

APPLICATION FOR DATA COLLECTION FROM PLC

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ABSTRACT

Some data are obtained from controlled process by Program Logic Controller (PLC). We need to get this data for next processing from PLC to PC. To create application is possibility for data collection from PLC to PC. This paper describes application which allows getting and storing data to PC from PLC. The application was created for connecting between PC and PLC through Process Visualization Interface (PVI). Data are read and saved on-line to PC. Bernecker&Rainer(B&R) PLC was used to process control. PVI present easy tool to connection between PLC and PC.

1. INTRODUCTION

Measurement and control of the process give data which we want to save and use for next processing. On-line watching the process values may be complicated without special tools from producer. B&R PLC's offers Process Visualization Interface (PVI) [3] for simple connecting variables. Connection is realized through standard communication interfaces as serial line, Ethernet and others between PC and PLC. Application running on PC was created for on-line connecting PLC to PC. Some type of controller, which controls observed process, runs on PLC. The parameters of the process are changed with time. We want to watch the evolution of the process parameters. Main idea of this application is storing data, saving data to specific files and on-line communication with PLC to changing controller parameters. Acquired data will be further processed. Data will evaluated by optimization algorithms. Matlab can be used for computation new controller parameters.

2. PROCES VISUALIZATION INTERFACE

PVI served to access to B&R Automation Net. B&R Automation Net provide wide tool to communication between PC and PLC or PLC and PLC, etc. (**Figure 1**).

PVI service can be divided three main areas:

- PVI client (Windows application)

- PVI component (PVI manager) for managing the process data
- PVI lines for managing the communication protocols/types and communication medium

Several PVI applications can run at the same time.

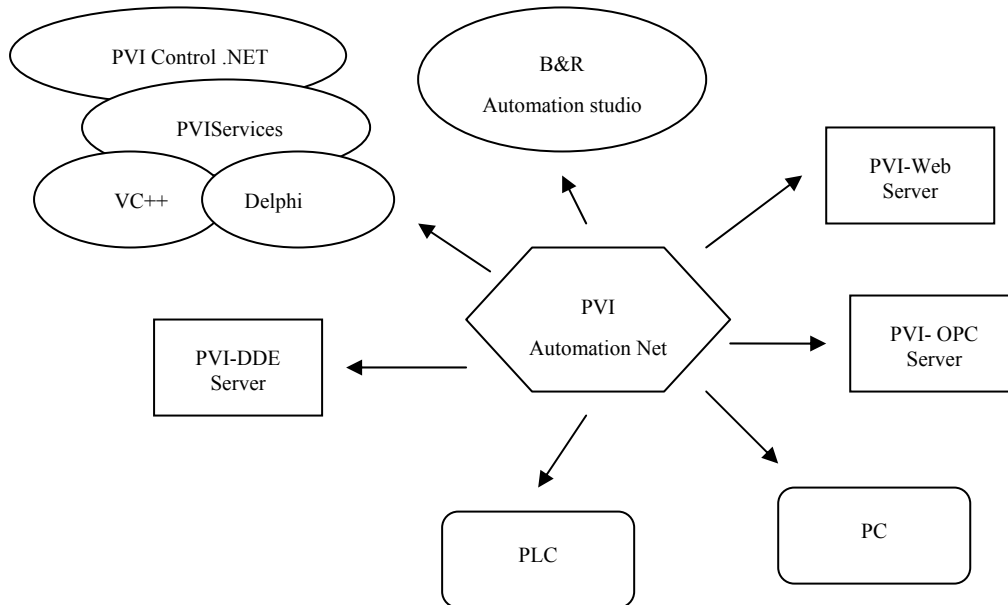


Figure 1: PVI interface [3]

Central PVI component is PVI manager. The PVI manager provides management of all process data. All connections to variables are through this manager. Problems and errors with join variables are simple resolvable thanks to PVI manager. Various libraries are usable to use B&R Automation Net. PVIServices library is used in this article.

2.1. PVISERVICES

PVIServices component is used in this application. This component is designated for communication and diagnostics services between Microsoft .NET development platforms [5] and B&R controllers. PVIServices allow simple connect variables and exchange data between PC and PLC. This component includes basic functions, basic properties and basic events for work with communication object. Class overview is shown on **Figure 2**. Service object provide all communication services. CPU object represents properties and methods for establishing connections. Task object represents task on PLC. Variable object represents process variable on PLC. Module object represents B&R module on PLC. Pvi-Com.DLL is communication library to access PVI. Namespace BR.AN.PVIServices includes number of classes, structures and enumerations [1][2][3]. Classes Service, CPU, Task and Variable are basics for establish communication and connection variables. Service class registers service in PVI manager. Connection type and connection settings are set by CPU class. Connection to defined task is done by Task class. Connection to enter variable is done Variable class.

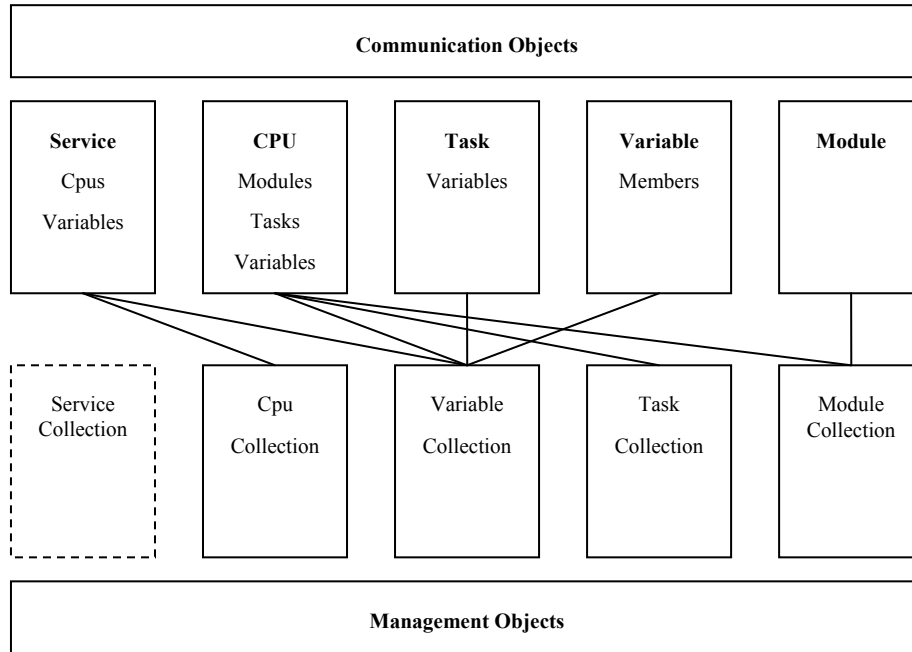


Figure 2: PVIServices class overview [3]

3. APPLICATION FOR DATA COLLECTION

This application is programmed in Microsoft Visual Studio 2005 in C# language. C# is object oriented programming language. C# was developed by Microsoft with .NET platform. Language C# is designated as to utmost make provision for Common Language Infrastructure structure. Common Language Infrastructure is open specification described code feasibility and runtime environment. [5][6]

Main work window and databank window is shown on **Figure 3** and **Figure 4**.

Device name	IP address	Prom1	Prom2	Prom3	Prom4	Prom5	Prom6
PP420_labino	147.229.76.18	5.0	3.5	2.0	4.8	2.5	1.9
DA01	147.229.76.12	4.0	1.3	2.8	7.9	10.0	2.3
DA03	147.229.76.14	3.3	9.4	3.4	7.8	0.3	0.0
DA04	147.229.76.15	6.0	10.0	2.0	9.4	5.6	4.4
DA05	147.229.76.16	3.2	5.6	8.5	1.2	3.4	5.6
DA08	147.229.76.19	1.1	0.0	0.0	0.0	0.0	0.0
DA09	147.229.76.19	0.0	0.0	0.0	0.0	0.0	0.0
DA10	147.229.76.20	0.0	0.0	0.0	0.0	0.0	0.0
DA11	147.229.76.21	0.0	0.0	0.0	0.0	0.0	0.0
DA12	147.229.76.22	0.0	0.0	0.0	0.0	0.0	0.0
PP420_kancel	120.0.0.2	0.0	0.0	0.0	0.0	0.0	0.0

Figure 3: Main work window

Date and Time	Device name	File name with data
Thu Feb 5 10:31:52 2009	PP420_labina	graf_4.csv
Thu Feb 5 09:33:23 2009	PP420_labina	graf_5.csv

Figure 4: Databank window with basic information about files

Application enables to add devices on main window. All devices communicate with application through TCP/IP. IP address, destination directory, name of file and observed values are entered with addition of device. Connected devices list is visible in main window. Basic information is visible in the list about devices. Six parameters can be observed actually. Number of observed parameters can be added to datagrid in development environment only. More information about device is available on double click on the row with device. Multi devices communication is solved by threads. Each thread is started when the device is added. Every device has its own thread. [4][7] The databank makes it possible browse collected files. Characteristics can be draw by this application. Data are saved in CSV file format. This file format makes possible easy importing data to Excel and Matlab for example. Data are separated by semicolon with each other.

4. CONCLUSION

This paper shows that getting data from PLC can be simple. PVI provide good access to values in PLC. It is universal instrument conductive several communication standards. Values can be observed and changed from PC in PLC. Created application simplifies getting data from PLC. Several PLCs can be observed. This data are further used by Matlab/Simulink for other computing. Data are long term stored. Plant evolution is observed thanks to long term store. Parameters of control loop can be changed after computing in Matlab. This application will spread in future. Spreading about optimization algorithms and other communication are planed. Application is agent between PC and PLC only without “intelligence”.

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