



EDGE COMPUTING & 5G IN THE AUTOMOTIVE INDUSTRY: FROM GEARS TO SOFTWARE

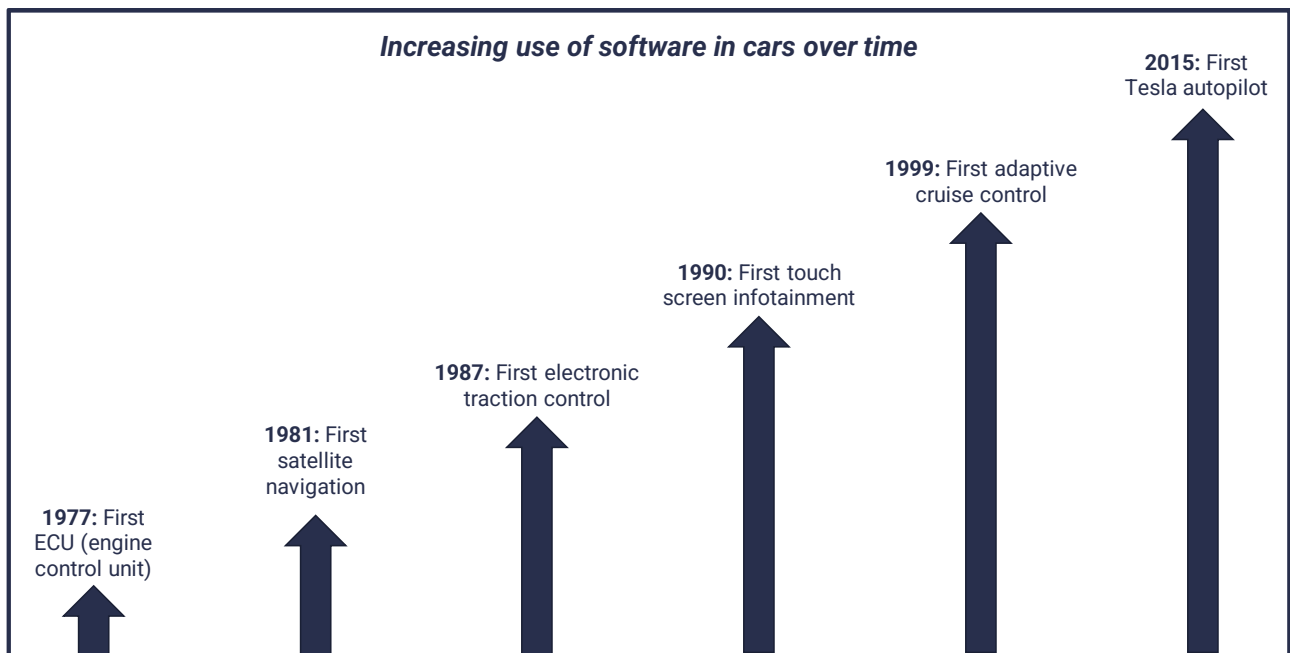
Edge computing and 5G is being explored and adopted within the automotive industry to support the increasingly complex software being deployed in cars. Together, 5G and edge computing can deliver low latency, high bandwidth and mobile applications in a secure and reliable fashion. In this article, we explore some of the automotive use cases enabled by these capabilities.

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Introduction

The first wave of software in cars came in 1977 almost 100 years after the first commercial car in 1886. From microprocessor chips used to display speed, fuel, trip, and engine information to Nvidia drives making the Tesla autopilot a reality, the ecosystem is now increasingly inclined to integrating electronics & software into their vehicles. In fact, famously, these days a Mercedes S class more complex software (requiring 20 million lines of code) than a F-22 raptor aircraft.

Figure 1: Software within cars is rapidly becoming more sophisticated, unlocking new use cases



Edge computing in the automotive industry & the role of 5G

There are many promising use cases for edge computing and 5G – these include advanced driver assistance systems (ADAS) and the beginnings of vehicle-to-everything (V2X) technology. It also includes more common functions, such as braking, entertainment, and navigation systems. As autonomous vehicle technology matures, these systems will evolve. There are over a 100 ECU (engine control units) in an average car today and functions like infotainment, navigation, adaptive cruise control can run on edge compute technology. With the advent of 5G, the use of edge applications is expected to increase exponentially, enabled by data stream speeds of as high as 1 GB per second.

Edge computing with 5G can be used for the following automotive use cases:

1. ADAS: Advanced Driver Assist Systems for enhanced vehicle safety

ADAS was once a luxury provided by the premium segment OEMs but with edge and 4G becoming affordable, ADAS has found a new position in the market. Companies like Mobileye, Netradyne & DrivebuddyAI aim to reduce the number of road traffic accidents through deploying AI to the edge to create a safer driving experience. By using radar/lidar/camera

sensors on powerful edge compute systems, more frames per second of video can be analysed, with fewer redundancies.

2. V2X protocols for enhanced connected car ecosystem

Vehicle to Vehicle and Infrastructure is becoming a fast-growing use case for edge computing and 5G technology. The largest bottlenecks so far have been the data transmission to the servers from the vehicles. One vehicle can produce up to 100 GB of data over a period of one month. This requires high bandwidth communications and storage/compute capacity. For enabling V2X protocols companies need to have edge based IoT devices installed across the ecosystem.

3. Authentication of devices to ensure data privacy

Sensors within cars today produce a lot of data every second and if that data is breached or falsely transmitted it could lead to accidents. Companies like Mercedes are investing heavily in making sure that their cars don't get hacked. When it comes to data transmission, data privacy has to be ensured. In order to achieve this we need a robust ecosystem of edge infrastructure and high-speed connectivity. The edge infrastructure can be used when a communication protocol has to be established between the host and the server for authentication. By using edge servers, the latency and bandwidth requirements for many sensors needing real-time authentication can be met.

4. Intuitive Infotainment systems for enhanced passenger/driver experience

Infotainment systems are the gateway for OEMs to improve customer experience. The buying decision of a vehicle can be hugely affected by the way the infotainment system is designed. Look at the recent launch of the [Mercedes MBUX](#) and the hype it has received around the world. Infotainment is becoming more intuitive to the driver and the passenger. Edge computing can enable new capabilities, such as real-time personalisation and recommendations of streamed video or music, and reduce the latency for updates to software happening over the air.

5. Adaptive & predictive vehicle maintenance

One of the key opportunities is in the service industry after a car has been purchased. Even with the advent of electric vehicles, the aftermarket for the automotive industry is still a lucrative segment for the OEMs. Today the focus is increasingly on solving the software bugs or electronic issues. Edge infrastructure has enabled companies to utilize the power of ML/AI and create predictive maintenance schedules for the vehicles. And today a lot of improvements can be pushed over the air instead of requiring a physical connection such as can be achieved when a car is recalled to the garage.

How STL Partners can help

Europe is the most mature market today when it comes to adoption of edge based automotive applications. The use cases discussed above have been chosen as those in which we expect to see increasing edge deployments over the coming years. Stakeholders in this industry still face a number of technical and commercial challenges to achieving their edge-enabled goals. STL Partners offers a dedicated edge insights service. [Find out more, or request a free edge insights sample pack here.](#)

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