

DISCRETE-EVENT MODELING AND SIMULATION OF UBIQUITOUS SYSTEMS WITH DEVSIMPY ENVIRONEMENT AND DEVSIMPY-MOB MOBILE APPLICATION

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ABSTRACT

Web service based simulation tools will be an important aspect of discrete-event modeling and simulation (M&S) in Internet of things (IoT) systems. However, efforts to develop this kind of M&S tools are significant and it is difficult to have a tool suite that offer the modeling and the simulation of ubiquitous systems. The combination of the *DEVSimPy* environment and the *DEVSimPy-mob* hybrid mobile application allows the modeling of ubiquitous systems and their simulation from a mobile phone. We propose in this poster to present the *DEVSimPy-mob* application through its architecture and its interface.

1 INTRODUCTION

The advantage of using simulation tools via web services is not new. In (Page, Buss, Fishwick, Healy, Nance, and Paul 2000) the authors question the potential impact of using these services with respect to the modeling methodology that is used. They conclude by noting that the combination of web and simulation surely lead to change our approach to the modeling of complex systems in the future. Nowadays, it seems obvious to offer the tools to model and simulate ubiquitous systems via web services. This approach allows the integration of simulation as a service accessible by mobile devices (Smartphone), or integrate mobile devices (or components embedding sensors) as a input data for simulation (Campillo-Sanchez, Serrano, and Botía 2013). *DEVSimPy* (Capocchi, Santucci, Poggi, and Nicolai 2011) is a general user interface dedicated to modeling and simulate DEVS (Discrete Event system Specification) models. It is based on the API Py(P)DEVS for the DEVS simulation kernel which is supported by the Modeling, Simulation and Design lab (MSDL) of the McGill University. DEVS (Zeigler, Kim, and Praehofer 2000) has been introduced as an abstract formalism for the modeling of discrete event systems, and allows a complete independence from the simulator using the notion of abstract simulator. We propose a new mobile app to simulate *DEVSimPy* models in a remote way via web services. The aim of *DEVSimPy-mob* is primarily to give users the option of executing *DEVSimPy* models from mobile devices. The mobile becomes a input data source for simulated models and allows the user to contextualize its simulations. Indeed, initially the user can select a model based on its position or the context in which it is located (mobility). So the selected model is dependent on contextual data that may be used by the simulation. Finally, the simulation can be executed from contextual data that are likely to influence the choice of simulation algorithms (sequential, parallel or distributed). The interpretation and the use of simulation results allow to make a decision in real time.

2 ARCHITECTURE

DEVSimPy-mob is based on a client/server architecture where the client (mobile device) is connected to the *DEVSimPy-REST* REST (Representational State Transfer) server which operates command line version of *DEVSimPy*: *DEVSimPy-nogui* (Figure 1).

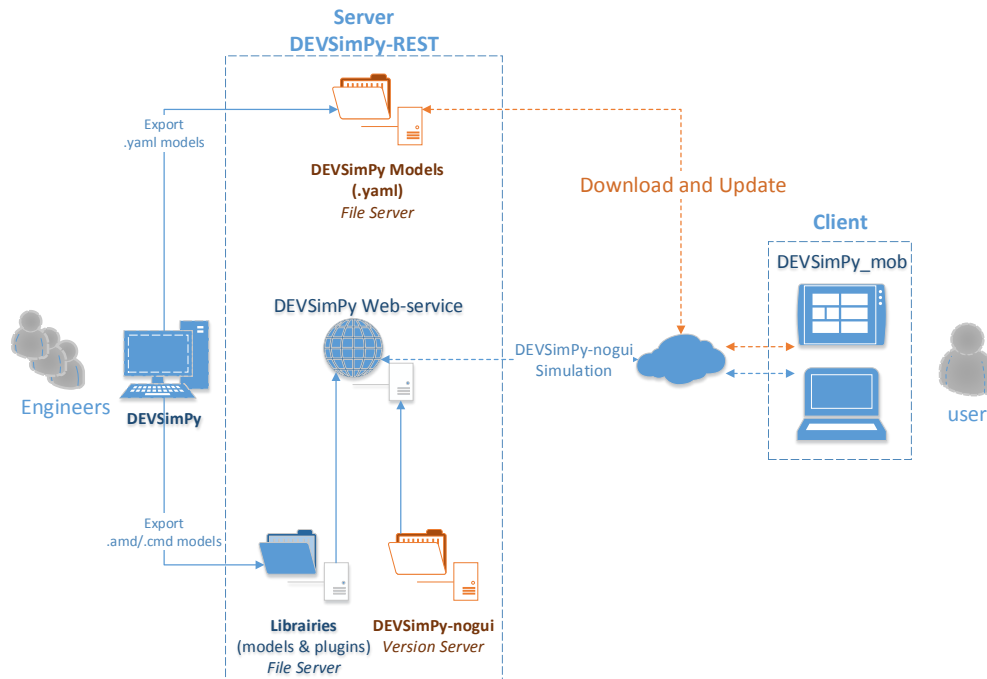


Figure 1: *DEVSimPy-mob* client/server architecture.

Developers build and validate their .yaml (YAML Is not Markup Language) models using the *DEVSimPy* environment. These models are synchronized to a remote file server and they are accessible by the *DEVSimPy-REST* server. In the same action, they develop models libraries (with .amd or .cmd extension) needed for .yaml models. These libraries are synchronized to another remote file server to be shared between developers. Users can connect to the server via an URL and the list of available .yaml models appears. There is no dependency between the .yaml models server and the libraries server.

3 CONCLUSIONS AND PERSPECTIVES

DEVSimPy-mob is an hybrid mobile application allowing the simulation of *DEVSimPy* models from a mobile phone. The idea is to allow users of *DEVSimPy* to simulate their models from a mobile phone. They can add real data from the mobile phone (temperature, photo, etc) in their simulation models. *DEVSimPy-mob* is a part of a client/server solution and must be coupled with a *DEVSimPy-REST* server which is in charge to simulate *DEVSimPy* models. We plan to choose the Ionic web framework for the future version of *DEVSimPy-mob* in order to make more robust the development of *DEVSimPy-mob*.

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