

Clear Methods in partnership with MIT's Engineering Systems Division developed a breakthrough modeling and simulation system to thoroughly evaluate system architectures as they are conceived.

The Challenge

In the early stages of system design it is difficult or impossible to rigorously evaluate architectural options. Yet, it is during these early stages that major project resources must be committed. A modeling and simulation system able to evaluate architectural approaches early in the process can have enormous payoff in reducing risk, project cost, and project duration. Since many complex systems are actually systems of systems, the overall simulation framework must accommodate multiple independent models. This is a challenge that MIT had been grappling with for almost ten years.

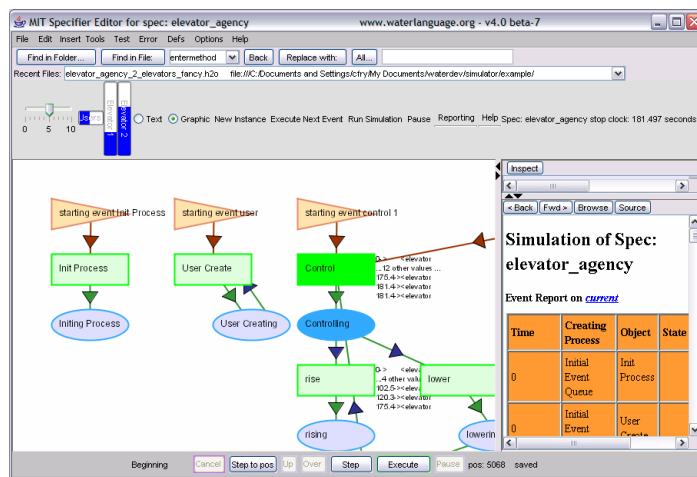
The Solution

The *Specifier*, created with Steam XML, is capable of generating multiple versions of a given system specification. Because the Water-based specification is actually executable, various architectural approaches to the system can be readily evaluated as soon as the specification has been completed. The specification in essence builds an instant simulation of the architecture, enabling what-if scenarios to be played out for analysis. The feasibility of each scenario can be evaluated and the most optimal can be selected and further tuned for maximum outcome. The Specifier is a meta-simulator that draws upon the capabilities of special-purpose simulation and visualization engines. At its core is a discrete event simulator, written in Water, that can be infused with user-specified Water code at any point. It offers both textual and graphical views of a specification. The graphical view offers a zoom feature for a closer look at any aspect of the display. Graphical editing, stepping, and report generation round out the array of tools for creating and running simulations.

As a test case, the Specifier was used at the MIT Engineering Systems Division in a complex system simulation of NASA's project that ultimately put a man on the moon. MIT was able to get the simulation up and running rapidly and found it especially easy to modify and incrementally grow the complexity of the model. With the Specifier they built a meta-simulator that integrated multiple methods to describe their system architecture. The resulting sophisticated decision model included both graphical and textual representations.

Savings and Benefits

Because the *Specifier* makes it possible to evaluate architectures while they are still in the conceptual phase, it enables a much more efficient use of physical prototypes that can cost millions of dollars apiece. In the aerospace field, prototype airframes and jet engines can range into the billions of dollars. With the *Specifier* it is possible to build easily-communicated models in a high-level simulation meta-language. This helps break down barriers separating customers, stake holders, engineers and architects; giving them a common vehicle to share concepts even at the earliest stages of projects. The *Specifier* provides a common language across cultures and natural languages.



Specifier screen shot of graphical system view

About Clear Methods

Clear Methods provides enterprises and independent software vendors with an advanced Web services platform that dramatically speeds the creation of flexible business software. The Clear Methods Steam XML product enables rapid prototyping of XML Web services. Through rapid prototyping, businesses can validate requirements and test new Web services early in the development process. Steam XML eliminates the need to program in multiple languages and technologies, and instead provides a single, interactive environment, especially designed for Web services and XML.

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