Martin O'Brien
Senior Vice President Integrated Electrical Systems at Siemens Digital Industries Software

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How to Bridge Boundaries in E/E Systems Development

Widespread electrification and growing product intelligence are causing a significant increase in the importance and complexity of the Electrical and Electronic (E/E) systems within a variety of products. The rapid growth in complexity, in fact, has outpaced predictions. Estimates from just a few years ago indicated that an average vehicle in 2020 would contain roughly 30 million Software Lines of Code (SLOC) and 10,000 network signals. Conversations with our customers, however, have revealed the true numbers to be closer to 150 million SLOC and 20,000 network signals.

Each product sub-system must also incorporate a diverse combination of domains to enable product functionality. This cross-domain complexity heightens the challenge of maintaining traceability throughout the product development lifecycle. Engineers now have to track thousands of components and functions across domains, coordinating the development, simulation and validation of electrical systems, ECUs, software applications and more.

The traditionally siloed approach to vehicle development often results in an inconsistent application of requirements in sub-system designs, lack of communication between domains and missing links in design traceability when confronting such complexity. These misinterpretations often only become evident when different contributing aspects of systems are integrated together, resulting in increased cost, missed deadlines and greater program risk.

The need for today and the future is to support integrations across domains, bridging the boundaries between silos to provide persistent data continuity throughout E/E systems design, manufacturing and service. With this approach, companies can drive electrical, electronics, network and embedded software design from the E/E systems architecture. Downstream support for harness manufacturing and vehicle service domains completes a comprehensive E/E systems development environment, with in-service data "closing the loop" by feeding back into future design iterations.

An important factor for success will be bridging silos and building the necessary capabilities to do so into the product development processes. Those that can effectively navigate these changes will position themselves for growth in the years ahead.