

Renew – The Reference Net Workshop

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RENEW is a continuously developed extensible Petri net tool, which enables modeling and simulating of various Petri net formalisms. One unique characteristic of the tool is the full support for Java reference nets [2], which combine the concepts of nets-within-nets and synchronous channels with a reference semantics using a pattern/instance mechanism analogously to object oriented programming languages. Furthermore Java can be used as inscription language whereby the formalism is well-suited for the implementation of concurrent software systems. Since RENEW is written in Java it is available for multiple platforms (including Windows, Linux and Mac). The current version 2.4.2 is available for download¹ free of charge including the source code [3].

RENEW provides an easy to use graphical editor for Petri net models and other types of models and a simulation engine, which is seamlessly integrated into this editor. It has a plug-in architecture, which makes it easily extensible. The core plug-ins are provided as part of the RENEW distribution. Many advanced features are supplied by optional plug-ins.

The editor has been improved over the last years and received many small usability enhancements and has evolved into an integrated development environment (IDE) for net based software development. It contains a syntax check during editing and debugging tools, such as breakpoints or manual transitions. Furthermore the editor features desktop integration, a file navigator and image export to various formats.

The simulator is capable of handling different formalisms. The main formalism is the Java reference net formalism, for which different extensions exist, such as inhibitor, reset and timed arcs. The workflow net formalism, provided by an optional plug-in, adds a task transition, which can be canceled during execution, so that its effect on the net can be reverted. Other formalisms provide simulation of P/T nets, feature structure nets and bool nets. Simulation is available in different modes. In the interactive simulation mode the user may control the simulation by choosing the transitions to fire and inspect each single step. The automatic simulation mode is usable for system execution and can be run with and without graphical feedback. RENEW features dynamic loading of nets on demand and configurable logging of simulation events. The monitoring plugins facilitate the inspection of remote simulations. With an integration of the LoLA verification tool [1] RENEW is also suited for verification tasks during modeling.

The first official version of RENEW was released in 1999 and has since then been continuously developed as a Petri net editing and simulation environment. The plugin system, introduced with the major release 2.0 in 2004 [4], enabled

¹ RENEW web page: <http://www.renew.de/>.

the extension of RENEW into various directions. Many of the newly developed plug-ins are related to agent-oriented software engineering. Additionally, RENEW was utilized to provide a workflow management engine and clients. Besides using RENEW primarily for modeling Petri nets, plugins provide support for different modeling techniques, i.e. diagrams from UML or BPMN.

In the future we like to further improve RENEW as an IDE for modeling and implementation with Petri nets. Anyhow, our plans in using RENEW's graphical framework as a modeling environment are not restricted to Petri nets. One of our current research projects aims at advancing RENEW to a framework for meta-modeling domain specific modeling languages [5]. Further research topics are concerned with providing the facilities to enable distributed simulations across multiple instances of RENEW and in distributed networks [6]. To furthermore qualify RENEW as an IDE for model based software engineering in a distributed software development environment, we are currently developing a plugin to integrate project management features. Another research project is concerned with utilizing RENEW as a library or service to other applications. Additional enhancements aim at improving the editor capabilities of RENEW. Drag and drop support for the navigator will support the usability by providing easy to use facilities to managing files. Our release plan includes improving the quick fix feature to provide better proposals for automated code completion. A re-designed console plugin enables interactive command line processing with history and command completion.

References

1. Hewelt, M., Wagner, T., Cabac, L.: Integrating verification into the PAOSE approach. In: Duvigneau, M., Moldt, D., Hiraishi, K. (eds.) *Petri Nets and Software Engineering. International Workshop PNSE'11*, Newcastle upon Tyne, UK, June 2011. *Proceedings. CEUR Workshop Proceedings*, vol. 723, pp. 124–135. CEUR-WS.org (Jun 2011)
2. Kummer, O.: *Referenznetze*. Logos Verlag, Berlin (2002)
3. Kummer, O., Wienberg, F., Duvigneau, M., Cabac, L.: *Renew – User Guide (Release 2.4.2)*. University of Hamburg, Faculty of Informatics, Theoretical Foundations Group, Hamburg (Jan 2015), <http://www.renew.de/>
4. Kummer, O., Wienberg, F., Duvigneau, M., Schumacher, J., Köhler, M., Moldt, D., Rölke, H., Valk, R.: An extensible editor and simulation engine for Petri nets: Renew. In: Cortadella, J., Reisig, W. (eds.) *Applications and Theory of Petri Nets 2004. 25th International Conference, ICATPN 2004*, Bologna, Italy, June 2004. *Proceedings. Lecture Notes in Computer Science*, vol. 3099, pp. 484–493. Springer, Berlin Heidelberg New York (Jun 2004)
5. Mosteller, D., Cabac, L., Haustermann, M.: An Approach to Meta-Modeling with Petri Nets. In: Moldt, D., Rölke, H., Störrle, H. (eds.) *Petri Nets and Software Engineering. International Workshop PNSE'15*, Brussels, Belgium, June 2015. *Proceedings. CEUR Workshop Proceedings*, vol. 1372. CEUR-WS.org (Jun 2015)
6. Simon, M.: *Concept and Implementation of Distributed Simulations in RENEW*. Bachelor thesis, University of Hamburg, Department of Informatics, Vogt-Kölln Str. 30, D-22527 Hamburg (Mar 2014)