Maximizing mobile engineering efficiency through Gen2 and Velocity: a benchmark report

At a glance

This benchmark report allows organizations to estimate the impact of the new Bitrise Gen2 Build Infrastructure — our fastest machines ever — and the Velocity plan on their mobile engineering team's speed and consistency. The teams behind some of the world's most popular apps have migrated to this updated version of the Bitrise platform and assessed the changes in build speed and performance experienced.

Through benchmarking of project build performance and conversations with the engineering organizations involved, this report quantifies the impact that this new generation of mobile CI has on mobile product engineering value streams. This report covers build performance in minutes when upgrading from Gen1 to Gen2 (based on the Elite configurations) for the total build time as well as a notable Step in each app's workflow.

Key outcomes

On average, across six of our customers, switching from the Gen1 to the Gen2 platform resulted in a 42% faster build time. Individual results are given below:

App	Total build time improvement	Potential monthly hours saved
Business	55%	112
Finance	35%	551
Utilities	30%	280
Social Networking	40%	1808
News	40%	1079
Food & Drink	50%	2242

gen2

Key features

Gen2

- **Faster compute options** through support of new hardware and new CPUs
- **macOS-based hypervisor** with small footprint and extremely quick VM start times
- **A different approach** on the orchestration of the virtual build environments (Virtual Machines)
- **Future-proofed** and ready to support GPU acceleration, Metal, Apple custom SoC capabilities and more

Velocity

- **Autoscaling** concurrency limits, eliminating delays caused by "waiting for worker"
- **Custom build timeouts**, allowing for bigger, more complex builds
- **Compute configuration per workflow** to ensure the best compute type, CPU and memory for every job
- **Maximize mobile engineering efficiency** through hands-on support from sales and customer success engineers

Business challenges

Maintaining the speed of iteration required for mobile success. Competition in most mobile categories is high and has led to a race for mobile product teams to deliver on constantly — and rapidly — changing end-user requirements. At the same time, velocity is hindered by platform-specific challenges like app store policies and submission processes, and a high stakes release environment where technical issues often lead to immediate churn.

Tension between test coverage and build-time. Maintaining test coverage is critical to ensuring first-time right deployments, but automated testing leads to bloated CI/CD workflows and increases the time it takes for developers to know if their changes can be merged. The result is ever longer build-times that disincentivize developers from committing changes frequently, or limiting the amount of testing which can compromise release confidence.

Fragile automation and tooling. Organizations have built portfolios of legacy technologies — often ill-equipped for the mobile use case to begin with — point solutions and integrations, combined into impressively engineered processes. Many of these processes have become so complex that a change to one part of the system has unintended consequences in other parts of the system, leading to a slowdown in applying even the most critical updates and changes.

Limited bandwidth to meaningfully improve mobile engineering processes. Mobile engineering organizations are often low in efficiency due to an abundance of manual steps and processes. Combined with a high pressure environment where speed is of the essence, teams often have limited time or ability to work on process and system efficiencies. This can lead to a stagnation in mobile engineering performance improvements and impedes its ability to deliver the value required by the organization.
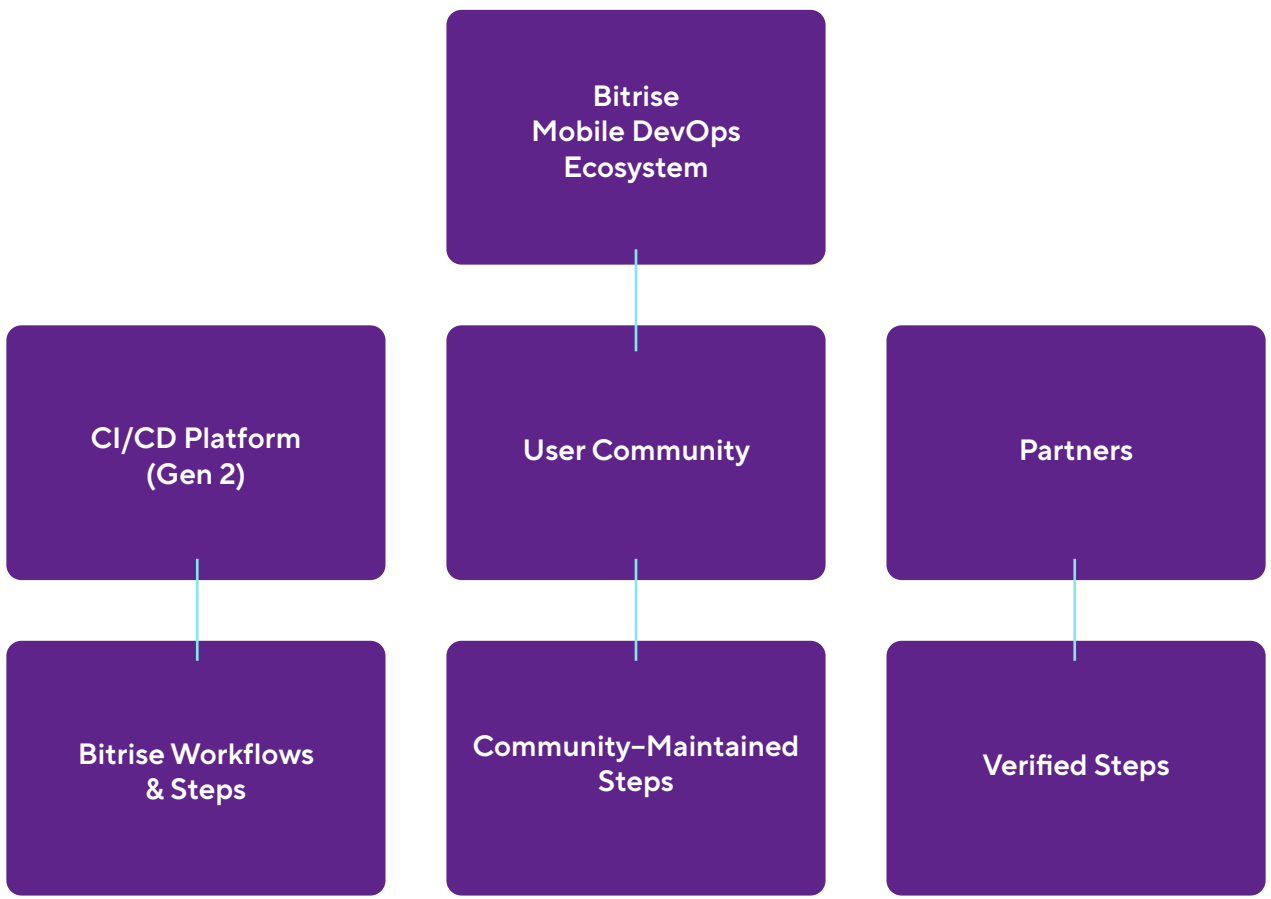
Offering Overview

Bitrise helps customers build and improve high-performing mobile engineering organizations.

At its core, Bitrise is a specialized continuous integration and continuous delivery platform, built to enable speed and confidence in the mobile engineering process. Feedback loops are shortened through high-performance hardware, providing developers with the information they need, where and when they need it.

Through the broader Bitrise Mobile DevOps platform, and integrated structures offered by Bitrise Workflows and Steps, organizations gain visibility and control over mobile processes that were previously scattered and difficult to optimize. This enables a cadence of continuous mobile engineering performance improvements.

To allow organizations to build, deploy and improve faster than ever before, the new Bitrise **Gen2** infrastructure was designed from the ground up to minimize potential bottlenecks and maximise performance on high-end hardware. During the closed, invite-only beta period, Gen2 was exclusively available to customers on Bitrise's **Enterprise Build Platform**, a virtual private environment. **Now, our fastest Gen2 machines are available to all customers on the Teams, Velocity, and Enterprise Build Platform plans.**

The **Velocity Tier** plans were created to match the speed offered by Gen2 with features and functionality aimed at mastering mobile engineering complexity. On Velocity, organizations find auto-scaling concurrency limits, customizability, and support for continued optimization.

Bitrise Mobile DevOps Ecosystem		
CI/CD Platform (Gen 2)	User Community	Partners
Bitrise Workflows & Steps	Community–Maintained Steps	Verified Steps

Results

Methodology

The speed of a CI build is fluent and impacted by a number of factors, including, but not limited to:

- The specific Steps and actions automated via the build
- The stack of preinstalled software used
- Network speed
- External services accessed during a build

To ensure a true apples-to-apples comparison of performance, for each of the six apps we're presenting in this report, we're comparing the iOS compute option for Gen1 Elite against Gen2 Elite (Gen1 Elite: 4vCPU @ 3.5 GHz, 8 GB RAM; Gen2 Elite*: 8vCPU @ 3.2 GHz, 35 GB RAM).

Each build was run multiple times to account for external influences, with performance averaged over no less than a dozen builds per configuration. Where possible, build time was broken down for specific parts of the process, illustrating where performance improved and where it didn't.
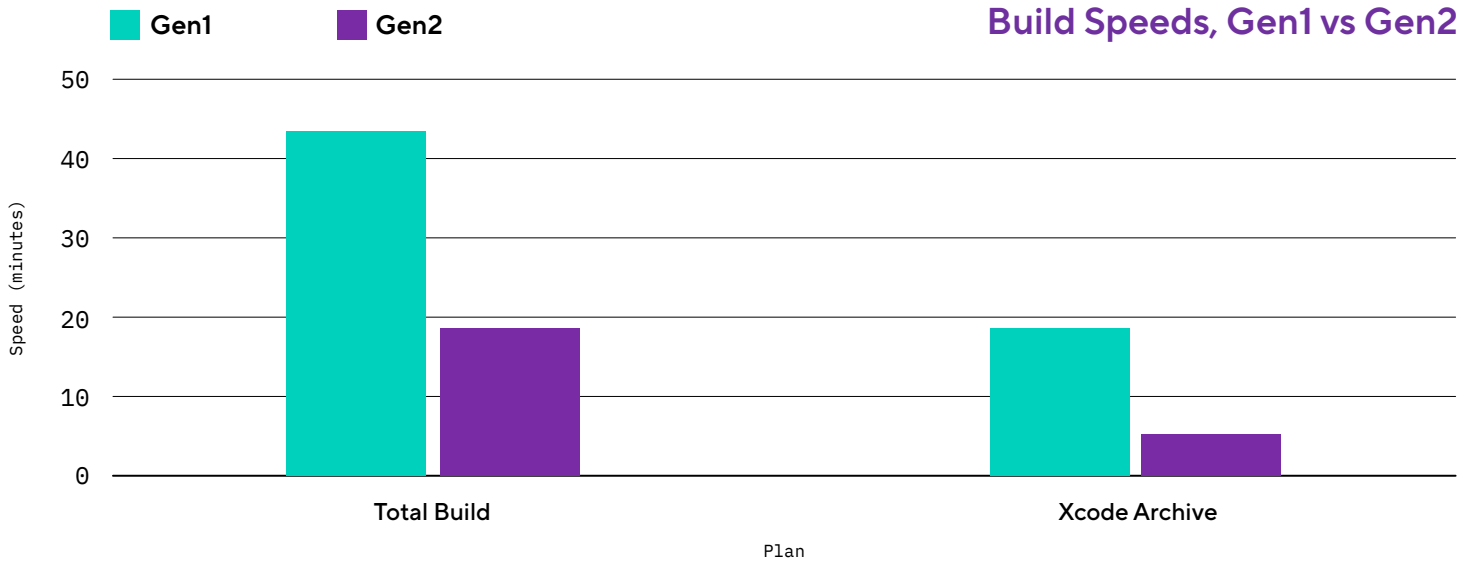
For each app we've presented the performance of the total build time as well as a noteworthy Step in their Workflows, such as XCode Archive. To give a clearer indication of return for each app presented, we have shown how many hours each will have saved in a typical 30-day period by upgrading from Gen1 to Gen2. The exception to this method was the News app: due to a limited amount of builds during POC, we have used an average figure for typical 30-day Gen1 build hours to calculate potential hours saved.

The presented performance benchmarks do not guarantee similar results for your app or Workflow, but will be validated and quantified during the POC period for each Velocity and Enterprise Build Platform customer.

*Subject to change
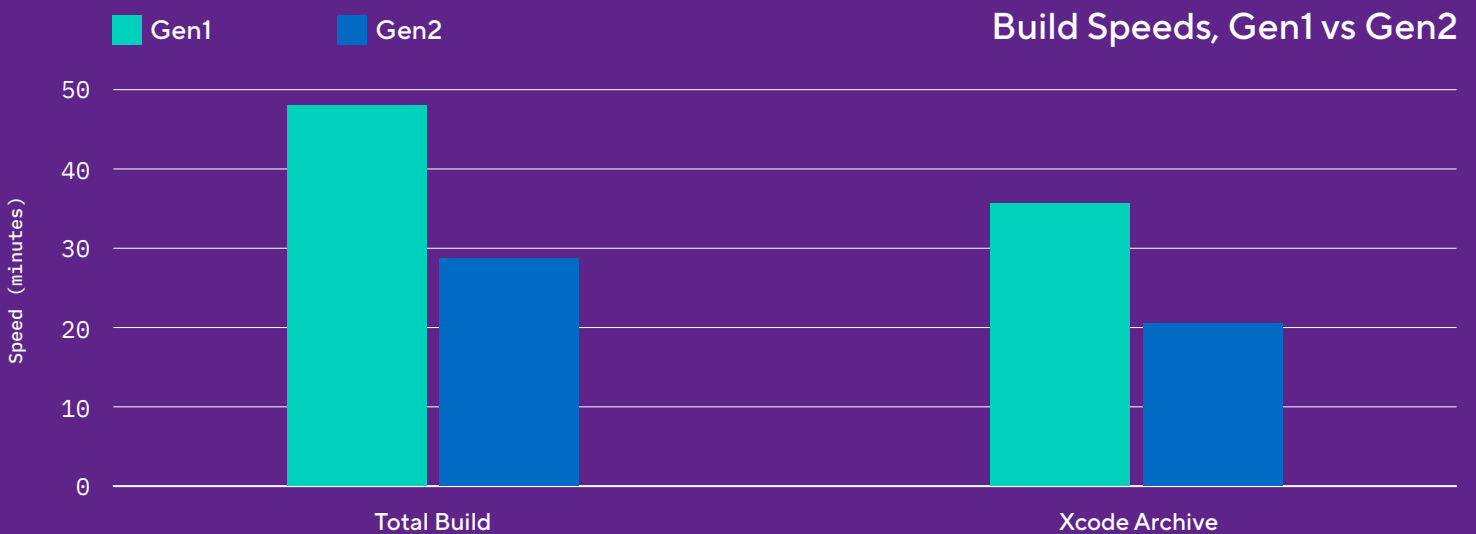
Business app, on a Velocity Plan

• Install size: 81 MB
• 32 languages

Build Speeds, Gen1 vs Gen2

Legend: ■ Gen1 ■ Gen2

Y-axis: Speed (minutes), 0 to 50

Plan	Gen1	Gen2
Total Build	~44	~19
Xcode Archive	~19	~5

X-axis label: Plan

Total build time: 55% faster / XCode Archive: 65% faster
Saving 111 hours in run-time per month.

Finance app, on a Velocity Plan

• Install size: 97 MB
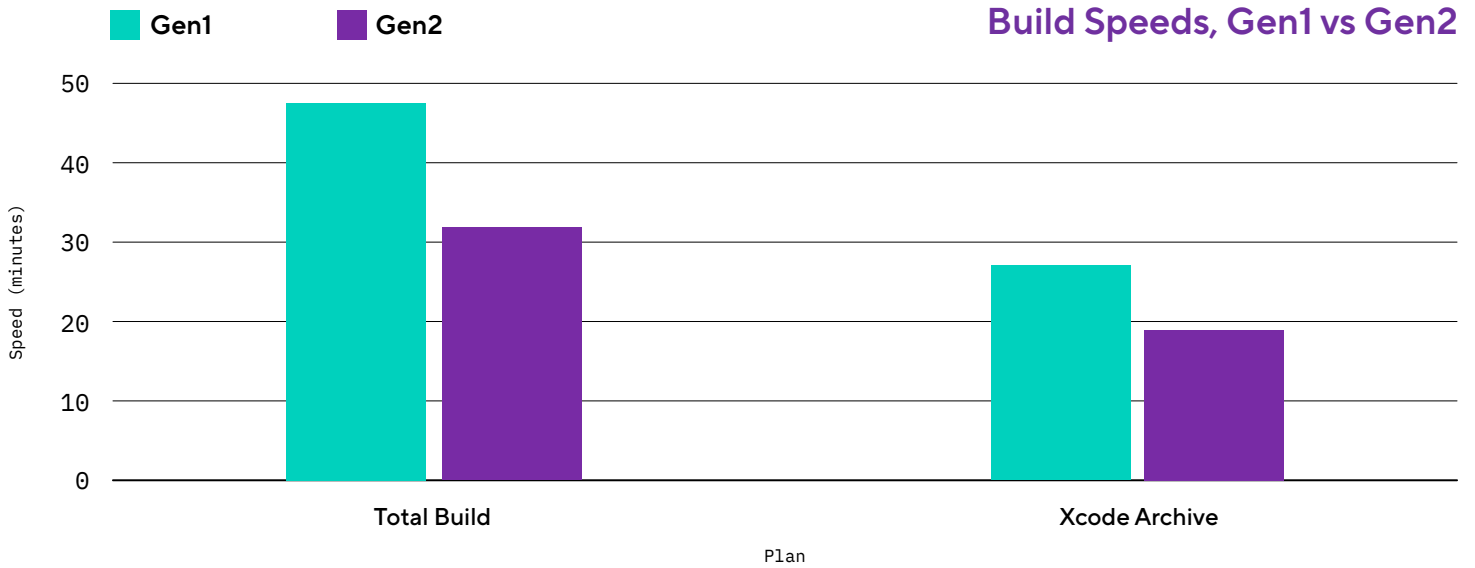• 14 languages
• Built on Xcode 12.5

Build Speeds, Gen1 vs Gen2

Legend: ■ Gen1 ■ Gen2

Y-axis: Speed (minutes), 0 to 50

	Gen1	Gen2
Total Build	~48	~29
Xcode Archive	~36	~21

Total build time: 35% faster / XCode Archive: 40% faster
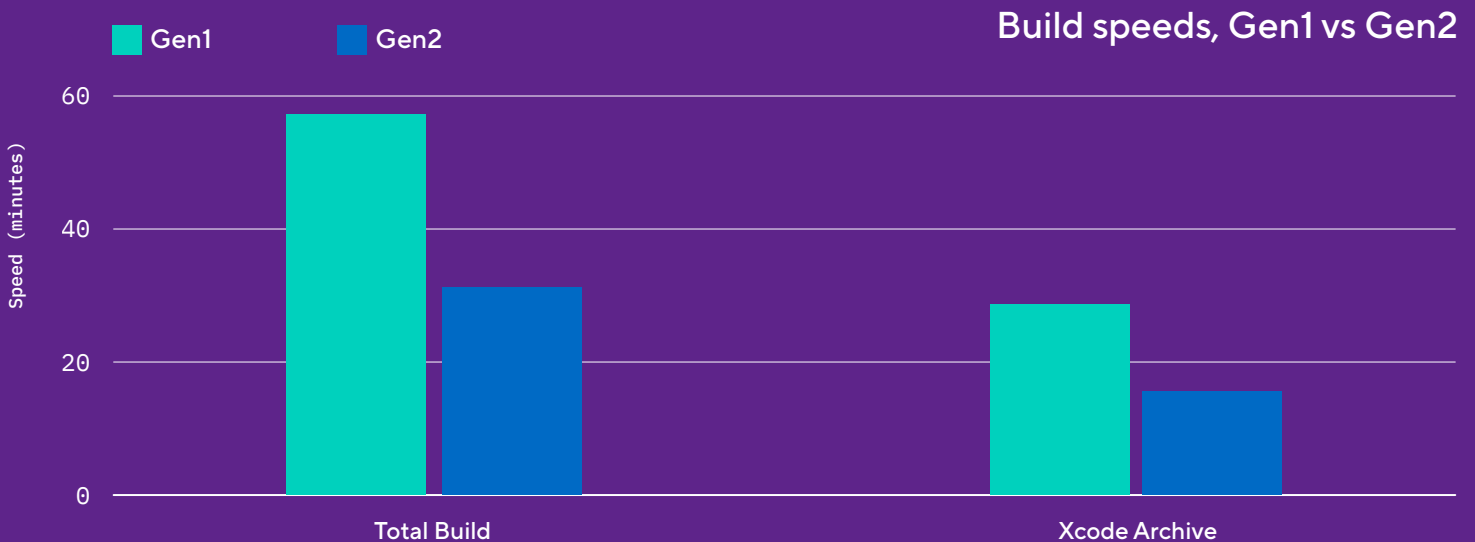Saving 636 hours in run-time per month.

Utilities app, on a Velocity Plan

- Install size: 86 MB
- 87 languages
- Built on Xcode 12.4

Build Speeds, Gen1 vs Gen2

Legend: ■ Gen1 ■ Gen2

X-axis (Plan): Total Build, Xcode Archive
Y-axis: Speed (minutes), 0 to 50

Total build time: 30% faster / Xcode Archive: 25% faster
Saving 168 hours in run-time per month.

# Social Networking app, on the Enterprise Build Platform

- Install size: 135 MB
- Built on Xcode 12.0

Build speeds, Gen1 vs Gen2

Legend: ■ Gen1 ■ Gen2

X-axis: Total Build, Xcode Archive
Y-axis: Speed (minutes), 0 to 60

Total build time: 40% faster / Xcode Archive: 45% faster
Saving 1536 hours in run-time per month.

News app, on a Velocity Plan

- Install size: 50 MB
- 3 languages
- Built on Xcode 12.5

Build Speeds, Gen1 vs Gen2
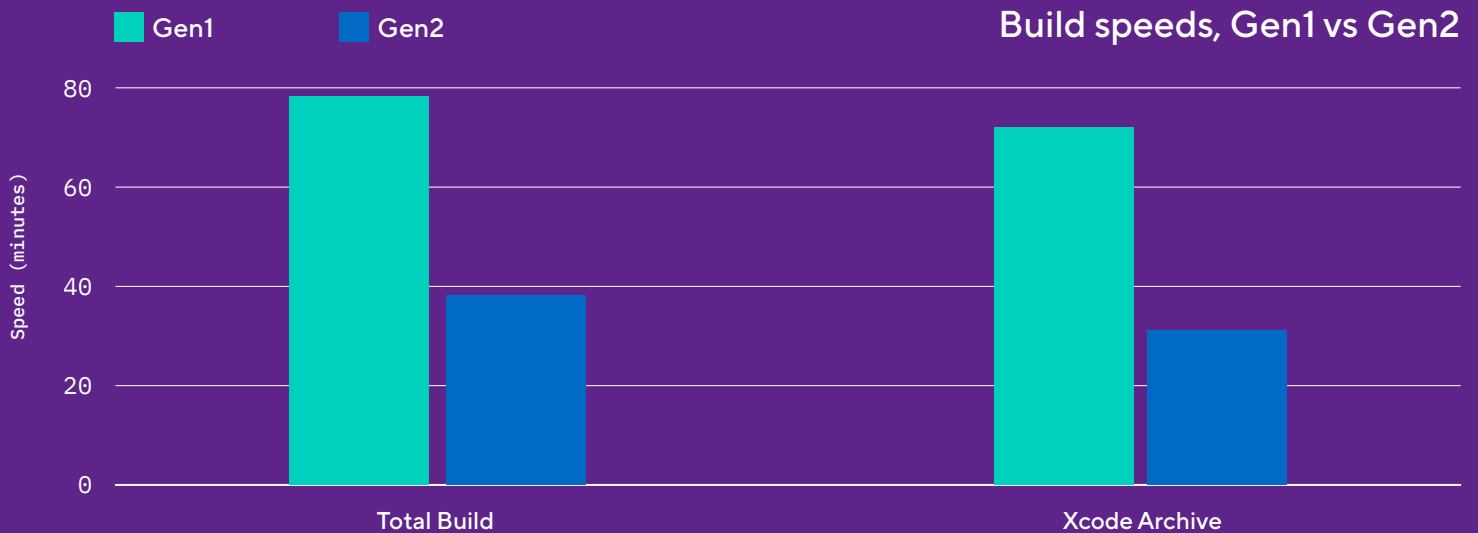
■ Gen1   ■ Gen2
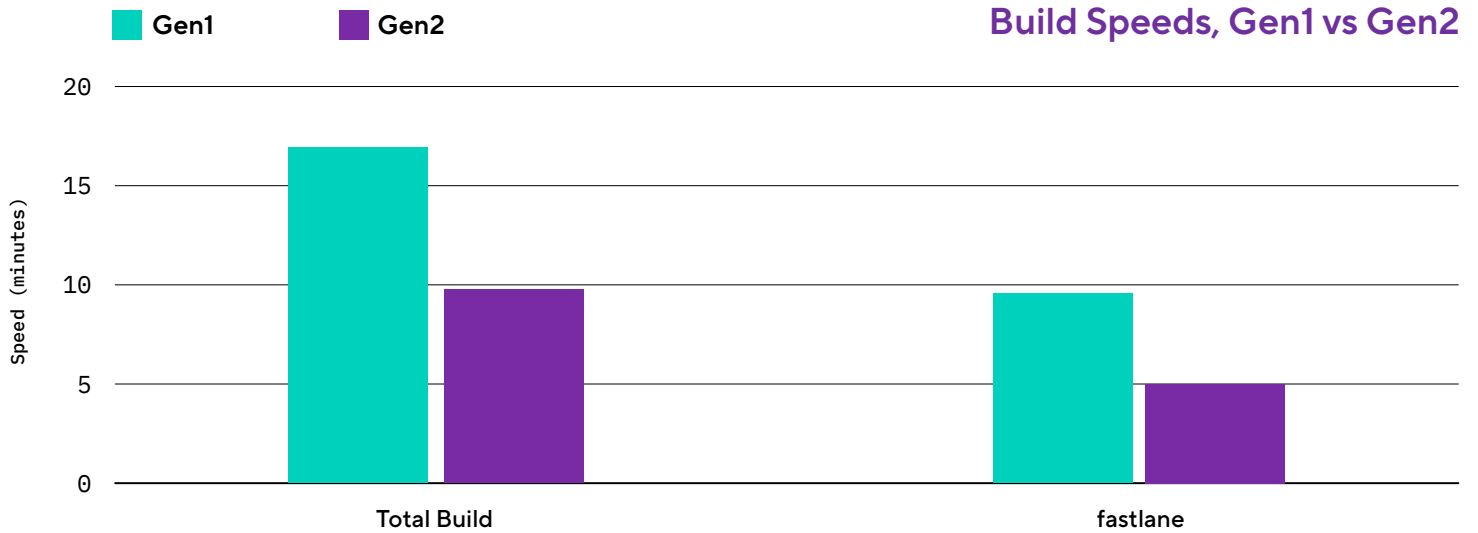
Total build time: 40% faster / fastlane: 45% faster

Saving 1079 hours in run-time per month.*

*due to a limited amount of builds during POC, this value is estimated based on a typical value of 1799 for monthly build-time hours on Gen1

Food & Drink app, on a Velocity Plan

- Install size: 310 MB
- 32 languages
- Built on Xcode 12.4

Build speeds, Gen1 vs Gen2

■ Gen1   ■ Gen2

Total build time: 50% faster / Xcode Archive: 55% faster

Saving 1184 hours in run-time per month.

How Gen2 has helped our customers

*"Switching to Bitrise's Gen2 machines has **increased the speed of our builds by 30%**, by decreasing our average build times from 21.3 minutes to 14.8 minutes. Additionally, the improved machine performance **decreased our yearly costs associated with CI/CD by 71%**. This cost saving and improved performance has allowed us to move faster and deliver bold changes to our customers."*

—Thomas Bajis,
iOS engineer

COMPASS

"Paysafe runs hundreds of builds per week, resulting in thousands of build minutes on a monthly basis. Bitrise has been instrumental in helping us run these builds more efficiently, increasing the overall speed and reducing maintenance efforts.

***The Gen2 application is more than two times faster than Gen1**, which translates to less waiting time and more coding time for developers to focus on building new features. In addition, Gen2 standard machines are faster than Gen1 Elite, resulting in **50% cost reduction** for the same builds.*

Gen2 is enabling us to save time, not only through the improved build speed but also by facilitating automation of production deployments, managing the CI/CD workflows, and avoiding having to deal with infrastructure related challenges. This enables our developers to focus their efforts on bringing business value to our clients faster.

*With the rapidly evolving nature of the payments and fintech industry Paysafe is focused on continuous innovation and on growing the expertise and experience of our team in this area. **Our partnership with Bitrise plays an important role in supporting us on this journey.** Overall, they have been a fantastic and reliable partner, able to migrate and adapt the Gen2 solution to our specific needs."*

—Sujit Unni,
Chief Technology Officer

Paysafe:

Conclusion

Mobile apps play a central role in our lives. Over the last year and a half especially, the ways in which we work and live have evolved, and our reliance on performant apps has never been felt more keenly. This means the pressure felt by mobile teams is increasing, as they work hard to ensure their apps are 1. high quality 2. cost-effective to build and 3. delivered fast to keep up with innovation and competition.

At Bitrise, we are enabling developers to work faster and produce higher-quality applications. We realized one of the bottlenecks is the performance of the build nodes and the resulting build time — especially when the team size increases or the app's functions become more complex. Which is why we've invested in the second generation of Bitrise Build Infrastructure: Gen2.

In presenting the results within this benchmark report, we have tried to choose a wide spectrum of apps with differing functionality and audience types. We have also tried to show that the speed improvements from switching to Gen1 to Gen2, as explained earlier in the methodology, can also range widely, depending on the nature of the build and application. What we can conclude, however, is that the improvements which can be felt by mobile teams upgrading from Gen1 to Gen2 can be significant.

Gen2 is now available for customers on the Teams, Velocity, and Enterprise Build Platform plans.

For new users, **sign up and trial Bitrise for yourself** — or, if you wish to find out the value that Bitrise can deliver to your team beyond the enhanced speed from Gen2, **request a demo**.

Existing customers interested in trialling Teams can **register their interest** in migrating to the new plan, while those wishing to upgrade to Velocity can **reach out to the sales team**.

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