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Cape Software's VPLink® for RA ProcessLogix Systems

Background

Cape Software delivers dynamic simulation solutions using the VPLink® product. Applications include:

- Control application logic verification and graphics validation.
- Operator console training.

VPLink® models process responses in connection with an offline ProcessLogix network. During acceptance testing, VPLink® reads and writes process variables to simulate the plant's dynamic responses. Prior to startup, an instructor can present process upsets and equipment malfunctions to the trainee. A dedicated offline system (warm standby) can be used for operator re-certification and *management of change* objectives.

Proven in the field and available today

VPLink® is now available to sites implementing Rockwell ProcessLogix control networks. The VPLink® solution is non-invasive and proven. Utility software makes it easy to export the control database directly into VPLink®'s file format. The ProcessLogix system offers an application programming interface which makes it very simple and very easy to switch the controllers from real I/O into "simulation mode".

What's different about the VPLink® solution?

VPLink® connects to the ProcessLogix control network using the API within the ProcessLogix server. VPLink can execute on this PC, or any PC on the network. This solution bypasses the real I/O hardware, reducing costs during system checkout. This solution is high speed and exercises the control logic exactly as configured for plant operations. This guarantees that the logic exercised is exactly the software delivered to the field. Since no hardware wiring is required, the solution delivered by Cape Software is a low cost alternative to traditional hardware test panel implementation. Since no reconfiguration is needed and no control language programming is required, VPLink® delivers a solution which is compatible with FDA, CMA, and OSHA recommendations for best practices. That is, the code tested is exactly the code implemented in the field.

The Benefits of the VPLink® solution

Users of VPLink® products have testified to many benefits over the past nine years (What's new is the gateway to the ProcessLogix, the VPLink® product is well proven and mature). The many benefits are diverse :

For the control system engineer and project manager

- Dramatically shortens the Factory Acceptance Testing phase of the project.
- Lowers costs of the Factory Acceptance Testing phase of the project.
- Higher quality application software is delivered resulting in on-spec production earlier than before, and reduced time and costs supporting staff in the field.

For plant managers and operations supervisors

- Operators are trained prior to startup on the actual system delivered to the field.
- Operators are trained on a process specific model.
- Operators are trained on the look and feel of the new interface.
- Upper management satisfies Process Safety Management Requirements for above.
- Emergency response training introduces process upsets and equipment malfunctions
- Operator re-certification is achieved.
- Operator Education is documented using quiz question and answer.

Details specific to VPLink®'s new Rockwell ProcessLogix Driver

The engineer does not need any real I/O cards, or any special hardware.

The engineer executes Cape's utility software to align the control database into a VPLink® configuration file.

The engineer is able to debug all aspects of the control software:

- graphics connections
- control language programs
- PID controller action
- interlock logic

Higher level batch management software and/or advanced control solutions will be tested and debugged as well, if implemented.

Requirements

- Rockwell ProcessLogix system including controller(s) with network interface connector and ProcessLogix server.
- PC with Ethernet card and WindowsNT
- VPLink® for ProcessLogix.

Summary

Cape Software is now delivering VPLink® with Rockwell ProcessLogix driver offering a direct connect solution to the following problems faced by control systems engineers and operations management :

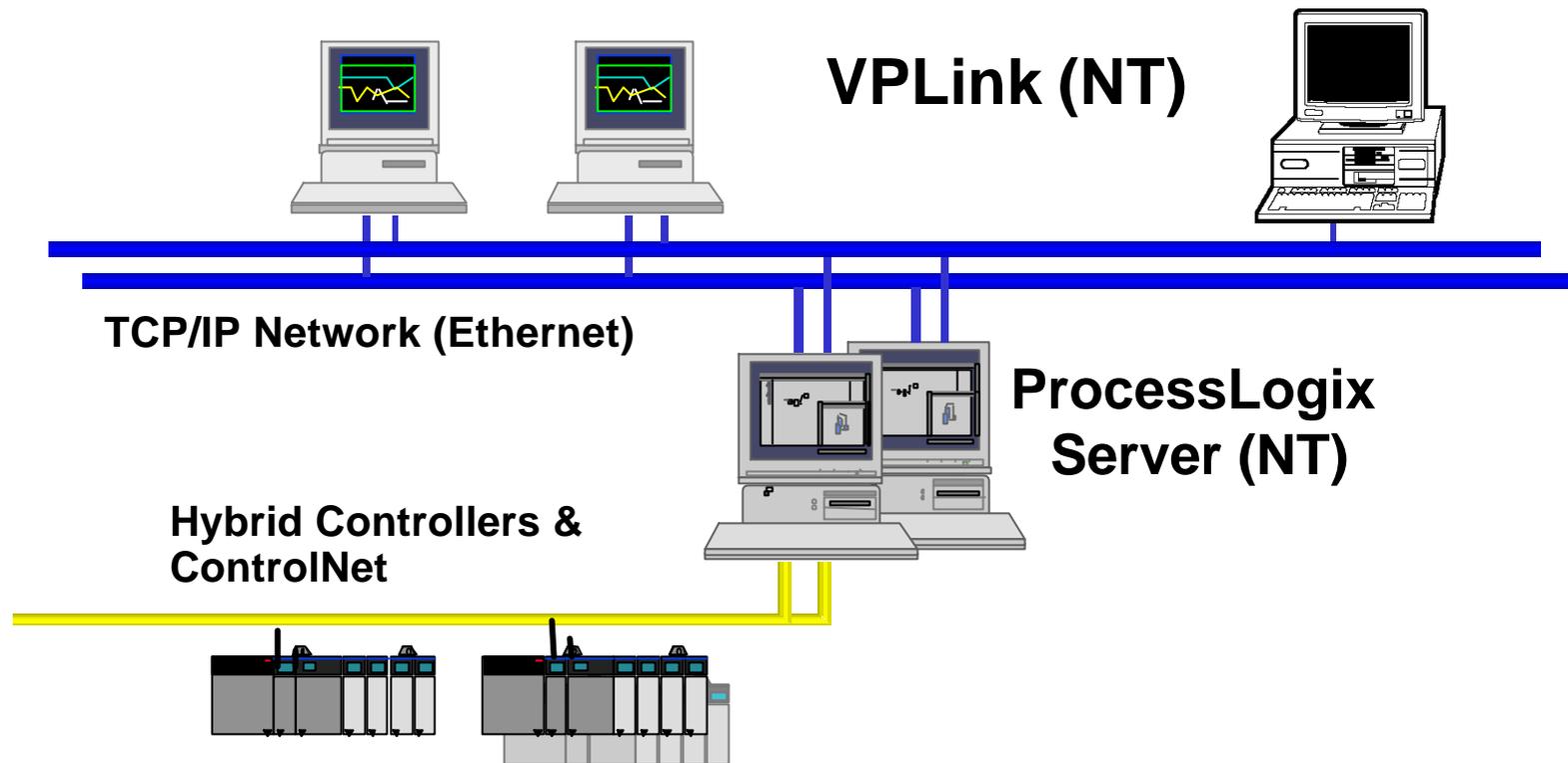
Control software validation

and

Operator console training on process specific requirements.

VPLink® has been in use by the leading chemical, pharmaceutical, refining and pulp & paper manufacturers for over nine years. The VPLink® for ProcessLogix users has been proven at many plant sites and offers a low cost solution which is easily justifiable within the scope of a single small project (300 I/O point count is typical; 15,000 I/O is large).

ProcessLogix Operator Stations

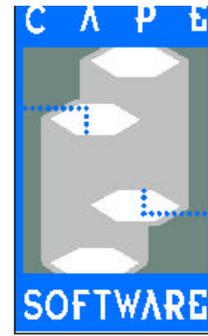


VPLink talks to the ProcessLogix controllers via Ethernet TCP/IP to the server. No I/O modules are needed. VPLink models field responses during system checkout/validation and operator training prior to startup. Benefits include higher quality and proficiency.

User documentation

VPLink[®] for Rockwell

ProcessLogix^ä



Cape Software's Virtual Process Link simulation package connects to Rockwell Automation's ProcessLogix™ system in place of real I/O to provide comprehensive simulation facilities capable of returning realistic process values to the control system.



VPLink connects to ProcessLogix systems using a native interface developed by Cape. The package is supplied with 'extraction' facilities which read simulator I/O configuration data directly from the system database, and utilities to set the control software for simulation instead of real I/O and vice versa.

This document contains the following sections

- A. Overview and System Architecture
- B. Installation of VPLink software
- C. Creation of the VPDR_SCN.EXE shortcut command line
- D. Exporting the I/O database to create the VPLink response model
- E. Executing the set_for_sim utility software to create your "simulation personality"
- F. Executing VPLink with your ProcessLogix system

A. Overview and System Architecture

VPLink can run on the ProcessLogix Server, communicating with the ProcessLogix API via TCP/IP localhost connection. Alternatively, it can be run anywhere on a TCP/IP network that includes the ProcessLogix Server. The choice of location will depend on the availability of hardware or the Server loading.

VPLink can be used to simulate all real I/O connections. This method of simulation maintains the integrity of the application as none of the application code is changed. The application code continues to run as if real I/O resides within the system but the I/O data is provided via VPLink .

VPLink creates simulation tags by using a lookup ASCII file to interrogate the ProcessLogix database and pull out all the I/O function block names via the ProcessLogix server API. VPLink switches the I/O function blocks between real I/O values and simulated values.

Once the tags are brought into VPLink, they can then be configured to interact and provide the desired feedback by utilizing VP response modeling blocks.

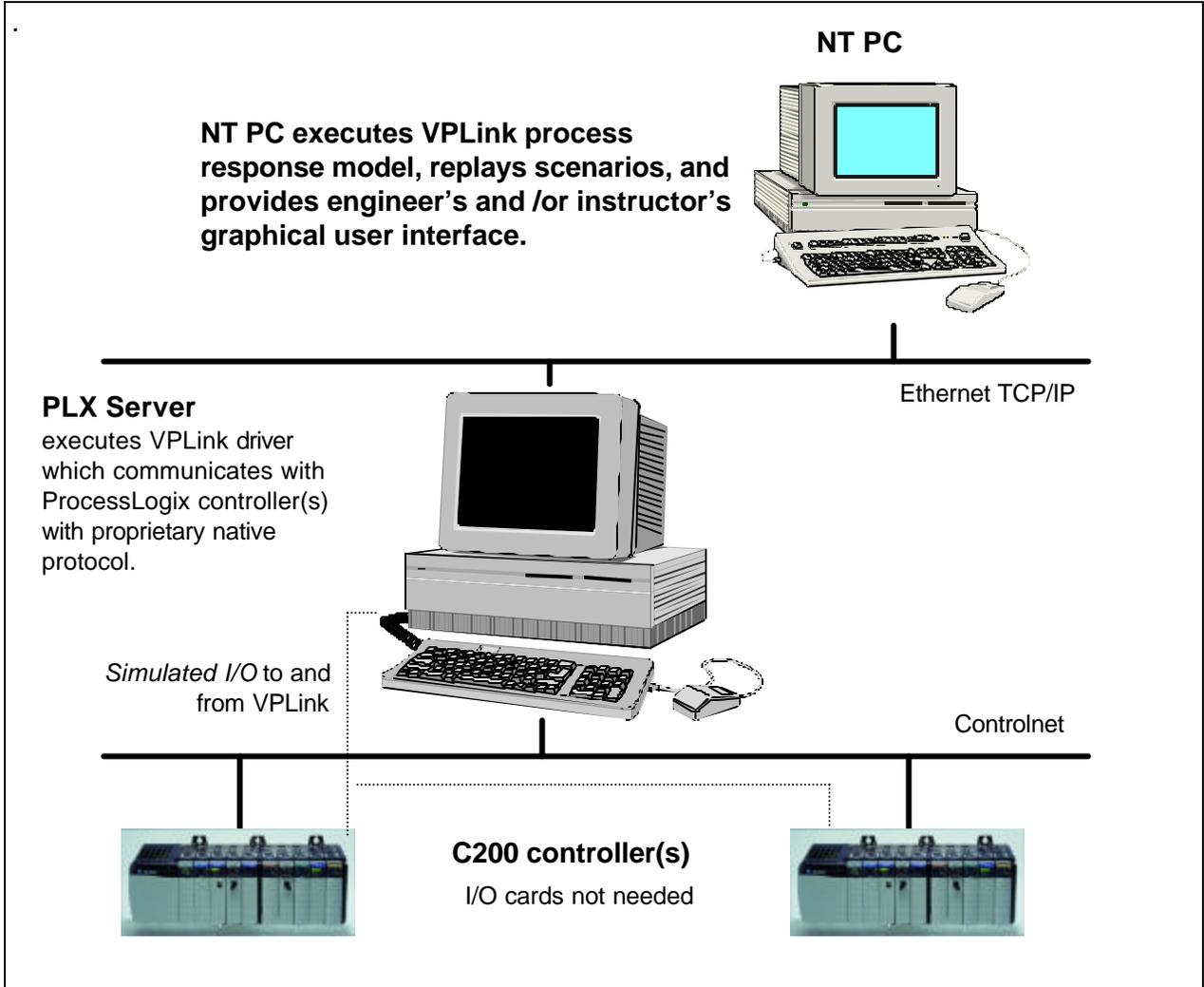
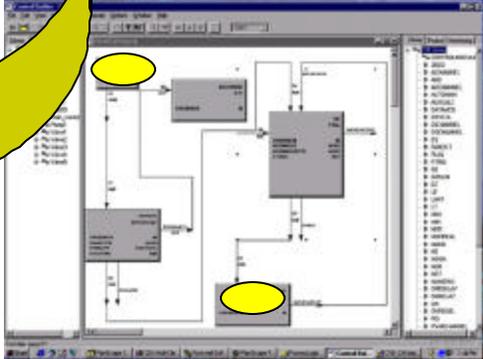
PLX server s/w

VPLink provides simulation for ProcessLogix

VPLink interrogates the ProcessLogix database to export the I/O assignments into VPLink import format. Utility scripts switch the I/O into "simulation mode" so that simulated feedback is delivered by the VPLink response model

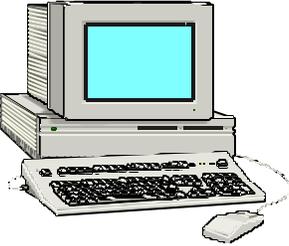
Application code executes on ProcessLogix controller

**VPLink Models
Process Variables and
Simulated I/O**



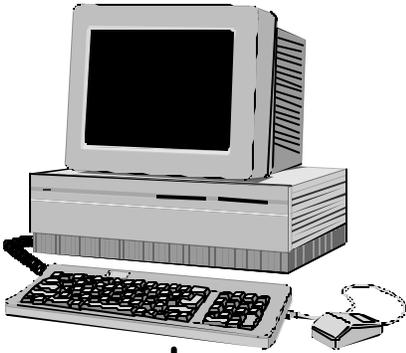
NT PC executes VPLink process response model, replays scenarios, and provides engineer's and /or instructor's graphical user interface.

NT PC



PLX Server
executes VPLink driver which communicates with ProcessLogix controller(s) with proprietary native protocol.

Ethernet TCP/IP



Simulated I/O to and from VPLink

ControlNet



C200 controller(s)
I/O cards not needed



Process Simulation Basics

Questions and Answers for ProcessLogix® Users

What is Process Simulation? The act of writing values for process variables, ie, field inputs, into the Processlogix using software, not the plant, bypassing real I/O. For Processlogix applications, the simulation software writes values for limit switch positions, motor contacts, flow rates, pressure transmitters, levels, temperatures, low flow switches, any/all inputs to the input assignment. The methodology could be implemented as either simple loop backs, a dynamics process model, or manual intervention.

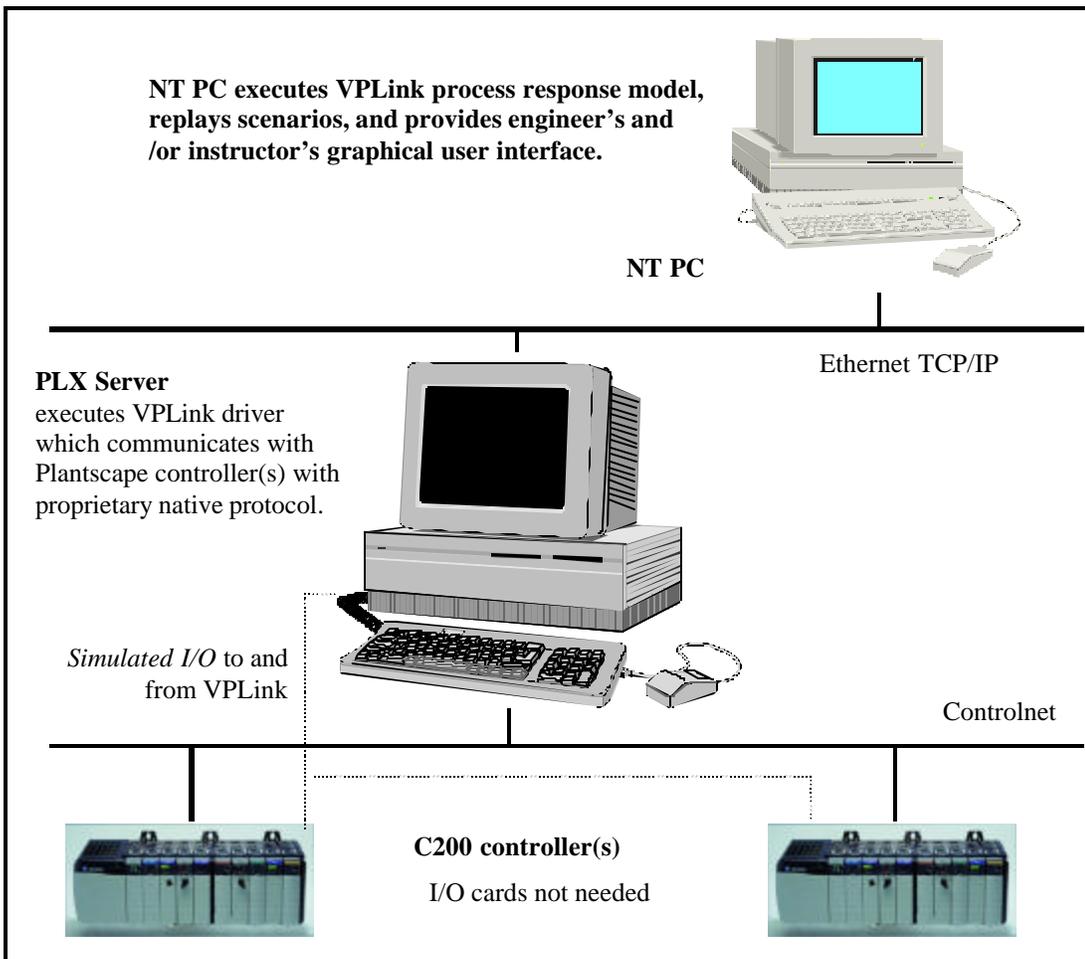
Why Process Simulation? Two Applications : (1) Control system verification/checkout and (2) Operator console training.

When? Before startup or commissioning of the actual system. Or, with the use of a spare offline system, anytime. The earlier, the better... simulation should develop alongside of the control logic implementation. During Acceptance Testing, the simulation is invaluable. For operator training, the week(s) in between F.A.T. and startup are the best time.

Who? Someone familiar with the process responses to the control system outputs. This may be the same person writing the control logic, but is often another individual from the team knowledgeable in the process.

Where? Wherever the system is being staged, or an offline training node can be found.

How? Applying VP Link® from Cape Software, Houston, TX



Benefits during Processlogix system checkout/ verification.

Checkout of graphics links. Rigorous testing of logic. Solution is non-invasive. Testing is documented. Scenarios automate testing so that many many more sets of input conditions are presented to processor than humanly possible.

Benefits during Operator console training

Trainee works in front of actual console with real displays. Trainee experiences startup and shutdown logic as well as normal operating conditions. Trainee experiences upset and fault emergency responses.