FDT®GROUP

Real-Time Data

Solving the IT/OT Divide
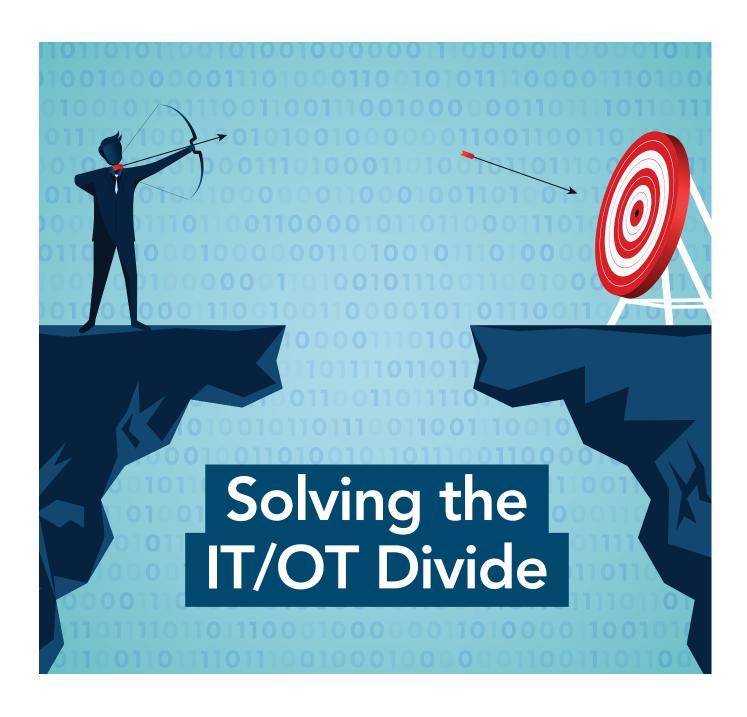
Standardized IT/OT Data Interoperability is Here Today – Ask for FDT UE

Enable a direct connection to the IT world with OPC UA integration/information modeling making data sharing seamless

Author: Steve Biegacki – FDT Group Managing Director

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FDT Group Managing Director

FDT Group's IEC 62543 field-to-cloud integration standard has a well-established, global installed base in the user community. Companies recognize the business benefits and specify FDT-enabled devices (DTMs) and systems (hosts) to provide a single, consistent and easy-to-use method for the design, configuration, and management of any device, across any hierarchy of networks. The embedded nature of FDT allows users the freedom to choose devices that best fit their control applications. The industry takes for granted the true openness FDT enables, as there are millions of FDT 1.2/2.x device DTM's in field operation today.

Although FDT Group has existed for 20-plus years, we find the organization at a transition point that matches the industry's transformation to end-to-end data-rich device intelligence and communication enabling IIoT applications.

In 2020, FDT Group launched the FDT 3.0 specification and developer tools simplifying migration to service-oriented device management solutions that take full advantage of FDT's foundational features at the request of the end-user community. With complete interoperability and device management that is now standardized based on NAMUR (NE107), the FDT 3.0 standard enables a direct connection to the IT world with OPC UA integration/information modeling making data sharing seamless.

With a great deal of collaborative support from other standards organizations and subject-matter experts that poured manhours into creating FDT 3.0, the FDT Group now offers the only standardized integration and data management solution making IT/OT convergence a reality out of the box. This is possible because of the main components of the spec; an enhanced device DTM which now includes a WebUI with separate business logic, an FDT Server creating an IIoT data hub with distributed control, and the FDT*hub* providing a single point of access to all certified DTMs — no more searching through websites for device drivers. The new standard creates a unified environment offering a modernized approach to device integration, management, and monitoring of control system devices.

Although FDT 3.0 focuses on extending data interoperability and access, the platform inherently supports its base of FDT 1.2 and 2.0 DTM's. The hosting upgrade allows a simplified migration path for customers when they have the business need to take advantage of the new benefits that FDT 3.0 device DTM's can provide.

Users currently using an FDT-enabled desktop hosting environment can migrate to an FDT Server environment providing a seamless connection to their IT business unit with the inclusion of a native and pre-wired OPC UA server. This allows any authenticated ERP, MES, or higher-level system application access to the FDT 3.0 server IIoT data hub. This opens a new world of device data connectivity to the entire enterprise with a tight connection to the IT infrastructure.

Although the FDT 3.0 spec is new and provides continued support for the current installed base of DTM's, the connection with OPC UA is a breakthrough for the industry. System vendors ready to answer the demands from end users can immediately embed the FDT Server in their asset management offerings allowing controllers and IT systems access to critical control device data — for configuration, control, and collection of data to be used in applications as asset management systems.

Many organizations are trying to create what FDT 3.0 can enable today — a seamless connection to devices for the reasons mentioned above. FDT 3.0 provides the Unified Environment you are familiar with, and it's here today. If you need IT/OT integration today, ask your vendors for FDT (3.0) UE!

EMPOWERING THE INTELLIGENT ENTERPRISE

Use Case: It's Not Enough
To Be Smart: Simplifying Device
Lifecycle Management

What Do Users Need? Simplification Based on Standards

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Consumer packaged goods (CPG) brands experienced intense growth during the pandemic. That high variability may remain for some time, according to McKinsey and Company, as consumers continue to make demands for more and different products.

Take-aways and lessons learned from that period continue to help companies like Procter & Gamble (P&G) navigate the future, including the ability to maintain and ramp up production to meet increases in demand.

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The future is encapsulated in P&G's Smart Process Cell (SPC), which recently tested Ethernet-Advanced Physical Layer (APL) to streamline networking, automation and process control. The slimmer Ethernet layer will modernize the hybrid skid supporting continuous and batch operations. It also will deliver better business decisions by connecting to the IT world focused on sharing diagnostic data from smarter devices to higher-level systems that need this data.

Figure 1: P&G's Ethernet-APL demonstration project at the company's Corporate Engineering Technology Lab (CETL) in West Chester, Ohio. This includes four tanks from 375 to 500 kg, six pumps with flowmeters, and three units performing continuous and batch operations. It runs water as its process fluid and is completely self-contained and remotely operated.

According to Paul Maurath, Ph.D., Technical Director, Process Automation, P&G, the coming new generation of "smarter" devices such as Coriolis flowmeters, pH transmitters, radar level gauges, pressure transmitters and even discrete devices on/off valves have more data to share — and more upper-level systems such as maintenance and data analytics want that information. Today end users face significant challenges integrating, managing, and monitoring these devices, which will hinder their adoption.

Reduce Lifecycle Complexity
For P&G today, conventional analog and discrete I/O dominate its architecture, which is highly distributed using an Ethernet backbone. Smarter devices using technologies like Ethernet/IP and IO Link are joining these networks, adding both functionality and complexity.

In addition to improved networking strategies to take advantage of real-time diagnostic data, P&G wanted to improve device management and maintenance strategies to handle the lifecycle of all connected devices. From

configuration to device replacement across networks, intelligent device management becomes a crucial factor in efficiently managing uptime and production.

What Do Users Need? Simplification
Paul's ask of partners is simple but not easy: With smarter, more complex devices, including everything from I/O to flow meters, he says, "Help us manage complexity."

From the ODVA and FDT Group General Assembly presentations, Paul compares the diversity of Logitech mouse options for Windows to a factory floor, with the tremendous variability of devices and features.

"When you replace a device like a mouse, what's happening in the background that you might not think about? You are losing the connection to the old device and finding a new one. If it's a simple wired two-button mouse, that's easy. But what if it's a complex gaming mouse with 15 configurable buttons and you don't have an exact replacement available? Can Windows find and install the right driver? What happens to all those configurable functions?"

The same can be said for replacing any device in a control system, like a pressure transmitter. If it's a conventional 4-20mA device, it is straightforward, even including HART configuration. But what if it's a smart device that uses Ethernet/IP or IO Link?

"The new product might look like the old product, depending on what you had in the storeroom, but once the application loses the initial connection and it must be reconfigured, this is where the problems can start."

How does the new device communicate? Is its new configuration file available? Does the controller have to be restarted or reloaded to reach the new device? Is the data structure the same for the new device, or does the application code have to be changed? How long will it take to get these tasks done?

While these big questions loom, the line is down and the biggest unknown remains: how long until that line is back up and running?

"This initial communication configuration is a headache, and it could get worse going forward, when devices turn into smart devices, with more parameters and configuration variables," Paul says. "To address this, we need help from suppliers and standard organizations around integration and compatibility."

Solutions must include what's needed to troubleshoot and repair a smart system and an easy way to replace devices to avoid delays of hours or even days.

Reduce Configuration Confusion

Anyone who has had to install, configure, replace or troubleshoot devices like a smart process transmitter can attest to how difficult the process can be. Does every device interface (and there can be several views) show the same information? If the answer is no, then it's too easy for the user to unknowingly download and overwrite the configuration.

Today, there's no easy way for controllers to upload configurations for field devices. Consequently, if a technician adds a filter to a device, a master controller may come along later and wipe out those changes. Who has the right configuration? And who has the master copy?

The options are enough to frustrate even the most experienced professionals. That's why FDT is focused on streamlining the work.

FDT Device Lifecycle Management Solutions for Distributed Architectures

As a standards organization with 20 years dedicated to smart device integration and lifecycle management, FDT can provide open standardized solutions to help address P&G's use case questions for lifecycle management of smarter devices. The solutions are adaptable to suit any networking topology including newer, streamlined Ethernet architectures.

FDT is a globally adopted standard (IEC 62453) designed for the integration, configuration and monitoring of networks and devices for enterprise-wide connectivity in brownfield and greenfield applications. The FDT standard serves software-based hosting (desktop/FRAME or Server) environments and device (DTM) solutions that open and unite the architecture independent of the mixed network topology, device/type or vendor. The embedded FDT host (which acts like a device manager) environment runs communication to the connected devices via DTMs in the background much like a PC's device manager would for peripheral devices like a mouse or printer. The end result: an open architecture giving the user freedom and flexibility to pick device/type/driver/vendor for their application, while providing a unified environment for device management. This simplifies intelligent device management, including design, integration, configuration, monitoring and replacement, for any connected device on the networks.
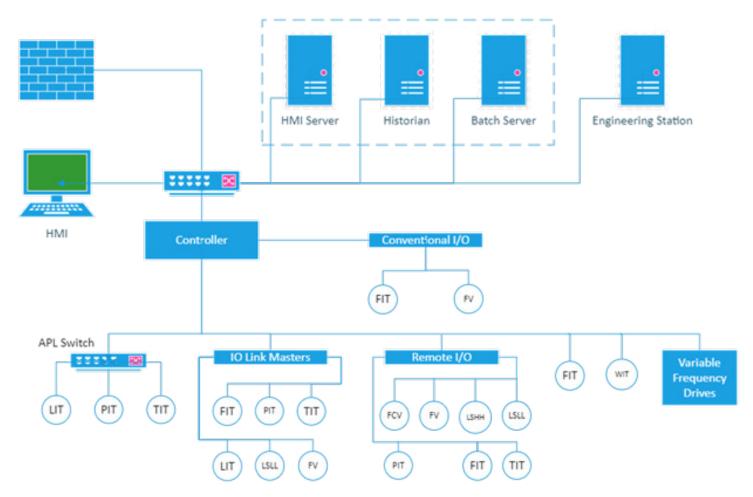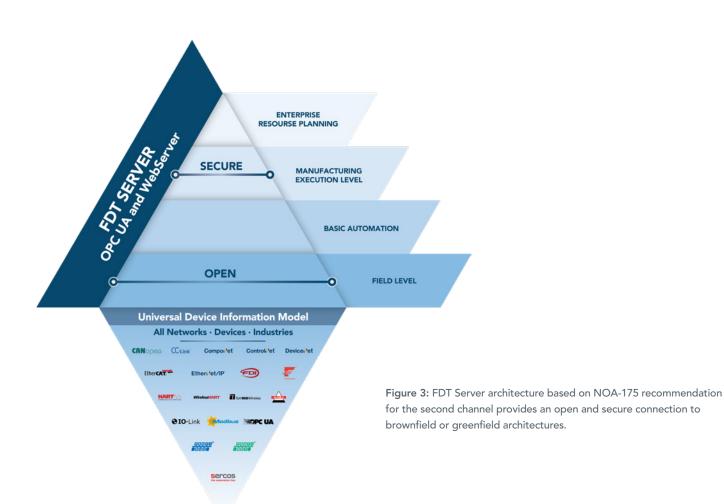

Figure 2: The SPC Today migrated to include APL and added IO-Link to its EtherNet/IP architecture.

Figure 3: FDT Server architecture based on NOA-175 recommendation for the second channel provides an open and secure connection to brownfield or greenfield architectures.

Specific to P&G's upgraded brownfield application, an FDT Server can provide a distributed control environment to handle device/process lifecycle management via the second channel that is recommended by the International User Association of Automation Technology in Process Industries (NAMUR) Open Architecture (NOA) - specifically NOA-175.

Two Solutions

There are two possible solutions to help solve intelligent device management complexity and protect the integrity of the installed base with modern ways to manage and monitor devices and data. Both are based on applying the FDT Server according to the NOA second channel solution.

Deploying the FDT Server on-premise gives the user direct access to field devices to gain real-time, OT data access, optimizing monitoring and maintenance practices via browsers or mobile devices. Additionally, the solution allows data mapping according to OPC UA information modeling so OT data can permeate the IT world (on-premise or cloud) allowing higher level systems/clients, HMI server, historian, batch server, engineering and maintenance servers authenticated access. The optional

FDT*hub*™ (DTM repository), deployable in the cloud or on-premise, allows automatic device detection and configuration and is a valued service focused on maintaining device software drivers, updates and apps.

The FDT*hub* assists the FDT Server with device replacement. In the event of adding newer, smarter or different devices, the FDT*hub* connected to the FDT Server will auto-detect a new device on the network and notify the user to configure the device (offline if needed). The Server will remember the device's old parameters, assuming that some parameters may cross over to the new device and implement new configuration parameters custom to that new device.

The Answer Is In the Standard

FDT is the internationally recognized, widely deployed, universal integration standard that allows devices to connect and communicate by seamlessly integrating all industrial networks into one project view.

That's important because future networks and architectures will only become more complicated with smarter and more
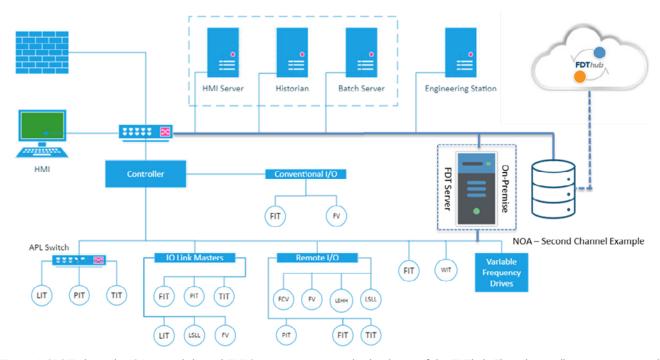
Figure 4: SPC Today with NOA second channel FDT Server on-premise with a local copy of the FDT*hub*. The solution allows monitoring and optimization of all field devices via OT and IT clients with all services hosted on-premise.
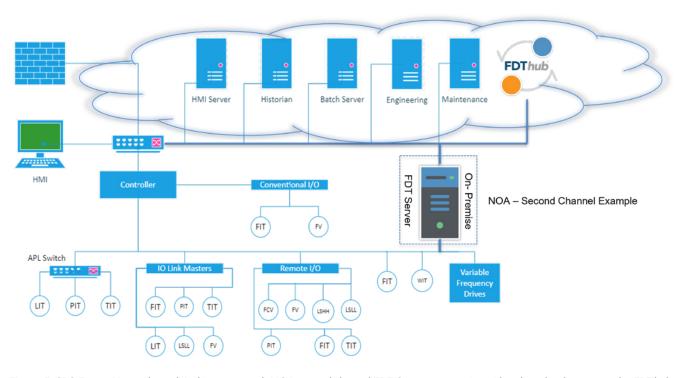

Figure 5: SPC Future Networks and Architectures with NOA second channel FDT Server on-premise with online cloud access to the FDT*hub*. The solution allows monitoring and optimization of all field devices via OT and IT clients with all services hosted in the cloud.

capable devices. New technologies based on standards deliver elegant solutions built on functionality and simplicity, rather than imposing a technology burden. The solutions put the end users who will troubleshoot these systems front and center when creating and managing standards.

"Smart devices are complicating our world, so it's critical for us to have standards that allow them to work with each other and our automation systems," adds Paul. "The market will decide which standards succeed, but we still need simple, functional technologies that are easier to implement, maintain and migrate over time."

FDT UE Makes IT/OT Data Integration a Reality—Today!

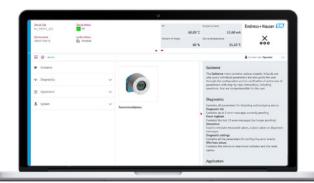**FDT GROUP**

OPC UA SERVER

WEB SERVER

FDT SERVER

Process
Hybrid
Factory

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utthunga
Engineering Transformation

FDT/DTM DEVELOPMENT

FDT INTEROPERABILITY SERVICES

FDT CONSULTATION & ADVISORY

FDT 3.0 (FITS) BASED MOBILE APP DEVELOPMENT

ASSET HEALTH MONITORING APP DEVELOPMENT

UTTHUNGA'S FDT SERVICES & SOLUTIONS

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PRE-COMPLIANCE & CERTIFICATION SUPPORT

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FDT UTP TO FDT-DTM

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MULTIPLE FIELD DEVICE PROTOCOLS SUPPORTED

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Benefit from the New DTM User Interface — It's More Than Just a Facelift

Device DTM's are embedded device drivers representing simple and complex smart instrumentation with specific parameters/functions and interfaces. DTMs allow all devices and device representations (DD, EDD, FDI, etc.) to connect and communicate with any FDT hosting environment (PC or device configuration tablet) independent of any network topology. They provide a unified environment empowering operators with a single user interface simplifying field-to-host interoperability and lifecycle management (device integration, configuration, monitoring, diagnostics, etc.).

With millions of DTMs in service around the globe, the user community is fond of the intuitive user interface that offers data consistency effective for asset management. DTMs are the perfect diagnostic assistant working 24/7, allowing operators a dashboard glance of asset health for predictive maintenance strategies. Endress + Hauser is committed to delivering a comprehensive device management environment based on your choice of FDT or FDI.

DTMs – The Hidden Heroes of Asset Management:

- DTMs enable smart devices — standardized integration, access, configuration, and monitoring of all field devices with any FDT hosting environment.
- Interactive DTM user interface — new design with modernized menus and features simplifies daily maintenance work.
- Improves plant lifecycle maintenance — commissioning field devices, and replacing obsolete assets.
- New wizards and DTM menus — streamline operations and improve accuracy along with worker safety while saving time and money.

Endress+Hauser has enhanced the DTM user interface based-on user-driven feedback with new features improving intelligent device management.

- Fast commissioning – Commissioning a new device can turn into hours if parametrization is not clear. The new DTM interface comes with an installation wizard guiding you through the installation and parameterization process.
- Easy operations – View and access device health status at a glance and gain real-time measured values from the top of your screen.
- Obtain the cause and remedy information for maintaining your asset with one click.
- Seamless documentation – The DTM gives you an easy option to document the device configuration paperlessly.
- Advanced usage – More functionalities added for specialists: e.g., you can switch on/off different diagnostics.

Schneider Electric

TeSys island – Full Tool Integration into EcoStruxure Control Expert Supporting M580 Controller

AUTHORS:
Norbert Gehre – Marketing Offer Range Manager

Dominique Leduc – Device Life Cycle Marketing Manager

FDT DTMS MAKES IT EASY TO ENGINEER, MANAGE AND MAINTAIN ALL YOUR LOADS, REDUCING DOWNTIME

The TeSys island load management solution has extended its FDT DTM based tool with more functionalities and optimized integration into the Control Expert engineering suite of Schneider Electric!

TeSys island is the fully digital load management solution for Direct Online Loads (DOL) like asynchronous motors or any other AC electrical load up to 80 Amps. With the object-orientated approach of TeSys island all loads are managed as a digital twin, called TeSys avatars. This makes it easy to engineer, manage and maintain all your loads. With the availability of all relevant load data like diagnostic data, warnings, maintenance messages, load current, energy and power data, it is now possible for OEMs and end-users to monitor, optimize and maintain its application while reducing downtime. TeSys island support several fieldbuses like EtherNet/IP, Modbus TCP, PROFINET and PROFIBUS.

TeSys island configuration tools are built upon FDT DTM technology including controller specific function block libraries. The DTM based tool gives full control to the TeSys island configuration and is seamlessly integrated into the EcoStruxure Control Expert. The function block libraries are dedicated to the different functionalities and data available within TeSys island. This means that you have structured

function blocks for tasks like avatar (load) control, load and system diagnostics, power and energy monitoring, communication management and asset management. With the availability of these libraries the programming effort to control and monitor AC loads are simplified, and engineering efforts are minimized.

All files are available for free download without the need of registration and licensing.

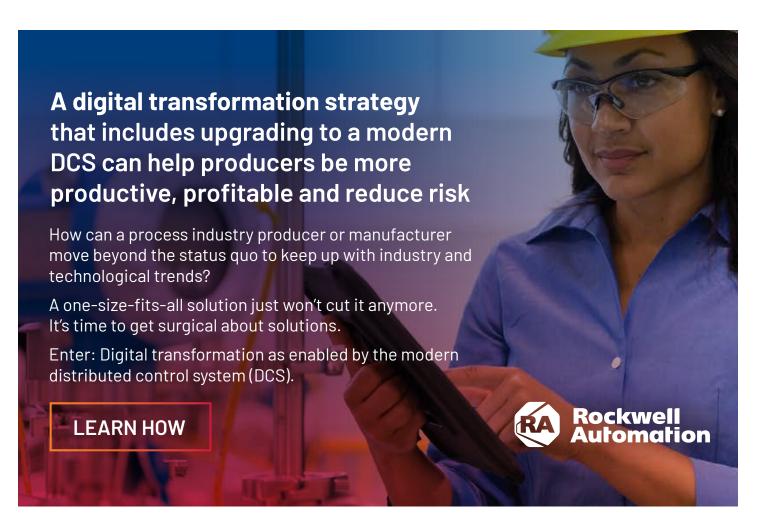**TeSys island — EcoStruxure Control Expert Classic Quick Start Guide**
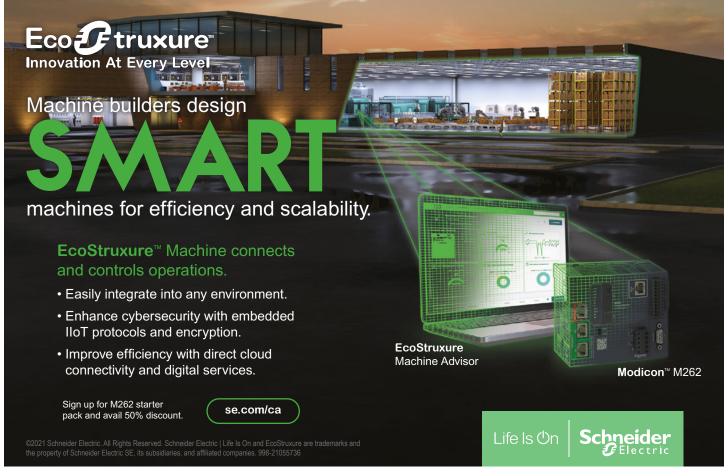
EcoStruxure Control Expert 2021 — TeSys™ island Library

EcoStruxure Control Expert — TeSys island Library Control User Guide

TeSys island DTM Library (Version 2.2.2)
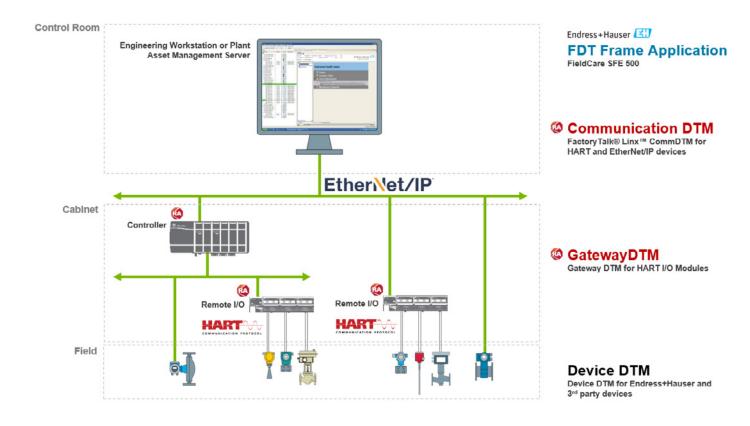
Rockwell Automation

Improve Operations with DTMs to Gain Access to Plant-Floor Data

EXPERIENCE AN OPEN ARCHITECTURE FOR INTELLIGENT DEVICE MANAGEMENT AND MONITORING

With increasing quantities of information that originate on the plant floor, remote access to real-time data and plant performance metrics is more important than ever.

That is why Rockwell Automation is committed to providing intelligent device management across the automation architecture. A leading standardized

method used for streamlining device lifecycle management (integration, configuration, monitoring) with advanced diagnostics according to NE 107 (NAMUR) recommendation is DTM-enabled I/O. The DTM is an embedded software (device, gateway, and comm levels) solution that standardizes the communication path and access to all connected devices/data over any network topology in the automation infrastructure. The solution supports a major automation use case aimed at providing a unified user environment optimizing operations

and maintenance performance for effective asset management.

To learn more about using DTMs to gain an integrated approach to field device management, please consider the following resources:

The **FactoryTalk® Linx CommDTM** Getting Results Guide will guide you through the set-up of the communication path between your field devices connected to Allen-Bradley I/O and an FDT asset management system.

To download the latest FactoryTalk® Linx Comm DTM and the Gateway DTM for your Allen-Bradley I/O platform, please visit our **Product Compatibility and Download Center** (PCDC) click on "Find downloads" and search for "DTM".

To engage with experts from Rockwell Automation and our **technology partners**, please attend the annual **Process Solutions Users Group** meeting in Chicago, IL USA on November 14–15, 2022, and **Automation Fair** on November 16–17, 2022. In addition to the full Rockwell Automation portfolio including, FactoryTalk Software, Allen-Bradley Hardware, PlantPAx Distributed Control Systems, and Lifecycle IQ Services, you will be able to talk to device and infrastructure providers to discover how their products (communication interfaces, cables, and safety barriers) create an opportunity to capture additional value by using device data to enhance decision making.
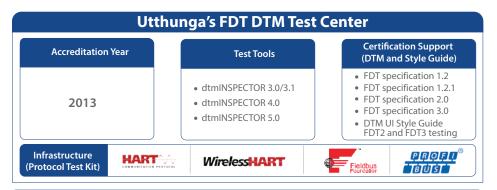
Visit our Product Compatibility and Download Center (PCDC). To download the FactoryTalk® Linx Comm DTM or other device DTMs for our I/O families, click "Downloads" and search for "DTM".

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Engineering Transformation

Utthunga's Simplified FDT DTM Certification Process

FROM FDT DTM DEVELOPMENT AND COMPLIANCE TESTING TO CERTIFICATION AND BEYOND…

Utthunga's FDT DTM Test Center

Accreditation Year	Test Tools	Certification Support (DTM and Style Guide)
2013	• dtmINSPECTOR 3.0/3.1 • dtmINSPECTOR 4.0 • dtmINSPECTOR 5.0	• FDT specification 1.2 • FDT specification 1.2.1 • FDT specification 2.0 • FDT specification 3.0 • DTM UI Style Guide FDT2 and FDT3 testing

Infrastructure (Protocol Test Kit)	HART COMMUNICATION PROTOCOL	WirelessHART	Fieldbus Foundation	PROFIBUS®

Utthunga's Simplified Certification Process

FDT DTM Generation

Vendor/manufacturer develops DTMs —independently or with Utthunga's assistance — using FDT DTM Common Components and Style Guide, and submits DTM Declaration files to Utthunga

Utthunga's FDT Test Center

We perform FDT DTM Conformation and Style Guide testing against the specifications using dtmINSPECTOR tool

We share DTM Declaration Form, Test Reports, and all defined deliverables with the FDT Certification Office

FDT Certification Office

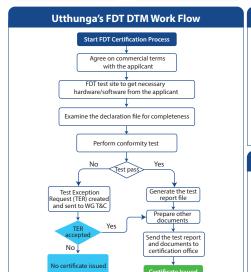Based on the recommendation, FDT Group grants and publishes certified FDT DTMs

FDThub DTM Repository

The certified FDT DTMs published on the FDThub for secure DTM/app management and storage

Utthunga's FDT DTM Work Flow

- Start FDT Certification Process
- Agree on commercial terms with the applicant
- FDT test site to get necessary hardware/software from the applicant
- Examine the declaration file for completeness
- Perform conformity test
- Test pass? — No / Yes
  - No → Test Exception Request (TER) created and sent to WG T&C
    - TER accepted → Yes
    - No → No certificate issued
  - Yes → Generate the test report file
- Prepare other documents
- Send the test report and documents to certification office
- Certificate Issued

FDT DTM Compliance Test – The Checklist

- DTM state machine
- Correct installation and de-installation
- Multi-use environments
- Mandatory and optional interfaces
- Robustness of the DTM
- Network scanning
- Topology import/export
- Audit trail

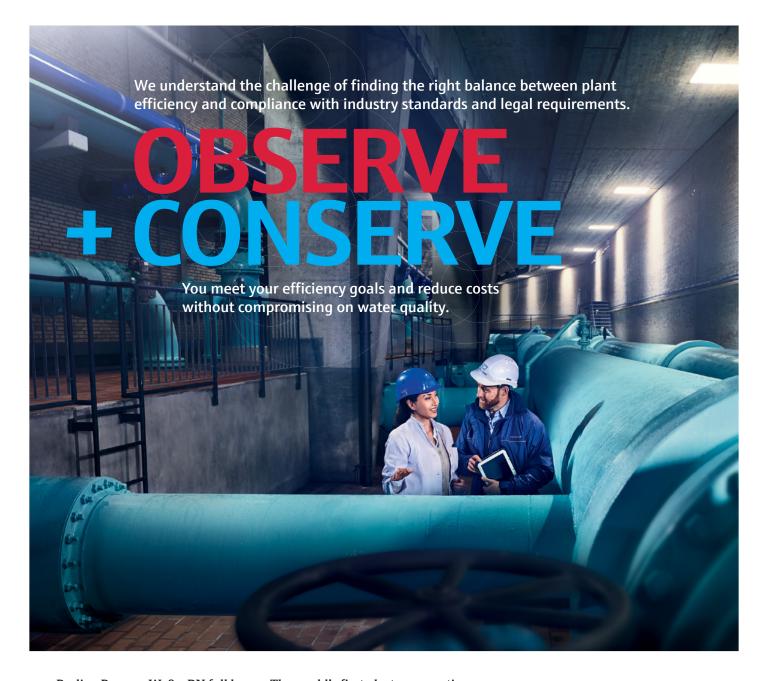## Beyond Certification

Interoperability Test

Different Host Systems	Different Frame Applications
• ABB • FDM	• PACTware • FieldCare • FieldMate • fdtCONTAINER

Learn more about Utthunga's Certification Process

We understand the challenge of finding the right balance between plant efficiency and compliance with industry standards and legal requirements.

OBSERVE
+CONSERVE

You meet your efficiency goals and reduce costs without compromising on water quality.

Proline Promag W 0 x DN full bore – The world's first electromagnetic flowmeter for unrestricted measurements

- Measure reliably – independent of flow profile and mounting location
- The first and only electromagnetic flowmeter with no inlet and outlet runs (0 x DN) as well as no pipe restriction (full-bore design) and thus no pressure loss
- Installation directly after bends, perfect for space-restricted areas and on skids

Do you want to learn more?
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