

## Article Abstract

Title:	Deterministic modeling and evaluation of a virtual research laboratory by using Petri nets
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Abstract:	<p>The purpose of the virtual laboratory is to propose an intellectual space for organization of the on-line work in specialized field of knowledge. The research presented in this paper is linked with the research carried out within the frame work of a two year scientific project. The main goal of the project team is to develop a Virtual Research Laboratory (VRL) as a collection of relatively independent distributed virtual mediums, search machine, software instruments and tools for specific research organization in the field of the modern electronic and computer technologies. The life cycle models for software development propose a system investigation and evaluation by using suitable apparatus to determine the adequate structural organization during the phase of the architectural design. In this reason, the goal of this paper is to present an investigation of the defined architecture by using the asynchronous apparatus of Petri Nets (PN) as a second phase of the project work concerning the VRL development. The PN model defining and the carried out research are based on the results obtained during the first phase of the project work – conceptual model defining, formalization, preliminary evaluation and general architecture building. The formal description is based on the fact that each process of the information servicing in the virtual environment could be treated as a sequence of events (states) that generates requests for access to different information resources (relations) via Internet. This formal description permits to make a deterministic model of the information service as a sequence of active events and transactions between them that could be realized by the asynchronous PN apparatus. The defined PN-model describes the evaluated object as a sequence of events (presented by transactions) that could be realized if all related conditions (presented by input places) are fulfilled. In this reason the PN model describes the information servicing in the evaluated VRL as a collection of transactions and position with defined relations between them. Some important experimental results and assessments are discussed.</p>
Keywords:	Virtual Laboratory; Architectural Design; System Investigation; Deterministic Modeling; Petri Nets.