Simulation Everywhere

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The **Advanced Real-Time Simulation Laboratory** is an advanced Modeling & Simulation research facility, located in the Department of Systems and Computer Engineering (Carleton University, Ottawa, ON, Canada). The Laboratory is physically located at the Carleton University Centre for Visualization and Simulation (V-Sim). ARSLab is an Associate Team of INRIA (DISSIMINET).

The laboratory investigates different mechanisms to automate the generation of executable models, and their integration with real-time data. The research focuses in interfacing different tools, with a focus on having **simulation everywhere**. This enables users to analyze massive simulation data in an intuitive and efficient fashion with increased realism, responsiveness (or interactivity), and immersion.

In recent years, the lab has developed new methods to include simulation services in remote servers using RESTful Web Services. The main objective is to integrate different simulation services with cloud computing services, in order to provide on-demand recommendations based on simulation results.

We will discuss how this technology can be used for carrying out varied experiments. We will first discuss examples in the field of environmental sciences and in particular in fire spreading models. The fire spreading model was mashed up using Geographical Information Systems as inputs, and outputs using of different Web Services (Google Maps, Google Earth). We will also discuss the design of ATLAS (Advanced Traffic LAnguage Specifications), a high-level specification language representing city sections. The ATLAS Traffic Simulator Compiler (ATLAS/TSC or TSC) was built using a set of templates that can be redefined by the user, easily adapting the generation of behavior to different modeling and simulation techniques (including standalone, embedded real-time, and parallel versions).

We will present the current advances in our lab, focusing on the methodologies employed for distributed simulation, mash-up applications and implementation on thin clients (including embedded applications).

About the Author

Gabriel A. Wainer (SMSCS, SMIEEE) received the M.Sc. (1993) and Ph.D. degrees (1998, with highest honors) of the University of Buenos Aires (UBA), Argentina, and Université d'Aix-Marseille III, France. After being Assistant Professor at the Computer Science Department of UBA, in July 2000 he joined the Department of Systems and Computer Engineering at Carleton University, where he is now an Associate Professor. He has been a visiting scholar at ACIMS (The University of Arizona); LSIS/CNRS, University of Nice and INRIA (Sophia-Antipolis), France. He is the author of three books and over 240 research articles; he edited four other books, and helped organizing over 110 conferences, including being one of the founders of SIMUTools and SimAUD. Prof. Wainer is the Vice-President Publications, and was a member of the Board of Directors of the SCS. He is also the Chair of the Ottawa Center of The McLeod Institute of Simulation Sciences. He is Special Issues Editor of SIMULATION, member of

the Editorial Board of Wireless Networks (Elsevier), Journal of Defence Modeling and Simulation, and International Journal of Simulation and Process Modelling (Inderscience). He is the head of the Advanced Real-Time Simulation lab, located at Carleton University's Centre for advanced Simulation and Visualization (V-Sim). He has been the recipient of various awards, including the IBM Eclipse Innovation Award, SCS Leadership Award, and various Best Paper awards. He has been awarded Carleton University's Research Achievement Award (2005-2006), the First Bernard P. Zeigler DEVS Modeling and Simulation Award, and the SCS Outstanding Professional Award (2011). Further information can be found at http://www.sce.carleton.ca/faculty/wainer.