FXU Tracer – User Guide

1. Overview

FXU Tracer is a part of Framework for eXecutable UML tool and it was designed to enable tracing of state machines execution in generated C# code. First version of *FXU Tracer* appeared in 2009 as a part of engineering thesis and was created by Marian Szczykulski. This tool has its own graphical environment and an engine, therefore it is completely independent from *FXU Generator*.

FXU Tracer is still under development. Some refinements are needed to make this tool really powerful. But even now, it can help better understanding of state machines created by someone else and detect some mistakes.

To start tracing process two elements are necessary:

- An UML model serialized in uml2 format of Eclipse.
- A trace log file, which was created by FXU environment during application execution (dbg extension).

2. FXU Tracer – step by step

2.1. The main window

The main window of *FXU Tracer* is composed of two panels (Figure 1. FXU Tracer main window.). The left panel is designed to contain a tree, which represent the UML model. The right panel has a text area designed to contain textual information about tracing process. The main window has also a menu bar and a tool strap.

The menu bar has two items "*File*" and "*Edit*" (Figure 1). The "*File*" item has items designed to load the UML model and a trace log file. They will be described more precisely later. The "*Edit*" item has items to manage the tree (e.g. expand tree).

The tool strap has tree buttons "Step over", "Run" and "Reload" (Figure 1). They will be described more precisely later.
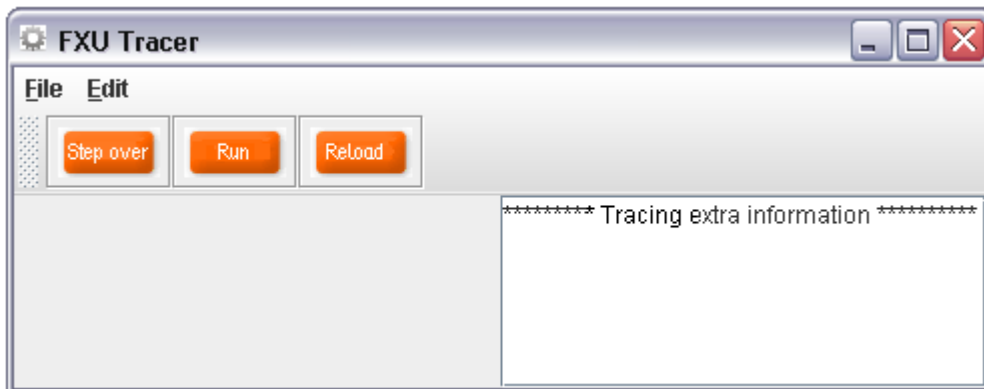

Figure 1. FXU Tracer main window.

2.2. The tracing process

This section shows in tree simple steps, how to use *FXU Tracer*.

[01] Load UML model serialized in uml2 format of Eclipse

After launching *FXU Tracer* it is necessary to load the UML model. Click "*File*" menu item and then "*Load UML model*" or just click "*Ctrl+U*" keyboard shortcut (Figure 2).
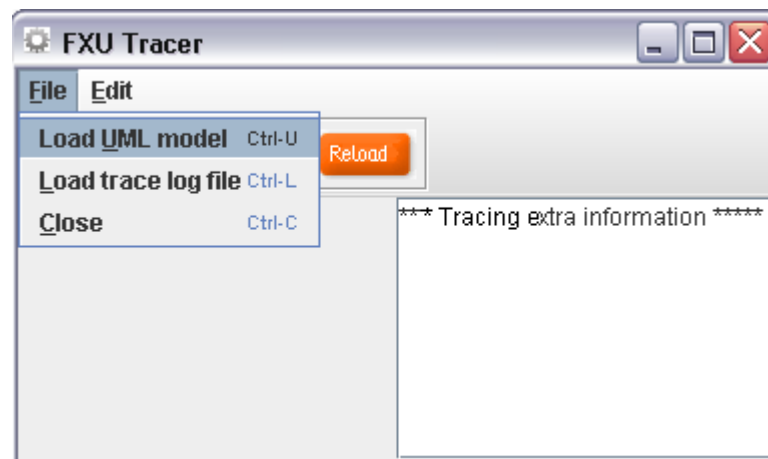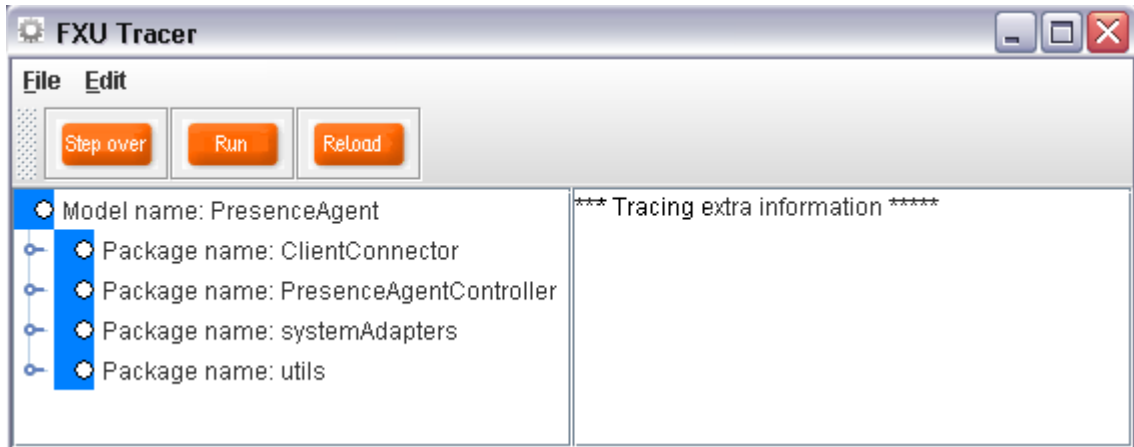

Figure 2 FXU Tracer - loading UML model.

Afterwards select appropriate file with the UML model (uml extension) and click "*OK*" button . After a few seconds an information window should be displayed and the model should be loaded and visible on the left part of the main panel (Figure 3).


Figure 3 Model loaded and visible on left part of the main panel.

The loaded UML model is visualized on the left part of the main panel as a tree. The tree has hierarchically grouped information about the whole UML model. A root node of the tree is the model name. Its children are nodes representing packages (Figure 3). The package node contains class nodes, which has a node representing state machine. The state machine node has all information about its regions, states, pseudostates and transitions also grouped in tree nodes. This hierarchy represents the real hierarchy in the UML model.

[02] *Load a file with trace logs, created by FXU environment during application execution*

The second step is similar to the previous one but at this time a trace log file will be loaded (with *dbg* extension). Click "*File*" menu item and next "*Load trace log file*" or simply click "*Ctrl+L*" keyboard shortcut (Figure 4).
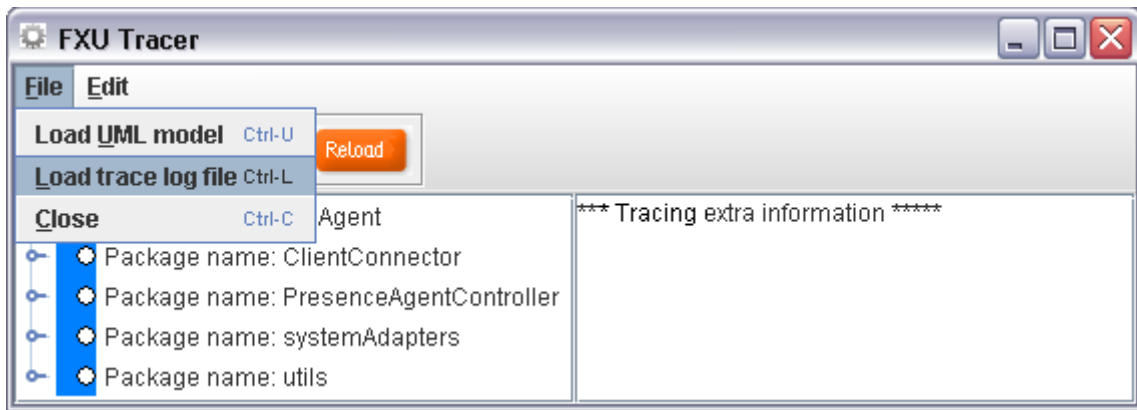
Figure 4 FXU Tracer - load trace log file.

After a moment the trace log file should be loaded and an information message should be displayed. Now *FXU Tracer* is ready to start tracing of the state machines execution.

[03] Start tracing.

Tracing process is visualized by the tree on the left part of the main panel as well as by a text information in a text area on the right part of the main panel. It was described below.

a. Follow steps visualized by the tree, which represents the UML model

The UML model tree is placed on the left part of the main panel (Figure 3). Every node of this tree has its own graphical label which has a specific meaning, explained in Table 1.

Table 1. Meaning of the tracer tree label.

Label	Description
○	A node is not processed at this moment and no breakpoint was set
●	A node is not processed at this moment, but a breakpoint was set
○	A node is processed at the moment and no breakpoint was set

	A node is processed at the moment and a breakpoint was set

It is possible to set a breakpoint on a specific node (Figure 5). Tracing process of state machines stops as long as this node is achieved and the process can be continued if it is requested.

There are two possibilities to trace state machines:

- Step by step – by clicking "*Step over*" button on the tool strap (Figure 5).
- Run to the next breakpoint – by clicking "*Run*" button on the tool strap (Figure 5).
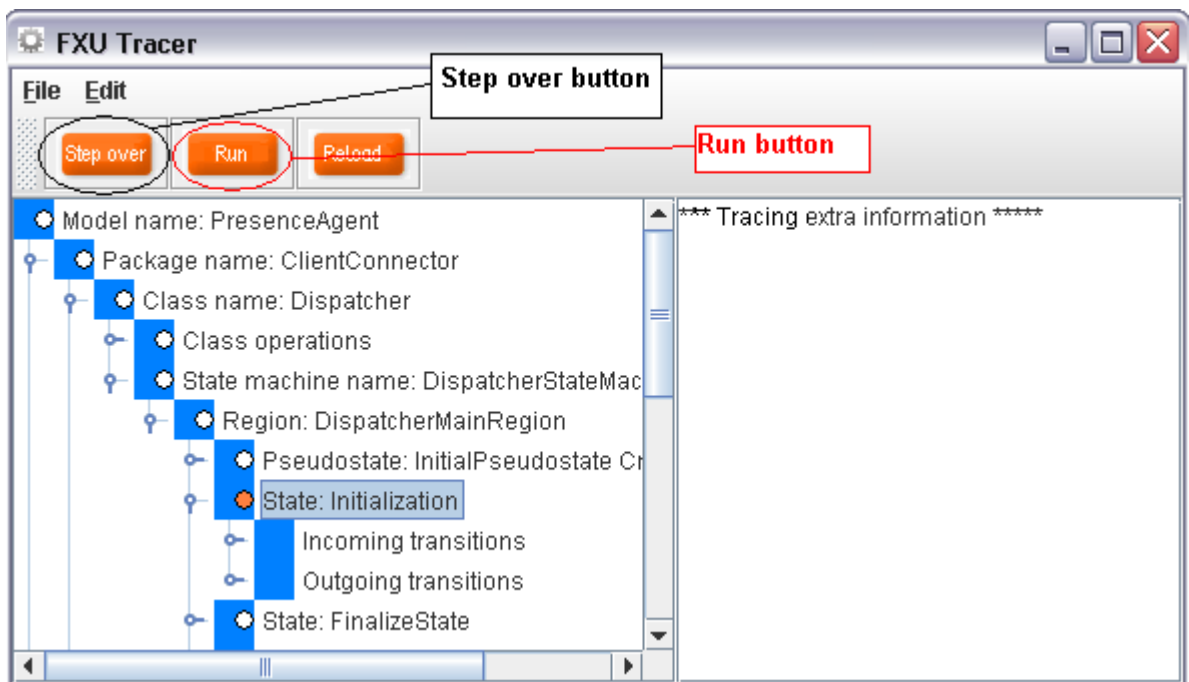
Figure 5 FXU Tracer - tracing buttons.

b. Follow steps in text area

During the tracing process textual information messages are continuously displayed on the right part of the main panel (Figure 6). Those information messages are more detailed and contain elements, which visualization on the tree is difficult such as end of an execution *entry*, *do* or *exit* actions or transition *effects*.
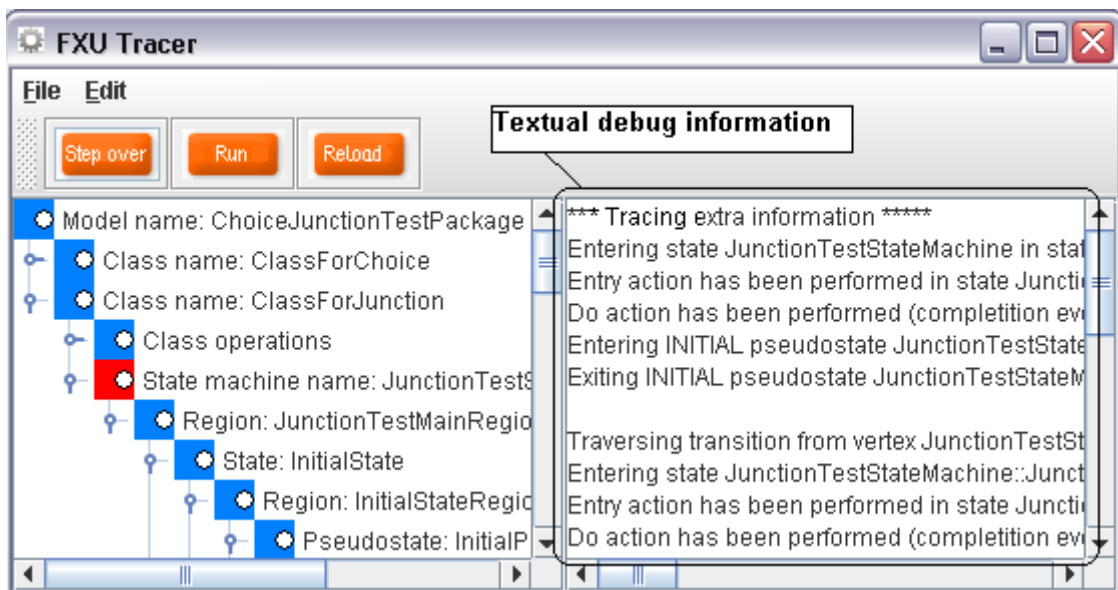
Figure 6 FXU Tracer - Text area with tracing information.

c. Restart tracing process if you need.

It is possible to perform tracing process once again by clicking "*Reload*" button on tool strap (Figure 7). *FXU Tracer* automatically loads once again the UML model and the trace logs file. The whole process can be repeated again without necessity of selecting those files manually.
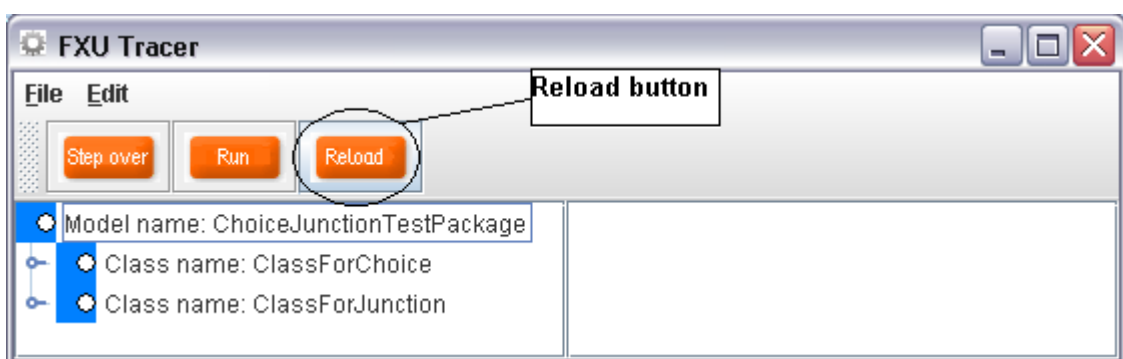

Figure 7 FXU Tracer - Reload button.

3. References

[01] Framework for eXecutable UML home page – http://home.elka.pw.edu.pl/~mszczyku/fxu