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Industry Insight – Future Mobility Radar

Rising popularity of **CASE Mobility** drives shift from traditional to advance E/E architecture

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Shift to advanced E/E architecture

The automotive industry has been witnessing a massive transformation in vehicle architecture in recent years. The traditional approach to designing and manufacturing vehicles is gradually giving way to electric/electronic (E/E) architecture. The new approach is driven by the increasing popularity of connected, autonomous, shared, and electric mobility and the need to build intelligent, connected, and sustainable vehicles.

Role of E/E architecture

E/E architecture is a complex system that integrates several components and technologies to deliver an enhanced driving experience. These components cover powertrain, advanced driver assistance systems (ADAS), infotainment, telematics, and cybersecurity.

Types of E/E architecture and companies adopting them

Type of E/E Architecture	Description	Advantage	Disadvantage	Company and name of E/E Architecture
Distributed Architecture	Components are spread throughout the vehicle and connected via a network	Redundancy, decentralized control	Increased complexity, difficult to add new features or update software	Toyota: TNGA (Toyota New Global Architecture), Honda: ACE (Advanced Compatibility Engineering)
Centralized Architecture	Most components are located at a central location and connected via	Simplified wiring, easier software updates	Single point of failure, potential reliability issues	Tesla: Centralized computer system, Volkswagen: E3 Platform
Domain Architecture	Components are grouped by function, such as powertrain, safety, and	Simplified development, easier to add new features	Increased complexity, potential communication issues between domains	BMW: ODX (One Data Experience), Audi: MIB (Modular Infotainment Platform)
Zonal Architecture	Components are grouped by location, such as front, rear, or centre of vehicle	Simplified wiring, easier to add new features	Increased weight due to redundant components, potential communication issues between zones	Continental: High-Performance Computer (HPC), Bosch: Vehicle Control Unit (VCU).

Challenges to advanced E/E architecture implementation:

1. **Cost:** The development and implementation of advanced E/E architecture can be costly, as it requires the use of expensive components and specialized software, as well as extensive testing.

2. **Complexity:** Advanced E/E architecture can be complex, as multiple systems and components are integrated into a single network. Managing such complexity and ensuring the interoperability of various components can be challenging.

3. **Safety:** Advanced E/E architecture, especially in autonomous vehicles, must be designed with safety in mind. The proper functioning of sensors, processors, and other components is critical to avoiding accidents and ensuring passenger safety.

4. **Standardization:** In view of the wide range of components and systems involved in advanced E/E architecture, standardization is essential. However, achieving standardized interfaces and protocols can be challenging due to the diverse range of manufacturers and suppliers involved.

5. **Cybersecurity:** As advanced E/E architectures relies heavily on software and communications systems, it is vulnerable to cyber attacks. Ensuring cybersecurity in vehicles is crucial to prevent unauthorized access and control of critical systems.

6. **Regulatory compliance:** Advanced E/E architecture in vehicles must comply with various regulatory requirements, such as those related to emissions, safety, and cybersecurity.

Future of E/E architecture

Future of E/E (Electrical/Electronic) architecture in vehicles is expected to be heavily influenced by rapid technological advancements and changing consumer demands. Some of the key trends that are likely to shape E/E architecture are:

1 Electrification:

With increasing focus on reducing emissions and shift towards electric vehicles, E/E architecture will need to be designed to support high-voltage electrical systems, battery management systems, and electric powertrain components.

2 Connectivity:

Consumers are increasingly demanding more connectivity features, such as advanced infotainment systems, internet connectivity, and ADAS. As a result, E/E architecture will need support these features and enable seamless integration with external networks.

3 Autonomous driving:

As the development of autonomous vehicles continues, E/E architecture will need to support a complex array of sensors, processors, and communications systems required for self-driving capabilities.

4 Modular design:

To enable greater flexibility and scalability, future E/E architecture is likely to be based on modular designs, allowing easier integration of new technologies and components.

5 Cybersecurity:

As vehicles become more connected and rely on increasingly sophisticated E/E systems, cybersecurity will become a crucial aspect of vehicle design. E/E architecture will need to incorporate robust security measures to protect against cyber threats.

Overall, the future of E/E architecture is expected to be characterized by greater electrification, connectivity, and autonomy, with a focus on modularity and cybersecurity.

Learn more about the future, implications, and benefits of E/E architecture through Evaluserve's Future Mobility Radar. If you have any questions, feel free to contact us at futuremobility@evalueserve.com

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