# ARM AUTOMOTIVE CORES

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CONTEXT

The automotive industry is experiencing a significant transformation, with vehicles evolving into highly complex "computers on wheels" driven by AI and a surge in software, leading to the emergence of software-defined vehicles (SDVs). This shift demands new levels of performance, efficiency, safety, and security.
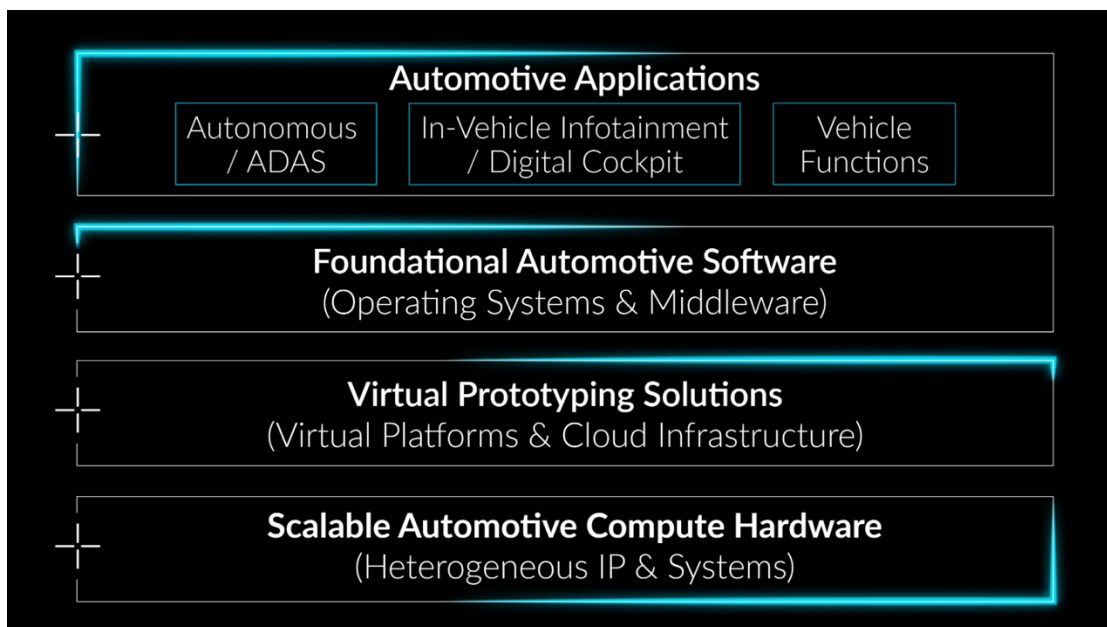
Arm is the center of innovation for the processors that dominate next-generation intelligent vehicles. Qualcomm and NVIDIA, for example, rapidly accumulate design wins for automotive ADAS and digital cockpit applications.

Arm recently announced new IP and tools to help that system continue to evolve:

- **Introduction of Arm Automotive Enhanced (AE) Processors**: Arm launched new safety-enabled AE processors incorporating Armv9 technology and server-class performance. These processors are tailored for AI-driven applications to enhance autonomous driving and advanced driver-assistance systems (ADAS).

- **Future Arm Compute Subsystems (CSS) for Automotive**: Arm released Compute Subsystems explicitly designed for automotive applications. CSS streamlines development processes, reducing time and cost, and offers maximum flexibility for creating high-performance automotive systems.

- **Virtual Prototyping Solutions**: For the first time, Arm is offering virtual prototyping solutions for the automotive market. These solutions allow software development to begin up to two years before physical silicon becomes available, significantly accelerating development cycles.

- **Partnerships for Virtual Prototyping and Software Development**: Arm collaborates with companies like AWS, Cadence, Corellium, and Siemens to offer virtual platforms and cloud solutions. This initiative is supported by partnerships with various software and technology providers, facilitating earlier and more integrated software development.

Arm's announcements are a crucial step in its strategy to grow its automotive ecosystem, accelerating the market readiness of innovative, software-defined vehicles built on Arm technology.

NEW: ARM AUTOMOTIVE-TARGETED CORES

Arm's announcement introduced several new processor cores designed for the automotive market. The new cores are part of Arm's Automotive Enhanced (AE) IP portfolio, bringing Armv9 and server-class performance to automotive applications for the first time.
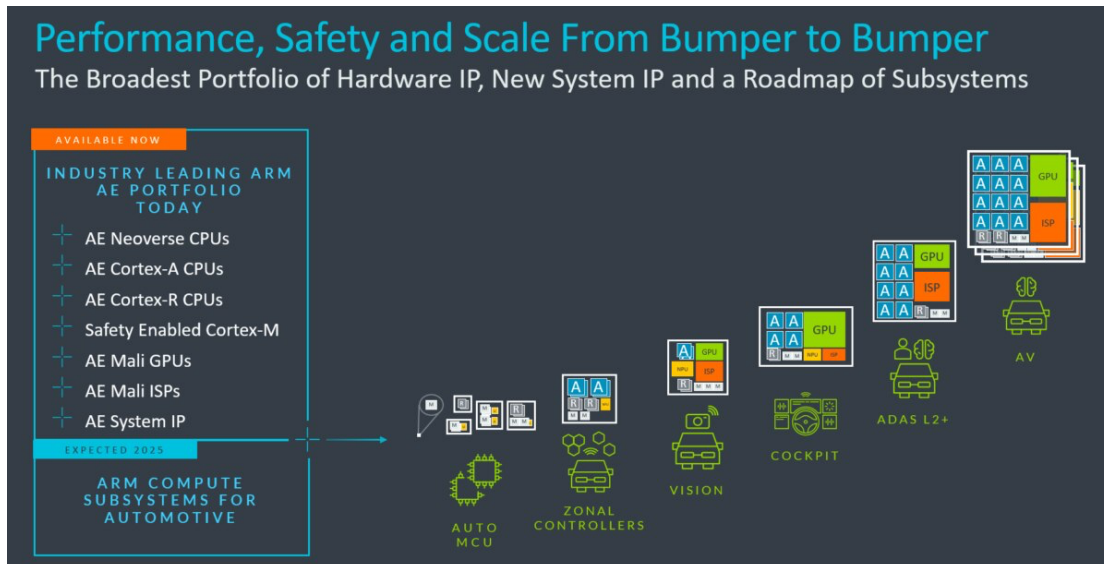
ARM NEOVERSE V3AE

- **Server-Class Performance**: The Arm Neoverse V3AE brings its Neoverse technology to the automotive sector, offering server-class performance that is particularly suited for AI-accelerated autonomous and ADAS solutions..

- **Designed for Automotive**: This product incorporates features specifically tailored for the automotive market, including transient fault protection (TFP) for functional safety applications.

ARM CORTEX-A720AE

- **Sustained Performance**: The Cortex-A720AE is designed for sustained performance with SoC design flexibility, catering to a broad range of software-defined vehicle applications.

- **Balanced Power and Performance**: Optimized for scenarios requiring a balance of higher performance and increased power efficiency, such as ADAS, Digital Cockpit, and IVI (In-Vehicle Infotainment) systems.

ARM CORTEX-A520AE

- **Power Efficiency**: This core is targeted towards various automotive use cases that prioritize processing compute workloads efficiently, particularly relevant for ADAS, where vision processing requirements are being optimized for lower power.

- **Functional Safety Features**: Includes leading power efficiency with functional safety features to scale across automotive use cases.

ARM CORTEX-R82AE

- **Real-Time Processing**: The Cortex-R82AE is a real-time processor for functional safety.

- **Versatility**: It is designed to meet the demanding requirements of real-time computing tasks within automotive systems, including communications, system management, and vehicle actuation.

ARM MALI-C720AE

- **Image Signal Processor (ISP)**: This is a configurable ISP optimized for the most demanding computer and human vision use cases, including camera-based ADAS systems and other vision-driven functionalities within vehicles.

ANALYSIS

Automotive is Arm's market to lose, with processors based on its IP in nearly every modern ADAS, digital cockpit, and in-vehicle entertainment system.

Arm's focus on developing a comprehensive suite of automotive-specific processors, coupled with its investment in virtual platforms and Arm Compute Subsystems (CSS)

Arm's latest announcements are not just incremental updates but signify a substantial leap forward in automotive computing. By marrying its expertise in high-performance, efficient, and secure computing with the specific needs of the automotive sector, Arm is enabling the industry to navigate the challenges of electrification, connectivity, and autonomy more effectively.

Arm's strategic direction could very well redefine the standards of automotive computing, making this an exciting time for the industry.