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RISE: A general simulation interoperability middleware container

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Abstract: In recent years, new services on the Internet have enabled global cooperation; in particular, the Web has enabled new distributed simulation technology. Much research has been devoted to develop middleware interoperability methods on the Web. However, most existing methods have constraints in the structural rules that are placed on the design of middleware interoperability methods. For example, such constraints make it difficult to enhance interoperability via decoupling systems implementations and design, which is essential in open computing networks, as in the case of the Web. In order to achieve such objectives we present the RISE (RESTful Interoperability Simulation Environment) middleware. This all-purpose WS-based distributed simulation middleware decouples design and implementation while allowing composition scalability and dynamicity. Furthermore, it supports experiment-oriented frameworks and has the ability to put Web 2.0 services in the simulation loop. RISE is the first existing middleware to achieve such objectives, and the first to employ RESTful Web-services. We present the foundations for meeting the above objectives, and the distinct characteristics of RISE from existing Web-based approaches.