Digital Business Ecosystem

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Workpackage 9

Model of Fitness Landscape

Deliverable 9.5

EvE Simulator Implementation

Information Society and Media

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Short description:
Implementation of an agent-based simulation framework for the simulation of the Evolutionary Environment.

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Versioning		
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Executive summary

STU's challenge in the DBE project is to support bridging between the different stakeholders from BUS, COM, and SCI. The present document acts as 'shell' for the software deliverable D9.5 - EvE Simulator Implementation - which can be found at http://evesim.sourceforge.net. The three main tasks of the EvE Simulator framework are (i) simulation of real-world networks and randomly generated large-scale networks, (ii) implementation of test bed for algorithm tuning, and (iii) configuration and visualization capabilities for non-technically experienced people. Stakeholders herein are researchers from natural as well as social sciences, business analysts, new regions joining the DBE, and the general public for dissemination of DBE 'philosophies'. A more detailed report on the utilisation of the EvE Simulator can be found in DBE deliverable D9.2 - Report on Evolutionary and Distributed Fitness Environment.

EvE Simulator Implementation

The Evolutionary Environment Simulator (EvESimulator[1]) is an agent-based economy simulation framework. It comes with a Graphical User Interface (see Figure 1) and simulates the behaviour of the various evolutionary processes in the DBE. This simulator, built as an agent simulation of the DBE environment, focuses strongly on the fitness-related issues found in the DBE. The Evolutionary Environment Simulator makes it possible to study and analyse networks of SMEs in depth. A more detailed description of the EvESimulator can be found in *D9.2 Report on Evolutionary and Distributed Fitness Environment*. In the following paragraphs the major implemented achievements of the EvESimulator framework are summarised.

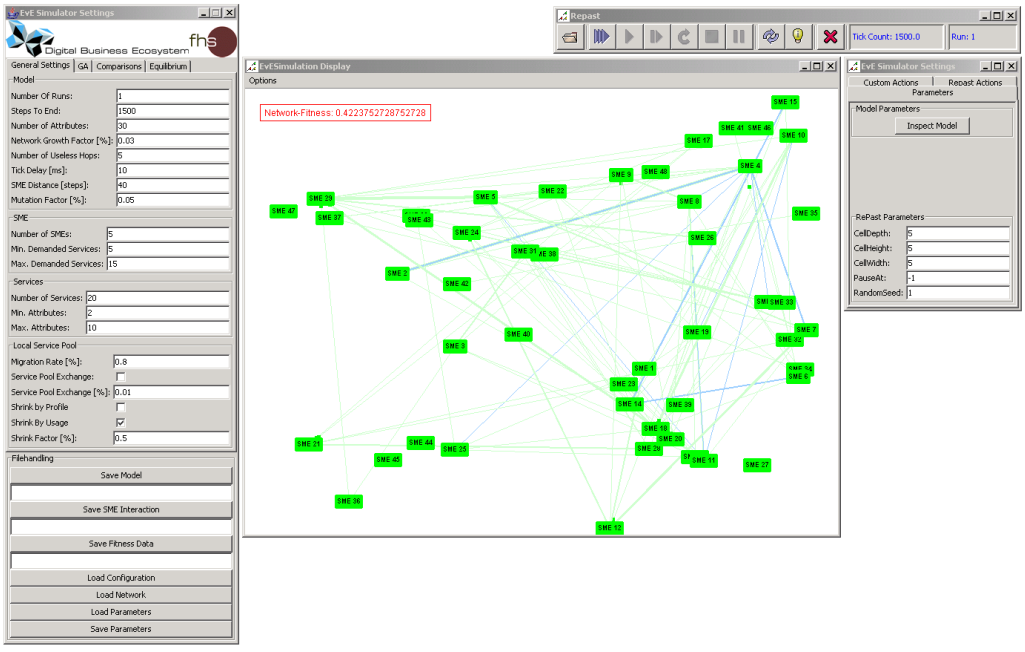

Figure 1: The EvESimulator's Graphical User Interface.

[1]EvESimulator,http://sourceforge.net/projects/evesim

First, the EvESimulator uses CSV (Comma Separated Values) and XML (Extensible Markup Language) formatted configuration files. These files are used for exchanging and converting data between various programs. It is also possible to load and save such configuration files. This enables the application and visualisation of the underlying network behaviour of participating SMEs, to understand the DBE concept and its advantages of, for example, the automated information exchange.

Second, observations through the simulator, of the real EvE implementation behaviour and the resulting network structure are possible. Scenarios for growth, cluster building (SME grouping), network topologies (central or de-central) and network evolution can be easily studied in depth. In general, the simulator is able to show how a network of SMEs can grow and evolve over time.

Third, simulations based on real-world networks as well as randomly generated large-scale networks including clusters offer an environment to test and fine-tune algorithms. The effects of the parameter values can especially vary for, for example, optimisation algorithms like the genetic algorithm, service pool thinning algorithms, different bootstrapping approaches as well as for rating approaches (fitness calculation) can be studied.

Consequently, the EvESimulator, built by the aid of the agent-modelling toolkit REPAST[2], is a toolkit that enables the exploration of business networks, regions and domains with all of their singularity and help to enhance and fine-tune the underlying algorithms of the DBE infrastructure to better satisfy the diversity of SME needs. The modeled network structure of the EvE, used as the basis of simulation runs, reflects the real network of SMEs in the DBE.

Figure 2 shows the current class structure of the EvESimulator framework. The diagram does not show the classes of the underlying Repast toolkit. The sources of the EvESimulator as well as the Repast can be found at:

- http://sourceforge.net/projects/evesim
- http://repast.sourceforge.net

[2]REPAST,http://repast.sourceforge.net/

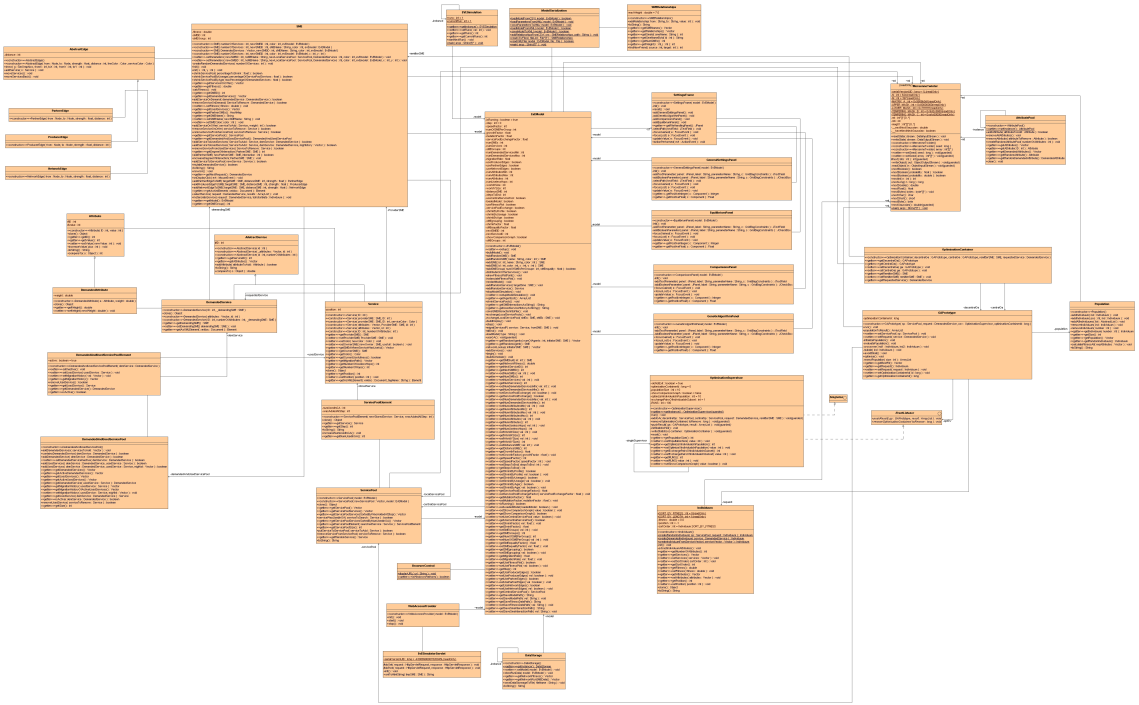

Figure 2: EvESimualtor Class-Diagram. For details, zoom in the pdf-Version or check out the sources from http://sourceforge.net/projects/evesim.