An Open Architecture Framework for the Integration of Virtual Prototyping Software Tools

ABSTRACT: The use of virtual prototyping tools typically results in products with lower costs, better quality, and shorter development cycles. However, there are many interface/ configuration problems that occur in the process of obtaining a design solution using the typical gamut of virtual prototyping tools. This paper presents the architecture, design, and implementation of a framework to support the integration of the multiple software systems used in the virtual prototyping of mechanical components. Some of the virtual prototyping software systems considered in the implementation of this framework were customer input systems, solid modeling systems, finite-element systems, knowledge-based systems, NC code generator systems, and virtual assembly systems. There is a pressing need for the different software systems to talk to each other while transferring the required data at varying levels of abstraction without compromising data integrity. Of special significance is the fact that the philosophy of the framework is widely applicable to any mechanical system, and is almost independent of specific software utilities. Thus, this design incorporates a clear path towards expansion to encompass other independent tools/systems. The architecture was designed using object-oriented methods. The framework was very successfully demonstrated for a well- defined subset of software systems being used at Isothermal Systems Research (ISR) Inc., a leader in proprietary spray cooling systems for multi-chip modules. This framework effectively supports the strong industry push towards integrated design, manufacturing, and virtual prototyping. The work presented in this paper was supported by an SBIR grant from the Department of Commerce, DOC contract 50-DKNB-5-00117. **KEYWORDS:** Integration framework, concurrent engineering