DNP Application Note AN2022-001

DNP3 Device Profile

Guide to completion and understanding.

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1 Introduction:

Background.

The DNP3 Protocol has many features that make it extremely versatile and suitable for use in applications other than its originally intended electrical utility. The number of features and the many combinations available has meant that it is not easy to describe the implementation to the prospective user. In many cases the features that a device has available are in addition to any claimed subset level. The DNP3 Device Profile lists all the features that the device has implemented and the options available in those features. The Device Profile is useful for the manufacturer to define the functionality of the implementation before commencing the design, and also for the purchaser of the device to study to ensure that the device meets the intended requirements.

A third purpose for which the Device Profile may be used is for the integrator to store the settings that were configured for a specific project or installation.

However, over the years it has become obvious that some aspects of the Device Profile are not clearly defined, and this has resulted in very few Device Profiles being completed or interpreted correctly.

Purpose

The purpose of this document is to describe the various fields in the Device Profile and to give some guidance to the values that should be used to sensibly complete the Device Profile document.

This document DOES NOT provide guidance as to the requirements for conformance to the IEEE1815-2012 specification. The protocol specification should be consulted for guidance on the requirements for conformance.

References

The clauses in IEEE1815-2012 most pertinent to the Device profile are found in Section **14 Interoperability**. It is strongly recommended that this chapter is read before attempting to complete a Device Profile.

Section 1 Device Properties of the Device Profile document gives some valuable information on how the columns should be filled out and should be read and understood before completing the Device Profile.

General notes

The Device Profile tables are divided into four columns. If any of the cells are “greyed” out it means they are not required to be filled in. All the other cells should be filled in, even if it is to say “not applicable” or “N/A”.

Column one

The first column describes the feature to which the next three columns refer.

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Capabilities

The second column indicates all the possible options for the feature. None, one, or more of these may be selected. If the device does not support the feature then either the boxes are left unchecked or, if it is one of the options, the Not Applicable box is checked. If it is possible to configure more than one option on the device, then all the options that are possible should be checked.

Current Value

The Current Value shows the configuration of the device. For the Current Value to remain useful, changes to the device configuration must be synchronized with corresponding changes to the Current Value in the device profile.

The current value may be unspecified, i.e. left blank if, for example, the document is being provided by the manufacturer to indicate the capabilities of the device.

Configuration methods

The final column is where the manufacturer describes how the capability is configured if it is a configurable parameter. The possibilities for this column are listed in 1.1.10.

What does "Parse" mean?

Section 4 of the Device Profile describes the Implementation Table for the device. That is, it describes the functional capabilities of the device which comprise those required by the subset level and also those that are additional to the subset level.

The word "Parse" in this table means that the device, master or outstation, shall be able to understand the function and qualifier codes associated with the object group and variation, and shall respond to the message in the appropriate manner. This is covered in more detail in section 4 of this document.

The tables in section 4 can be confusing and are rarely completed correctly. Clause 12 of IEEE1815-2012 give a comprehensive guide to the parsing tables and should be read before they are completed.

1.1 Device Identification

The Device Properties section of the Device Profile is used to describe the properties of the device that are outside the scope of the DNP3 Specification but which are things that:

- Identify the device that is the subject of the Device Profile including the specific version,
- describe features supported by the device that are in addition to those required by the claimed subset level,
- describe how the device is configured

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