BrowserStack

Turn Testing into a Business Advantage

How to Mature Your Web and App Testing Operations to Compete and Succeed

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Test Automation is a Key Pillar of your Digital Transformation

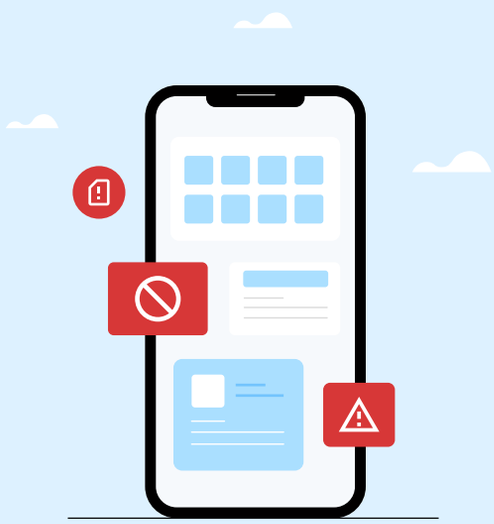
Competing in today's digital economy hinges on speed and quality. The faster your organization can ship high quality software, the bigger your advantage and the greater your growth and success. On the flip side, if speed or quality suffer, your organization's reputation or even revenue might take a hit.

There have been plenty of unfortunate examples:

- "Bug in backup software results in loss of 77 terabytes of research data at Kyoto University"
- "TikTok fund glitch prevents rising stars from getting paid"
- "Call of Duty: Warzone glitch is now wreaking havoc in Vanguard"

A site or app that doesn't work as intended creates a bad experience, prompting customers to go elsewhere. And, once gone, it's very hard to win customers back.

The numbers don't lie:



- **80% of apps are uninstalled after a single use - #1 cause of uninstallation: Crashing or freezing.**
  Helpshift
- **52% of users said that a bad mobile experience made them less likely to engage with a company.**
  Google
- **61% of users are unlikely to return to a site on mobile if they had trouble accessing it and 40% visit a competitor's site instead.**
  McKinsey

The best way to mitigate such negative outcomes is to test, continuously and thoroughly. However, testing can generate bottlenecks and impact an organization's speed to market, which is critical to their ongoing success. Most of these bottlenecks result from slow, manual testing processes or limited automation testing setups, forcing companies to compromise on when and what to test. This ultimately creates gaps in coverage, allowing bugs to slip through.

By maturing operations to support continuous testing, organizations can release bug-free code more frequently, delivering customer satisfaction to win their loyalty. When done right, testing can help you meet both your speed and quality objectives to increase your growth and revenue; companies that ship faster, grow faster.

This whitepaper delves into what typically holds the testing capabilities of companies back. It lays out a roadmap around five key parameters that can help you overcome many of these challenges, so you can mature your testing operations to improve your ability to compete and win.

Why Isn't Every Company Testing Everything?

While most companies agree that testing is something they should do more of, many find they lack the ability to effectively ramp up their testing operations to test continuously. The biggest gating factors often come down to skills, infrastructure, and time.

Lack of Expertise

Companies need people focused on testing throughout the entire development lifecycle. A software development engineer in test (SDET), or an automation specialist is skilled in building out the tests that need to be run at different stages for different apps or sites. Traditionally dedicated testers sit within the quality assurance (QA) team, but in recent years we've also seen organizations embed these capabilities directly within developer teams.

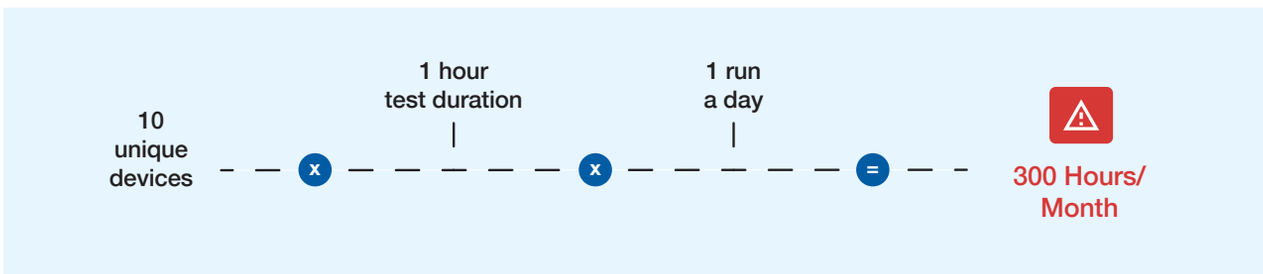
Regardless of where they sit in the organization, SDET talent needs to stay up to date on the product's continuous integration and deployment (CI/CD) cycles and clearly understand how the product is changing, so they can write the right test cases and code to effectively test at each stage of development.

The more resources an organization commits to test automation, the more they can expand coverage and reduce build time. It's a virtuous cycle, but one predicated on an upfront investment in automation talent that is sometimes difficult for organizations to commit to – that is, until they understand the value that testing can bring to the business.

Value of SDETs

If a tester were to manually run tests on the different combinations of devices and environments that could be used by customers to access and run a site, app, or service, it could take hours, days, weeks even. For example, to manually run just one regression test suite on 10 devices each day would take up to 300 hours a month. This is why companies end up having to pick and choose when to test and how many unique device types to test on.

Why Manual Testing + Device Coverage just doesn't work:



But, if a SDET writes a test script, it can be run repeatedly with minimal effort for any number of device types to:

- Expand testing coverage
- Improve product quality
- Speed up release velocity
- Lower costs

SDETs can be a force multiplier in rapidly ramping up your QA team's output. Manual QA testers who upskill themselves can make themselves a far more valuable asset to their teams by learning how to code, leverage automation testing technologies and understanding the technologies involved in building websites and app.

Of course, the infrastructure to run all the tests must be available, which brings us to the second challenge that a lot of companies face – lack of testing infrastructure.

Cost Benefit Analysis	Manual Testing	Automated Testing
Team Size	10 Manual Testers	7 Manual Testers 3 Automation Testers
Testing Hours	1350	5040 (Automated) 965 (Manual)
Release Frequency	Monthly	Bi-Weekly Cadence (Smaller Projects)
Coverage	4 Devices during UAT (Realistic)	15+ Combinations (Target Stages - Test Environment)
Cost Per Test Hour	$78	$17.54

4x Coverage

2x Release velocity

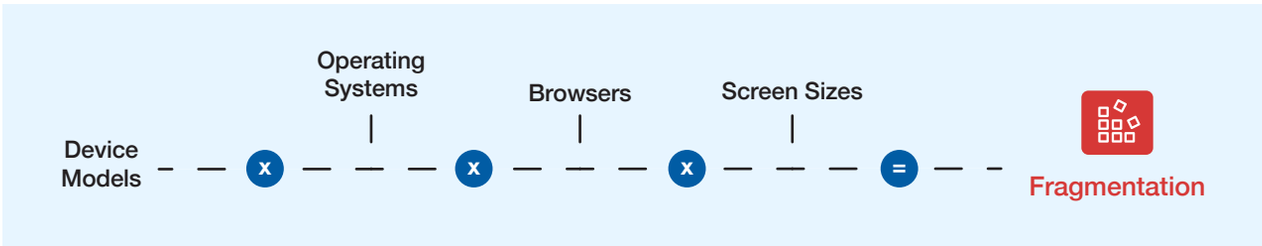
1/5th Cost

Lack of Infrastructure

Many companies don't have the proper test infrastructure to test at various development stages against all their requirements. Considering all the different devices, operating systems, software versions, etc. that users are using, it is easy for companies to be overwhelmed by the prospect of developing tests for all the different environments their app or site could encounter.

Building out real-world environments that represent all the different combinations is prohibitive for most companies – most don't have the budget or skills to build, manage, and maintain all these environments. Plus, it becomes an unnecessary overhead diverting focus away from the company's core competencies. As a result, many companies end up choosing a sampling of environments that they hope represent their customers.

Users are everywhere



9000 Device Models	**8** Browser Engines	**20%** YoY Device Growth
20+ Browser Versions YoY	**50+** iPhones & iPads in Use	**21** OS Versions

The problem is that these environments keep changing; at any point, to achieve upwards of 80% device coverage, companies need to test on more than 30 device combinations. To give companies confidence that they understand how most of their customers will experience their app or site, they need to enhance their testing coverage. Considering that more than 50% of all online traffic is sourced from mobile devices and 73% of consumers are omnichannel mobile shoppers, it's not an option to limit testing to just a handful of device combinations. This is where solutions like BrowserStack can come in and plug the gap, enabling your organization to automate testing across thousands of real devices and browsers.

Lack of Time

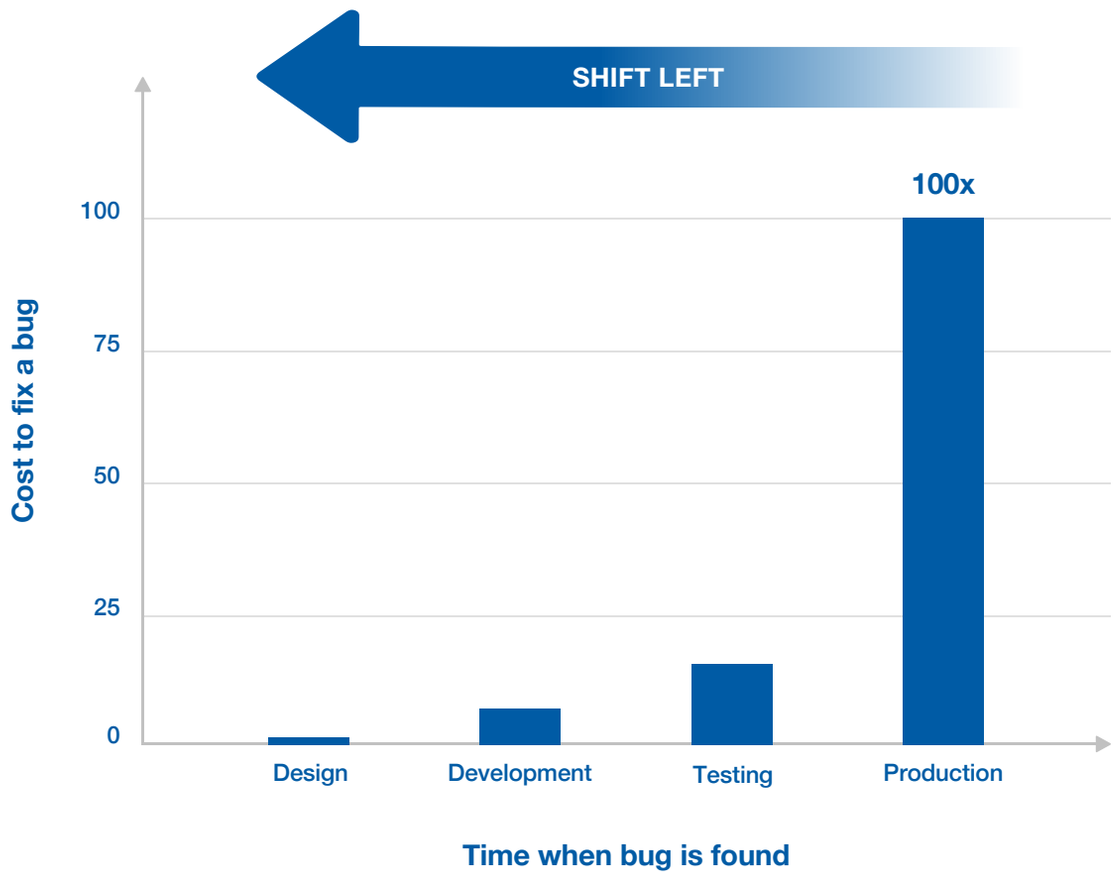
Code that's not in production is code that's not generating revenue. Because testing takes time, most companies, in an effort to get code out the door as fast as possible, make choices around what to test when, sacrificing quality to meet deadlines and revenue goals. To accelerate feature development, teams will typically only run basic tests early in the development cycle, preferring to wait until the last possible stage to do more robust testing (e.g., more environments and user flows).

A defect found and removed in production costs approximately 100x more than one identified and removed during the product's requirement phase.

Unfortunately, bugs can slip into the code at any time in the development cycle, for any number of reasons. A programmer or developer may misinterpret requirements, lack information or knowledge of dependencies, be under a time-crunch, be working with code that is poorly documented, or even be using tools that have bugs themselves. Problems in the code compound if testing is pushed to the end of the software development cycle. This wastes more time and creates bigger bottlenecks because there is more code to deal with, creating more complexities in the debugging and fixing phases.

To try to find and fix errors earlier, companies are looking to implement Shift Left testing to catch bugs earlier in the development cycle. This way, issues are identified as soon as they are introduced, making it easier to fix code without wasting unnecessary time and effort.

The cost to fix bugs rises exponentially, the later you detect them:



Ponemon Institute research found that vulnerabilities detected early in the development process cost on average $80, while the same vulnerabilities detected after they have moved into production cost around $7,600 to fix.

Test Automation is the Force Multiplier for Business Success

QA is the enabler that can help everyone in the organization build and ship better products faster, but it's often overlooked and under-resourced. While many companies think nothing of adding engineering and DevOps resources because they understand the potential return on their investment (ROI), their success is actually contingent on having testing that can support the additional capacity.

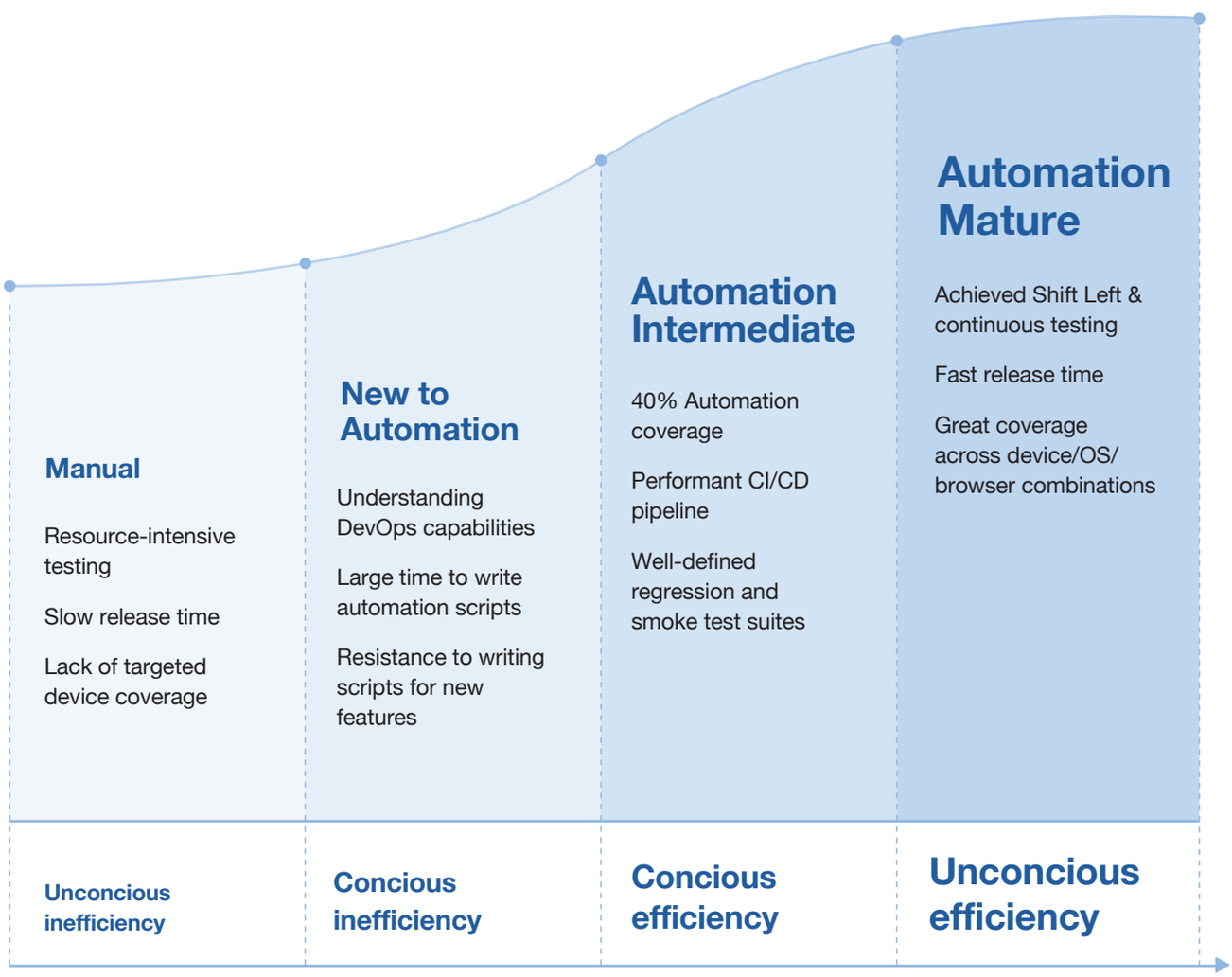
The reality is you can't ship software that hasn't gone through QA. What this means is that when scaling engineering and DevOps, companies need to be making a proportional investment to scale their testing operations. If they don't, testing will continue to be a bottleneck in their software development setup.

Those companies that have invested in building out robust, mature testing operations have fast, precise practices that reduce friction and support innovation. These companies are able to move faster, catch more bugs, and spend less time fixing them, creating a virtuous cycle that allows them to automate more, cover more, and deliver more. Companies with mature testing operations are able to change the trajectory of their organizations - helping them accelerate revenue growth (up to 5x faster), while saving millions, by catching and fixing bugs earlier and reducing churn with a great customer experience.

How Do Companies Advance and Mature Their Testing Operations?

Ultimately, companies need to prioritize and invest in maturing their testing operations if they want to generate the kinds of results that can make a real difference to their business. In general, the more mature organizations have been able to automate more of their testing operations to support greater coverage and faster release times, which can lead to growth in customer satisfaction (app ratings) and revenue.

Test Maturity Curve



Five Parameters that Determine the Maturity of Testing Operations

In the course of working with more than 50,000 customers, including industry leaders, such as Microsoft, Spotify, Amazon, Twitter, etc., running millions of tests on the BrowserStack platform, we observed some commonalities in the best software teams. These mainly pivot around five parameters - Automation, Team Composition, Device Coverage, Release Frequency, and Operational Best Practices:

1. Automation Coverage

What percentage of test cases are automated?

The more a company can automate their testing, the more mature their capabilities.

2. Team Composition

How many SDETs are employed in ratio to manual testers?

Companies that have invested in SDETs tend to be more mature in their capabilities and farther along in their automation.

3. Device Coverage

How many device/browser/OS combinations are being tested? At what stages are they being tested?

The more device combinations a company can test against the more confident they can be in how their apps/sites will perform across their customer base. The more often they can test these combinations, the better the chance that they can catch and address issues early, which saves both time and money.

4. Release Frequency

How often is code being shipped to production?

The more mature a company's testing operations, the faster they can confidently release clean code.

5. Operational Best Practices

What other processes are in place to help foster better testing and development?

When a company commits the resources and rigor to their testing operations it can become a force multiplier, building speed and efficiencies into the business that can fuel revenue growth. This includes enabling teams with state-of-the-art tools and setup to testing more effectively and efficiently. Most high-function teams choose BrowserStack for the same.

By analyzing these parameters, along with some additional inputs - Build Time, Revenue Growth, and even Alexa rankings - we started to identify patterns in companies as they matured their testing strategies and capabilities. The following table breaks down what the varying stages of testing maturity look like across these parameters to help you see what it takes to advance your testing operations to extract more value.

Test Maturity Stages

Benefits	Baseline		Key Stage 1		Key Stage 2
			2x Faster Revenue Growth 4x Coverage Risk of compatibility bugs reduced by over 50% 2x faster time to market		5x Faster Revenue Growth 7x Coverage Risk of compatibility bugs reduced by over 90% Up to 30x release velocity
	Manual	**Adopting Automation**	**Ramping Automation**	**Almost Automated**	**Fully Automated**
% Automated Tests	0%	10%	30%	60%	>80%
Team Composition	All Manual	10% SDETs 90% Manual	30% SDETs 70% Manual	60% SDETs 40% Manual	80% SDETs 20% Manual
Device Coverage	5 Combinations (UAT Stage)	10 Combinations (Targeted Stages - Test Environments)	15+ Combinations (Targeted Stages - Test Environments)	25+ Combinations (All Stages)	35+ Combinations (All Stages)
Release Frequency (Time to Market)	Monthly Cadence (Smaller Projects)	Monthly Cadence (Larger Projects)	Bi-Weekly Cadence (Smaller Projects)	Bi-Weekly Cadence (Larger Projects)	Weekly or Daily Cadence
Maturity Indicators	Ad-Hoc Test Strategy	Early Test Strategy defined Improved communicat-ions with the Dev team to understand product requirements	More clearly developed Test Strategy Robust Reporting and Analytics Basic CI/CD Setup with Regression Builds Scalable, on-demand test infrastructure Testing informs the release process	Well-defined test execution & development schedule Well-developed synergies between Dev & QA Teams More regression tests developed Test performance is optimized	Continuous Testing in place Complete Shift Left testing to catch bugs at earliest possible stages Reusable test artifacts

The Real-World Value of Mature Testing Operations – A Look at Sainsbury's Group

Sainsbury's is one of the oldest, most popular retail chains in the UK, selling everything from groceries and clothing to houseware, electronics, and more to millions of customers. Many customers shop via Sainsbury's web and mobile apps, using a diverse range of browsers and devices – their research showed that 80% of their traffic came from mobile devices.

To create fresh, great experiences and enhance their competitive advantage, the Groceries Online team wanted to increase their release frequency, from once a month to every two weeks. However, it was difficult to scale their manual testing to meet this goal, as it took more than 5 days to complete regression testing, even when split among different testers.

Their SDETs were trusted to evaluate and come up with a solution that would help them automate their testing across a wide range of browsers and devices. They chose BrowserStack and its Cypress integration to automate their regression testing and run tests concurrently across a range of browsers and devices. Sainsbury's successfully leveraged their QA team as a force-multiplier, increasing their coverage and testing at every commit to improve product quality and experiences and reduce costs.

Impact

With BrowserStack, Sainsbury's was able to cut testing time from 5+ days to 1 day, while doubling the number of browsers and devices they were able to test on - giving them the confidence to speed up releases to meet their business objectives.

2x **Digital Revenue** £2.7bn to £5.8bn in 2 years	**10X** **Release Velocity** Ability to release 2x weekly
250 **Parallel Threads** On-demand 24x7	**40+** **Devices/Browsers Tested Weekly**

Sainsbury's

Industry

E-commerce, Retail chain

Location

United Kingdom

Products

Live | Automate | Percy | App Automate | App Live

"BrowserStack provides us the necessary mitigation and test reports at a business level to confidently release our software. It's a tool that fulfills it's purpose. I don't know how else we would do this manually."

Akbar Mughal
Senior SDET, Sainsbury's Digital

Argos

"We can run our whole pack on BrowserStack in about 8-9 minutes and our regression pack in 4-15 minutes. We release 2 times a week now, but we have deployed 3-4 times a day in the past. It is massive improvement on our release frequency from 2 years ago."

Sean Darley
SDET, Argos

This automation also reduced their testers' stress and frustration, eliminating human error and freeing them up to focus on getting other work done to close off tickets and add extra scenarios and edge cases. They've seen their digital revenue double in two years, thanks in large part to their accelerated release cycles. Because of their success, the Sainsbury's Group has extended their testing automation - they now have 250 BrowserStack licenses - so every developer and QA team across the organization, including subsidiaries, such as Argos, can test on BrowserStack to speed their release cycles and improve their customer experiences.

About BrowserStack

BrowserStack is the world's leading software testing platform powering over two million tests every day across 15 global data centers. BrowserStack helps Tesco, Shell, NVIDIA, Discovery, Wells Fargo, and over 50,000 customers deliver quality software at speed by moving testing to our Cloud. Our platform provides instant access to 3,000+ real mobile devices and browsers on a highly reliable cloud infrastructure that effortlessly scales as testing needs grow. With BrowserStack, Dev and QA teams can move fast while delivering an amazing experience for every customer. Founded in 2011, BrowserStack is a privately held company backed by Accel, BOND Capital, and Insight Partners.

For more information, visit https://www.browserstack.com

Speak to our Solutions Architects to learn how your team can leverage BrowserStack to ramp up testing operations.

References

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Trusted by global enterprises