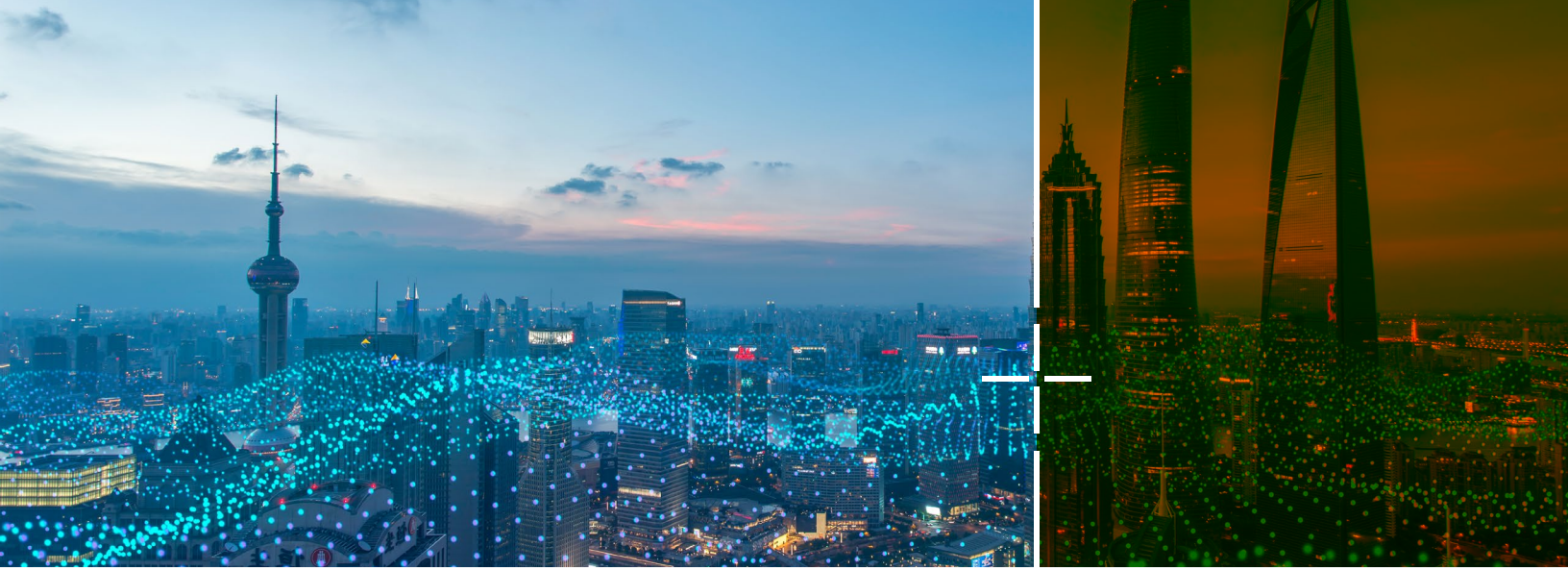

CASE STUDY

An Experiment With Arm Sparks Cost Saving, Better Performance in Cloud Infrastructure Transition

FusionAuth

TAKEAWAYS

- By transitioning to the Arm architecture, FusionAuth saved money and boosted performance of their cloud infrastructure.
- By leveraging Arm-based instances, FusionAuth achieved a 26% to 49% increase in logins per second and cost savings of 8% to 10% compared to x86 architecture.
- The smooth transition to Arm architecture allowed FusionAuth to support additional use cases such as IoT and high-performance cloud platforms, while maintaining their focus on self-hostable and cloud deployment options, an API-first approach, and unmatched customization for users.

Introduction

If necessity is the mother of invention, experimentation is its favorite sister. And for FusionAuth, experimentation led to a transformative moment in its business.

FusionAuth is the customer authentication and authorization platform that makes developers' lives awesome. They get all the auth features their app needs like login, registration, SSO, MFA, social logins, passkeys — plus a customizable, scalable solution that can run on any computer, anywhere in the world.

Key to the company's technology and strategy is to deliver the most friction-free user experience possible (after all, no one ever exclaims "look at this login page, I just love it" when they are trying to get into an application). This means being able to run its solutions on any computer, anywhere in the world. Its focus, after the product release in 2018, was on the x86 architecture, but over time, its developers began embracing computing platforms built on the Arm architecture. This meant that FusionAuth needed to think about their development flow from laptops to the cloud.

In fact, more developers are embracing Arm64 for their production and development environments because it makes it easier to troubleshoot and reproduce bugs locally, earlier in the development process. And with

Arm-based processors now available in every major cloud, these Arm-native developers need a multi-arch aware toolchain to safely deploy their code.

The thought process all started, however, with a little serendipitous experimentation in 2020. A member of FusionAuth's community of more than 10,000 users ported FusionAuth to an Arm-powered Raspberry Pi device.

"It was just an experiment and not for production use, but it worked" said Dan Moore, Head of Developer Relations at FusionAuth.

Smooth Transition

Things moved quickly. During a hackfest in summer 2021, Moore conducted load testing on FusionAuth instances running on AWS Graviton, which showed better price and performance than x86 instances.

"The engineering team and the CTO found this very interesting, and by December 2021, we had the first downloadable software version for Arm," he said.

FusionAuth is a Java shop, which meant they had to find a Java Virtual Machine (JVM) that supported Arm (Java 17 was the first version to do so). FusionAuth added Java 17/Arm support to the code, and then updated Docker to target the Arm architecture with jlink and multi-arch builds. Because they run on Java, the FusionAuth lift was relatively small. Once they found a JVM built for Arm, it was just a matter of working out any remaining kinks.

In February 2022, FusionAuth version 1.33.0 officially supported Arm and Java 17 in downloaded software. After modifying deployment software, the SaaS version of FusionAuth, FusionAuth Cloud, offered official support for Arm in June of 2022. The expansion was quick, and as of March 2023, more than 70% of their SaaS instances were running Arm.

In running benchmarks, FusionAuth chose to benchmark the login request, since password hashing makes logins an especially CPU-intensive process. Having tested 50,000 logins in the EC2 environment, they found the Arm architecture handled between 26% and 49% more logins per second, and cost between 8% and 10% less than the equivalent setup with an x86 architecture.

So, by leveraging Arm-based instances, they were able to offer improved performance while maintaining the same prices for their customers. This allowed them to provide better value and efficiency in their cloud offering.

When they announced the transition, Daniel DeGroff, FusionAuth co-CTO, said, "The engineers we built FusionAuth for are the same ones that are building the next generation of technology. Because we are developers ourselves, we've seen the shift toward Arm-based infrastructure and have prepared appropriately. We will always prioritize resources to ensure developers have what they need to make auth simple, secure and deployable anywhere."

Benefits and Cost Savings

The transition to Arm architecture allowed FusionAuth to meet the needs of their development team and provided cost savings and improved performance for their cloud infrastructure. The cost per hour for Arm-based instances was lower than the previous generation. FusionAuth was able to handle more logins while costing 8 to 10% less (the company has tested its platform to handle more than 100 million users). This cost efficiency has allowed them to maintain the same pricing for years.

One FusionAuth customer, Hendy Irawan, CIO of Dunia Anak Alam Foundation, said, "I just switched a FusionAuth instance to arm64 and the transition was so smooth I couldn't even tell whether it's actually running the arm64 version."

By working with Arm processors, FusionAuth can support additional use cases such as IoT and high-performance cloud platforms that are built on Arm-based architectures. Because of FusionAuth's relatively small memory footprint, standards support, and performance characteristics, lower-powered devices such as kiosks can run it already. By supporting the Arm platform, FusionAuth can run on an even wider range of devices, such as more sophisticated IoT systems. This lets developers add powerful, secure authentication to their applications, wherever they execute. Arm support also lets developers using FusionAuth utilize high-performance, lower-cost instances available in all major clouds. In addition to AWS Graviton-based instances, developers can use Google Cloud Tau T2A, the Ampere Altra Arm-based VMs in Microsoft Azure, or the the Ampere A1 Compute VMs available in Oracle Cloud.

The smooth transition process to adopting Arm architecture not only met the needs of their development team but also provided cost savings and improved performance for their cloud infrastructure. FusionAuth continues to differentiate itself in the market through its self-hostable and cloud deployment options, API-first approach, and unmatched customization for the user experience.

The key to accelerating and unlocking even more innovation in the world today is for workloads to run on the best hardware for the user's price-performance needs. Arm technology continues to push the boundaries of the performance-efficiency balance without the developers having to worry about whether their software is compatible.

Learn more about how to transition to Arm architecture.