Agile QA at Scale

Software Testing Strategies from Enterprise Teams
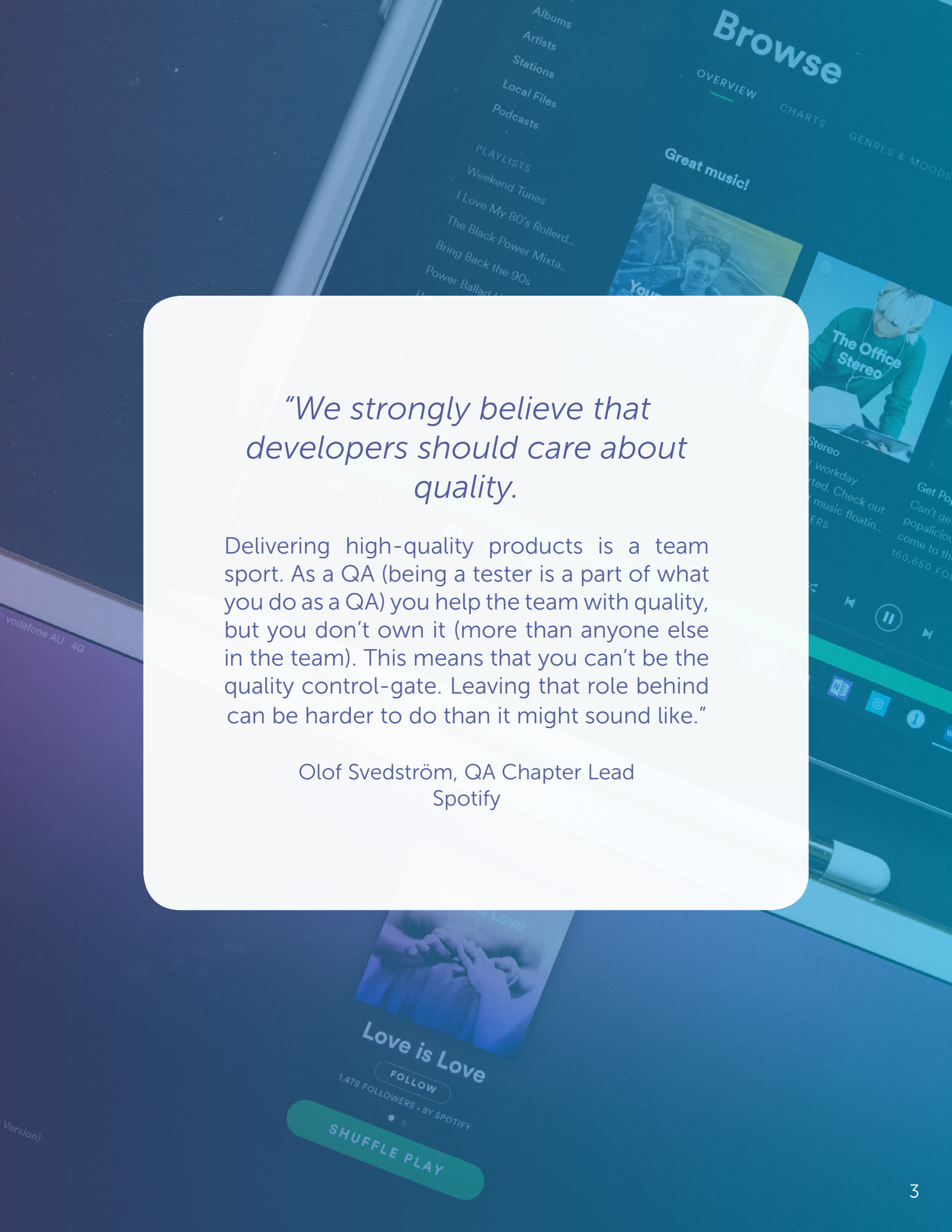
rainforest

What does it take to scale a QA strategy successfully?

A thoughtful, reliable QA process is essential for any development team or organization. Even for small teams, QA is challenging to do well. As teams grow in size and complexity, they must adapt their QA process and strategy to keep up with and stay ahead of accelerating development and product goals. But how can fast-growing teams scale their QA process efficiently, without creating a bloated, time-consuming or expensive process?

Fortunately, some innovative organizations are already working on an answer to that question. To aid growing teams in understanding and developing a solid QA process, we can look at the QA processes of teams that have scaled up successfully. By using them as examples of what to do (and perhaps more importantly, what not to do) dev and QA teams can streamline and optimize their software testing strategy.

In This Guide

The purpose of this guide is to provide high-level best practices (and anti-practices) to help teams guide the creation of a stronger, more scalable QA strategy in the long term. To do so, we will study the examples of four enterprise tech companies (Google, Facebook, Spotify and Atlassian) using a variety of QA strategies and recommend lessons from their approaches.

"We strongly believe that developers should care about quality.

Delivering high-quality products is a team sport. As a QA (being a tester is a part of what you do as a QA) you help the team with quality, but you don't own it (more than anyone else in the team). This means that you can't be the quality control-gate. Leaving that role behind can be harder to do than it might sound like."

Olof Svedström, QA Chapter Lead
Spotify

Spotify makes communication and collaboration top priorities in the way they approach testing and the structure their team. As part of their model-based approach to testing, Spotify QAs design tests for developers to use as specs. After the product is developed, the QA team leans on developers for test automation scripting.

EMPLOYEES	USERS	REVENUE
2960+	159 million	$4.99 billion

How to Scale QA Like Spotify

Design test execution for speed and efficiency

Spotify runs tests continuously to ensure that developers get continuous feedback on product quality. But because GUI tests slow down the build server, Spotify maintains a separate testing server to ensure developers are never waiting on test runs to get work done.

Make test data available on-demand

With a diverse global audience, Spotify's developers must create a platform that works seamlessly across a variety of browsers, devices and scenarios. To ensure that testing a wide range of use cases doesn't slow down deployment, Spotify built a test data service to pull up random data variables for testing scenarios quickly. This model reduces the resources required for test data management, so testers can focus on test execution.

Cut down on metrics noise

Because of continuous test execution, Spotify's testing activities generally create a lot of test feedback. While the test results data includes critical information for the developers, it can be overwhelming and noisy.

To keep the flow of information focused and useful, Spotify simplifies each team's QA feedback to a single dashboard per team. This provides developers with an efficient way to surface the results that matter most. These dashboards also create an easier means of exposing product quality status to management and other stakeholders.

"On every code change to our apps, we run a large suite of tests to avoid introducing new bugs in our codebase.

At Facebook's scale, thousands of code changes are made each day, resulting in hundreds of thousands of test runs. One World allows us to run these tests on emulators, simulators, and devices at this scale and provides quick feedback on results as engineers write code.

- Facebook Engineering Team

facebook

Social media-giant Facebook is famous for not building a QA team or employing any full-time testers for a long time, and their famous "move fast and break things" ethos illustrates both the advantage and drawback of that decision. Since their founding in 2004 the organization has grown and matured substantially. As a result, Facebook QA strategy has evolved as well. Facebook now includes end-to-end and integration testing for every release.

EMPLOYEES	USERS	REVENUE
25,105	2.2 billion	$40.653 billion

How to Scale QA Like Facebook

Canary releases

Facebook doesn't do major releases all at once. Instead, they roll new features and functions out slowly. With a huge user base, these canary releases/dark launches allow Facebook to minimize the risk of every release, without losing speed. Because of the reduced risk of catastrophic launch issues, this also encourages more experimentation.

Test execution that emulates user experiences (at scale)

Testing in environments that are as close to the end-user's experience as possible are essential for companies at a scale. In the past few years, Facebook has built out more QA processes and tools to keep up with their broader range of products and more diverse user base. This includes building out "One World," a suite of in-house mobile device lab, simulators and emulators to give their team free rein to test as much as they need.

Teams that want to follow Facebook's example don't necessarily need to build out their own in-house lab — services like Amazon Web Services provide on-demand device labs.

Learn more about how Rainforest uses AWS Device Farm for on-demand mobile testing.
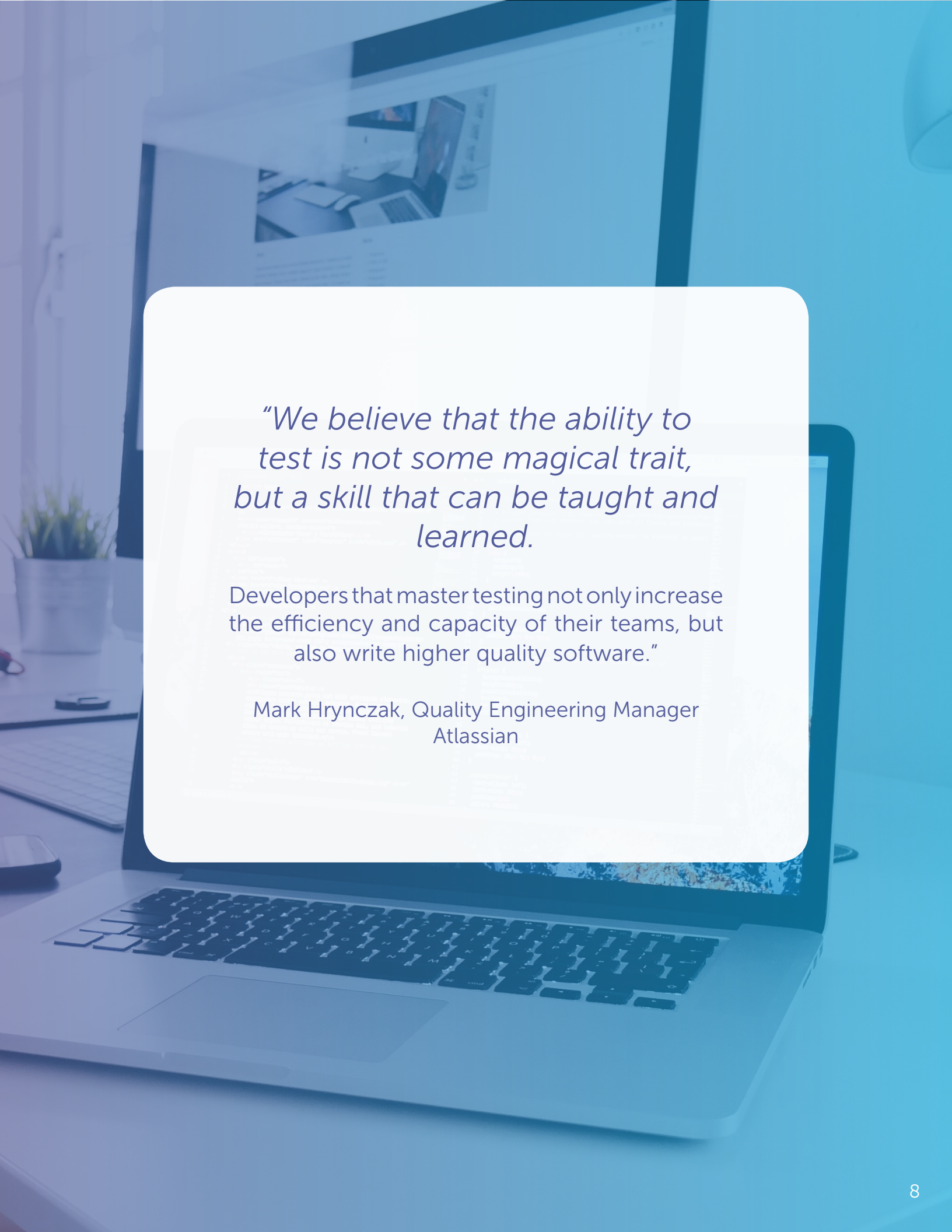
6

Dogfooding strategically

Despite their relatively small QA team, Facebook is a huge organization, with a large number of employees spread across the globe. With such a substantial workforce, Facebook is able to dogfood their product and test out new features on employees before they reach the public. They've even built a special tool to help employees easily log issues as they find them. This was explained by a Facebook representative to TechCrunch in 2012:

"It's called "Rage Shake" and the name is spot-on. Employees just violently shake their phone and it automatically logs its current state and sends details to Facebook's mobile bug-squashers."

One key part of making this method work is understanding user behaviors well. Facebook has had to take some steps to ensure that their internal users accurately reflect the use cases of their consumers. "Droidfooding" was implemented at Facebook to encourage more testing on Android devices, after they discovered that Facebook employees heavily preferred using iPhones.

"We believe that the ability to test is not some magical trait, but a skill that can be taught and learned.

Developers that master testing not only increase the efficiency and capacity of their teams, but also write higher quality software."

Mark Hrynczak, Quality Engineering Manager
Atlassian

ATLASSIAN

With a whole range of products designed to help teams work more efficiently, it's no surprise that Atlassian provides a great example of continuous delivery, DevOps and lean QA at scale. Atlassian adheres to the "Quality Assistance, Not Quality Assurance" Model.

EMPLOYEES	USERS	REVENUE
2292+	60,000+	$619.9 million

How to Scale QA Like Atlassian

The earlier you start QA, the better

At Atlassian, the QA process starts before development does. QA engineers attend iteration planning to give quality feedback before development even starts. The integration of QA into feature development helps dev and product teams be more in sync with each other, and makes for more accurate time and resource estimates. Bugs are caught earlier in the development cycle, making QA faster and more efficient both short-term and long-term.

Developer-driven testing requires training & support

Atlassian's developers are responsible for quality, and they're expected to do a good amount of testing during development, both as unit tests and exploratory tests. In order to scale this mindset, Atlassian ensures that all developers have training in test writing and QA best practices.

Beyond helping with testing-training, the QA team at Atlassian is thought of as a partner to development, rather than a gatekeeper. After completing a story, an Atlassian dev does a demo for QA, and they make a decision together about quality and next steps. Quality concerns are addressed, but issues don't require a separate process for resolution.

Create An interim QA strategy to help your team scale

It's common for teams who are changing up their approach to QA to dive headfirst into implementing their new strategy. But major shifts can be disruptive, and a poorly implemented shift can lead to poor adoption of the new process and strategy.

To ease the team into change, work incrementally. Develop a phased strategy that introduces a new workflow in stages to ensure adoption. As Atlassian was ramping up their Quality Assistance model, they assigned a "Developer on Test" to help make it clear that quality is everyone's problem.

"At Google, it's the product teams that own quality, not the testers.

Every developer is expected to do their own testing. The job of the tester is to make sure they have the automation infrastructure and enabling processes that support this self reliance. Testers enable developers to test."

James Whittaker, Engineering Director
Google

In terms of scale, Google is in a league of its own. Maintaining consistent quality across multiple products and projects around the world while staying innovative is an ongoing challenge for Google, so the team is continuously experimenting.

Google's developers own their own QA to a large extent, but their team also includes a variety of quality-focused roles to help support and enable developers to continually improve product quality. As Google's team grew, software engineers building and testing their own code didn't scale. Instead of rolling out a more traditional testing team, Google started creating specialized engineering roles to help boost the organization's QA bandwidth holistically. Because automation is at the core of their testing strategy, Google's QA team has a strong backbone of engineering skills running throughout.

EMPLOYEES	USERS	REVENUE
73,992	4.5 billion+	$40.653 billion

How to Scale QA Like Google

Release small, but think big

When it comes to testing, Google favors small, frequent releases and small, concise tests. This incremental approach allows them to better control changes to the user experience over time and pinpoint issues efficiently.

As a result, they invest heavily in unit and integration testing and use end-to-end testing more sparingly. In general, Googlers are encouraged to look for ways to speed up testing cycles and minimize test failures to ensure that the team's QA process continually becomes more efficient.

Find metrics that drive action

Google also puts an emphasis on communicating product quality internally to increase ownership and spur the team to focus on quality every day. For example, Google has internally published data about how code coverage helped increase adoption of best practices.

This practice has had a measurable impact on the team's productivity. Software Engineer in Test Marko Ivanković summarized the effect of sharing coverage data with the team in a post for Google's testing blog:

> *"The feedback from our fellow engineers was overwhelmingly positive. The most-loved feature was surfacing the coverage information during code review time. This early surfacing of coverage had a statistically significant impact: our initial analysis suggests that it increased coverage by 10% (averaged across all commits)."*

Design your team around quality goals

Google thinks of QA as a focus, not a role. There are several engineering roles within the "testing" focus to solve different quality problems: Software Engineers, who write test code; Software Engineers in Test, who focus on testability and refactor code to make it more testable; and Test Engineers, who organize overall test strategies and write automation scripts. Developers and QAs sit together in Google's offices, ensuring that the teams can collaborate closely and don't become siloed from each other.

Google has an active Testing Blog that helps their QA team communicate what they're working on and share their findings with the rest of the company and the public. This blog hints at the company's focus on integrating quality into the day-to-day activities of every team member. Another example is Google's now-infamous "Testing on the Toilet," which involved leaving pamphlets about QA best practices and rotating QA quizzes in the bathrooms at the Googleplex.

Key Characteristics of QA at Scale

Rainforest has helped a wide range of teams build QA strategies that work for them, from small startups preparing for growth, to large, complex organizations that want to streamline and speed up testing. If we've learned anything from helping teams scale their software testing strategies, it's that there's no one right way to do QA testing. However, companies that scale with a lean QA team or process successfully do have a few key things in common with each other.

Automation is part (but not all) of the strategy

Whether they use automation from the start or adopt it along the way, most teams find that they'll hit a ceiling for bandwidth if they aren't thinking strategically about using automation. Teams that scale effectively use testing automation as the means, not the end, to their QA goals. It's not just test case automation, either — teams that are efficient at scale look for ways to automate processes wherever possible.

Quality has an owner

For smaller teams that opt to forgo dedicated QA resources, a common mistake is not designating someone to own quality. This is especially true as teams get larger and more complex. Whether developers own testing or not, someone within the organization needs to think about quality strategy, not just execution. Whether that quality owner is a developer, a QA manager or a product manager, someone needs to be responsible for quality at a high-level.

Make quality a priority for the whole team

Developers, QA and product should be aligned around quality goals. The whole team understands that they have a stake in product quality and QA activities. Teams sit together, whether literally or figuratively, in order to encourage collaboration. As a result, many teams think about QA as Quality Assistance, rather than Quality Assurance, positioning their QA team as part of the development team.

Measure quality, not just QA

You can't optimize what you aren't measuring. Teams that scale successfully focus their QA metrics around product quality and the QA team's impact on business goals, rather than how busy they are. Teams that can scale are those who can measure their efforts effectively, and are able to communicate how those activities and results line up with top-line goals.

"It's important to establish long-term, sustainable speed.

If I make short-term decisions that are supposedly higher-speed or faster, they will eventually have a long-term impact on my ability to deliver. That trade-off today, which feels like I'm increasing speed or quality, will ultimately reduce speed or quality, which will be a lot harder to fix down the road."

Rob Zuber, CTO of CircleCI

Common Pitfalls During Scaling

On the flipside, many teams face the same challenges as they grow. Here are critical mistakes that teams often make as they scale. Avoid these to ensure quality stays high!

Leaning too hard into automation

Most teams find it difficult to scale without leveraging some amount of automation, but relying too heavily on test automation leads to a host of new problems that can slow you down or create bloat. Remember that automation requires technical expertise to script and maintain, so if your goal is to keep dedicated QA resources lean, automation should stay lean and focused as well.

Measuring or aiming for the wrong things

It's not just about what you're measuring, but why. Finding metrics that give you insight into quality is key. Immature organizations often focus on metrics that tell you how much the QA team is working, such as code coverage or number of tests run, instead of what the quality of the product is.

Expecting QA at 100 people to be the same as QA at 10

If you're one of the lucky organizations that has a QA process that seems to work fine in the early days, it can be tempting to stick with it as you grow. But the processes and goals of a team at scale are often very different — not to mention more complex — than those for a smaller organization.

Trying to fix "all the things"

Lean QA strategies are all about triage. Instead of trying to fix everything as it comes up, they make long-term, overall quality — rather than individual bugs — the focus of QA activities. Understanding where your QA and development teams' time is being spent and optimizing for the highest value will help lean teams have the greatest impact.

Designing Your Scalable Strategy for QA

The best time to think about your QA process at scale is before you need to implement it. Ready to start preparing for hypergrowth? Here are three more resources to help ensure that your team is ready to scale quality alongside your product, team and customer base.

Ensure Your Team Has the Skills They Need to Scale

The skills required to execute a QA strategy at scale have evolved alongside increasing demands for high-quality software at the speed of continuous delivery. In this guide, learn from QA leaders what it takes for QA testers, managers and engineers need to excel.

Download "Level Up Your QA Career"

Develop a Roadmap to Troubleshoot Quality Issues

Quality issues can prevent teams from achieving the level of software quality that they need to grow. This guide features interviews with a variety of QA and development leaders to help teams define and resolve common QA issues.

Download "90 Days to Better QA"

Define a QA Strategy that Scales

In this webinar Bleacher Report Senior QA Automation Engineer Quentin Thomas and Rainforest CIO Derek Choy discuss how QA teams must change their approach as their team grows, and how they can adapt their QA strategy for scale.

Listen to "Creating an Agile QA Strategy with Bleacher Report"

About Rainforest QA

Rainforest is changing the way QA is done in an era of continuous delivery. Our on-demand QA solution improves the customer experience by enabling development teams to discover significantly more problems before code hits production.

Hundreds of companies including Adobe, Oracle and Solarwinds use Rainforest to automate their QA testing process and easily integrate it with their development workflow via a simple API. Headquartered in San Francisco, Rainforest is a 2012 Y Combinator graduate funded by Bessemer Venture Partners and SVB Capital among others. For more information, visit https://www.rainforestqa.com.

Resources

Want to dig deeper into how enterprise organizations build great QA processes? Learn more about the companies profiled in this guide in the resources below:

Spotify

- Kristian Karl, Model-Based Testing @ Spotify
- Smartbear, "How Spotify Does Test Automation"
- Darwin Recruitment, "An Interview with Olof Svedstrom, QA Chapter Lead at Spotify"

Facebook

- Facebook Code Blog, "Managing Resources for Large Scale Testing"
- TechCrunch, "Droidfooding: After Years of Giving Employees iPhones, Posters At Facebook HQ Beg Them to Test Android"
- Fast Company, "How Proper Dogfooding Might Have Saved Facebook Home"
- SD Times, "How to launch features like Facebook"

Atlassian

- Atlassian Blog, "Inside Atlassian: the Jira QA process"
- Atlassian Blog, "Quality assistance: how Atlassian does QA"
- Atlassian Blog, "Moving from quality assurance to quality assistance"
- Atlassian Blog, "Engineering higher quality through agile testing practices"

Google

- Google Testing Blog, "From QA to Engineering Productivity"
- Google Testing Blog, "How Google Tests Software" Series
- Google Testing Blog, "The Google Test and Development Environment - Pt. 1: Office and Equipment"
- Washington Post, "Building a 'Googley' Workforce"