

PETRI NETS FOR MODELLING OF THE TECHNOLOGICAL PROCESS WITH DISTRIBUTION INTELLIGENCE

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ABSTRACT

The article deals with modelling of the technological process control systems with distribution intelligence – Lon Works and with using of mathematical-modelling tool, called- Petri Nets. The article describes of the Petri Nets properties, the Lon Talk protocol facilities in regard to creation of his communication model. The common description of the LonWorks technology is also available. The target of the article is mention for safety properties of the LonTalk protocol. This attribute predetermination using of this new advanced technology for effective control not only conventional but also critical technological process.

Keywords: Petri Nets, Lon Works, Lon Talk protocol.

1. INTRODUCTION

The monitoring and control complex of the technological process is present realisation by of the computing technology. The computers are distribution in control systems mainly variability and flexibility in compare with conventional technologies. The computers are employ than passive (monitoring) and active (control) components of systems real time control in area than are control of flight operation, research of the atmosphere and cosmos, in the aeroplane, in the industry area, in the medicinal systems etc.

2. CURRENT CONCEPTIONS IN THE AREA CONTROL OF THE PROCESS

The current situation in the control is characterise make use of automatized systems control of the process base at standard 8, 16 and 32- bit chip computer which are realise modular box of the bricks alternatively non-standard command-driven control systems. These systems separate three levels:

1. Technological level - sensors, actuators.
2. Level of process - own control of process.
3. Dispatching level – total phase of system in the real time and communication with next of systems.

In the last age give out towards innovation in the design and realisation of the systems control of the process where technological, process and dispatching level flow by only level in the version control data of the nets. To vanish closed single-purpose systems than too semi-automatic-closed systems. The development categorical bound design control of the nets than absolutely open and patchable systems to only highway.

Necessary condition that myself control system use to automatic control any of the process is necessary make full mathematical description control of the process.

The current theory automatic of the control provides a lot of the solution practical problems of the control. They are finished practical methods continuous of the identification multivariable systems too. Continuous identification realisation adjustable systems.

3. LON WORKS TECHNOLOGY

Lon Works technology is a commodity solution to the many problem of the designing, building, installing and maintaining controll networks of all industries. Lon Works technology is a important new solution for control networks development by Echelon. Is it file HW and SW tools for solution volume of the systems, which insure scanning, monitoring, controlling, communication and co-operation 2 till 32385 application of nodes. This technology applied is concept control system override concept LON-Local Operating Network). These application node are connection with architecture" peer to peer " (Fig.1.) through scale communication with optional topology.

Communication among the nodes may be peer-to-peer (distributed control) or master-slave (centralized control) in either case computational capability in the nodes permits the distribution of the processing loads (sensors can be intelligent for example performing local data analysis, conversion and normalization and reporting only significant changes in their environment).

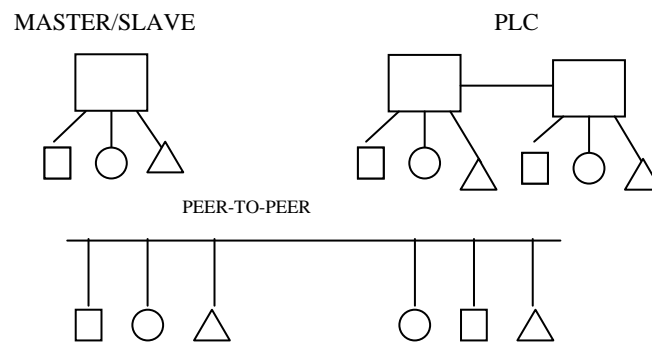


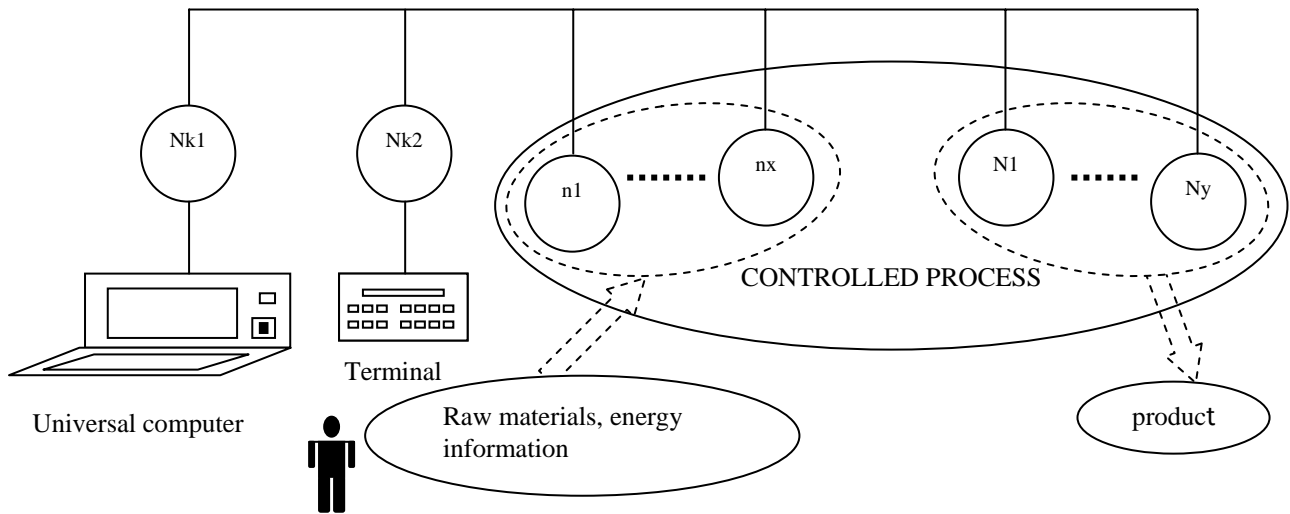
Fig. 1. Evolution of the computer architecture

3.1 Lon Talk protocol – open standard for control

Lon Works technology is a complete solution for implementing distributed control networks. These networks consist of the nodes that communicate with one another over a variety of the communications media using Lon Talk protocol a common message-based communications protocol. Lon Talk protocol supports end-to-end confirm with automatic repeat and next functions, which using for application of the safe and critical process.

Core every intelligent of control node is neutron chip, with support LonTalk protocol. Operation of the technological process basis Lon Works platform is emphasis laying on communication between intelligent nodes of the net. New technology was successful is necessary utilisation properties Lon Talk of the protocol. Lon Talk protocol is basis this new of the philosophy in area control process. LonTalk protocol (LTP) is complete seven laminar communication protocol, which have effective and dependable co-operations between of the nodes. Lon Talk protocol is developed for communications in control nets (Fig.2.).

PEER-TO-PEER – Lon Talk protocol



Baseline function objects:

LON - Nk1, Nk2, n1-nx, N1-Ny – Local operating network – total distributed control system for platform technology Lon Works. (Supported by topology: bus, round, star, free topology)

Nk1,Nk2 – chat mode

n1-nx - intelligent actuator

N1-Ny - intelligent sensors

Fig. 2. Decentralized system control of the technological process – platform Lon Works

4. PETRI NET AS TOOL FOR EVENT SYSTEM MODELLING

Petri Nets are ideal resource for creating event model Lon Talk protocol than dynamic of the system in term of the data interchange in control nets LON.

In the present time are Petri Nets communicate with application design, analyse and modelling parallel and distributed of systems as well as technical area so too software equipment of computers.

Expected representation of the results in description communication system Lon Works by Petri Nets are these priority:

- Unlimited marked of the places resulting indefinite state area of Petri Nets. Beside with description of the systems by final slot is modelling ability of Petri Net more general.
- Petri Net defined sequence of the event which characterise behaviour of the system. Distribution of the states and event prevents at explicit display relation each other independent of the event. On the chance final of the slot are these of the sequence result disposition elements following dependency defined transitional of the function.

The principal purpose in consist on the subject of the factors because they were Petri Nets design than centre tool for solution of the problem and advance before other alternative of the method mathematical of the modelling. Hence he was design mathematical model of the protocol. Results of the simulation are use by for algorithmization of the role control alternatively at coding application of the software.

Control algorithm will simulated of Petri Net and for graphical is solution of artificial experiment for communication between of too nods net LON representation on Fig. 3.

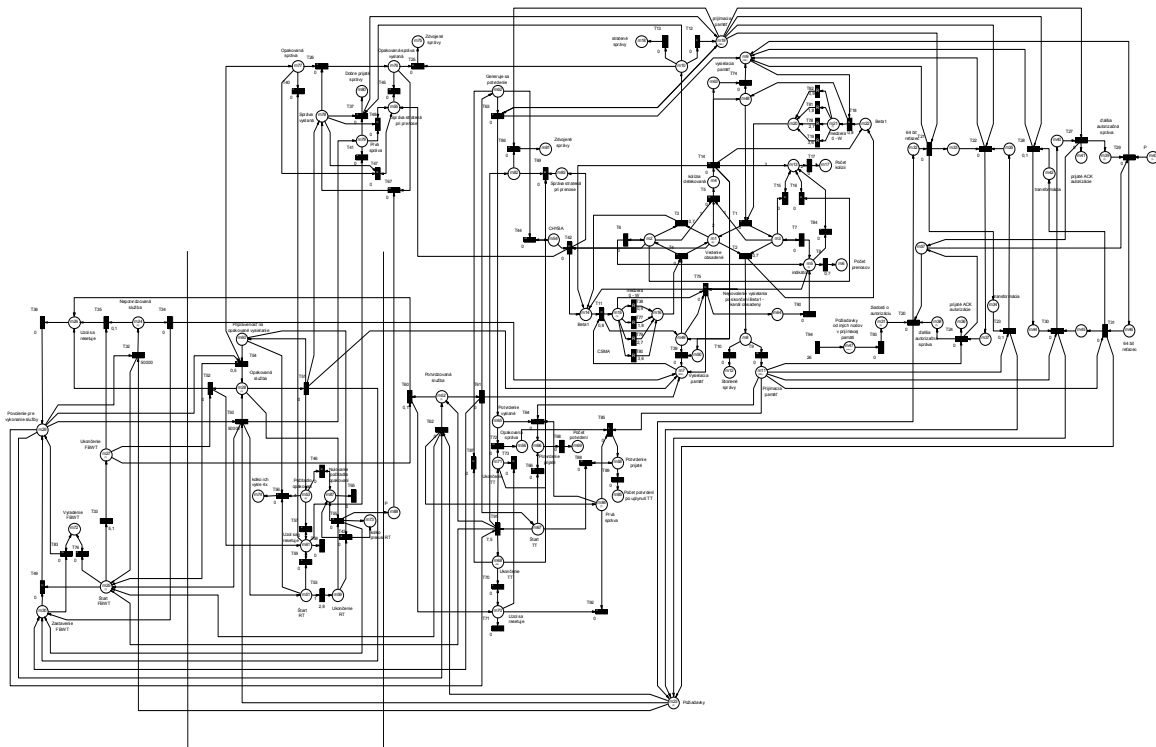


Fig. 3. Petri Net of LonTalk protocol

5. CONCLUSION

The aim of the article wasn't in detail present new philosophy in area control by means of the Lon Works technology or it was call attention to need for new approach application this technology in control of the technological process where centre is communication. After right interpret results of the artificial experiments they have direct fall in control of the technological process. Considering extent this material it wasn't possible presentation some continuity and by himself results of the simulations.

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