

# DNP3: Building on Success

By Ameen Hamdon

*With DNP3, utilities now have a solid protocol solution that provides proven inter-operability for substation automation.*

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In June 2000, *Utility Automation* magazine published an article that asked: "Is DNP3 the Right Standard for You?" For an overwhelming number of utilities worldwide, the answer to that question is a resounding yes.

A recent international substation automation study indicated that DNP3 is now the most popular protocol in use by global electric utilities. The DNP LAN implementation led the way for planned use by both North American and international utilities.

The August 2000 Newton-Evans Research Co. report, titled "The World Market for Substation Automation and Integration Programs in Electric Utilities: 2000-2004," surveyed 137 utilities from around the world about existing and planned substation automation programs. Of the total survey respondents, 20 percent plan to use the LAN implementation of DNP3 in their future projects for communications within the substation. Combined current and planned use of DNP3 from the substation to an external host was reported by 33 percent of respondents. Both figures indicate widespread adoption of DNP3 as both a serial and LAN communication protocol in the worldwide market, edging out proprietary protocols. The protocol fared better among survey participants than UCA/MMS and IEC 60870-5 protocols in most applications outside of Western Europe.

Charles W. Newton, author of the report, said, "Of interest in our study was that one of the major reasons utilities claim for slow implementation of substation automation programs is the lack of communication standards. Yet, the rate of adoption of DNP3 as a de facto standard around the world is phenomenal.

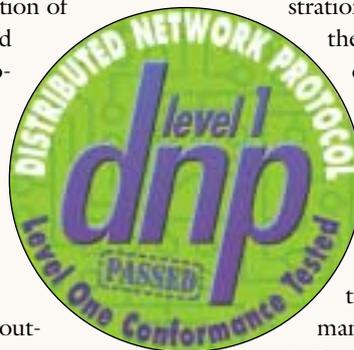
"The DNP User Group's success in continuing to migrate the protocol to meet users requirements and its progress in standardized testing and verification programs have made the protocol both technically and financially attractive to utilities and integrators/developers (implementers) from all corners of the world," Newton said.

## *DNP3—A Proven Solution*

The main reason for DNP3's enormous popularity is that over the years it has evolved from being a "published protocol" to a "proven solution." That evolution can be attributed directly to the ongoing grassroots efforts of the DNP User Group. Since 1993, vendor and utility membership in the group has steadily grown to its current worldwide membership of more than 300. The key to success for the DNP User Group is that it puts ongoing management of the protocol directly into the hands of the utilities and vendors who use it.

Its members have known for years that initial publication of documents defining the protocol and a few demonstration projects would not be the completion of a standard, but only the first steps in its evolution. The DNP User Group acts as the focal point for this ongoing evolution, bringing the entire DNP3 global community together to collectively manage and evolve the protocol. Due to this community support, the DNP User Group is able to address issues related to the protocol on an ongoing basis, helping ensure DNP3 truly is meeting its members needs.

The results of these efforts are clear. Utilities now have a solid protocol solution that provides proven inter-operability. When a utility chooses to use DNP3, it is



not limited to a small number of products available from a limited number of vendors. In fact, the opposite is true. Never before have utilities had so many vendors offering them such a large selection of intelligent electronic devices capable of communicating with one another. Furthermore, utilities benefit from the availability of many value-added products and services, including PC-based protocol test sets, DNP3 training, and specialized system integration services that have emerged as a result of DNP's popularity.



### *DNP3 Benefits Extend to Vendors*

DNP3's benefits to the vendor community are just as significant. For years vendors faced pressure to implement a large library of SCADA protocols in their products. Vendors grappled with this issue, as supporting new communication protocols is a costly exercise and the potential market for many of these protocols may be limited to only a few utilities. These issues basically disappear as a result of DNP3. Today, vendors that implement DNP3 know it opens their products to a worldwide utility marketplace that includes hundreds of utilities. Perhaps even more important are the results highlighted in the Newton-Evans study, illustrating that DNP3 serial-based and LAN-based solutions are identified as the most popular options for utilities in the years to come.

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DNP User Group members have worked diligently over the years to help vendors implement DNP3 into their devices more effectively. Years ago, three DNP subset levels were defined to assist vendors in determining what DNP functionality they should implement within their device. At the same time, the DNP Technical Committee also published the DNP Device Profile document that provided vendors with pre-defined templates to document their DNP3 devices.

The committee then developed standardized test procedures to help vendors ensure their devices conform to the DNP3 standard. The User Group also developed specially designed conformance-tested logos to help vendors promote their devices as meeting DNP3 conformance requirements. Additionally, beyond the User Group, many companies around the world currently offer turnkey DNP implementation services, DNP source code, and third party testing services that are designed to provide cost-effective, quick-time-to-market solutions for vendors.

A primary reason for DNP3's success has been its stability, coupled with interoperability and enhancements to ensure compatibility with existing implementations. Acceptance of the conformance testing process now means users have a deservedly high expectation that devices from disparate manufacturers will work correctly together out-of-the-box. The DNP Technical Committee continues to respond to marketplace needs while ensuring that extensions to DNP3 do not make existing implementations obsolete. This has been crucial in ensuring that existing DNP3 equipment and systems are compatible with the latest, most full-featured DNP3-compliant devices.

Vendors and utilities both appreciate this commitment to compatibility and continuity, as no one is left with unwanted orphans that don't fit in anywhere.

### *Building on Success*

The DNP User Group has ambitious plans for the future. It plans to improve services to its members by both advancing the DNP User Group organization and advancing DNP3 to further enhance the protocol's capabilities.

The main organizational advancements to the DNP User Group revolve around the new DNP Web site and a new DNP membership structure. The updated Web site and DNP membership program will be introduced at the DNP User Group's annual general meeting held in conjunction with DistribuTECH 2001.

The goal of the new DNP Web site ([www.dnp.org](http://www.dnp.org)) is to provide many new features to enhance the site's usefulness for both visitors and members. Highlights for the new Web site include:

- Specialized sections for the various DNP User Group committees, including the DNP Technical, Marketing and Liaison Committees.
- A new Conformance Test section that will provide details regarding conformance testing procedures and will list all DNP devices that have successfully passed conformance tests.
- A new DNP Product & Services Showcase section that will allow Premium Membership vendors to better promote their products and services via the Web site.
- A new section where Premium Membership vendors, utilities and system integrators will be able to share DNP project success stories.

Under the new DNP membership structure, the Basic Membership

(\$200.00/year) will be maintained, plus a Premium Membership that provides additional member services will be offered.

The Premium Membership will provide many high-value services such as the ability to market DNP3 products and services in the DNP Web site's Product & Services Showcase and in the DNP User Group booths at various tradeshow.

The User Group plans to reinvest the additional revenues generated from the Premium Membership fees to support DNP Subcontracting of Technical Committee activities. This will accelerate the User Group's ability to keep up with increased industry demands for additional testing procedures and functionality. The current DNP User Group and DNP Technical Committee volunteer model has been effective. DNP Subcontracting of Technical Committee activities will not eliminate the volunteer activities, but rather supplement them when tasks are too big for volunteers to handle expeditiously.

Chuck Newton noted that the DNP LAN and DNP IED conformance tests were two key reasons for DNP's continued popularity. These items represent two of the major DNP Technical Committee efforts over the past few years. A DNP3 Master Test procedure is scheduled to begin development in January 2001. The DNP Technical Committee is currently addressing several other key items, including:

- **DNP3-2000 Documents.** This is an effort aimed at consolidating the DNP3 Basic 4, subset definitions, technical bulletins and conformance requirements into one updated set of documentation.
- **CASM over DNP3.** This work is designed to provide a bridge to allow UCA to connect into DNP3 systems and to provide UCA services within DNP3.
- **DNP3 Security.** The DNP Users Group is participating in the IEC

working group on Data and Communications Security.

- **DNP3 Self-Description.** This is an effort to update the DNP3 Device Profile Object capabilities to support automatic configuration capabilities.

The vendors and end-user utilities employing DNP3 all have made significant investments into DNP3 product developments and utility automation systems over the years. They have a strong desire to see these investments provide benefits to their companies for the long term. As a result, their combined efforts, via the DNP User Group, will be focused on ensuring that DNP3 continues to be the right standard for them for many years to come. ■

Ameen H. Hamdon, P.E., is president of the DNP User Group and also president of SUBNET Solutions Inc., an engineering firm specializing in substation communications and networking products and services. Gary Moore, DNP User Group secretary, and Andrew West, DNP Technical Committee chairman, also provided input for this article. More information about DNP3 and the DNP User Group is available online at [www.DNP.org](http://www.DNP.org).