DNP 3.0 Ethernet

Description

The Ethernet DNP 3.0 driver allows the FieldServer to transfer data to and from devices over Ethernet using DNP 3.0 protocol. The FieldServer can emulate either a Server or Client. When the FieldServer is a Server (slave), only one Client (master) can communicate to it. The DNP 3.0 Ethernet Driver adheres to and supports the framework specified by the IEEE 1815-2012 Standard for electrical power system communications.

The following information was copied from the DNP 3.0 User Group Internet site:

The development of DNP3 was a comprehensive effort to achieve open, standards-based Interoperability between substation computers, RTUs, IEDs (Intelligent Electronic Devices) and master stations (except inter-master station communications) for the electric utility industry. Also important was the time frame; the need for a solution to meet today's requirements. As ambitious an undertaking as this was, we reached this objective. And since the inception of DNP, the protocol has also become widely utilized in adjacent industries such as water / waste water, transportation and the oil and gas industry.

DNP3 is based on the standards of the International Electrotechnical Commission (IEC) Technical Committee 57, Working Group 03 who have been working on an OSI 3 layer "Enhanced Performance Architecture" (EPA) protocol standard for telecontrol applications. DNP3 has been designed to be as close to compliant as possible to the standards as they existed at time of development with the addition of functionality not identified in Europe but needed for current and future North American applications (e.g. limited transport layer functions to support 2K block transfers for IEDs, RF and fiber support). DNP3 has been selected as a Recommended Practice by the IEEE C.2 Task Force; RTU to IED Communications Protocol.

DNP3 is an open and public protocol. In order to ensure interoperability, longevity and upgradeability of, protocol the DNP3 Users Group has taken ownership of the protocol and assumes responsibility for its evolution. The DNP3 Users Group Technical Committee evaluates suggested modifications or additions to the protocol and then amends the protocol description as directed by the Users Group members.

DNP3 Features:

DNP3 offers flexibility and functionality that go far beyond conventional communications protocols. Among its robust and flexible features DNP3 includes:

- Output options
- Secure configuration/file transfers
- Addressing for over 65,000 devices on a single link
- Time synchronization and time-stamped events
- Broadcast messages
- Data link and application layer confirmation

DNP3 was originally designed based on three layers of the OSI seven-layer model: application layer, data link layer and physical layer. The application layer is object-based with objects provided for most generic data formats.The data link layer provides for several methods of retrieving data such as polling for classes and object variations. The physical layer defines most commonly a simple RS-232 or RS-485 interface.

DNP3 is very efficient for a layered protocol while ensuring high data integrity.

DNP3 Benefits:

Because DNP3 is based on the IEC 870-5 requirements, DNP3 is suitable for application in the entire SCADA environment. This includes RTU to IED communications, master to remote communications, and even peer-to-peer instances and network applications.

Being an object-based application layer protocol, DNP3 has the flexibility to support multiple operating modes such as poll-response, polled report-by-exception, unsolicited responses and peer-to-peer. It permits multiple masters and encourages distributed intelligence.

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Users can expect many benefits from using DNP3. In the short term:

- *Interoperability between multi-vendor devices*
- *Fewer protocols to support in the field*
- *Reduced software costs*
- *No protocol translators needed*
- *Shorter delivery schedules*
- *Less testing, maintenance and training*
- *Improved documentation*
- *Independent conformance testing*
- *Support by independent users group and third-party sources (e.g. test sets, source code)*

Connection Facts

FieldServer Mode	Nodes	Comments
Client	1-65519	The FieldServer as a client can communicate to multiple Servers (outstations).
Server (outstation)	1	The FieldServer can emulate as 1single Server (outstation) per port. Note that only one master can communicate to the FieldServer.

Formal Driver Type

Ethernet, Client or Server

Compatibility

FieldServer Model	Compatible
ProtoCessor	Yes
ProtoCarrier	Yes
ProtoNode	Yes
ProtoAir	Yes

FieldServer Model	Compatible
QuickServer FS-QS-10xx	No
QuickServer FS-QS-12xx	Yes
QuickServer FS-QS-20xx	Yes
QuickServer FS-QS-22xx	Yes
QuickServer FS-QS-3x10-F	Yes

Connection Information

Connection Type: Ethernet

Ethernet Speeds Supported: 10Base-T, 100Base-T

Multidrop Capability: No

Devices Tested

Device	Tested (Factory, Site)
DPAC 2440	Factory

Communication Functions

The generic profile for the DNP 3.0 driver is available in DNP 3.0 format on the MSA Safety website.

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