FLEETCOR:
Modernizing and Simplifying Payment Card Apps for Truck Drivers With the Flutter Framework

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Ginger Brauhn
Senior Scrum Master, FLEETCOR

Before an app can make a user's life easier, it has to be easy to use.

FLEETCOR's payment card apps promised major convenience for on-the-road professional truck drivers and the companies desperately trying to recruit them—but only if they could pull their user experience and digital infrastructure into the 21st century. Here's the story of how we helped meld their outdated payment card apps into one modernized product, using a cutting-edge mobile UI framework, Flutter.

BACKGROUND

The supply chain needs truck drivers—badly

If you've attempted to buy, well, anything in the past two years, chances are you've come face to face with the torn remnants of a supply chain disruption. From empty shelves at the grocery store to scary receipts at checkout, consumption in the post-2020 world has become a contact sport.

So what's driving the shortages? A myriad of factors, from reduced access to raw materials to production shutdowns, rising costs, and, most relevant to our purposes here, freight congestion. Ports along both coasts have become so clogged, in fact, that they've become the subject of federal reform, with President Biden set to sign the Ocean Freight Reform Act of 2022 into law.

But even once goods break free of overcrowded ports in places like Los Angeles and Savannah, they still have to make an earthbound journey to their final destination—and that requires professional truck drivers.

Unfortunately, prior to the pandemic, the logistics industry was already losing drivers in droves. In fact, according to Forbes, annualized long-haul driver turnover averaged 94% pre-2020. Since the pandemic, the industry has lost 6% of its workers, and the American Trucking Association estimates a shortage of 160,000 drivers by 2030. In the next ten years? We'll need to recruit a million.

Suffice it to say, recruiting and retaining truck drivers is of enormous consequence to the supply chain, and more broadly, to global commerce as a whole. But it's also a hard sell given all the challenges facing professional drivers. Top concerns include grueling hours, a scarcity of truck parking lots (which would allow for needed rest), lengthy delays at customer facilities, and, the number one ranked concern in a recent ATRI survey: driver compensation. Even when annual pay is competitive, many still have to factor in costs incurred while on the road as part of their take-home pay, including gas, insurance, and maintenance.

"Venmo for truckers"

Given market conditions, anything that makes a professional truck driver's life easier is a win not just for the trucking industry but for global industry as a whole.

That's where FLEETCOR comes in, offering state-of-the-art payment tools that help businesses control spending, eliminate reimbursement hassles, and simplify record keeping while discouraging fraud and delighting employees. Their card payment app specifically allows trucking companies to automate payments to drivers and load them onto a debit card accepted by many merchants. That way, drivers

have immediate access to their funds while on the road and can use them for the various expenses that arise.

A sister app offered by FLEETCOR even allows drivers to transfer these funds to friends and family, adding another layer of convenience for everyone involved while drivers are on the road.

Six apps, one common goal

In total, FLEETCOR offers six apps across their portfolio of payment cards and B2B payment solutions. Their long-term goal is to combine all of these apps into one, for maximum administrative and user simplicity.

To start, the FLEETCOR team wanted to focus on the two payment card apps for truck drivers and their families. Both were on the older side and presented significant maintenance challenges.

"The apps, when they were originally built... back in 2016, we used a third party vendor to do all the work," explained Danny Radke, mobile product owner at FLEETCOR, "And so internally, we didn't have a lot of knowledge about the code base or how to modify them and where we could go from there. And we weren't able to really enhance them to what our customers needed."

The objective was to combine the two into one, Driven, on a modern framework that would allow the FLEETCOR team to better maintain and update them moving forward while pivoting to a more customer-first strategy for digital products. Ideally, users wouldn't even be aware of the switch—they would simply log in and find an updated UX/UI.

The FLEETCOR team knew they wanted to use Flutter to fuse the two apps. An open-source mobile UI framework created by Google, Flutter offered a simplified way to develop apps for Android, iOS, Linux, macOS, Windows, and Google Fuchsia from a single codebase.

"When we originally started the project, we wanted to be able to get this app out quickly and easily," Radke shared. Given those goals, Flutter made the most sense. "Being able to develop this new Driven app with Flutter really saved us a lot of time and resources, because we can develop in one place rather than having to have iOS and Android developers separately trying to manage the code base. So Flutter allowed us to do a one-stop shop of Android and iOS and develop the code quickly."

Released in May 2017, Flutter is a relatively new framework, but as polyglot software engineers, we were more than ready to apply software engineering best practices to help FLEETCOR modernize and combine its payment card apps using the framework.

Rather than confine ourselves to one methodology or framework, we make it a point to stay nimble and apply whichever framework and language best suit the task at hand. Our methods are flexible, but the goal is always to architect the absolute best solution for our partners, and that's exactly what we set out to do for FLEETCOR.
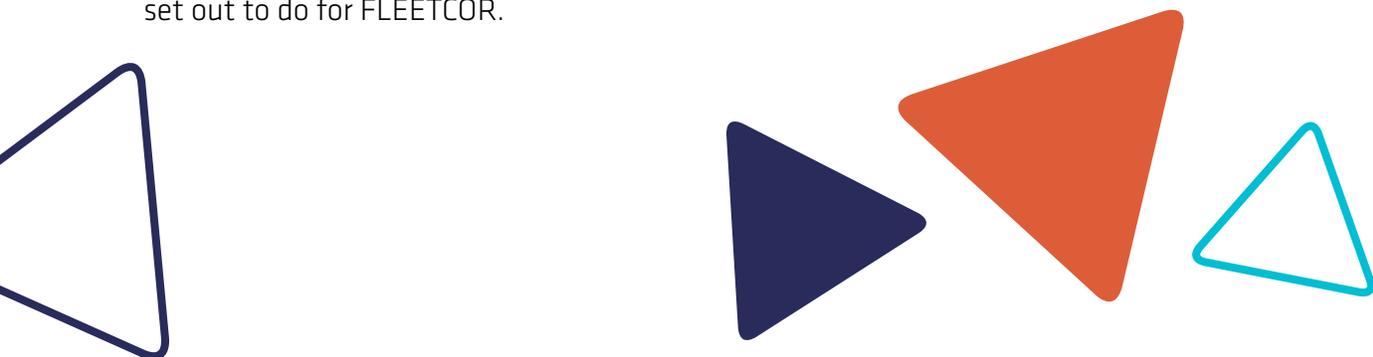
CHALLENGES

Speeding through the unexpected

Speed-to-market was a top priority for modernizing the first two FLEETCOR apps, but factors related to the legacy apps' third-party development created timing challenges for our development team right from the start.

First, both apps had been originally built with the first version of Ionic (another app development platform), and they hadn't been updated since. As a result, the apps weren't in a workable state, so we would have to publish at least some small updates in Ionic before we could even move the apps to a new version. Ionic was new to our team, but true to form, we learned and adapted fast to keep the project moving.

We also needed to make sure that the apps would have the latest security protections, meaning the authentication method would have to change. 7Factor engineering manager Jordan Welch and software engineer Amy Maraisane, the team lead, set to work using Auth0 to improve app security and make sure industry standards were being followed.

As a time-saving measure, we immediately set up a mobile-specific CI/CD pipeline for the project. However, a key component of the CI/CD pipeline for the project would be a separate Mac runner required for Apple builds, which took time to procure.

Why go CI/CD?

Continuous integration allows developers to deliver smaller portions of code over time, passing them through reviews and testing, and then merging them back to the main branch. Continuous delivery automates code changes to testing and production environments after the build stage. Together, in the form of a CI/CD pipeline, they're a lethal combination against common development roadblocks.

Fix bugs before they go viral

Reduce risk by testing and deploying code more frequently.

Pick up the pace

An automated pipeline keeps code moving without the need for manual intervention. Plus, faster releases mean quicker customer feedback for your next release.

Work smarter, not harder

Spend less time on manual QA and cut out the complexity of testing.

Save money

Need we say more?
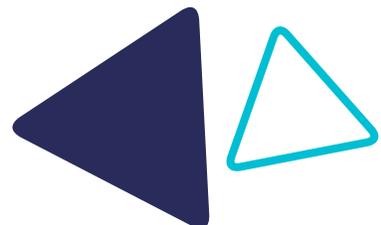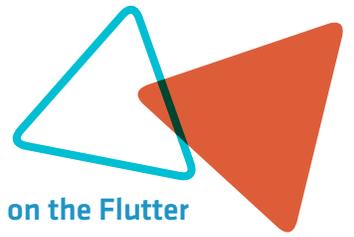
Merging methodologies

In addition to timing challenges, we also sought to constantly improve our process on the Flutter framework and the product we were building—as we built it.

"We're always trying to find better ways of doing things with Flutter," said Welch. *"So one of the things that we're doing is making testing easier and easier. As we've gone, we've built lots and lots of utilities to improve the application. With this application, we were inventing, or building the plane as we flew it, getting better and better at ways of testing and ways of building."*

Pivots are part and parcel of any development project, so we maintain an agile approach no matter the language, framework, or program. We also strive to become a seamless extension of our client's team. On this project, that meant integrating with the client's Scrum workflow. We worked closely with the FLEETCOR team to make sure our process would allow them to hit their targets while maintaining our own service level agreements (SLAs).

"We did a lot of work to make sure that we can work with them in the process they want to work in, and collect the metrics they want to collect, while also still making sure that it is not slowing down our dev process," explained Welch.

SOLUTIONS

Taking off with Flutter

The biggest win – and the greatest joy – for our team was to dive in head first, troubleshoot challenges and make Flutter work to FLEETCOR's advantage. "For coding, you can read all day about, oh, 'these are the best practices,'" said Maraisane. "But I feel like the key, the magic, is in being able to actually apply them and figure out in context what is a good pattern. So that's been really cool from a development growth standpoint."

Welch, Maraisane, and 7Factor distinguished engineer Alex McConnell were also able to pick up several efficiencies along the way thanks to the simplicity of the Flutter framework. For example, Flutter creates the native code for Android and iOS, and requires less boilerplate than other languages when it comes to building components. Even though we were combining two separate apps, our team only had to write code once. It was also easy to insert a web view for legal and privacy documents, so the app wouldn't have to store them and users could still access them seamlessly on a web browser. Plus, Flutter widgets made design and style choices easy and streamlined.

Beyond the app and into a mobile practice

A broader piece of the puzzle for FLEETCOR was strengthening their internal product capabilities and making their digital products more responsive to customer needs. Whereas app development had typically been an outsourced function in the past, the FLEETCOR team was now looking for a development partner who could both help them modernize their apps and also set them up for long-term autonomy and success with app development and UX improvements.

Throughout the project, we partnered with the FLEETCOR team to help them develop their internal systems so that they would have the infrastructure they needed to create an internal mobile practice at the company. With Welch and Maraisane embedded on their team throughout the project, helping to hire and train new personnel, the FLEETCOR team is now in a much better position to manage and evolve their own apps in the long run.

"We're really going to hopefully leave them with much more of a process of how to do mobile development," **explained Welch.**

RESULTS

Test for success

Thanks to our strong testing suite, we're leaving little to chance with the new Driven app. It makes our life that much harder in the short term but yields invaluable quality control for the long-term health and success of the product.

"We have a really strong test suite, which can be a hassle, or it can be a challenge for front end unit testing," Maraisane explained. "But I think it's really great."

On top of our rigorous testing, it doesn't hurt that Flutter is hard to break. So much so, in fact, that

when the FLEETCOR team inquired about our protocol for testing crashes, we had to explain that we did in fact have one, but we simply hadn't needed it throughout the development process. In the end, the framework's flexibility and check-as-you-go structure helped ensure our success—and the client's confidence in the end product.

"I like the fact that it has the ability for the team to actually check their code, and it helps them with the unit testing so that we make sure we have better code when we actually roll something out," said Ginger Brauhn, FLEETCOR senior scrum master. "That's a piece of Flutter that was really new to me, but I think that has helped this team really make sure that they deliver a quality product."

"I really can't say enough about how great 7Factor has been. I don't think this project would've gotten to where it is today without the help of 7Factor and the great developers and leads and everyone in 7Factor, so it's been pretty amazing,"
Danny Radke, FLEETCOR mobile product owner.

User-approved UAT

User acceptance testing (UAT) of Driven, in preparation for launch, revealed very few errors—a testament to the strength of our process, technical expertise, and the Flutter framework itself. Even for seasoned professionals like Brauhn, this was a first.

"When you go through a UAT timeframe, and you come out with four bugs and seven potential future user stories, it doesn't get any better than that. I've never gone through a UAT where I didn't have 50, 60 bugs, so it goes to the quality of code that they do, the unit testing that they do, the use of Flutter," **said Ginger Brauhn, FLEETCOR senior scrum master.**

Additionally, many of the participants in the UAT were current and former users of the legacy apps, and they provided positive feedback on both the user interface (UI) and functionality of the app.

"They all pretty much said that it's a really good improvement: it looks much better, and the user experience is much easier to work with," Radke shared.
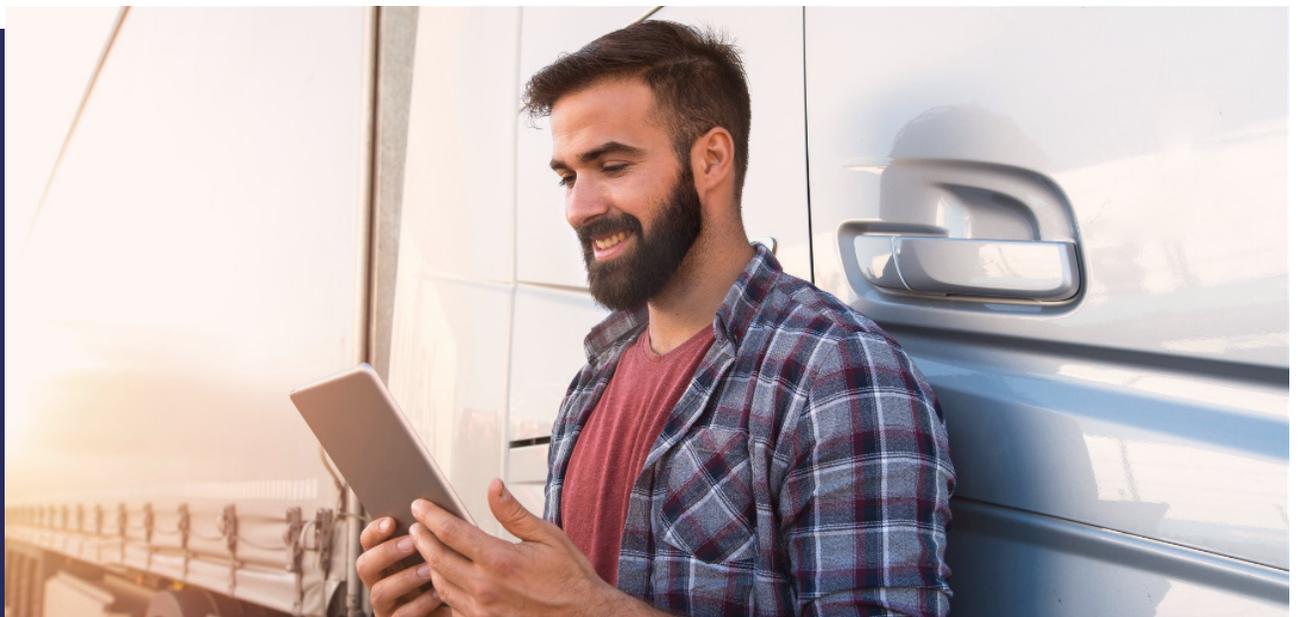
Rare Finds

Moving forward, Brauhn expects the overall cost of managing the new app and the customer retention it will support to be the biggest benefits of the overhaul. Users will get a better experience, and FLEETCOR will spend less time and money on upgrading and maintaining the product. She credits the success of the project to our technical skills and operational agility.

"The leadership of that team and the quality of code that they delivered is by far the best I have seen in my 30 years of working with development teams," Brauhn explained. *"They just came to the table with the proper skill sets for their teams, and they delivered on what they said they were going to deliver when they said they were going to deliver. They are by far the most skilled development team I have ever worked with."*

A group of experienced developers is a rare find, no matter what a company says during the sales cycle, Brauhn continued. "Many times we'll get a company that says, 'Oh yeah, we've got great developers. They've got three, four years' experience.' And then when they come to the table, they can't even do the basic thing, like run a sequence statement," she said.

But with 7Factor, the claims of experience turned out to be more than lip service: *"And that's why I think it's so surprising for me to run into 7Factor. This is actually my first experience with 7Factor as a contract company. And I, by far, given the opportunity, would use them strictly. Only them, if I had that chance."*

For FLEETCOR, another unique aspect of our collaboration was the leadership we brought to the table with Welch and Maraisane. We weren't just heads down on our code—we were in the mix, putting our people skills to work.

"I think it's important when you bring a leader to the table, that leader needs to have a strong technical background," said Brauhn. *"And they're not just a team leader, a technical leader, whatever that company happens to call them, but Jordan [Welch] has both, and I think that's significant. He's made a significant impact to this project and to this team because he is technical as well as he's got very good leadership skills.*

The customer is the guide—and the sky's the limit

Together with the FLEETCOR team, we can't wait to launch the new app. Users won't have to take any special steps to access it, but they will be met with a vastly improved experience from a company newly grounded in their needs.

Radke and the rest of the FLEETCOR team share in our anticipation: "I'm really excited about the product. It's so crazy to see how far we've come from when we started to where we are now, and it's really tremendous. I'm really excited."

Simplifying the lives of truckers and tech entrepreneurs while exciting our clients? **Results like that drive us to deliver our best every day.**

We build good things

Let us show you how