# Automotive industry embraces software-defined vehicles to drive innovation



The automotive industry is undergoing significant changes influenced by the push towards software-defined vehicles (SDVs), a concept that aims to integrate advanced software capabilities into automotive design. Acknowledging the fragmented nature of the current hardware and software ecosystem for vehicles, the consortium, Scalable Open Architecture for Embedded Edge (SOAFEE), is striving to establish a common, standards-based compute layer that fosters innovation and addresses the industry's pressing challenges.

The inception of SOAFEE can be traced back to 2019 when Arm, a semiconductor and software design company, noted the inadequacies in compliance with vehicle safety standards stemming from a lack of harmonisation within the software/hardware ecosystem. Suraj Gajendra, Vice President of Automotive Product and Software Solutions at Arm, pointed out that switching between different systems on a chip (SoC) often necessitated major alterations in fundamental software aspects like boot, power management, and security. He emphasised that this fragmented approach was not conducive to efficient development processes, highlighting the urgency of establishing consistent standards.

In an effort to rectify the situation, Arm launched a standardised firmware layer known as the Edge Workload Abstraction and Orchestration Layer (EWAOL), which has been made available to the open-source developer community. This development was a precursor to the formation of SOAFEE in 2021, which now boasts approximately 130 members, including automotive giants like General Motors, Geely, Tata Motors, and technology corporations such as AWS and Bosch. These members share three core objectives crucial for deploying SDVs at scale: the ability to port software across various hardware platforms, the necessity for consistent functionality across cloud and edge computing environments, and the capacity to develop software prior to hardware availability.

Gajendra, who serves as Chairperson of the SOAFEE Governing Body, highlighted the active working groups within SOAFEE, which are currently exploring the complexities of standardising software stacks. These groups are tackling vital issues such as the coexistence of safety-critical and non-safety-critical components on a singular platform—a topic of substantial importance for advanced driver-assistance systems (ADAS) and autonomous driving software.

Moreover, in January 2024, SOAFEE, along with other consortia including AUTOSAR, COVESA, and Eclipse SDV, will unite to form the SDV Alliance. Gajendra affirmed that while there may be overlaps among these groups, they each approach distinct challenges, reinforcing the collaborative nature of the venture.

To further its mission, SOAFEE is developing a non-differentiating compute layer intended to establish a standards-based architecture for cloud-native software development. This foundational framework, equipped with freely available APIs, is expected to facilitate consistency across the automotive software ecosystem, thereby accelerating the time-to-market for SDVs considerably. Gajendra noted that traditional methods of constructing automotive subsystems could range from nine to twelve months and come at substantial costs. By utilising EWAOL, the consortium aims to streamline processes, allowing engineers to concentrate on aspects that differentiate and add value to their offerings.

As the industry transitions towards higher automation, Gajendra views the SDV concept as a vital backdrop to the broader trends of autonomous, connected, and electric mobility technologies. He articulated the need to adapt swiftly in light of rapid developments in artificial intelligence (AI) hardware, cautioning against prolonged timelines for platform advancements.

SOAFEE’s next phase, titled 'SOAFEE.next', is set to roll out in September 2024, focusing on aligning new hardware and development platforms with robust validation services to ensure compatibility with the latest automotive architectures. Gajendra outlined that this initiative eliminates the reliance on physical silicon, allowing software engineers to expedite development via virtual prototyping in cloud environments.

Furthermore, the integration of SOAFEE software solutions with Arm’s Reference Design-1 AE hardware is anticipated to unify AI, security, safety, and virtualisation efforts, striving for total parity across all automotive and cloud platforms. Gajendra referred to this alignment as a "magic bullet", as it promises smooth functionality and reduces the need for software reconfigurations.

In pursuit of a seamless deployment pipeline, SOAFEE aims to tackle critical issues raised by the community, showcasing over thirty ongoing projects branded as 'Blueprints'. These projects will exemplify SOAFEE’s commitment to implementing standards-based firmware and hardware.

Dipti Vachani, Senior Vice President and General Manager of Automotive at Arm, emphasized the collective efforts needed in solving the unique software challenges facing the automotive sector. She affirmed that collaboration within the SOAFEE landscape is integral to driving the essential transformations in the industry, underscoring the complexity and interdependence of the efforts required to realise the potential of SDVs.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

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* <https://www.automotiveworld.com/articles/soafee-builds-parity-across-sdv-developer-environments/> - Please view link - unable to able to access data