

Experiences in simplifying distributed simulation: The HLA development kit framework

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Abstract

Distributed simulation represents a solid discipline and an effective approach for handling the increasing complexity in the analysis and design of modern Systems and Systems of Systems (SoSs). The IEEE 1516-2010 – High-Level Architecture (HLA) is one of the most mature and popular standards for distributed simulation, and it is increasingly exploited in a great variety of application domains, ranging from aerospace to energy, due to its capabilities to enable the interoperability and reusability of distributed simulation components. However, the development of fully fledged simulation models, based on the IEEE 1516-2010 standard, is still a challenging task and requires considerable development effort that often results not only in an increase in development time but also in low reliability. In this context, the paper presents the HLA Development Kit framework, a general-purpose, domain-independent software framework that aims to ease the development of HLA-based simulations by letting the developers to focus on the specific aspects of their simulation rather than dealing with the common HLA functionalities.

Moreover, the so obtained simulation code is independent of any specific HLA platform, thus enabling its deployment and execution on any desired implementation of the HLA standard provided it is written in Java. The effectiveness of the proposed framework is shown in the context of the Simulation Exploration Experience (SEE), a project organized by the Simulation Interoperability Standards Organization (SISO) and led by NASA that involves several U.S. and European Institutions.

Keywords

distributed simulation high-level architecture agent-based simulation

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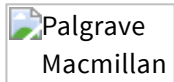
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