

Case Study: DNP3 Protocol Slave Driver for PLC

Provider Name : KALKI Communication Technologies (P) Ltd.

Client Name : Fortune 100 Automation Major

Project Title : DNP3 Slave Driver for GE 90-30 PLC

The Problem

The client, a Major OEM in the PLC and SCADA space, required to Implement DNP3 Slave capability to GE 90-30 PLC's. This involved the implementation of standards based ANSI C DNP3 Slave Source Code Library on their programmable co-processor module, as well as development of DNP3 Driver configuration utility for the PLC.

The Solution

The stated driver was developed using the following Resources:

1. PLC Programmable Co-Processor Module for GE 90-30 PLC
2. Documentation of Co-Processor Module and Programming Environment
3. DNP3 specifications and PLC Back-plane communication API's
4. Standard Device profile for the Slave

The said PLC provided a programmable co-processor module. This co-processor module ran a task-switching real-time kernel, as well as API's for back-plane communication with PLC CPU. The DNP3 Slave implementation was carried out using the ANSI C DNP3 Slave Source Code Library from M/S Triangle Microworks Inc., The library and its associated Macro's were compiled onto the target platform. The interface definitions were modified to achieve capability of accessing the Controller data using back-plane communication and time stamping and event detection were carried out at the Co-Processor module. The driver was designed to support multiple driver-redundancy using multiple co-processor modules.

A Configuration Utility was developed, which would enable the end-users and OEM's to configure the DNP3 Driver. This utility is an application software, with GUI's for configuring data types, point ID's, transmission speeds, redundancy options etc., This utility could be used by the users to modify the DNP3 Slave Driver, during Acceptance Testing, for support of different DNP3 Masters as well as for use at site.

The DNP3 Slave Implementation was Validated using DNP3 Test Toolkit from M/S Triangle Microworks Inc., USA. The slave implementation underwent further interoperability testing and Quality Validation by the Client's quality department.

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Tools Used:

- Microsoft C Compiler
- Proprietary Real Time Task Switching Kernel
- DNP3 ANSI C Source Code Library from M/S Triangle Microworks Inc.
- Embedded Processor Development and Debugging Environment
- Test Harness DNP3 Test Simulator
- VC++ based Configuration Utility