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TOYOTA MOTOR EUROPE AND DELOITTE POWER "MOBILITY FOR ALL" WITH DIGITAL INNOVATION ON AWS

Learn how AWS Partner Deloitte helped Toyota Motor Europe modernize legacy infrastructure to accelerate automotive innovation and reduce development cycles

Toyota Motor Europe (TME), headquartered in Brussels and operating across 49 countries, chose to migrate from its legacy IT infrastructure to unlock opportunities for innovation and rapidly deliver new features to customers. The automotive company looked to Amazon Web Services (AWS) to modernize its technology foundation. Working alongside AWS Partner Deloitte, TME implemented a cloud-based foundation and high performance computing (HPC) capabilities that accelerated innovation and development. This way, TME can bring advanced automotive features to market faster.

BENEFITS

UP TO 20% faster HPC ML model training for robotics

80% fewer days to train proprietary models

DAYS INSTEAD OF WEEKS to deliver customer safety features

2 DAYS INSTEAD OF 7 WEEKS to set up dev team accounts

21% TIME SAVINGS **in** LSDyna simulations compared to on-premise infrastructure

OPPORTUNITY | Accelerating Innovation to Lead the Future of Mobility

TME is committed to quality and reliability and invests significant resources in the research and development of new features that are designed to enhance safety, sustainability, and the overall driving experience. TME's core mission is "happiness for all through mobility for all": bringing innovative, accessible, and sustainable mobility solutions to customers worldwide.

As the automotive industry continues to evolve toward carbon neutrality, autonomous driving, and AI, TME saw an opportunity to modernize its technology infrastructure to maintain its competitive position. The company's existing tech stack, while functional, was limiting development speed and preventing the rapid feature delivery that customers expect in an increasingly digital world. TME saw the potential to transform its technology foundation to accelerate innovation cycles, enhance its research and development capabilities, and deliver innovative mobility solutions that align with its core vision.

SOLUTION | Establishing a Modern Cloud Infrastructure to Support Product Engineering

To achieve its goals, TME engaged Deloitte for its experience in cloud migration and digital transformation. TME and Deloitte designed two major projects to accelerate innovation cycles and the delivery of advanced automotive features. First, TME migrated its tech stack to an elastic cloud infrastructure that serves as a scalable backbone for all the company's applications. This foundation functions as an account vending machine.

The company's teams can quickly provision landing zones with advanced security features by using a combination of AWS services, such as AWS Organizations, which offers policy-based management for multiple AWS accounts. Now, TME can set up new AWS accounts in 2 days. **"Originally, we were spending up to 7 weeks to set up a functioning account for a development team by coordinating with multiple stakeholders,"** says Ben Edwards, Manager at TME. **"Through automation, we can align all stakeholders and create an account much faster."**

The platform also includes a service catalog of curated cloud infrastructure components that can be deployed in a self-service manner by developers. As a result, TME can efficiently launch new projects and applications with the necessary guardrails and visibility—and without infrastructure bottlenecks. This infrastructure is built using a suite of cloud-based services, harnessing the full potential of AWS. These include Amazon Elastic Compute Cloud (Amazon EC2), which provides secure and resizable compute capacity for virtually any workload. The infrastructure also uses Amazon Elastic Container Service (Amazon ECS), a fully managed container orchestration service that businesses use to efficiently deploy, manage, and scale containerized applications.

For the second project, TME and Deloitte built upon the cloud infrastructure to improve TME's HPC capabilities and support its research and development objectives. The teams implemented AWS ParallelCluster, an open-source cluster management tool, to manage HPC clusters that support AI and computational fluid dynamic (CFD) workloads. AWS ParallelCluster uses Slurm for job scheduling and automatically scales the computing nodes in response to users' needs.

This HPC infrastructure supports the AI-driven development of robotics features, vehicle simulations, and predictive analytics that enhance safety and performance capabilities. Using this HPC solution, TME's research and development teams gain on-demand access to compute, accelerating prototyping and innovation. Through the automation that was put in place, TME can now launch 12 new projects per month with the same team size, which was previously limited to 2.

To support both initiatives, TME and Deloitte adopted AWS Lambda, which empowers developers to focus solely on code while it handles all infrastructure management, to automate infrastructure processes and streamline account provisioning. They also used AWS CloudFormation, which speeds up cloud provisioning with infrastructure as code, to deploy infrastructure consistently and repeatedly. By implementing these services, TME can maintain standardized environments while scaling operations efficiently. The company also established a Cloud Center of Excellence to provide ongoing governance and technical leadership for the cloud transformation.

OUTCOME | Enhancing the Customer Experience with Faster Time to Market

Using AWS, TME improved its development capabilities and the overall customer experience. For HPC machine learning (ML) workloads, the company accelerated ML model training for robotics by up to 20 percent compared with on-premises infrastructure. At the same time, TME reduced training days for proprietary models by 80 percent and can run CFD workloads up to 32 percent faster. Thanks to this improvement in computational efficiency, TME's research and development teams can iterate faster on new automotive innovations, from safety features to AI-powered driving assistance systems.

The cloud foundation has transformed how TME delivers features to customers. Development cycles now take weeks instead of months, helping TME respond rapidly to market demands and customer needs. Infrastructure maintenance can be handled in sprint release cycles instead of 4-week campaigns. Teams across the company have access to scalable, efficient, and cost-effective infrastructure that streamlines the entire development process from concept to deployment. Features such as automatic collision detection, battery range display in near real-time for electric vehicles, and predictive maintenance alerts can reach customers significantly faster.

TME can now deliver more responsive, innovative mobility solutions that directly advance its mission of "happiness for all through mobility for all." Customers receive overnight software updates and enjoy faster access to safety and convenience features. The modernized infrastructure empowers TME to maintain its position as a leader in an industry where digital innovation drives both competitive advantage and customer satisfaction.

> *"Our customers directly benefit from the AI-powered capabilities that are supported by Deloitte on AWS. We can now accelerate mobility innovations and deliver safety features in days instead of weeks."*
>
> *—Ben Edwards, Manager, Toyota Motor Europe*

AWS Services Used

- Amazon Elastic Compute Cloud (Amazon EC2)
- Amazon Elastic Container Service (Amazon ECS)
- AWS ParallelCluster
- AWS Lambda

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About Toyota Motor Europe

Toyota Motor Europe (TME), headquartered in Brussels, provides Toyota and Lexus vehicles, parts, and services across 49 countries. Guided by the mission of "happiness for all through mobility for all," TME stands out through innovation, quality, and local manufacturing excellence.

About Amazon

Amazon is guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and longterm thinking. Amazon strives to be Earth's Most Customer-Centric Company, Earth's Best Employer, and Earth's Safest Place to Work. Customer reviews, 1-Click shopping, personalized recommendations, Prime, Fulfillment by Amazon, AWS, Kindle Direct Publishing, Kindle, Career Choice, Fire tablets, Fire TV, Amazon Echo, Alexa, Just Walk Out technology, Amazon Studios, and The Climate Pledge are some of the things pioneered by Amazon. For more information, visit amazon.com/about and follow @AmazonNews.

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