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Paradigm Shift in the Automotive Industry – From Hard- to Software

Software not only makes cars safer, but also more useful, and has done so for decades. This is clearly visible in the fact that despite a rapidly growing number of vehicles on our roads, the number of accidents is declining. Software, such as in ABS, ESP and other modern driver assistance systems, has played a large part in this. However, these technologies have become hygiene factors: Whereas ten years ago a 5-star NCAP test result was still a selling point, today a model without a 5-star result is difficult to position on the market. The expectations of today's buyers are shaped by their experience with mobile devices and computers in general: Integration into digital ecosystems, cross-device use of digital services, multimodal travel and regular, functional updates are some of the aspects that influence the purchase decision. The realisation of such services often takes place in cloud environments or large backend systems.

In the meantime, we know that traditional car manufacturers have only marginally followed developments in this area for a long time. One reason for this is the hardware-driven and bill-of-materials-oriented thinking. Business models are mainly evaluated on the basis of their hardware costs. Downstream digital business models are rarely considered. Keeping unused computing capacity or memory, e.g. in a navigation system,

which could potentially be used for further software functions, is considered wasteful.

Safety-relevant functions have also developed complex structures that are unnecessarily extensive. It is not uncommon for large development projects in the ADAS or infotainment area to start with new toolchains that have to be maintained over the entire lifecycle. So there are two major challenges to be mastered: on the one hand, to get to grips with the lack of skills in digital services and, on the other hand, to solve the inefficient software development in vehicle functions against the background of further increasing complexity. Forecasts currently predict a three- to fivefold increase in complexity over the next five to ten years.

A frequently discussed approach at present is an collaboration of interested parties. Here, the non-competitive part of the software stack in the vehicle, in the cloud backend and the associated tooling is developed jointly in open source. Collaboration can save resources and prevent complexity. An example for that is the Eclipse Software Defined Vehicle Working Group (Eclipse SDV). Here, OEMs, Tier 1, system integrators, silicon providers and high-tech companies join forces to overcome the challenges of the automotive industry.