on a tight schedule

Multiple developments, and high volumes of new releases – particularly those that incorporate a large number of changes – are a significant challenge for testers.

Against a backdrop of accelerated business demand and new technologies, the need to orchestrate multiple releases is acute. Although some organizations are starting to use ML to prioritize test workloads, the use of spreadsheets to generate test data manually for multiple Your testing environment has become too complex with disparate technologies and configurations.

The need to orchestrate multiple releases is acute.

3. Your testing environment has become too complex with disparate technologies and configurations

Within the test environment of almost every organization lies a morass of diverse technologies. Legacy mainframe systems interoperate with current-generation software and emerging innovations such as voice recognition and IoT.

System integration gives rise to exponential increases in the complexity of testing. While the benefits of interconnected systems are undeniable, system integration can amplify a single software error or quality issue across your environment and the user experience.

A use case where a customer makes an investment in a bank, for example, may involve the following technologies:

- Mobile app
- Wealth management system
- Anti-money laundering system
- Settlement system

Typically, each underlying system is written in different technologies, with old legacy systems sitting alongside RESTful microservices.

How can traditional testing approaches possibly cope with the impact of even one feature change across this environment?

Many businesses continue to choose the manual testing route, and for understandable reasons. For a single transaction that spans multiple technologies, it might seem easier to write one manual script. This ignores the passage of time, which introduces changes to an entire configuration of technologies, necessitating a continuous approach to quality. As feature changes come in thick and fast, the risks and inefficiencies multiply.

4. Your testing tool chest is continually evolving and incorporating new assets

The proliferation of automation tools can be bewildering. Many of these tools do not interoperate and cannot learn from and react to changes dynamically.

As efficiency spirals downwards instead of upwards, the outcome is a failure to deliver return on investment. It should surprise no one that a multiplicity of incompatible tools will fail to meet the scale of today's quality challenges.

The only way forward is to bring together, under a single intelligent framework, the capabilities that these tools offer. This alone will open up the opportunity to address complex quality challenges.

5. You need to provide various people with testing status updates at a moment's notice

In today's dynamic environments where systems and applications are in constant flux, keeping stakeholders across the enterprise informed about testing progress and releases is crucial, and a high level of coordination is required.

The satisfaction levels of your customers and end users may hinge on rapid resolution of problems, and timely communication is essential. Scalable communication across the matrix of changes and stakeholders is needed.

The satisfaction levels of your customers may hinge on rapid resolution of problems.

Benefits of partnering with the right vendor

The software test automation market is awash with tools, solutions, and heady promises. But only by partnering with the right vendor can your business stay ahead of the competition with the benefits that testing automation can deliver.



Enterprise-scale testing

Testing practices and technologies which can now flow through functions, systems, applications, and teams, have led to a rise in demand for end-to-end testing.

Test automation solutions offer virtual assets such as digital twins, which behave like real components. Simulation environments help teams test against other applications and services via a single user interface. The ability to test real user journeys through the panoply of technologies in place can play a pivotal role in optimizing the digital experience.

As Gartner observes, integrated automation of all testing activities extends beyond automation into orchestration. Massive test datasets provide what Gartner calls a 'hyperscale view of testing' [4]. This opens up the opportunity to identify particularly impactful user journeys and prioritize them in testing.

Data and metrics can also determine how much of an application needs testing and where.

All of this can deliver highly desirable business outcomes at speed.

4 Innovation Insight for Autonomous Testing. Gartner, 2020.

5 The Forrester Wave™: Continuous Functional Test Automation Suites, Q2 2020. Forrester, 2020.

6 The Forrester Wave™: Continuous Functional Test Automation Suites, Q2 2020. Forrester, 2020.

Faster time to market

Faster delivery to customers and end users has obvious competitive advantages. While only a few years ago quarterly software releases were commonplace, today organizations like Amazon release software updates approximately every 15 seconds.

Forrester argues that the combination of the global pandemic and market volatility is forcing enterprises to become ever more adaptive, and rapid delivery of software in our digital-first world plays a huge part [5].

How does this impact testing?

Until recently, even test automation failed to keep pace with modern delivery. But as Forrester argues, newer testing automation solutions can infuse AI and ML, integrate nonfunctional and functional testing, and support both business and technical testers [6].

Look for leading solutions that combine scriptless models, AI, and analytics to automate the entire testing process from test-case generation to test optimization and results analytics.

End-to-end automation of the testing process removes the quality risks that fragmented testing approaches incur at speed. In DevOps teams, which now automate a vast proportion of their testing, code is deployable at any time, with quality built in. Teams that continue to test manually, on the other hand, can only handle weekly to monthly deployments.



Amazon release software updates
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Earlier detection of defects

With continuous development from build through to testing and release, DevOps is transforming quality assurance, shifting testing left into the development cycle. DZone reports that 66% of its surveyed respondents now begin automated testing on their software during development, up from the previous year's 54% [7].

AI-enabled testing automation solutions deliver much-needed early detection with a user-centered approach to continuous testing. Using scriptless models, AI, and analytics, every permutation of the user journey can be tested. This generates actionable insights into potential issues and defects in the digital experience. Your team can then address these issues long before they compromise user experience, brand value, and even the bottom line.

Scale test maintenance efforts with ease

Fine-grained manual test scripts, which detail every step and test asset, present serious problems in a fast-moving environment where rapid change is the only constant.

Maintaining the volume of test scripts that a typical enterprise holds in these conditions underlines how unsustainable manual testing is. This gives rise to a scenario many IT leaders will be familiar with—when a test fails, what is the problem? Is it a system defect or an outdated test script?

One approach that is gaining traction in the marketplace is the auto-generation of tests from a digital twin updated in real time. This takes away the pain of test maintenance. And auto-healing capabilities can now reach detailed test assets such as icons, and remediate as part of the testing process.

7 DZone's 2019 Guide to Automated Testing. DZone, 2019.
8 The Future of Business Resilience. Microsoft, 2020.

Reduced costs

Although the cost of testing remains a significant concern, the scalability of cloudbased environments can deliver considerable savings.

Test automation offers even more cost reductions, by shrinking down test cycles and freeing up resources from the burden of manual testing, benefiting your bottom line. Emerging technologies now available, such as Robotic Process Automation (RPA), hold even greater promise.

At enterprise level, as more effective and cost-efficient testing improves overall digital resilience, your organization could be looking at aggregated cost savings of 15-25% [8].



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Improvements in testing efficiency

Away from high-performing DevOps teams, many testers continue to follow resource-heavy manual approaches and are soon outpaced by development. Early-generation testing tools can automate basic repetitive tasks [9], but businesses soon come up against their limitations.

A more scalable approach automates testing more fully, with newer technologies including:

AI and ML: AI and ML algorithms can identify permutations in the user journey, and are smart enough to identify the riskiest or business critical areas and prioritize them.

RPA: From data preparation and the setting up of test cases through to regression testing and post-testing checks, RPA performs basic tasks and offers significant time savings [10].

Smart testing ecosystems: These integrate across functional, nonfunctional, API, web, and mobile testing [11]. They use analytics to detect issues and generate test data in real time.

KPI-focused testing

Testing automation can now target business Key Performance Indicators (KPIs), meeting the need of businesses across all sectors to understand the impact of technology enhancements on Key Performance Indicators (KPIs).

Gartner identifies the ability of advanced testing automation solutions to support decision-making by automatically correlating test metrics to corresponding business metrics [12]. Testing can then be prioritized on that basis.

This is in line with the move away from fragmented and uncoordinated digital transformation initiatives, and aligns with datadriven decision-making across the enterprise.

It is possible, for example, to quantify the customer impact of new product versions prior to release and make any necessary changes to optimize performance. Changes in conversions, bounce rate, revenue, and other KPIs can also be predicted, and segmented into different customer categories.

9 Magic Quadrant for Software Test Automation. Gartner, 2019.

11 The Forrester Wave™: Continuous Functional Test Automation Suites, Q2 2020. Forrester, 2020.

12 Innovation Insight for Autonomous Testing. Gartner, 2020.

Improved quality and user experience

In the drive to deliver excellent user experiences, the sheer velocity of change combines with unpredictable user behavior to present huge challenges for testers. How can testing automation solutions help?

New testing innovations related to the user experience to watch out for include:

Testing the user experience with AI: The end-to-end user journey is greater than the sum of its parts. You can now test the entire experience through the eyes of the user.

Testing the UI as well as the API: While most providers restrict UI testing to the data that the API passes across to the interface, it is possible to test the experience of the UI itself.

Testing Usability and Accessibility: Usability heuristics can assess readability, and identify specific color combinations known to incur eye fatigue, for example.

Testing the omni-channel experience: Testing should cover any device, operating system, browser, endpoint, and screen. Voice can also be tested through to different devices.

Peak performance testing: This area has become business critical. The commercial risks of failing to handle surges in usage, such as online shopping on Black Friday, are obvious.

Localization testing: Look for the ability to handle combinations of localization settings, such as a user device with a German language setting located in the United Kingdom

Choosing the wrong solution provider can be costly

Choosing the wrong vendor for your test automation can present a number of risks for your business. Here are some of the most common problems.

No business can afford to get locked into an ecosystem that is already falling behind the competition.

Diminishing test capabilities

In areas as fast moving as test automation, obsolescence is a constant risk. No business can afford to get locked into an ecosystem that is already falling behind the competition. How can you avoid this? By choosing an intelligent platform with these characteristics.

Innovative: Your chosen solution needs to be as innovative as possible, using today's leading edge technologies to meet tomorrow's needs. AI, ML, and RPA are approaching mainstream adoption, for example, so it makes sense to invest in a software test solution that already incorporates them.

Scalable: Make sure the provider offers the scalability your IT function and overall business need.

Noninvasive: By testing applications without touching the source code, noninvasive testing can test future systems that are yet to reach your development cycle.

Agnostic: It's crucial that your solution should be able to test any device, operating system, browser, or technology, and be future-future-proofed for emerging innovations such as IoT.

Security breaches

With the pandemic, we've seen a dramatic rise in cyber crime. 80% of firms have seen an increase in cyber attacks. Between January and April 2020 alone, cloud-based attacks rose by 630% [13].

Just as technology evolves at pace, so does cyber crime. To mitigate this testing risk, look for a solution with the following capabilities.

Cloud: Migration to cloud-based test environments will help deliver the speed, flexibility and iterative cycles necessary to stay one step ahead.

Automation: In automated test environments, higher volume and speed of tests can be increased to reduce security risks.

Early testing: Security testing should be incorporated at the earliest possible stage.

AI and ML: As cybersecurity requires ever more sophisticated tools and algorithms, AI and ML can play a central role in detection and remediation.

With the pandemic, we've seen a dramatic rise in cyber crime.

Delivery delays

67% of CEOs say acting with agility is “the new currency of business; if we’re too slow, we will be bankrupt,” according to KPMG [14]. The inability to release high-quality software at speed is now an existential threat for businesses in every sector.

Delayed support

Implementing test automation without the necessary skills presents a major danger for many DevOps projects. Specialist support needs to be available 24/7/365. Take a good look at the service level agreement to make sure it covers the timeliness and responsiveness you need. Then ask the vendor for references, to make sure the provider lives up to its support promises by consulting existing clients.

Loss of control over operations

Any business considering outsourcing test activities is presented with risks as well as benefits.

Close collaboration is so much harder when teams are not in-house, and this can undermine the benefits of building testing into the development process. Communication lines can be much weaker, from initial misunderstandings of requirements onwards. And these problems can incur financial costs as well as loss of operational control.



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3 pitfalls to avoid when choosing a testing automation platform.

1. Failing to fully understand the total cost of ownership.

It's not enough to understand the pricing model. Understanding and quantifying the total cost of ownership involves tracking both direct and indirect costs of people, processes, and tools.

Buyers should consider the following costs of a testing automation solution:

- Software licensing
- Set-up of the test automation environment
- Upkeep and maintenance
- Running costs of testing automation.

2. Ignoring the contractual terms

The risks of overlooking contractual terms can be legal as well as commercial. Buyers should pay particular attention to the following areas when evaluating a testing automation solution.

Privacy and confidentiality: How does the contract protect your business against unauthorized access, disclosure, misuse, and conversion of data?

Payment terms: Do software licenses need to be pre-paid in advance, and what are the terms of non-fulfilment? Is there capping in place for future increases in license fees, services, enhancements, and upgrades?

Flexibility: Does the license allow for reasonable changes in products or services delivered?

Cancellation: How easy would it be to terminate the agreement?

Disclaimers: Would any disclaimers in the contract prevent you from claiming damages against the vendor if necessary? Is there a cap on compensation for damages?

3. Non-adherence to compliance and regulatory requirements.

Three key areas to consider when evaluating a testing automation vendor against regulatory requirements are:

Privacy and security: This applies to both data and source code, and is critical for compliance with regulations such as GDPR. Noninvasive testing, now available, does not touch the source code.

Quality and integrity: If regulatory compliance demands zero-defect functions, then the testing automation solution must be able to deliver. This underlines the importance of reference sites in the same industry as your business.

Performance in load conditions: Regulated environments can be extremely time-sensitive, and a testing automation solution must offer robust performance testing.



Key considerations

Define success

Outcome-driven execution depends on defining success in the first instance.

For today's digital-first businesses, success is above all dependent on user experience. IDG's recent Digital Business Survey found that 63% of organizations define success on the delivery of an excellent customer experience, as measured by customer satisfaction scores [15]

From there, top-level KPIs can also provide robust indicators of success. In banking, for example, app adoption rates can be business-critical. A testing automation solution that prioritizes the user journey will have clear synergies with this KPI.

Understand your challenges and goals

Realistic and measurable goals and challenges – supported wherever possible by meaningful metrics – fall out of a clear definition of success.

Your goals may be commercial, such as increasing market share or revenue. Or they may be quality-driven, measured by review ratings. They should ideally be time-bound. Challenges may be related to the limitations of manual testing or even the incumbent automation tool.

Communicating these goals and challenges clearly and honestly can transform your vendor-buyer relationship into a strategic partnership. With their market-wide view, vendors may be able to suggest solutions you would be otherwise unaware of.

Get audited

An audit can help gauge the complexity of your infrastructure and test stack. For many buyers, this is an important step once they have understood their goals and challenges.

It's quite common for an audit to unearth previously unidentified goals and challenges, as well as hidden opportunities. It can also help you determine which testing automation solution suits you best.

Look for providers that use tried and tested frameworks to perform audit services.

Types of testing automation tool. Which one is right for your business?

The various testing automation tools in the marketplace fall under the following categories. There is no one-size-fits-all, and buyers need to map their goals and challenges to the tools available.

Test management tools: These support the planning and management of tests, scheduling, defect logging, tracking, and analysis.

Test data preparation tools: These allow data to be selected from existing datasets, or alternatively created or manipulated.

Test coverage tools: These measure how much of the target system or application has been covered by testing.

Functional testing tools: These support unit testing, smoke testing, system testing, and regression testing.

Load and performance testing tools: These help to determine the speed, effectiveness, reliability, scalability, and interoperability of a system or application under load.

UI testing tools: These help testers to test the UI efficiently.

Bug tracking tools: These help to detect, record, report, manage, and track bugs.

Continuous testing platform: These support the process of executing automated tests as an integral part of the development cycle.

Testing automation platform: These smart, integrated suites of testing capabilities outperform the best-of-breed tools to deliver faster, lower-cost, and smarter testing, according to Forrester [16].

Do your research

There is no shortage of information about testing automation vendors on the Internet, but how much of it is reliable? Premium research from providers such as Forrester and Gartner will give you a clear picture of trends in the marketplace, as well as robust, disinterested evaluations of the major vendors.

Consider the end user of the solution

The pool of human testers is becoming more diverse. Software engineers with API-functional, UI-functional, and nonfunctional testing skill sets [17] sit alongside business users with little or no technical know-how. Buyers need to be mindful of the skill mix in their own organization.

The rise of the business user in testing certainly helps expand the testing pool, alleviating what is an acute talent shortage. With their indepth knowledge, they can encode invaluable domain intelligence into testing assets. But how can your organization get around their limited technical skills?

To support business testers, testing frameworks have emerged that combine scriptless, keyword-driven testing, and behavior-driven development (BDD) in no-code, low-code environments.



17 The Forrester Wave™: Continuous Functional Test Automation Suites, Q2 2020. Forrester, 2020.

Evaluating a testing automation solution provider

Longevity

How long has the vendor been in business? And are they growing or downsizing? Look for these indicators of success and stability.

There is always the chance that a more recent start-up is exactly what your business needs. So look at the vendor's track record of success at the same time.

Vision and innovation

Being ahead of the curve is a huge plus for any prospective service provider, but when it comes to a rapid-moving area like software test automation, choosing one that can demonstrate vision and innovation is a must.

An innovative partner in this critical area can give you guidance on newer capabilities such as RPA, AI, and ML. They will know the latest developments in the industry and should be happy to communicate this intelligence and their own experiences with you. They can also propose new ideas and fresh approaches.

Industry experience

Each industry vertical has its unique business processes, so bringing in a vendor who is unfamiliar with your industry will, at the very least, slow down your testing efforts. Worse though is the risk that they will be unaware of industry-specific regulatory constraints and requirements, and may base tests on false assumptions.

An innovative partner in this critical area can give you guidance on newer capabilities.

Existing customer base

A testing automation solution is a significant investment, and checking references is essential. What does the provider's current customer base look like? Are both current and past customers happy with their experience?

Case studies and testimonials can be useful, but cannot take the place of detailed references, especially if you can speak with the customer directly. Also bear in mind that references from your own industry will provide more value and reassurance.

Security and compliance

Security is a particularly important area of due diligence when considering a prospective provider, and detailed checks are needed.

How will the provider handle your data, and where will it be located? What steps will they take to keep your data secure? And in the event of changing supplier, what would happen to your data? Check for assurances that their network is secure 24/7/365. And make sure you obtain their IT, security, and financial audits.

Business continuity

With software testing now a strategic function in digital-first enterprises, business continuity and disaster recovery could not be more important.

In the event of a cyber attack or disaster, will your prospective provider have a business continuity plan in place? When did they last test it? As a proof point, how adaptive have they been to pandemic restrictions?

Business continuity and disaster recovery
could not be more important.

Industry recognition and awards

What is the public and industrial profile of the provider? In an innovative area such as testing automation, thought leadership is particularly valuable. Have they formed robust partnerships with industry leaders? Have their achievements been recognized with an award?

Training

The rise of the business tester underlines the importance of training and documentation. But with the incorporation of emerging technologies in test automation solutions, your vendor will need to bring your entire team up to speed on the platform and its capabilities.

How clear is the documentation? And how thorough and time-consuming is the training itself?

Support

Make sure you check the small print when it comes to support and maintenance. What support will you be entitled to? Will the vendor take care of updates or will you be required to intervene?

Make sure their support provision covers the channels your team needs, and is available on a 24/7/365 basis.

Reporting

The provider should be able to provide sample reports. Check that they are clear, accurate, and comprehensive. Make sure that all authorized stakeholders are able to access the information they need, when they need it, with an intuitive reporting interface.

Technical checklist

- ✔ What types of testing does the automation solution cover? Does it cover functional, performance (both regression and load), usability, and accessibility testing?
- ✔ Does the solution support testing across all APIs and databases? And can it visually validate and control any visual UI designed for human use?
- ✔ Will the solution automatically bring customer insights back from production to enable you to test in areas of greatest importance to the business?
- ✔ Can the solution test a system or application in exactly the same way as users would experience it? As opposed to an API test, which is only a proxy.
- ✔ How does the solution services enable test maintenance at scale? Can the solution's automation capabilities separate test case design from creation, and automate test asset creation and maintenance separately?
- ✔ What infrastructure is needed to implement the solution?
- ✔ Which types of testers can use the solution with ease? Can it accommodate low-coders and no-coders as well as developers?
- ✔ Which browsers does the solution support?
- ✔ Which devices does the solution support?
- ✔ Which platforms does the solution support?
- ✔ Can the solution test any combination of platform, browser, and device, both current and any future sets?
- ✔ How is the product or service offered?
 - On-premises
 - As a cloud service
 - As a hybrid solution
- ✔ Does the vendor meet your training requirements?
- ✔ Does the service level agreement meet all needs?

Conclusion

This buyer's guide has been designed to help you navigate the complexity of the testing automation marketplace, with a framework for research and due diligence.

What, then, is the next step?

On a practical level, an audit will give you and your prospective provider a detailed and accurate picture of the infrastructure your chosen solution will interoperate with. It can also finesse your understanding of the goals and challenges your organization aims to meet.

Once you've bottomed out your requirements in full, trialling the solution is the only way to be sure that it's the right fit. Your trial should cover the full development lifecycle, in your own environment, and with the people who will have to use it.

Whether you're moving into automated testing for the first time, or replacing existing tools with a more sophisticated solution, we hope you achieve the success you're looking for.

Learn more at: www.keysight.com/find/eggplant

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