

# Petri net Modeller

Contributed by Administrator  
 Wednesday, 30 April 2008  
 Last Updated Thursday, 01 May 2008

The Petri net Modeller v1.01 As a tribute to the Open Source software initiative I will hopefully be able to release my Petri net Modeller software to the community for free. It is the only Petri net editor in existence built upon the Microsoft .net Framework and has been written in VB.net. The tool will be available to the community to alter, modify and enhance. Petri nets are a graphical and mathematical tool for the modelling, analysis, simulation and control of systems that exhibit parallel evolution, concurrency, synchronisation and sharing phenomena. The petri net Modeler needs the Microsoft .net framework to be installed and requires Windows 2000/Windows XP: Microsoft .net Framework 3.0 Redistributable Microsoft .net Framework Developers Centre History In 1962, as part of his Ph.D. dissertation, Carl Adam Petri introduced the concept of Petri nets (Place Transition nets) as a tool for the modelling of systems: &ldquo;Petri formulated the basis for a theory of communication between asynchronous components of a computer system.&rdquo; [Peterson, 1981:3] This general purpose mathematical tool was primarily used for the mathematical modelling of relations between conditions and events, but Petri&rsquo;s dissertation was mainly a theoretic development of the basic concepts from which current Petri nets have been developed. Since the 1960s, Petri net research has been conducted, including the start of Petri net related work by the Massachusetts Institute of Technology (MIT) in the 1970s. Much of this was conducted by Professor Jack B. Dennis, who published a considerable number of reports and papers as director of the Computation Structures Group (CSP). However, further and more detailed work has enthusiastically continued in Europe, with The International Conference on Petri nets held every year since 1980 (formerly the European Workshop). &ldquo;The chief attraction of this area is the way in which the basic aspects of distributed systems are identified, both conceptually and mathematically.&rdquo; [Rozenberg, 2000:5].

Practical Use of Petri nets Petri nets are particularly useful for the modelling of Discrete Event Dynamic Systems (DEDS). &ldquo;They are useful because they make it possible to visualise types of behaviour, including parallelism, concurrency, synchronisation and resource sharing.&rdquo; [David & Alla 1992:1]. The main users of these nets are computer and automatic control scientists who work in the fields of Communication Networking, Computer Systems Modelling and Flexible Manufacturing Systems, but their use is not limited to these areas. At the 2003 International Conference on Petri nets, Jens Bæk Jørgensen introduced the use of Colored Petri Nets (CPN) in the development of a Pervasive Health Care System. The use of CPNs was suited to the work and it was recommended that they be used alongside the Unified Modeling Language in the design of the system. &ldquo;CPNs have potential to be used in development of pervasive systems&rdquo; [Jørgensen, 2003: 7].

Petri nets can be used for many purposes, including the modelling and analysis of business supply chains. In a recent American research paper &ldquo;A negotiation-based Multi-agent System for Supply Chain Management&rdquo;, Coloured Petri nets, are used in the modelling of the multi-agent negotiation process. The purpose of the research was to develop a no preset relationship between functional agents in a supply chain system, with the ability of enabling components in the chain to change, according to different external situations. Coloured Petri nets were ideal for the project because: &ldquo;Petri nets provide the primitives for process interaction, while the programming language provides the primitives for the definition of data types and the manipulations of data values.&rdquo; [Chen et al, 2000:4]. Petri nets are not limited to large scale systems. In the 2000 International Conference on Petri nets, Jörg Desel, from the Catholic University in Eichstätt uses Petri nets as part of his presentation, to model and analyse basic vending machines whilst also highlighting the different behavioural patterns of the different machines.