

Handling Event-Driven Scenarios in CPS Application Simulations

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Abstract – The development process of the embedded distributed applications raises specific issues which concern the academic research. One of them refers to the need of performing simulations as realistic as possible for the whole embedded system before deploying the application on the hardware devices. This approach enables error detection in early stages of development and predicts the network's behavior. In this case event-driven simulators are preferred over other types of simulators. This paper proposes an XML-based event-driven model specification of the distributed network, allowing the developer to describe specific simulation scenarios for the distributed application. It also proposes a reusable event oriented programming model for handling such event-driven scenarios independently of a specific simulation environment. The presented approach contributes to the reduction of the number of lines of code required for implementing a distributed application, by an average of 20% compared to the application implementation from scratch. In special situations the improvement can reach up to 45% compared to the classic simulation development process, depending on the application goals.

Keywords – Cyber Physical Systems, event-driven simulation models, OMNeT++, simulation specifications, embedded distributed networks

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