EDDL: Unlocking Device Information

Jonas Berge explains how enhanced Electronics Device Description Language (EDDL) simplifies device configuration, calibration and diagnosis, and brings benefits to the bottom line.

The breadth and depth of intelligent devices available to open interoperable systems necessitates a structured, flexible and scalable approach to administration of the software used to manage the devices. Electronic Device Description Language (EDDL) is the standard device description language at the core of software used with various intelligent device protocols like HART, FOUNDATION fieldbus, and PROFIBUS.

The standard core language insures the ability of users to integrate the information from different kinds of devices using different protocols, and EDDL serves as a single common language that ensure software can be kept current as new device versions are introduced.

EDDL can be likened to HTML (Hyper Text Markup Language), the underlying technology that makes information from a variety of sources easy to access on the Internet using any kind of computer.

Similarly, EDDL is based on Standard Generalized Markup Language (SGML) and was developed to make information easy to access from various buses using various digital tools.

Translating digital bus communication to values, text, and graphics for display and configuration and working in the background of standard communications protocols, EDDL is the engine in device configuration and maintenance software; it simplifies work for instrument technicians by allowing them to use a single tool for all the devices they support and avoid disadvantages associated with installing software for every device type.

Intelligent device management became viable with the introduction of EDDL in 1990, and EDDL with enhancements enables suppliers to present their devices in a user-friendly visual format rather than as just a table of parameters.

While there are many possible device management approaches, when it comes to long-term viability and the ease and cost of maintaining the device management software, EDDL is the better solution. Typical device management functions are explained in Table 1.

Enabling technology

A basic understanding of the unique characteristics of EDDL reveals how the language makes device management effective and enables users to enjoy the benefits of intelligent device management systems, handheld communicators, and predictive maintenance practices.

By contrast with printers interfaced via Windows operating systems, where only a few exist and require unique drivers, device management software tools must work with hundreds of device types and many versions of each, and more are added as new models and revisions keep coming. This is why a more scalable solution is required.

EDDL enables many different versions of devices to integrate with the same software and handheld. Using the EDDL standard, device vendors describe all the information in their device and how that information plus help text shall be displayed in the most optimal way to the technician using the device management systems or handheld EDDL, eliminating driver software.

Function	Example
Identification	Tag, Device ID, Manufacturer, serial numbers, versions etc.
Information	Materials of constructions, primary and final elements
Diagnostics	Sensor failures, loss of supply air, memory failures etc.
Performance Analysis	Valve signature, step response, hysteresis etc.
Operational Statistics	Reversals, total travel, power cycles etc.
Parameterization	Ranging, advanced setup, reconciliation etc.
Simulation & Override	Loop test
Calibration Trim	Correct measurement reading, output current, etc.
Device Security	Write protection
Documentation	Datasheets, manuals, procedures, loop diagrams, P&ID etc.
Monitoring	Dynamic monitoring of device internal parameters and logic
Maintenance	Logging of calibration, inspection, and service etc.
Service Notes	Permanent record of technician's observation
Audit Trail and Report	Reporting on all activities of activities for traceability
Device List	Listing of devices: active, failed, and spares etc.
Scheduling	Scheduling of maintenance and calibration
Reset	Restart of device
Commissioning	Tag and address assignment etc.

Table 1: Device management functions make use of EDDL

Since EDDL is a mark-up language for files describing the information in a device, the description file is based on tags similar to XML or HTML and includes label, data type, classification, range, unit, help text in many languages, and other aspects.

EDDL uses interactive scripts to help technicians through a series of steps to complete complex tasks such as diagnostics, calibration, and advanced setup. The EDDL files are small and therefore easily transferred across the Internet. Files for many types and versions of devices can be stored in handhelds.

After the EDDL files are copied into the computer or handheld communicator, software renders their displays based on the EDDL keywords in the file and the interactive method scripts. The software and handhelds work in a way analogous to how Web browsers render displays for HTML pages.

Meeting users' needs

NAMUR (www.namur.de) is an international user association of automation technology in process industries, where members pool experience to set requirements on new devices, systems and technologies, and participate in standardization efforts. And NE 105 is a NAMUR recommendation for integrating fieldbus devices in engineering tools. Its emphasis is on the fact that investments must be protected by a stable

interface between the application and operating system.

An issue of considerable importance in the process industry is the fact that plants are operated for many years. Device integration technology must not reduce the lifespan of the system as a whole and obsolescence resulting from the use of off-the-shelf IT products must be minimized.

EDDL has a number of characteristics (listed and explained below) that serve to meet user requirements for managing devices, management and long-term viability of the tools themselves as presented in the

NAMUR NE 105 recommendation for integrating fieldbus devices in engineering tools:

Full device functionality support

EDDL files are created by device developers to display the device, to step the user through advanced setup step-by-step, as well as to display sophisticated diagnostics information and assist the technician in the analysis. Intelligent device management software (on a host PC) and handhelds can access all functions even in the most sophisticated devices. The EDDL language includes methods for calibration and complex setup; presentation of waveform curves, continuous trend charts; graphical gauges and bargraphs; and images.

Consistent display of devices

Since EDDL works across all devices, and does not require individual drivers, intelligent device manager software and the tools for its use are consistent and easy to use. Device vendors decide what will be displayed for their devices to make it easy for the user to set up, calibrate, and diagnose. Device management software ensures that different devices from different manufacturers get rendered with the same style for consistency and ease of use. Mouse clicks and key strokes to transmit changes, zooming in on trends and waveforms are also the same for all devices.

Investment protection

Users in plants have found that the EDDL files in devices continue to work even when the device management software is installed
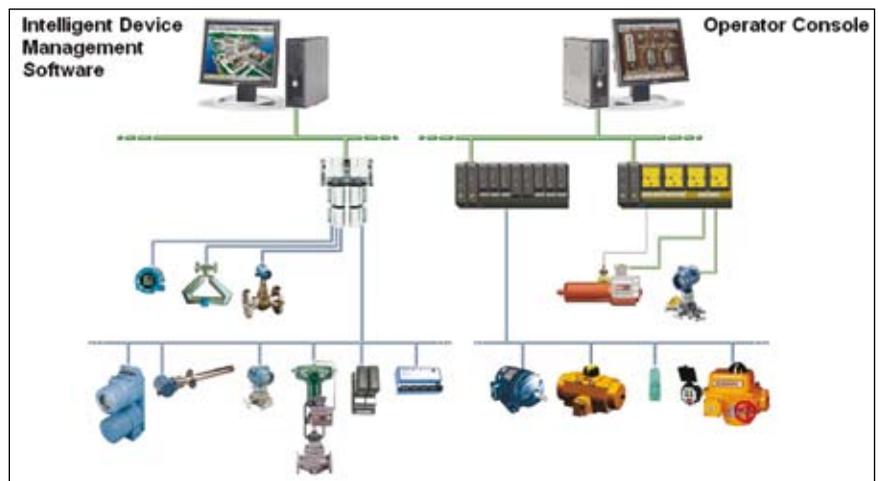
The position of device management software in the automation hierarchy. (Handheld communicators can also be used to access devices).
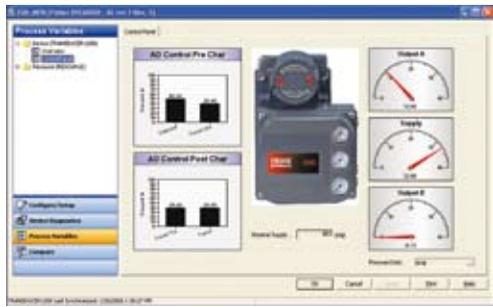
Gauges and bargraphs bring fieldbus numbers alive.

on new versions of Windows or when service packs are installed. Since EDDL is standard and not unique for each device type, upgrading computers, operating systems, and device management software eliminates the need to seek new drivers for old devices. This OS independence is one of the biggest advantages of EDDL as it ensures long-term viability of the intelligent device management software and tools. The investment by the plant in intelligent devices and the software that manages them is thus protected.

Single universal solution

EDDL technology brings together information passed over different protocols enabling host software to support a broad range of device types, for commissioning through to complex maintenance tasks. Software in PCs and handheld communicators use EDDL to display information ranging from simple text for basic temperature and bus health transmitters to rich graphics for sophisticated valve positioners and variable speed drives.

Easy integration

Adding support for a new device type or version to a system or handheld based on EDDL is straightforward. A small EDDL file is simply downloaded from the Internet and copied onto the device management software. Thus, new wireless devices, for example, to be easily integrated to existing device management software.

Full utilization of host features

Intelligent device management software based on EDDL does not require device vendors to write software to support parameter reconciliation, offline parameterization, save, or printing. Thanks to EDDL, the rich functions built into device management software can be used with all devices.

Externally accessible

EDDL-based systems decode the information in the devices not only for display on a local screen but can also make it available to other applications via an OPC server. This compares favorably against systems that only display information on the screen.

International standard

As an international standard (IEC 61804-3), EDDL ensures software and handheld communicators work with legacy EDDL files as well provide compatibility with files in new devices.

Robust

Intelligent device management systems or handhelds based on EDDL do not make procedure calls to third-party software. This avoids issues that can occur when varieties of device driver software from multiple vendors are combined. And with each device version having a unique EDDL file (no driver software or shared components), the risk associated with uninstalling old versions of device driver software on running control systems is eliminated.

Testing

Because the EDDL files are tested together with the device as part of the HART and FOUNDATION fieldbus interoperability registration process, software in systems and handhelds ensure smooth and risk free integration of hundreds of device types and versions.

Secure

When devices are added to EDDL-based systems or handhelds, no software is installed or registry entries made, thus minimizing the risk of malicious code and providing better security than software based on device drivers that could get infected.

Straight to the bottom line

To get management buy-in and budget allocation for the capital expenditure for the device management system, it can be justified on the ability for technicians to act quicker in response to device problems, before it affects production, as well as the ability to maximize the utilization of maintenance resources by focusing them where they are needed the most.

In addition, the benefits (see below) of device management extend throughout the lifecycle of the system: commissioning, normal operation, and maintenance. The cost of device management software is low

in comparison with the savings and plant output that can be achieved. Essentially, then, device management software gives plants a competitive edge.

- **Commissioning benefits**

The device management software starts paying for itself at control system commissioning. For example, "ringing out" of newly laid wiring becomes less labor-intensive and can be done much quicker. Faster loop checkout also comes from the ability to centrally activate simulation function in devices to verify loop function, and perhaps even more importantly, to verify device has been returned to normal operation and not permanently left in simulation. And device commissioning becomes faster thanks to automatic detection and identification of devices in a "live list".

- **Operational benefits**

Device performance affects process performance due to process variability and downtime. Moreover, poor device performance often goes unnoticed causing loops to operate sub-optimally which in turn can lead to premature failure due to increased wear from hunting valves, etc. Causes of process variability include long-term drift in transmitters, imprecision due to wear and tear, valve hunting and stiction, device failure and poor setup or tuning. The effect of process variability is poor quality and lower yield as well as throughput below design capacity. The wrong solution, which is all too often used, is to put the setpoint above the requirement – a comfort zone to avoid alarms. This results in quality give-away and it consumes more resources. The right solution is to use the device management software to detect causes of variability and eliminate them.
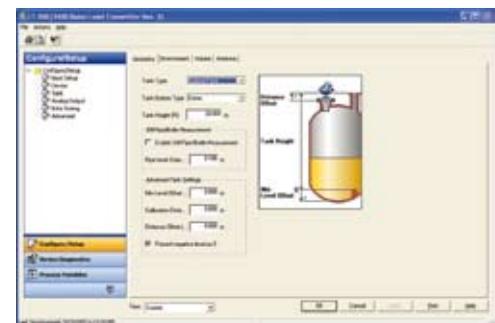
For users, EDDL files simplify the device setup process – in this case, radar level transmitter tank geometry.

• **Maintenance benefits**

The greatest saving from device management comes from improved maintenance practices that includes reduced field visits by first diagnosing devices centrally before going out to the field to verify that "hunches" are indeed genuine problems. The system automatically keeps up with device conditions, thereby eliminating unnecessary routine checks, and some problems can be solved centrally by simple parameters changes such as damping or tuning. And device faults are displayed with finer granularity enabling the technicians to pinpoint the source, the cause, pick the right spares, and tools and thus resolve the problem faster.

> # The greatest saving from device management comes from improved maintenance practices."

• **Compliance benefits**

The device management software may optionally include an audit trail that logs all tasks performed, such as parameter changes, device replacements, calibration, and maintenance inspection. This reduces paperwork time and simplifies compliance to ISO 9000, OSHA 1910, and FDA.

Key to interoperability

Its ease of use and robustness makes EDDL the preferred device integration technology for most plants the world over. EDDL with enhancements makes "surfing devices" for information easy, much like HTML makes surfing the Internet easy. This makes technicians more effective in their work. Similarly, EDDL makes it easy for the device management software, systems, and tools to keep up to date over the long lifespan of process automation systems.

Intelligent device management system is at the heart of a digital plant architecture that uses the power of field intelligence to improve plant performance. There is no

Future Device Integration: One Is Better Than Two

At an historic press conference during Hannover Fair 2007, the FDT group announced their decision to join the EDDL Cooperation Team (ECT) to work alongside the existing members from the HART Communication Foundation, Fieldbus Foundation, Profibus International, and the OPC Foundation. The extended team will develop a next-generation Field Device Integration (FDI) technology based on EDDL. It will also develop an added plug-in software interface model from device software driver, based on OPC-UA specifications.

Raising the flag: collaboration between the EDDL and FDT camps to develop next-generation Field Device Integration (FDI) technology was announced at this years Hannover Fair.

Flavio Tolfo, Managing Director of the FDT Group: "After much discussion, we reached a commitment to work together and protect the investment of each technology for the benefit of end users. The FDT Group is looking forward to bringing to bear its broad experience of integrating software applications in conjunction with device descriptions by joining the EDDL Cooperation Team to solve end user needs."

ECT Chairman Hans-Georg Kumpfmueller commented, "This agreement, once brought into reality, is a major step forward for device integration in several areas. It eliminates double efforts for customers and vendors, and preserves backward compatibility and operating system independence. Our agreement is more than a compromise; it is the natural technical evolution based on the most up-to-date, open and flexible technologies."

The FDI project is in its infancy, but will advance the cause of process users when products come to market.

single fieldbus to deliver accurate, actionable information to the right person in time to make a difference. Different protocols and devices of different types from different manufacturers must work together in the same software.

A typical plant may be using FOUNDATION fieldbus for process control devices, PROFIBUS DP for motor control centers, and HART for functional safety instruments. And it is EDDL that provides the key to interoperability along with a myriad of user advantages.

Jonas Berge is Senior Manager, PlantWeb Consulting at Emerson Process Management Asia Pacific, and the author of the books 'Fieldbuses for Process Control' and 'Software for Automation'. For more information on EDDL, refer to www.eddl.org

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