Deliveroo on AWS

Deliveroo has built a successful food delivery business by meeting customer needs quickly. Deliveroo uses AWS in every part of its core business: accepting orders, transmitting them to restaurants, and delivering meals to customers. On AWS, Deliveroo can go deeper into its data, using analytics and machine learning to enhance every part of the business.

"AWS enabled us to grow by letting us focus on what we do best: connect restaurants and consumers through a team of riders. At first, this was simply by providing the infrastructure that we needed to scale but didn't have to manage on our own. Today, it's with sophisticated tools that help us make the most of data, make us more secure, and enable us to operate as efficiently as possible, no matter what." - *Will Shu, Founder and CEO at Deliveroo*

Website: **www.deliveroo.co.uk**

Executive Summary

Deliveroo works with more than 140,000 restaurants to deliver meals in over 500 cities across Europe and Asia. Founded in 2013, the company experienced exponential growth early on, and meeting demand became a key challenge. Deliveroo began migrating to Amazon Web Services (AWS) in 2017, and its scalable cloud infrastructure helps Deliveroo meet the fluctuating demands of delivering food in 12 markets worldwide. Now all in on AWS, Deliveroo has improved service quality—reducing rood delivery times by 20 percent—while also cutting compute and database costs by 56 percent. To continue to differentiate itself in this competitive industry, Deliveroo also uses AWS machine learning (ML) and data analytics services, providing customers with personalized restaurant recommendations and making rider dispatch more efficient.

Deliveroo: A Journey with AWS

In this presentation from re:Invent 2019, Deliveroo CIO Will Sprunt discusses the company's vision of becoming "the definitive food company," its tremendous early growth, and how Deliveroo has scaled seamlessly without sacrificing speed of development by building on AWS.
Watch the video

The Awkward Teenager: Learnings From One Uk Unicorn's Story

2020 - In this talk, find out what food delivery company Deliveroo has learned by growing from an early-stage, 20-person startup into a "teenage" business with an awkward growth phase and then reaching its current status as an enterprise company with over 300 engineers.
Watch the video

Deliveroo Innovates Core Business Areas Using AWS

Deliveroo builds on AWS to stay on the cutting edge of technology and succeed in the competitive field of food delivery, creating an exceptional customer experience, making data-driven business decisions, and promoting a culture of growth and innovation. Deliveroo uses Amazon Connect, an omnichannel cloud contact center that provides care agents with a comprehensive view of a customer's profile to improve satisfaction and retention. By analyzing the terabytes of data it stores on AWS, Deliveroo can make smart decisions about entering new markets and optimizing rider routes. On AWS, Deliveroo can continue to drive its culture of growth and innovation by streamlining and scaling operations and freeing employees to focus on developing new ideas and services.

Learn More About Deliveroo on AWS

AWS Support—In Deliveroo's Words
Amy Harms, Senior Engineering Manager at Deliveroo, shares how AWS Support helps Deliveroo grow quickly and effectively. Amy highlights the value that the Technical Account Manager (TAM) delivers and also talks about Deliveroo's use of the Trusted Advisor tool.
Watch the video

Making daily dinner easy with Deliveroo meals and Amazon Rekognition
When Software Engineer Florian Thomas describes Deliveroo, he is talking about a rapidly growing, highly in-demand company. Everyone must eat, after all, and Deliveroo is, in his words, "on a mission to transform the way you order food." Specifically, Deliveroo's business is partnering with restaurants to bring customers their favorite eats, right to their doorsteps. **Read more**

Hospitality Runs on AWS

Travel and hospitality companies have always been innovative. We've seen this prove out time and again with our customers leveraging AWS to improve operational efficiencies and enhance the customer experience—even when faced with a global pandemic. Learn more on the AWS Travel and Hospitality page and the customer stories below.

Airbnb. The company credits the flexibility and responsiveness of AWS with helping it to prepare for more growth. **Learn more**

Domino's. A predictive ordering solution developed using AWS is helping Domino's customers get their pizza faster, hotter, and fresher. **Learn more**

Hello Fresh. A predictive ordering solution developed using AWS is helping Domino's customers get their pizza faster, hotter, and fresher. **Learn more**

Deliveroo Delivers on Customer Expectations Using AWS

The restaurants, diners, and delivery riders that Deliveroo brings together are all its customers. Ensuring each one has a good experience interacting with its services sets it apart in a competitive market. AWS is key to making this happen. Using AWS, Deliveroo can balance the needs of diners, delivery riders, and restaurants. Ensuring that Deliveroo is always available and that agents have the tools they need to find a solution is key. By learning from problems and building on strengths, Deliveroo can offer a customer experience that keeps all three types of customers hungry for more.

At its core, Deliveroo is in the business of user experience. What it offers is a way for consumers to get the food they love on their tables. But just delivering the order isn't enough. The entire process should be smooth and pleasant. On the rare occasion it isn't, that's when customer care is there to help.

"Customer care is all about providing for recovery. We accept as a business that things will go wrong, but, when they do, we want to recover so that we retain those customers— whether they're consumers, riders, or restaurants—and ensure they continue to use Deliveroo," says Amy Norris, product manager at Deliveroo.

"Customer care, more than any other part of the business, sits on a wealth of data about things that have gone wrong. We know what's happening, where it's happening, when it's happening, and who it's happening to. Whether it's in the app, in the restaurant, or with the rider, we can partner with various teams to smooth out any rough spot in the customer experience," Norris says.

To do that, Deliveroo must provide its agents with tools that enable them to resolve situations effectively. A big part of that is ensuring that agents can offer the right compensation to help a customer if something goes wrong, rather than taking a one-size-fits-all approach.

"We consider what happened on the order—

was it missing items, was it late, what went wrong? We try to break down all of those different permutations and understand what decisions we should be making at an order level, or a customer level, when somebody rings in and says that there's been a problem. The agents are guided by the data that's been analyzed to say, 'This is how we should treat this customer if this happens'."

Success is a Balancing Act

Making this data and the results of the analysis readily accessible to agents was why Deliveroo put Amazon Connect, an omnichannel cloud contact center, at the heart of its customer care structure.

Amazon Connect gives agents a single tool that can access a complete customer profile, including access to previous care interactions, whether through chat, text, email, or voice channels. It provides the agent with an analysis of the customer's relationship with the company and determines an appropriate level of compensation to satisfy the customer and retain the business. Striking the right balance is key.

Ideally, a consumer's experience will go smoothly and they will not need to contact a care agent. But the principles of a good customer experience will still shape their interaction with the company. And, of course, it's not just consumers. Deliveroo must also ensure it provides a good customer experience to its other two customer segments: delivery riders and restaurants.

Restaurants and riders often have different needs, though. Unless it's an issue with a particular order, many concerns don't require an immediate resolution, which means that restaurants or riders can use different channels to contact Deliveroo. For example, the Deliveroo interface in a restaurant—essentially a specialized tablet—features a button that allows the restaurant to alert Deliveroo to its needs; those needs are then analyzed and routed to the right staff, who contact the restaurant.

"We're about empowering customers. You can always get to an agent regardless of what channel you prefer," says Norris. "Whether customers get in touch via voice call, chat, email, social media, or text message, Deliveroo is committed to providing a high-

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quality experience. We'll use whatever works for the customer."

Deliveroo Deploys AWS Tools to Gain Powerful Business Insights

Knowing the business inside and out makes the difference between making decisions that lead to success or failure. Deliveroo uses AWS data collection, storage, and processing tools to develop the insights that determine whether to enter a new market or when to call in more riders. Using AWS, Deliveroo can understand the customer journey and share data on popular dishes and customer trends with restaurants to help them run their businesses better. And Deliveroo's powerful predictive algorithm—called Frank—allows it to efficiently deliver orders based on the location of restaurants, riders, and customers. Deliveroo uses data to develop insights that drive better decision-making in all aspects of its business, from entering new markets and designing app features, to coming up with PR pitches for journalists.

Deliveroo teams have direct access to self-service tools that mine data stores running on Amazon Web Services (AWS) to help them find those key pieces of information and create models that will help them make smarter decisions.

Data Pinpoints New Delivery Locations
Data has helped Deliveroo expand rapidly from a startup in 2013 to a company that now delivers restaurant meals and groceries to homes across 800 locations in 12 markets.

Decisions about which markets to enter are based on extensive analysis of information gathered on local competition, the number and types of existing restaurants, and demographics in a particular area.
Analysts feed all of this data into a self-built mapping tool that then reveals locations with the highest demand for restaurant delivery and the greatest likelihood that Deliveroo would succeed there.

"We've taken the guesswork out of expansion," says Andrew Ferrier, data and analytics lead at Deliveroo. "We can develop a sense of whether Deliveroo would be successful in a town, even if no one from Deliveroo has ever been there before."
The mapping tool also analyzes data to

determine the benefits of expanding delivery areas for existing markets. It gives precise details, such as whether expanding delivery boundaries by another 500 meters will significantly boost order numbers or decrease profits per order.

Delivering Groceries in the Pandemic
During the COVID-19 pandemic, data played an essential role in scaling up Deliveroo's grocery delivery business based on growing demand for staple items.
"We looked at what people were buying at the grocery stores we were already working with," says Ajay Lakhwani, global vice president of groceries and commercial partners at Deliveroo.

"It used to be treats like ice cream and chocolate, but as lockdowns began in Europe, we saw new demand for essential grocery categories including fruit and vegetables, bread, eggs, and milk. Many customers weren't able to get delivery slots with conventional supermarkets, so we added more stores to our grocery delivery service," he adds.

Using data on the most popular grocery orders allowed Deliveroo to improve its menu structure and add the right products to increase the conversion rate for turning menu viewers into buyers.

"We used to carry on average 250 items on the individual retailer menus," says Lakhwani. "Today, we carry an average of 1,000 SKUs on a menu and our conversion rate of turning visitors of the shop into buyers has almost doubled."

All Parts of the Business
Data helps manage the fleet of delivery riders who keep the food moving. The rider operations team uses data to ensure that enough riders are available based on demand and that the fleet is delivering meals efficiently.

The team tracks timestamps for rider shifts and wait times, how quickly restaurants prepare meals, and the number of riders available to determine when to activate surge promotions or try to enlist more riders to ensure quick delivery of food. Deliveroo even tracks the weather's effect on delivery service, because rainy conditions create greater demand from customers but result in a smaller supply of riders.

Deliveroo shares its wealth of data, too, letting

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restaurants know where they rank on ordering pages and popular menu items, and how they compare to other options.

And the company's finance team watches metrics on profit targets and order volumes by country and provides details on changes to business leaders.

Human Intuition Still Essential
As much as Deliveroo relies on hard data, human intuition still plays an important role in decision-making, especially when examining long-term consequences.

In many business decisions, such as which features to include on the app, the data might show a positive short-term effect, such as driving up customer conversion rates. But if teams believe—after considering the long-term consequences—that there could ultimately be a negative effect on customer journey or decreased retention, they will rely on their intuition and roll back the feature.

"While we're absolutely a data-driven company, we're not blindly driven by the data," says Ferrier. "We take all the results from an experiment and balance that against what we think is actually happening.

Because, ultimately, data cannot explain or understand everything that's happening, particularly when talking about longer-term effects."

Deliveroo Builds a Culture of Growth and Innovation on AWS

Deliveroo CEO Will Shu founded Deliveroo with the mission of increasing food delivery options in London. His ambition and focus on results form the basis of Deliveroo's culture and values. The flexibility of AWS serverless computing has allowed Deliveroo to fulfill a core value to develop the best proposition for riders, restaurants, and consumers. Using AWS, Deliveroo can also focus on launching innovative new services and managing growth. But a company's culture is, at its heart, about people, and AWS allows Deliveroo's employees to focus on customers and do their best to create a better business every day.

Deliveroo is a great example of how technology should never get in the way of a business representing the values of its employees. Technology is a tool, even in a company that uses technology to drive its underlying processes. It powers Deliveroo, but it doesn't define Deliveroo.

"Our fundamental mission at Deliveroo is to build the definitive food company and be the platform that people turn to when they think about food. Technology is the enabler of this overarching goal; it's not the goal itself," says Dan Winn, CTO at Deliveroo.

Deliveroo has identified 11 values it sees as core to being great at what it does. Looking at those, it's easy to see how AWS helps support those values and the people putting them into practice.

For example, "We are customer obsessed" is number one on Deliveroo's list of values, and AWS touches many aspects of what makes Deliveroo's customer interactions special.

Using AWS helps Deliveroo connect with customers. This includes using Amazon Connect in the contact center to provide faster service to customers, delivery riders, and restaurants. It includes building on personalization with ML recommendations for new restaurants, rather than basing recommendations on simple categories of favorites. And it includes providing restaurants with customer data so they can adapt their menus and marketing.

With operations in 12 markets, Deliveroo deals with a lot of complexity—and the company is always looking for ways to simplify things. That's value number six: "We simplify." AWS streamlines marketing and finance functions by powering the tools that give staff easy access to the data they need to make good decisions via simple, integrated interfaces. Access to data via easy tools allows employees to educate themselves faster, experiment, and innovate more. AWS also simplifies IT design and operations.

"Working with AWS simplifies things from an architectural point of view, which allows for greater scale, flexibility, and innovation while negating the need to manage multiple systems and providers, which would detract from our core mission," Winn explains.

There are more values on Deliveroo's list, but there is also value in a holistic view. The company is a place where employees are encouraged to do more, to explore more, to contribute more, and to bring their curiosity and intellect to the job. In return, Deliveroo provides employees with the tools they need to put the values into practice. That's something that Winn is really proud of.

"We embody the company values in every decision we make at Deliveroo; they guide how we work as teams and develop as a business," says Winn.

"Our people really make us who we are and they're the ones who have obsessed over every detail of how to create the best online food content and delivery experience, becoming experts in the technology and logistics that make our marketplace work seamlessly. Working with AWS—a partner that understands our culture, provides the platform to make this a reality, and joins us on this mission hand in hand—helps us immensely."

> "Working with AWS simplifies things from an architectural point of view, which allows for greater scale, flexibility, and innovation while negating the need to manage multiple systems and providers, which would detract from our core mission."

Deliveroo Makes Its Business Better for the Environment Using AWS

Deliveroo strives to ensure that it reduces the environmental impact of its operations. One way it accomplishes this is by continually improving its innovative machine-learning algorithms that run on AWS to minimize riders' travel times between restaurants and consumers, thereby reducing emissions. The company also promotes green vehicles, takes advantage of the AWS on-demand resource model to reduce energy usage, and works with restaurants to minimize packaging, so they can deliver the same great meals with less waste. Deliveroo CEO Will Shu founded Deliveroo with the mission of improving the food delivery options in London. His ambition and focus on results form he basis of Deliveroo's culture and values. Using AWS, Deliveroo can focus on launching innovative new services and developing the best proposition for its marketplace. But a company's culture is, at its heart, about people, and AWS allows Deliveroo's employees to focus on customers and do their best to create a better business every day.

Deliveroo is passionate about providing an excellent customer experience for all three sets of its marketplace users—delivery riders, restaurants, and consumers—and for the communities that these customers live and work in. When it comes to meal delivery, that care means reducing the environmental impact of its operations.

"Environmental sustainability is a priority for us as a business," says Paul Bedford, VP of policy at Deliveroo. "We think it's important to deliver great food in a sustainable way."

One way in which Deliveroo accomplishes this is by continually improving its machine-learning algorithms that run on Amazon Web Services (AWS) to minimize riders' travel times between restaurants and consumers. The algorithms optimize delivery routes and find the best rider for each order, so that every delivery happens as quickly as possible and produces as few emissions as possible. Shorter delivery times also mean riders can take on more orders per shift, restaurants can prepare

more meals, and consumers receive hot food.

Deliveroo also encourages riders to make deliveries on electric scooters or bicycles wherever possible. Bedford says the use of environmentally friendly vehicles has been "built into our DNA from day one" when it first began offering meal delivery in London.

Scalable Systems Use Less Electricity

The scalability that AWS provides gives Deliveroo another way to operate sustainably, because the on-demand resource model reduces energy usage. Demand for meal delivery rises and falls throughout the day, over the week, and across the year. Using AWS, Deliveroo is able to scale up compute resources when it's busy, and then scale them down when orders slow.

This allows Deliveroo to use only the electricity that it needs to serve customers and avoid the waste of operating its own dedicated servers or using an on-premises solution that would require it to commit to a static service level.

When it comes to its products and offerings, Deliveroo is always thinking about sustainability. The ordering system, for instance, allows customers to choose whether to receive disposable cutlery.

This opt-out option has reduced the number of Deliveroo meals that contain plastic cutlery by 90 percent. Deliveroo also helps to reduce waste by offering restaurants the option to choose recyclable packaging for serving food to consumers.

Deliveroo Gets Local

Deliveroo's attention to environmental impact extends to keeping its customers' local communities clean. For example, Deliveroo works with councils and local authorities to help them clean local beaches and parks, and offsets delivery emissions in 10 markets.

"Even though we operate across 12 markets, at the end of the day, what we do is extremely local," says Bedford. "We're helping bring together people who produce great food with the people who want to enjoy great food in their communities. It only makes sense that we want to preserve the quality of life in those communities for as long as possible."

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For Deliveroo, Using AWS Helps to Navigate Disruption

The COVID-19 pandemic created huge disruption for Deliveroo. Lockdowns closed restaurants in many areas, while people needed food delivery more than ever. It was time for the company to innovate. After weathering the initial shock by scaling down AWS serverless computing resources, Deliveroo moved forward when restaurants reopened. Using AWS, it didn't have to focus on IT management and had access to data-driven insights about the changes to its business. This enabled it to launch new services such as contactless restaurant ordering and payment during a difficult and challenging time.

Deliveroo's resilience was tested during the COVID-19 pandemic when lockdowns closed restaurants in many areas, while people stuck at home needed meal delivery more than ever.

Using Amazon Web Services (AWS), Deliveroo was able to meet this dramatic change in demand seamlessly. And because it didn't have to focus on IT management and had access to data-driven insights about how the business had changed, it was able to grow and innovate during the biggest business disruption of a generation.

Managing the Initial Shock

Deliveroo responded to the sudden shock of mass restaurant closures by adjusting its compute resources to serve customers in a cost-effective manner. For example, it scaled down features such as the personalized list of suggested restaurants—which are auto-generated for users based on their past behavior—to avoid featuring restaurants that were closed. Deliveroo then shifted those resources to meet the increased demand for the home page, where customers searched to see if any restaurants were open in their area.

When restaurants reopened, Deliveroo looked to AWS to help it meet new spikes in demand as housebound customers ordered meals in high volumes.

"With the flexibility of AWS, we can say we want to scale not just the entire operation up or down

but on a feature-by-feature basis," says Deliveroo CIO Will Sprunt. "Being able to say how we want each one to respond to change in demand is huge."

Innovating During Strange Times

With the website running efficiently, Deliveroo was able to focus on accommodating customers' evolving needs.

When it noticed a rising need for staple foods, t rapidly expanded the number of grocers and the number of menu items for its grocery delivery business so it could bring customers ingredients to cook their own meals while restaurants were shut.

As restaurants reopened in Europe, Deliveroo also launched a new Table Service that allowed customers to order food and pay for dine-in meals in a restaurant without interacting with staff. The Table Service was spun up in just five weeks.

Always Resilient

Being able to rise to the challenges of the COVID-19 pandemic underscores the day-to-day resilience that Deliveroo has come to expect from AWS.

Every day, Deliveroo needs to scale its systems to meet variable demand and provide reliable service to its three-sided marketplace of consumers, restaurants, and delivery riders.

The greatest fluctuations come from the number of consumers' orders. Deliveroo sees spikes at lunch and dinner times, as well as on special days, such as Valentine's Day, when demand can increase by up to 400 percent. It must manage these spikes and the many different time zones it operates in.

Using AWS, Deliveroo can solve these issues through automatic scaling of resources to meet customer demand, whether it's high or low. Deliveroo also saves money by paying only for what it uses.

Looking to the future, Deliveroo is confident that, having weathered one of the greatest business and economic disruptions of a generation, the flexibility and support it gets from using AWS will allow it to prepare for whatever comes next.

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By Migrating to AWS, Deliveroo Charts a Journey to Reliable Growth

In 2017, Deliveroo approached AWS to create a plan for how and when to migrate each workload from its previous providers. Over several months, Deliveroo moved its mission-critical systems to AWS without disrupting service. By 2019, Deliveroo was all-in on AWS. Deliveroo uses AWS for more than 90 percent of its technology needs, including every part of its core business: accepting orders, transmitting them to restaurants, and delivering meals to customers. AWS also allows it to handle vital applications such as credit card processing, compliance tasks, and backend finance. Since migrating to AWS, Deliveroo has improved website and network performance during busy times and seen a 56 percent reduction in compute and database costs.

Discovering AWS

In 2017, Deliveroo searched for a new IT solution to manage rising demand with the guiding principle that it would only seek out service providers that were larger than itself from an engineering perspective: as an ambitious startup, Deliveroo needed to collaborate with a company that could help it learn how to grow well.

Amazon Web Services (AWS) had what Deliveroo needed. Along with being able to provide the compute resources to meet Deliveroo's growing customer demand, AWS offered a global presence that helped with a different aspect of Deliveroo's growth: expansion into new geographical markets. AWS offers multiple availability zones around the world that allow Deliveroo to easily shift workloads when it enters new markets.

In 2017, AWS offered the only fully supported PostgreSQL database service, a technology that Deliveroo relied on. Deliveroo began by moving its database workloads to Amazon RDS for PostgreSQL (Amazon RDS). Next, it moved its managed Docker service to Amazon Elastic Container Service (Amazon ECS).

Deliveroo was pleased with the support that AWS offered for these moves and noticed immediate reliability improvements. This showed that AWS was the provider that could take its business to the next level and Deliveroo decided to go all-in.

A Nine-month Migration

Over nine months, Deliveroo redesigned its technology estate to take advantage of AWS and its serverless computing and container-based services. AWS Enterprise Support guided Deliveroo through this change by providing direct access to specialists for Amazon RDS and Amazon ECS. At a time when many engineers lacked sufficient cloud migration experience, AWS filled that gap and helped Deliveroo design the system that it's still running on today.

By early 2018, Deliveroo was running its first production systems on AWS and, by that summer, it had moved all of its workloads off its former provider and onto AWS.

"We even managed to migrate the business-critical services without service disruption," says Cordero.

Since migrating to AWS, Deliveroo has improved the reliability and performance of its website and network during busy times.

Managing Mission-critical Apps

Today, Deliveroo's customer demand and ambitions continue to grow. Throughout its journey, AWS has been there to support it becoming a leader in the competitive restaurant delivery space.

"We're still a startup at heart and, like any startup, we always have more opportunities to grow the business, to improve customer experience, and make better propositions for delivery riders and restaurant partners than we do engineering bandwidth," says Vaughn Washington, VP of engineering at Deliveroo. "Being on AWS allows us to leverage its strengths to enable us to scale up and meet growing demands without having to completely rearchitect."

Today, more than 90 percent of Deliveroo's platform runs on AWS and the company uses over 61 AWS services. This includes workloads for every part of its core business: accepting food orders from diners, transmitting them to restaurants, and delivering meals to customers. The website that diners place orders on runs on AWS. So does the network that transmits orders to restaurants. The same

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is true for the network that delivery riders use to see where they need to pick up meals from and deliver them to.

Deliveroo also uses AWS to handle vital applications such as credit card processing, compliance tasks, and backend finance.

In a healthy business, growth never stops. Deliveroo now works with more than 140,000 restaurant and grocery partners and more than 100,000 delivery riders to deliver meals in 800 locations across Europe and Asia. For Deliveroo, one constant during this dynamic period has been AWS, which has provided the support and services it has come to rely on.

Deliveroo Makes Data-driven Decisions Based on AWS Machine Learning

Deliveroo uses machine learning to provide business leaders with the information they need to make data-driven decisions. Machine learning allows them to test new product ideas or operational approaches, and quickly provide the business with actionable insights about how the idea or approach would fare before rollout. Deliveroo also uses ML to provide personalization on its website, which increases order size and reduces abandoned transactions. Customer orders arrive quickly at customers' doorsteps thanks to ML that improves the efficiency of delivery riders' routes. ML algorithms predict restaurant meal preparation times, as well as rider pickup and delivery times.

Deliveroo uses machine learning (ML) to make better decisions. Those decisions can be automated or they can be made by humans supported by rich data, says Mahana Mansfield, data science director at Deliveroo.

Automating dispatch of riders is an example of an area where using ML produces a better, faster result than would be possible with a human in the loop. Full automation benefits everyone, from restaurant, to rider, to consumer.

On the other hand, deciding which types of marketing campaigns to run is an area where data science can help humans make the best choices. "People used to make those decisions based on their past experiences. They'd try to look at results but were limited in how deep they could go," says Mansfield. "Now it's possible to look at different campaigns and analyze what the responses were and to control for variables not related to the campaign, such as seasonal variations or which style of cuisine is most popular in a given delivery area.

"The final decisions are still made by people, but now they can base it on a deep understanding of data, rather than trying to guess which factors were most important and just going on gut feeling," says Mansfield. "They're able to perform at a higher level because they access the data they need."

How ML Delivers Better Service

Deliveroo has embraced Amazon Web Services (AWS) to help it use ML more quickly and efficiently. That's important, says Michael Sprague, machine learning engineering manager at Deliveroo, because ML touches so many aspects of the business.

"A lot of the things that the customers see on the site are machine learning. The restaurant recommendations. The estimated delivery times. Everything you see on the screen is ML. We wouldn't be Deliveroo without it," he explains.

"On the delivery side, Frank (Deliveroo's rider dispatch tool) tries to predict how long it would take the rider to get to the restaurant, how long for the food to be cooked, the delivery time, and so on. That would be a lot of variables for human dispatchers to consider. ML can refresh its view of the world every few seconds and humans can focus on higher-value tasks," says Sprague.

Deliveroo also uses ML and artificial intelligence (AI) tools powered by data to provide a better experience in its contact center. Amazon Connect, an omnichannel cloud contact center, integrates with Amazon Transcribe to automatically convert speech to text. That text can then be analyzed using Contact Lens for Amazon Connect to better understand the reasons customers are calling and any snags in the Deliveroo care experience, allowing the company to improve its practices.

In addition, Amazon Translate gives Deliveroo's agents the ability to serve customers speaking a different language using real-time translation. This means that if there is a demand spike in one region, agents from another market can help, even if they don't speak the language. Data science is the foundation of so much of what makes Deliveroo special.

Making the Right ML Choices

Communication between data scientists and other parts of the business is crucial to the success of any ML project, says Mansfield. AWS has the tools and resources ready, but a business needs the right people to use those

> **"If a company wants to get into machine learning, they should be looking for the right people.** Trust the people you can understand, the ones who keep it simple and speak in plain English. They should be able to speak in terms of impacts and how to measure that impact."

to achieve business goals. The best ML results start with the best human results.

"If a company wants to get into machine learning, they should be looking for the right people. Trust the people you can understand, the ones who keep it simple and speak in plain English. They should be able to speak in terms of impacts and how to measure that impact," Mansfield says.

"Communication with your ML team is essential. It's their job to support the people in the business to automate what can be automated, make better decisions faster, and deliver the most value."

Amazon Connect Lets Deliveroo Combine Chat and Voice Customer Service

Using Amazon Connect, which offers a seamless experience across voice and chat, means that Deliveroo can always offer great customer service as it grows. Customers increasingly expect companies to offer an omnichannel contact center that allows them to reach the company via their preferred channel and quickly get an effective resolution to their request. With Amazon Connect, Deliveroo has doubled its contact center volumes with no increase in overheads, effectively resolved complaints, and seen uptake of its self-service Order Help portal grow by 30 percent—from 35 percent of customer contacts to 50 percent. All of this means Deliveroo can really connect with customers.

Deliveroo is a company built on relationships. Operating in 12 markets, it has revolutionized the home delivery of restaurant meals since its 2013 launch. For it to be successful at food delivery, it must maintain good, fast, open communications with its customers—and that's a three-part balancing act.

"We have to think about our customers, and when we say customers, we mean all three sides of the marketplace. We mean our riders, we mean our restaurant and grocery partners, and we mean our customers," says Vaughn Washington, VP of engineering at Deliveroo. "That core platform for all sides of the marketplace has AWS under the hood."

To provide outstanding care to all three sides of the marketplace while supporting its massive growth, Deliveroo had to revamp its customer service strategy. Each side of the marketplace has a unique, evolving set of needs, and Deliveroo required a contact center solution that was flexible enough to address all of them. The company decided to migrate to Amazon Connect—a single unified contact center for voice, chat, and task management—and it's already paying off.

By the end of 2020, Deliveroo had doubled contact volumes with no increase in

overheads, decreased handle times, and improved resolution of customer complaints by streamlining compensation offerings while maintaining customer satisfaction levels. It also saw uptake of its self-service Order Help portal grow by 30 percent; that portal is now used by half of its customers.

Connecting Touch Points for Better Customer Service

Using the insights gained from the customer data it collected and analyzed helped Deliveroo to create a self-service portal. Amy Norris, product manager at Deliveroo, is quick to emphasize that the self-service portal isn't about leaving customers unsatisfied and unable to reach an agent. Instead, it's a result of having a better understanding of what customers value and making resolutions faster.

Sometimes, a customer might prefer a self-service route that empowers them to solve simple problems on their own quickly and easily, which can help de-escalate potential issues. Other times, a customer might want to reach a representative who will resolve the issue for them. With Amazon Connect, Deliveroo gives customers the agency to choose the service they want based on their situation.

Understanding the customer creates a better experience, and one of the best ways to understand is to listen. Previously, when a customer said something about their experience, that data would often be trapped, siloed in different parts of the company, and subdivided by contact channel. By uniting voice and chat channels with Amazon Connect, Deliveroo can fully harness its customer data.

By using Amazon Connect, Deliveroo collects, centralizes, and analyzes customer information and makes that data available to agents through an integrated interface. "The agent helping a customer always has the full picture of who they are and their history with us," says Norris. "They know what's important to them and what they like. Having all of that information reduces the average handle time."

What Good Service Means Around the World

Amazon Connect is also helping the company understand what good service means in the different regions in which it operates.

"We've found that consumers in different regions prefer different channels by analyzing

"We have to think about our customers, and when we say customers, we mean all three sides of the marketplace. We mean our riders, we mean our restaurant and grocery partners, and we mean our customers. That core platform for all sides of the marketplace has AWS under the hood. "

the data from Amazon Connect," says Norris. "For example, consumers in France tend to prefer contacting us by voice—net promoter scores for chat interactions were consistently lower—so we promote the voice option prominently, though we ensure they have the option of the other channels as well. Having the option for voice or chat is very important," she says.

Looking Forward

As it grows, Deliveroo is looking to provide more options to customers in a high-quality and cost-efficient manner and use tools that are sophisticated and better integrated with one another. This might mean using ready-made functionality within Amazon Connect, developing its own tools to work within Amazon Connect, or a combination of the two approaches.

"Amazon Connect provides a more tailored experience that lets us bring in a lot of tools, such as digital translation tools. It captures data in all contact channels and makes sure the agent has access to the information in the customer profiles they need to understand the customers and provide an appropriate, personalized experience," says Norris. "It lets us expand the customers' options while maintaining a high-quality experience."