

The Application of Web Services in Establishing a C4I Virtual System Engineering Environment (VSEE)

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ABSTRACT:

“Software as service” is the notion of tomorrow’s web services within the commercial Information Technology (IT) world. Moving beyond the browser, emerging web services offer access to specialized utilities that perform various services external to one’s computer, and yet, integrates seamlessly and autonomously with the software within that computer. Through technologies such as XML and the Simple Object Access Protocol (SOAP), modern software can learn to “discover” appropriate network services and automate the process of querying, gathering and transforming data seamlessly. This notion of web services is ushering a new level of Reuse at the **application level**. Historically reuse has been associated with either an object programming language (i.e., C++, Ada, Smalltalk) or components (i.e., ActiveX, VCL, JavaBeans), but web services are not concerned with the language of the app or the platform the component was designed for. Web services offer language and platform independence for those wishing to reuse the services they offer.

One of the key needs within the C4I community is to integrate systems, simulations, applications including data bases. This includes “as-is” and “to-be” systems and system configurations. The application of modeling and simulation (M&S) is seen as an effective mechanism for representing current and future systems, environments, and scenarios in a cost effective and highly functional way. The utility of modeling and simulation (M&S) in concert with the concept of web services provide the mechanisms for establishing a **Virtual System Engineering Environment (VSEE)** for the interoperability of systems and models. The VSEE provides an open collaboration framework for conceptual and virtual modeling, scenario execution with players consisting of constructive, live, and virtual systems, and the assessment of data against predefined requirements.

Technologies used include SOAP and the Web Service Description Language (WSDL) to describe the set of collaborative services available. The SOAP component provides a simple and lightweight mechanism for exchanging structured and typed information, such as DIF and XML documents, between peers in a decentralized, distributed environment. The WSDL component provides the interface allowing systems to request and retrieve information from a central server or host system using Remote Procedure Call (RPC) type communication. Together the components of a VSEE allow the integration and collaboration needed among a wide variety of applications and tool environments to support C4I *operational, system, and technical* activities. Furthermore, a VSEE provides an environment for testing and training allowing our military force and communication infrastructure to be “strategically responsive, deployable, agile and versatile.”

This paper explores the benefits of the VSEE and how web services can be used in combination with M&S technologies to integrate multiple assets including constructive and virtual simulations, analysis tools, databases and repositories, and live systems. We will examine how the VSEE can also be used to assess shortfalls, gaps and deficiencies of C4I environments including unforeseen issues and the identification of duplicative efforts and unnecessary capabilities.