

## CPN Tools Models of Tatiana R. Shmeleva

Tool to run models - CPN Tools, <http://cpntools.org>

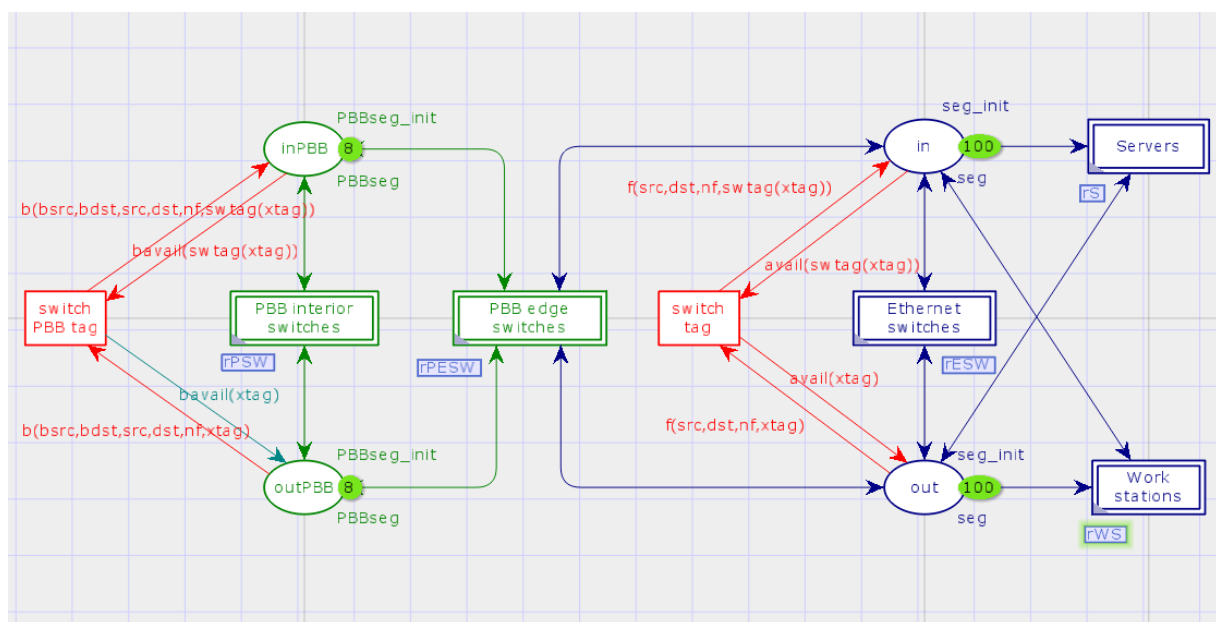
### List of models

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### 1. Reenterable Model of Provider Backbone Bridge

The model has the same structure for any given PBB network. It evaluates the maximal and average network response time on-fly. The network topology is inputted as a value of dedicated constant together with other parameters such as addresses of various types of terminal and communication equipment their performance and the number of ports.

Reenterable models are devised for model-driven design of networks.

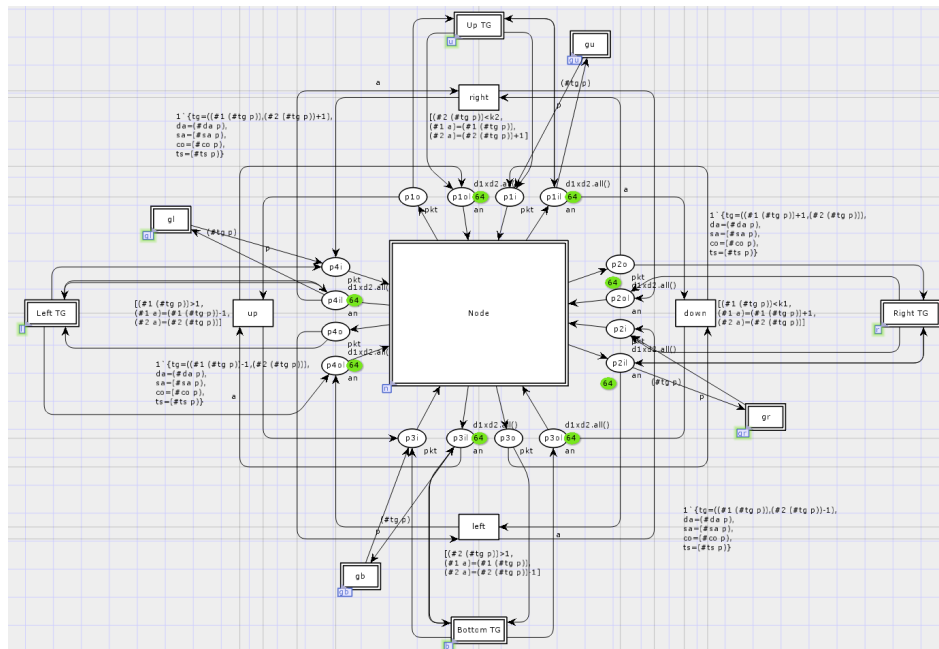


Dmitry A. Zaitsev, Tatiana R. Shmeleva, and Anatoly I. Sleptsov, "Reenterable Colored Petri Net Models of Networks, Grids, and Clouds: Case Study for Provider Backbone Bridge," Proceedings of 26th Telecommunications Forum (TELFOR), Belgrade, Serbia, November, 20-21, 2018.

The zipped folder containing the model (reen-pbb.cpn)

## 2. Reenterable Model of Rectangular Communication Grid with Cut-through Nodes

A reenterable model of communication grid with cut-through nodes is constructed. The cut-through transmission of packets works fast, because it uses only the head of packet, which contains the destination address, for the forwarding decision. The reenterable models of the grid structures do not depend on the grid size that is the main advantage of reenterable models. The grid performance and average packet delivery time are evaluated for various intensity of Poisson and Uniform distributions.



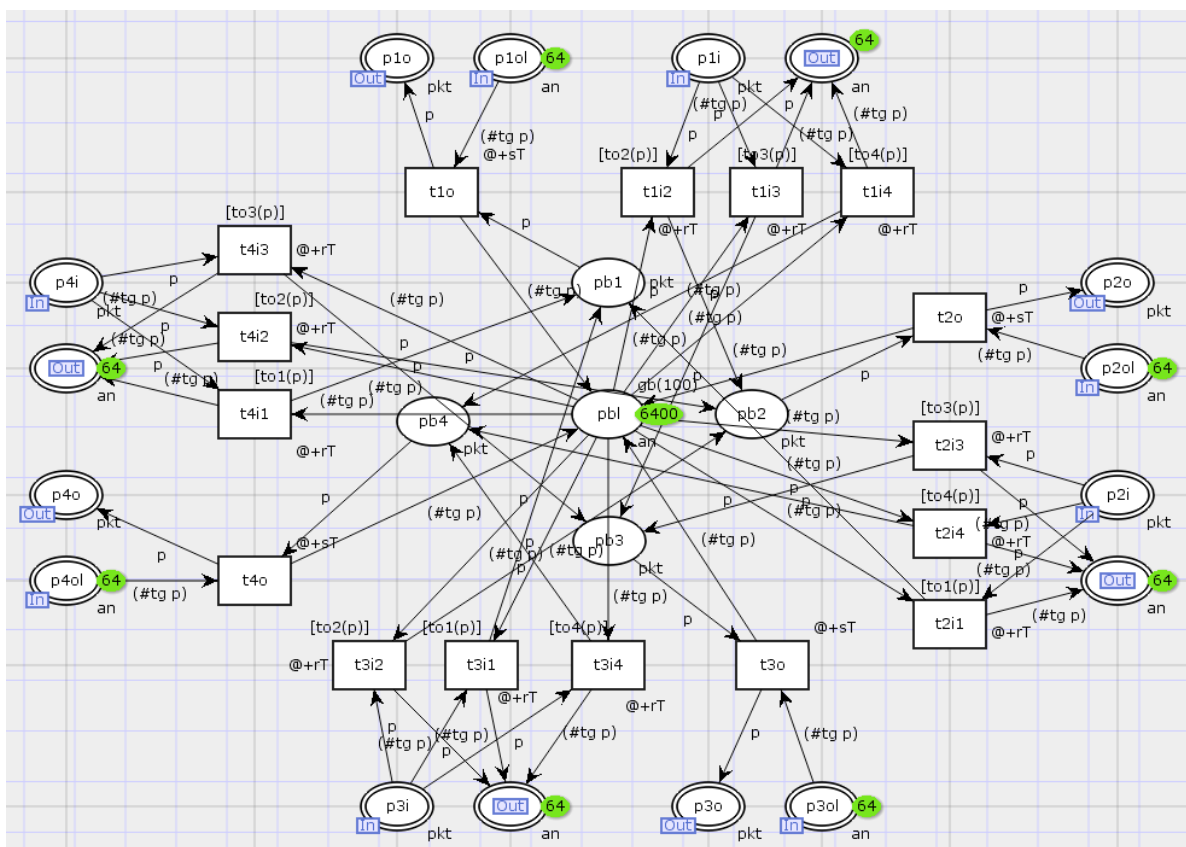
Shmeleva T.R. Performance evaluation of communication grids with cut-through switching nodes. Proceedings of the O.S. Popov ONAT, No. 1, 2018, pp. 98-105. [https://ojs.suitt.edu.ua/index.php/sbornik\\_onat/article/view/1078](https://ojs.suitt.edu.ua/index.php/sbornik_onat/article/view/1078)

Shmeleva T.R. Reenterable Model of Communication Grid with Cut-through Nodes. Transactions of IEEE 4th International Scientific-Practical Conference «Problems of Infocommunications. Science and Technology» (PIC S&T), October 10 – 13, 2017, Kharkiv, Ukraine, pp. 223 – 227.  
DOI:10.1109/INFOCOMMST.2017.8246384,  
<https://ieeexplore.ieee.org/document/8246384>

The zipped folder containing the model (8x8grid\_cut-through\_reenterable.cpn)

### 3. Reenterable Model of Rectangular Communication Grid with Store-and-forward Nodes

A reenterable model of communication grid with store-and-forward (SAF) nodes is constructed. The reenterable models of the grid structures do not depend on the grid size that is the main advantage of reenterable models. The grid performance and average packet delivery time are evaluated for various intensity of Poisson and Uniform distributions.



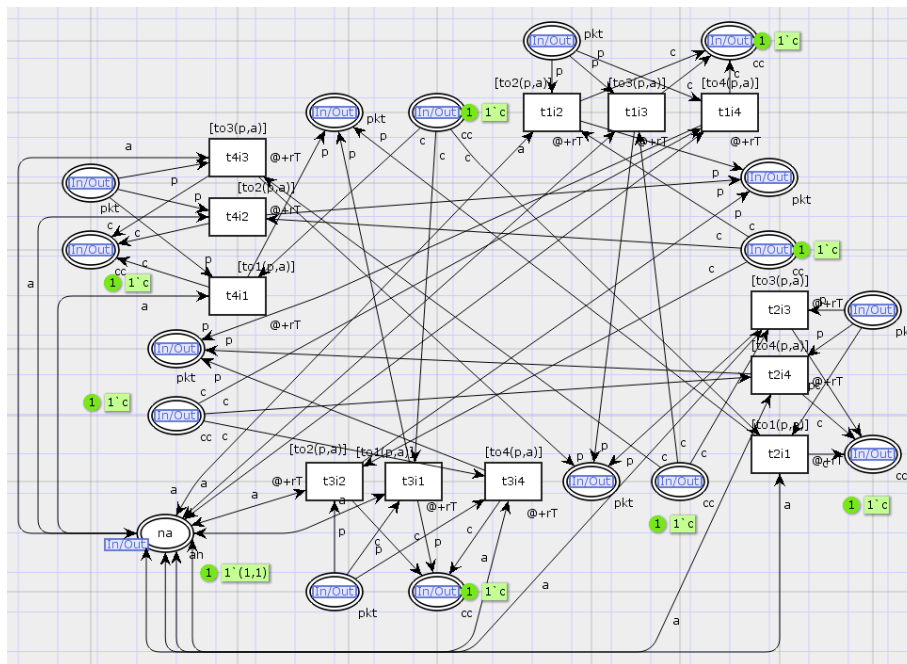
Shmeleva T.R. Efficiency estimation of computing grids with various traffic types. Proceedings of the O.S. Popov ONAT, No. 2, 2017, pp.89-95.

[https://ojs.suitt.edu.ua/index.php/sbornik\\_onat/article/view/1052](https://ojs.suitt.edu.ua/index.php/sbornik_onat/article/view/1052)

The zipped folder containing the model (8x8grid\_SAF\_reenterable.cpn)

#### 4. Rectangular Grid with Cut-through Switching Nodes

The model is composed of packet switching nodes situated on a rectangular grid and generators of traffic attached to the grid borders. It is supplied with malefactor models in the form of traffic guns disguised under regular multimedia traffic. Switching nodes use cut-through transmission of packets that works fast, because it uses only the head of packet, which contains the destination address, for the forwarding decision. A series of simulations reveal the fact that the grid is blocked in the same way as the grid with store-and-forward nodes.



Shmeleva T.R. Security of Grid Structures with Cut-through Switching Nodes. System Informatics, No. 10, 2017, p. 23-32.

[http://www.system-informatics.ru/en/article/135,](http://www.system-informatics.ru/en/article/135)

<https://doi.org/10.31144/si.2307-6410.2017.n10.p23-32>

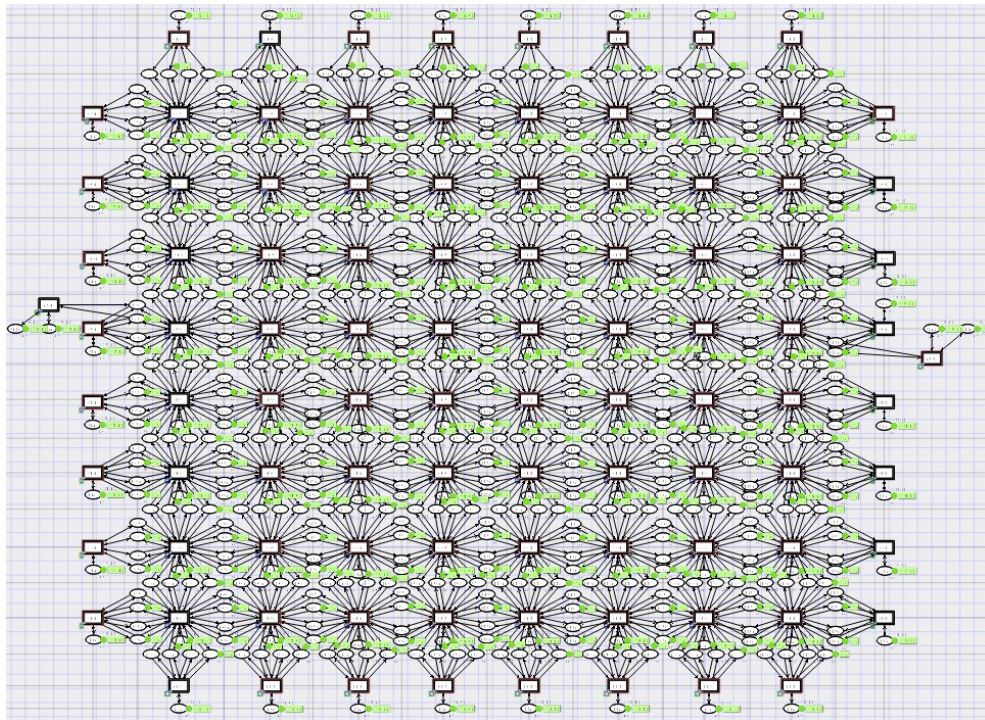
The zipped folder containing the model (grid8x8\_cut-through.cpn)

(Note that loading this model may take several minutes, please be patient).

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## 5. Rectangular Grid under Disguised Traffic Attack

The model consists of an 8×8 matrix of switching nodes that deliver packets to computing nodes which are attached to the matrix borders and produce and consume packets. Traffic guns are added to the model to represent traffic attacks. Simulation in CPN Tools revealed simple and dangerous traffic gun configurations.



D. A. Zaitsev , T. R. Shmeleva, W. Retschitzegger, B. Pröll Security of grid structures under disguised traffic attacks, Cluster Computing, 19(3) 2016, 1183–1200. Online 17 June 2016. DOI:10.1007/s10586-016-0582-9

The zipped folder containing the model (grid8x8.cpn)

(Note that loading this model may take several minutes, please be patient).

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