

Case Study: DNP3 Protocol Master for VMS SCADA

Provider Name : KALKI Communication Technologies (P) Ltd.
Client Name : Indian Oil and Gas Automation Major
Project Title : DNP3 Master Protocol Driver for VMS SCADA

The Problem

The client, a Major automation OEM for the Oil and Gas Pipeline industry, required to support DNP3 Master Protocol on their VMS based SCADA Software. This involved the implementation of standards based ANSI C DNP3 Master Source Code Library on VMS based systems.

The Solution

The stated protocol was developed using the following Resources:

1. VAX VMS System
2. Documentation of ANSI C Environment and VMS System Level Programming Environment on Digital's VAX Systems
3. DNP3 specifications and VMS Inter-process Communication Documentation
4. Standard Device profile for the Slave's to be supported

The said SCADA platform runs on the VAX VMS based system. The SCADA interface available for adding protocol support was studied and a model prepared to make the said interface totally protocol-independent so as to allow further protocol strap-ins. After review, the model was implemented and used for adding the required DNP driver. The interface was designed as IPC buffers for scan data and control commands with prioritized scanning of the same. It was required to design the Interface specification to ensure that the Master Source Code library interface definitions match the Interface definitions on the SCADA end. A Device Profile was arrived at after discussion with the Client, on the level of support required on the SCADA side, for future support of different DNP3 Slaves.

An initial dummy implementation was first carried on Windows NT Platform, and then later ported to VAX VMS. Additional features like Line Redundancy (to each slave with automatic switchover)etc., were also built on to the Protocol driver.

The DNP3 Master Implementation was Validated using DNP3 Test Toolkit from M/S Triangle Microworks Inc., USA and later with field RTUs. The Master implementation underwent further inter-operability testing and Quality Validation by the Client's project team.

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Tools Used:

- VAX VMS C Compiler
- DNP3 ANSI C Source Code Library from M/S Triangle Microworks Inc.
- Test Harness DNP3 Test Simulator