AllCloud

GPS FLEET SOFTWARE

Faster time to market for new AI services with AWS

Summary

Fleet and machine management is becoming a competitive issue – especially in the construction industry – and sustainability is one of its key drivers. The adoption of digitalization and predictive maintenance has triggered a massive increase in data volumes, while artificial intelligence (AI) algorithms form the data-hungry foundation of these new services. Against this backdrop, the telematics specialist company Software-Management GmbH, better known as GPS.at, decided to move its GPS FLEET software solution to the AWS cloud. Working together with AllCloud, it completed the migration in just five months. This enabled the firm to develop innovative AI services soon afterwards, such as its Health Index for machines. This is just one example of how small to midsized companies can benefit from a migration to AWS.

About GPS FLEET Software

The fleet software and telematics company based in Vöcklabruck (Upper Austria) specializes in B2B fleet management solutions provided as software-as-a-service (SaaS). Large customers such as the Habau Group, one of Austria's leading construction firms, use the GPS Fleet software to manage its roughly 3,000 vehicles. The industry is characterized by a heterogeneous machine and fleet landscape that ranges from small vibrating plates and mobile rock crushing equipment to recycling machines and road gritting machines for winter. All of these vehicles can be managed digitally with software. As well as localization and navigation, additional processes are now available, including IoT-based optimization, smart energy management as well as – increasingly – preventive maintenance. As many machines and construction vehicles are expensive capital goods, customers want to ensure the longest lifespan possible and the highest level of availability. This is why the digitalization of vehicle fleets is a strong trend.

On-premises IT is no longer economically scalable

The company had actually set up an AWS account in 2017 and was thinking about a future migration, but it was still running its solutions in several on-premises server cabinets by the end of 2021. "At one point we just decided that we wanted to stop buying new servers every year," notes Markus Häusler, CEO of Software-Management GmbH. "After all, we're a SaaS company, not a hardware provider." He adds that running their own datacenter meant they were partially dependent on their own IT experts. As a small company, it wasn't economically viable to employ a large team of hardware specialists. When operations depend on a handful of staff, outages can quickly become risky in the event of absences due to vacations or illness.

In addition, more and more data was needed for analysis, leading to significant impact on the volume of customers' data that is processed by the fleet software provider itself. The size of the company's database was doubling annually with the on-prem solution. That required extensive expansion projects every year that lasted up to two months and involved multiple resources. And along with easier scalability, the firm also wanted to focus on getting new services to market faster.

Freedom found in the AWS cloud

Markus Häusler says that his firm made a conscious decision to choose AWS. "We didn't want any other cloud platform because we found that AWS offered so many features we needed and will phase in gradually." However, the company decided to start the implementation by working with the cloud service provider and AWS Premier Partner AllCloud in the Migration Acceleration Program (MAP). The project started in mid-2021. "AllCloud's DevOps know-how was very important to us – the project would have failed otherwise, despite our many years of experience in our own datacenter," comments Häusler. "The project started with them setting up a perfect and future-proof Landing Zone, which helped us avoid common mistakes right from the outset." Since then, the solution has even been certified by the AWS Foundational Technical Review (FTR). This test confirms the solution's conceptual and technical maturity as well as security – an important argument for customers.

Häusler sees the implementation as an "IT showcase project". He notes: "The collaboration with AllCloud was very professional with meetings every two weeks. The changeover to AWS and the "SaaS-ification" of our solutions were completed in five months, right on time and on budget." As the solution has been set up in AWS cloud-natively, Häusler believes that there's a significantly greater potential for further development and faster implementation. As a result, the company was able to begin its expansion plan immediately.

Removing hurdles for AI

To date, customers have mainly evaluated data such as operating hours, kilometers driven, times on construction sites and road gritting services in winter. "Our first requirement was to increase the level of process visibility," explains Häusler. "We want to help customers supplement their gut feel and assumptions with knowledge gleaned from real-time operations." Customers also need to have clear proof of when things are running perfectly. In Markus Häusler's view, AI is a key trend in this area. "AI requirements are increasing all the time and there's a dramatic rise in customer expectations too. ChatGPT will help to drive this development further," he adds and notes that, as a provider, his firm needs to meet this demand.

Using AI algorithms to predict maintenance needs and problems requires the appropriate data in the right quality – but collecting it usually involves a lot of work. To counter this, the company worked with its partner AllCloud to develop a way to make customer data more "trainable". As Häusler explains: "A specialist can do this at the customer site in about four weeks by collecting data and analyzing whether the machine is running 'well', 'badly' or 'very badly'. The AI learns from this data and will then be able to run the assessment itself automatically." The front-end solution also makes it much easier to label the required data. Markus Häusler: "The biggest challenge was giving the customers a tool with which they could do the labeling themselves and make it as simple as possible, because they are the only ones who have the relevant domain knowledge. As the data volumes are so huge, the information needs to be visualized at a glance, so that the specialists can actually manage to classify it." Doing this with something like two billion Excel datasets is clearly hopeless. A couple of machines can generate several million datasets within a few hours. In a ten-hour working day alone, a single machine can produce 400,000 lines of data.

Linking user behavior and machine health

AI analyses deliver useful insights, especially from construction machines operated by different employees with a range of driving styles and knowledge levels. For example, the way a car is driven can say a lot about the condition it is in – such as drivers who speed up and brake suddenly compared with thrifty and careful drivers. Similarly, the way a machine is operated has a significant impact on its lifespan and functional efficiency. This data is then sent to another solution developed with AllCloud: the Health Index. “This enables us to continuously ascertain how employees operate machines and use that information to see why one machine breaks earlier than another,” says the CEO. This can also help inexperienced drivers optimize the way they use the machines, as the company can show them the right parameters.

The implementation would have been practically impossible without the cloud. "Our own hardware was clearly a limiting factor. To develop new features more quickly, the personnel requirements would have increased significantly and would no longer have been feasible," Häusler notes. He adds that they would have been very dependent on hardware suppliers whenever there was a problem. With some service levels, it had previously taken several days for a technician to visit. In the cloud, the software provider no longer has any of these problems. As a fleet management specialist, this aspect gives the firm a significant competitive advantage. Most of its competitors still use traditional datacenters and proprietary solutions, making it hard for them to keep pace with developments, according to Häusler.

Cloud has significantly increased the security level

The company was also able to get rid of some old security worries. “The migration allowed us to replace various proprietary components, such as firewalls,” says Häusler. “Now, we only work with standards like the Web Application Firewall 2.0.” That ensures there is no longer any danger of sudden operation outages or that the solution’s security is only understood by a few specialized employees. The intelligent AWS firewall proved itself right from the first moment: GPS Fleet Software caught a hacker during the go-live process and proactively prevented an attack exploiting the Log4J bug. This causes outages, which has been see at several other companies in the market. According to Häusler, another key benefit is that backups are much easier as they now run automatically via imaging. He also sees the standardized assembly of resources on the Landing Zone as important. AllCloud has focused on this area with its own development department, which has produced a Next Generation Landing Zone as a project blueprint.

Paradigm shift with the AWS Aurora database technology

The database changeover was an important part of the migration project. “We wanted to move the database to AWS Aurora, especially as it offers four times the computing power with the same hardware,” comments Markus Häusler. “Aurora can also be clustered globally and across zones, which is a key factor in failsafe performance.” He adds that it would be illusory for small or midsized firms to try and implement a comparable concept in-house. The new database also delivers additional benefits, including automatic management and updates. “Aurora Deep Insights lets us see immediately when something’s not running properly and that in turn always helps us detect weak points in the software’s resource usage,” says Häusler. In addition, the provider AllCloud offers ongoing cost optimization thanks to its FinOps specialists and tools like CloudHealth, ensuring that GPS Fleet Software is using AWS Cloud in a cost-effective way.

Joint solutions on AWS

In light of the successful collaboration with AllCloud, the two companies are now planning joint solutions. For selected FLEET customers, who have already provided a lot of data, there will be a modular extension of the software that will run on the AWS platform. AllCloud will be providing a Landing Zone, based on the infrastructure-as-code principle, for international building and construction companies. That will lower the barriers to entry significantly, as many processes can be automated and will need very little intervention by the customers' own IT teams. Additional AWS services can also be implemented more easily.

The Health Index will also be available as a standard service to increase a machine's lifespan. With expensive vehicles, even an extension of two to five percent makes a major difference. The third service should drive sustainability forward. A combination of sensors will measure performance and energy consumption, which will help customers define the right operating parameters for energy optimization. This aspect is important to most companies, especially in light of increasing energy costs. A route optimization service is also planned. With their joint services, the two companies are responding to a gap in the market, as the goal of many construction companies is to be independent of their machine manufacturers. Customers will be able to analyze all their machines on a single, open platform using AI services instead of having to use each manufacturer's platform for each type of machine.