

# Snoopy - a Tool to Design and Animate / Simulate Graphs

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 = Data Structures and Software Dependability =  
<http://www-dssz.informatik.tu-cottbus.de/software/snoopy.html>

## Basic Properties

### Extensible

- the generic design supports facile implementation of new graph types

### Adaptive

- simultaneous use of several graph types
- GUI adopts dynamically to the graph type in the active window

### Platform Independent

- Implementation: C++, wxWidgets [12], Xerces [13]
- supported for Windows and Linux (Suse)

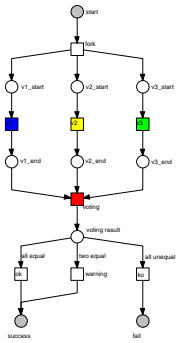
## Main Features

- hierarchy by subgraphs
- logical (fusion) nodes
- different shapes for net elements
- colouring of graph elements (e.g. paths or invariants)
- automated layout by Graphviz library [11]
- digital signature by md5 encryption [16]

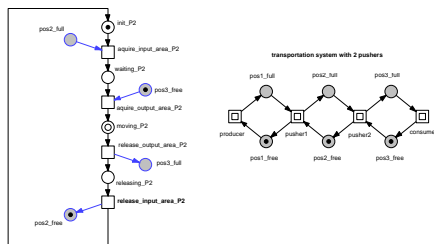
## Graph Classes

- reachability graph
- place/transition Petri net
- extended Petri net (read / inhibitor / reset arcs)
- continuous Petri net [17]
- EDL-signature net [18]
- fault tree [20]

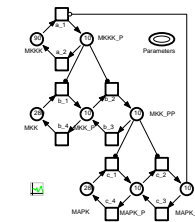
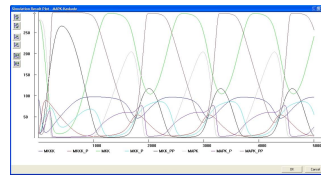
### N-Version Programming Petri Net and its Fault Tree



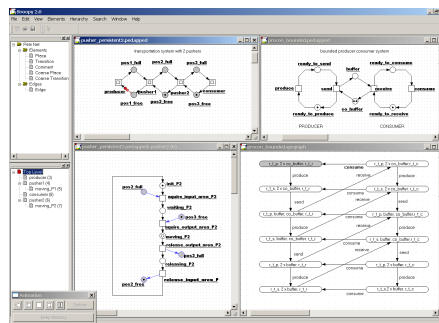
### Pusher Case Study as Hierarchical Petri Net



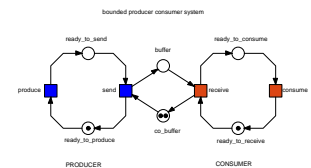
### MAPK Cascade as Continuous Petri Net and Simulation Results



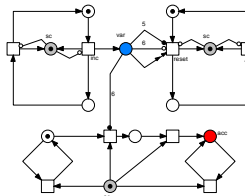
### Screenshot of Snoopy in Animation Mode



### Producer Consumer as Petri Net and its Reachabilitygraph



### Product Büchi Net of two Processes and a LTL-Formula as Extended Petri Net



## Exports to other Tools

### General Printing

- eps
- Xfig
- FrameMaker

### Fault Tree

- SyRePa [7]

### Continuous Petri Net

- LaTeX
- SBML, e.g. Copasi [1]

### Petri Nets Export

- IDD-CTL, IDD-LTL [10]
- INA [8]
- LOLA [2]
- MARIA [3]
- PEP [5]
- PN MC-KIT [4]
- PROD [6]
- Tina [9]

## Animation / Simulation

### Petri Nets

- step forward / backward
- play forward / backward
- firing-rules: single, intermediate and maximal step

### Continuous Petri Nets

- step forward
- play forward
- 12 stiff / unstiff ODE solvers

## Outlook

- coloured stochastic Petri nets
- generalized animation / interaction concept
- advanced evaluation of invariants, e.g. automatic colouring

## References

### Analysis Methods / Tools

- Copasi: <http://www.copasi.org>, 2006
- Lola: Proc. 21th ICATPN, LNCS 1825, 465-474, 2000
- Maria: <http://www.tcs.hut.fi/Software/maria>, 2005
- MC Kit: Proc. 24th ICATPN, LNCS 269, 463-472, 2003
- PEP: <http://theoretica.informatik.uni-oldenburg.de/~pep>, 2004
- PROD: <http://www.tcs.hut.fi/Software/prod/>, 2006
- Schneeeweiss, W: Die Fehlerbaum-Methode, LiLoLe-Verlag, 1999
- Starke, PH; Roch, S: <http://www.informatik.hu-berlin.de>, 1999
- Tina: <http://www2.laas.fr/tina/>, 2006
- Tovchigrechko A: Ph.D. Thesis, BTU Cottbus, CS Dept., to appear

### Libraries

- Graphviz: <http://www.graphviz.org>, 2005
- wxWidgets: <http://www.wxwidgets.org>, 2005
- Xerces: <http://xerces.apache.org>, 2005

### Theses

- Menzel, T: Diploma Thesis, Snoopy, 04/1997
- Fieber, M: Diploma Thesis, Snoopy, 07/2004
- Dube, M: Report, Signing and Verifying Snoopy Files, 03/2005
- Scheibler, D: Diploma Thesis, Continuous Petri Nets, 01/2006
- Meier, M: Ph.D. Thesis, EDL- Signatures, to appear
- Winder, K: Diploma Thesis, Invariants, to appear
- Kurth, A: Diploma Thesis, Fault Trees, to appear