White Paper

Honeywell

Honeywell Process Solutions

Standards for Open Device Integration

Introduction

In recent years, field devices and equipment supporting digital technologies have become widely adopted in the process industries and have proven to provide benefits to customers. Digital devices and equipment provide a great deal of data about the operating environment. This data can lead to several useful applications that prevent losses or disruptions, enhance quality and reliability, and reduce maintenance costs. One of the key reasons for their growth and popularity has been open standards like HART*, FOUNDATION* Fieldbus and Profibus*.

Open standards provide customers with freedom of choice, allowing a control system and its input/output devices to all be from different manufacturers. Long gone are the days when a customer's choice of devices was limited by the choice of the system. This has not only created a more open and competitive marketplace which reduces costs, but has also led to increased innovation, allowing field devices to be more complex and intelligent than ever.

This innovation has led to interoperability issues with complex devices in distributed control systems. The key issues are with respect to availability of functionality, like valve signatures with smart valve positioners and echo curves with level instruments, from these complex devices in all systems. Today, there are several diagnostics from field devices that may work on one system from vendor A but not from a system from vendor B. When coupled with the trend that devices are getting more complex, this only makes us wonder if we are headed back to the times of proprietary standards.

Two industry initiatives, EDDL and FDT-DTM, have emerged to address the drawbacks. This paper will examine these technologies and provide customers with recommendations on what they should expect from their suppliers.

DD Technology

While open standards like HART, FOUNDATION Fieldbus and Profibus must enforce certain specifications for field instruments to follow, all of these standards are extendable so that device vendors can provide differentiating features and functions in their own products. The vendors can add their own parameters, diagnostics, wizards and other functions that help them remain competitive in the marketplace. This is a key characteristic of open system standards that is so attractive to the marketplace. Simply put, each device can have unique features and functions and yet completely conform to the standard.

If you are wondering how host systems deal with the differences between devices, this is where the Device Description (DD) file comes in. A DD is a file developed by the device vendor and used to describe all the functions and parameters built into the device. The format of the DD file is specified and regulated (through testing and certification) by the respective protocol foundations. Host systems use these DD files to learn about device capabilities. A full DD-capable host system can completely access all functionality in the device.

A key point that is easy to miss is that the field instrument protocol itself does not guarantee interoperability. Ensuring that the correct integration technology is placed on top of the communication protocol does. This is why awareness of DD technology and FDT-DTM is important.

The DD standard was created in the 1990s, and the devices available during that time were not as complex as they are today. The original DD technology had some shortcomings, such as:

- Inability to access and render graphical data (like graphs, trends and pictures)
- Little consideration given to windows, dialogs, etc. (DD was designed for a handheld)
- Inability for the devices to access historical data stored on the host (needed for diagnostics which require trend data analysis)

This led to the need for standalone proprietary tools which worked only on some systems and not with others. There were other issues with standalone tools, such as:

- No central database/data store
- No common security/authentication mechanism
- No common history and audit trail
- More training and maintenance
- More integration effort

As a result, two standards, EDDL and FDT-DTM ,have emerged to address these issues.

EDDL: Enhancements to the DD Language

EDDL, which stands for **Electronic Device Description Language**, is based on existing DD technology. It represents significant extensions to the DD language specifications. The enhancements include:

- Additional graphic support (images, charts, trends, graphs, etc.)
- Extended windowing support (windows, tabs, dialogs, parameter groups, etc.)
- Better computation capabilities (full math library support)
- File and data store and access (for history and trend access)

Using the DD enhancements in EDDL, a vendor can now develop support for advanced applications, like valve signatures and other diagnostics, which will work on any system supporting these enhancements. EDDL files are developed using the same tools and practices used by the DD technology, making support for them easier.

FDT-DTM: Device Application Integration Technology

FDT-DTM stands for **Field Device Tool**, **Device Type Manager**. Supported by the FDT Group, FDT is a Windows COM-based technology which standardizes the communication interface between field devices and systems. The device supplier develops a Device Type Manager (DTM) for each of its devices or group of devices. The DTM encapsulates all the device-specific data, functions and business rules, such as the device structure, its communication capabilities, internal dependencies and the human machine interface (HMI) structure. DTMs provide functions for accessing device parameters, configuring and operating the devices, and diagnosing problems. A DTM can range from a simple graphical user interface (GUI) for setting device parameters to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes. The DTM is loaded and launched in an FDT container program (also called as an FDT frame application). The host environment has an FDT container that defines a set of interfaces between the host application and the DTM. Frame applications can be device configuration tools, control system engineering tools, operator consoles or asset management tools.

The frame application also contains the communication component to interface the host system with the specific communication protocol (HART, Profibus, Fieldbus, etc.). The FDT container initiates the DTM and enables the device to interoperate with the system engineering and operating environment.

A DTM can provide advanced specialized applications and yet still interoperate with the host system without any integration effort. DTMs can provide a consistent HMI, a common database, history, audit trail and security.

Differences Between EDDL and FDT-DTM

Though these two standards appear to serve the same purpose, they are based on different technologies and have some significant differences. The table below summarizes the differences in key areas:

	EDDL	FDT-DTM
Control Use	Yes, an EDDL provides information used by the control system	No, a DTM is an independent program and is not used in control strategies
Advanced Application Integration	Yes, used anywhere control data can be used	Yes, but only within the DTM
Setup/Installation	Addition of a file to the host program One install per system	Installation of each DTM (single or package) per client
Distribution	Fieldbus organizations and instrument vendors	Instrument/device/equipment vendors
Communication Interface Support	No	Yes
Alarming and Notification	Yes	No
Operating System	Interpreted by the host or DCS	Windows (version specific)
Certificate	Yes by each Fieldbus organization	Yes by FDT group
Certification Process	Yes by each Fieldbus organization	Yes by FDT group
Protocols	HART, FF, Profibus	Any (Fieldbus, HART, Profibus, Inter-bus, DeviceNet, more in prep.)

Conclusion

EDDL and FDT-DTM are complementary technologies, important to the open integration of control systems and instrumentation in multi-vendor environments. Benefits of supporting both include freedom of choice, reduced integration costs and, most importantly, the advantages of continuous innovation that open systems offer. You should expect support for both of these technologies in your control system as well as in your smart instrumentation to help you gain access to all device information and diagnostics.

More Information
For more information on Honeywell's asset management solutions, visit our website www.honeywell.com/ps, or contact your Honeywell account manager.

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