

Mecel to present applied research within dependable communication at SAE World Congress 2007, Detroit

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Mecel will present interesting applied research results within dependable communication at the SAE World Congress, that will take place in Detroit, Cobo Center between the 16th and 19th of April 2007.

The first article scrutinizes a method and algorithm to increase the fault isolation of malicious ECUs connected to a CAN bus and is intended for use where safety is a concern. The concept is well-suited for gateway services.

The second article revisits the assignment to achieve data consistency within distributed integrated systems, through membership agreement. The FlexRay protocol is a targets for the proposed membership algorithm.

Article 1, title: ESCAPE CAN Limitations

Authors: Brendan Hall, Michael Paulitsch and Kevin Driscoll - Honeywell
Håkan Sivencrona – Mecel AB

Summary

The Controller Area Network (CAN) protocol is a de facto network standard for automotive applications. Since initial deployments in the late 1980s the simple low-cost bus topology and inherent flexibility of CAN have enabled it to capture the majority of low- to medium- speed networking traffic. Today most automotive engine control units (ECU) have some form of connection to a CAN network, and most automotive-centric semiconductors have at least one integrated CAN controller. However, as safety-related applications emerge, some of the advantageous attributes and features of the CAN protocol can lead to dependability vulnerabilities. This paper reviews the dependability of CAN and introduces a new enforcement and configuration strategy to augment CAN protocol dependability. The strategy enables standard COTS CAN node hardware to be used without modification. We further introduce new message agreement and validation strategies that can assist signal qualification within a distributed application context.

Article 2, title: A Process Membership Service for Active Safety Systems

Authors: Carl Begrenhem - SP Technical Research Institute of Sweden
Johan Karlsson - Chalmers University of Technology
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Summary

This paper describes a process membership protocol for distributed real-time systems that use both time-triggered and event-triggered message passing for communication between its processing nodes (ECUs). TTCAN and FlexRay are examples of communication networks that support such systems. The membership protocol supports redundancy management in architectures where distributed applications such as braking, stability control, and collision mitigation share a common set of processing nodes. We assume that each such application consists of several processes executing on different nodes and that each node executes processes belonging to different applications. The protocol allows a group of co-operating processes to establish a consistent view of each other's operational status, i.e. whether they function correctly or not.

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