Politecnico di Torino

COMPUTER AND CONTROL ENGINEERING

Leonardo S.p.A. - Data sharing and synchronization via TSN network in a distributed Avionic Test System

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Context of the research activity	The objective of this proposal is to identify and develop a prototype of a new architecture for a distributed Avionic Test System based on the TSN network.
Objectives	The new architecture must enable seamless data sharing among entities within the distributed system while ensuring precise time synchronization, as required by real-time systems. The project will be executed in three key phases: - Define and Implement the TSN Network Framework: The first phase involves identifying and establishing the Time-Sensitive Networking (TSN) framework as the foundational backbone of the new architecture. Adapt the TSN Architecture for Avionic Test Systems: The second phase involves customizing the TSN architecture to meet the specific requirements of an avionic test system. This includes addressing the requirements for data sharing, synchronization, and ensuring data integrity and controlled access times. The synchronization mechanism should allow for the scheduling of multi-rate entities distributed across different nodes within the system. Develop a Prototype to Demonstrate the System's Functionality: The final phase involves developing a working prototype to validate the capabilities of the new architecture for Avionic Test Systems. This prototype must facilitate synchronization between multiple nodes, both in terms of precise timing and the consistency of the shared memory content.
Skills and competencies for the development of the activity	The implementation will target industrial hardware platforms such as PCIe, PXI, or VME, with a Linux-based Real-Time Operating System (RTOS).