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Ethernet as an Enabler for Software Defined Vehicles

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Questions/Discussion

Why is there a need to this discussion on SDVs now?

Customers expect new features and functionality to be made available to their vehicles. In addition, many new features are being deployed in a subscription payment model. This will require the automotive network architectures to evolve from an “Engineered System” to an open dynamic hardware and software system. The “what if” poses many design challenges

What is the state-of-the-art of SDV activities in the Automotive industry? SDV are in production today. Most of the deployed software features are limited to a single subsystem or enable access to features that are already deployed. Future SDV updates may change the entire software architecture. As this relates to this conference and automotive Ethernet, this will require the network architectures to be designed to insure deterministic traffic and reliability with any software architecture. We must also do this within the constraints of energy consumption, computing power and memory.

Questions/Discussion

What makes a software defined vehicle? What new functionalities are enabled with the software defined vehicle? From the early days of ECU development software could be updated and features could be added. In the beginning we used programable EPROMS and then flash memory. So how is this different from a modern Software Defined Vehicle? A SDV provides a mobile electronic platform that can continuously expand the capabilities of ADAS, infotainment or self driving. A SDV must include the following:

1) A flexible hardware architecture that allows for parallel expandable architecture. We see this today with multi-core processors
2) A flexible software architecture that allows for parallel applications in a secure stable manor. We see this today with the use of containers and virtual machines.
3) A deterministic and reliable network. We see this today with TSN – Time Sensitive Networking
4) Over-the-Air updates to address software patch management and Cybersecurity

<u>These four enablers allow for evolutionary software-based enhancements to be deployed over the life cycle of the vehicle without sacrificing safety or reliability.</u>

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Marty holds a Bachelor of Science Degree in Electrical Engineering from Lawrence Institute of Technology and a Master of Science in Engineering Science from Rensselaer Polytechnic Institute. He started his career as a software R&D engineer at McDonnel Douglas. He then moved from aircraft to automobiles and joined General Motors/Delphi as an Application Engineering manager focused on in vehicle test instrumentation. For the past 25 years Marty has continued his attention to Test and Measurement with Hewlett Packard/Agilent/Keysight Technologies Marty is currently the TSN Program Manager with the Network Test segment and is responsible for the strategy of Keysight's TSN products. He is a solution expert in high-speed technologies and has worked with customers on a variety of applications. Marty is an active member and participant in IEEE 802.3 and Avnu Alliance standards bodies.