

# DEVICE INTEGRATION STRATEGIES

Empowering the Intelligent Enterprise

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# What is FDT® Technology?

The FDT Group AISBL is an international non-profit corporation consisting of leading worldwide member companies active in industrial automation and manufacturing. The major purpose of the FDT Group is to provide an open standard for enterprise-wide network and asset integration, innovating the way automation architectures connect and communicate sensor to cloud for the process, hybrid and factory automation markets. FDT Technology benefits both manufacturers and end users, with advancements such as the Industrial Internet of Things (IIoT) and Industry 4.0 delivered out-of-the-box – enabling modernized asset integration and access to performance data for visualizing crucial operational problems. Around the world, end users, manufacturers, universities, and research organizations are working together to develop the technology; provide development tools, support, and training; coordinate field trials and demonstrations; and enable product interoperability.

FDT Technology is comprised of two primary software components—the FDT Device Type Manager (FDT/DTM™) the driver for an intelligent device, and the FDT Frame Application (FDT/FRAME™), which can be a stand-alone configuration application or embedded in engineering applications such as a DCS, PLC or asset management solution. DTMs developed by instrumentation suppliers provide a graphical interface to support configuration, diagnostics and troubleshooting of critical measurement devices and other assets. The FRAME Application provided by the system supplier, hosts DTMs used for management of all the devices on a wide variety of process and factory networks within a facility. Together, an FDT/FRAME and a collection of DTMs and/or other device drivers create an FDT-enabled application, which can be scaled from a small collection of devices to tens of thousands of devices controlled by a single FRAME throughout the automation communication pyramid.



## Learn More

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Visit [www.fdtgroup.org](http://www.fdtgroup.org) for more information.

## Join Us



# Mobility Advances with FITS™ (FDT IIoT Server)

See FDT® mobility, OPC UA connections at SPS; FITS roadmap demos for members only



Lee Lane, Chairman of Board of Directors, FDT Group

I am pleased to report that our Mobility prototyping team of more than 15 industry experts is making great progress on our FITS™ (FDT IIoT Server™) architecture. They have been focused for the last few months on refining the selections of the underpinning technologies by exercising the two most common use cases for FITS – a web browser client and an app connecting to FITS via secure web sockets. All of this work is being built on top of our developers' tool kits, called Common Components, to allow a smooth migration to a released and supported specification. While there is much more work ahead of us, I am very grateful to this team for their expertise and dedication to the project.

Another pillar of our FITS architecture is the inclusion of a rich set of capabilities through OPC UA connectivity. Our OPC UA team is also working on a nice set of enhancements to our OPC UA annex to the FDT specification. This work will debut at the SPS show in Nuremberg in November. Watch for booth staffers holding tablets that are wirelessly exercising FITS with an OPC UA client. Whether you are already an expert on OPC UA or just starting to appreciate its capabilities, I think you will enjoy the demo.

With the rapid progression of the FITS architecture, we wish to ensure that our membership can prepare their internal company technology roadmaps to align with FITS. We will hold a membership-only introduction to the FITS architecture and technology stack on 6 Sep-

tember 2017 in Mannheim, Germany. Members will receive an email with the details shortly. We will review the technology roadmaps, the advantages of FITS, and the architecture of FITS. This is an excellent opportunity for developers, product managers, and product architects to get their first detailed look at FITS from the people engaged in the project. If you can't attend in person, a WebEx session will also be offered.

The Board of Directors recently appointed new officers for the FDT Group as part of a transition plan for retiring officers. Shannon Foos of Rockwell Automation has been named the new Chairperson of Standards and Associations, replacing Klaus-Peter Lindner from Endress+Hauser. Klaus-Peter has successfully led the FDT Group, winning global standardization recognition in all major markets. I am very grateful to Klaus-Peter for his dedication and success over his many years with the FDT Group and I wish him well in his retirement. Henk

## Welcome New Members

**WESTLOCK**  
CONTROLS

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东崎仪表

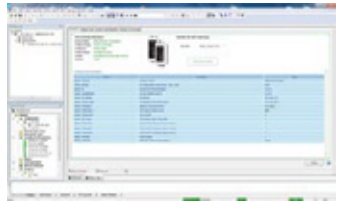
Interested in joining FDT Group? Learn more about FDT technology and membership benefits by visiting our website.

FDT Group

# EPack Compact Power Controllers

Designed for fast integration and optimum efficiency

Eurotherm, a Schneider Electric company, has released a DTM™ to manage its EPack controller family supporting FDT/ FRAME™ enabled applications. The EPack range allows you to optimize a vast spectrum of industrial processes.



For more information

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Life Is On

**Eurotherm.**  
by Schneider Electric



## Reduce engineering

- Easy integration
- Compact, easy installation
- Reduce commissioning time



## Improve your process

- Advanced information for process improvement
- Improve process reliability



## Reduce your costs

- Reduce energy costs
- Consistent quality
- Reduce scrap

## Continued Mobility Advances with FITS™

van der Bent of Yokogawa has been named as Treasurer for the FDT Group upon the retirement of Manfred Brill from Schneider Electric later this year. I'd like to thank Manfred for helping with the transition to Henk. Manfred's service and contributions to FDT have made a huge impact to the success of the organization and the technology. We have been very fortunate to have his support over the years.

The Executive Committee has ap-

pointed Dr. Thomas Hadlich of Rockwell Automation as Chairperson of the Architecture and Specification Working Group. Suriya Selvaraj of Yokogawa has lead this group in recent years but has found it necessary to step down from this role due to other commitments. While Suriya will remain an active member of the working group, I would like to take this opportunity thank him for his outstanding technical leadership in this critical role for the FDT Group.



# FDT & OPC UA Empower a Single Approach to Enterprise Integration

The era of digital transformation is taking shape with FDT's native integration of OPC UA providing information modeling and ongoing advancements through FITS™ for sensor-to-cloud and enterprise-wide connectivity

In today's enterprise infrastructure, system and application integration is more and more frequently a mission-critical concern. Industrial organizations are seeking to tie edge devices into information technology (IT) systems that include manufacturing, enterprise and cloud-based applications. The objective is to take volumes of data and make it easily accessible and useful information for end-users to maximize their efficiency.

The following article describes how the latest collaborative developments of the FDT Group and OPC Foundation empower a single approach to enterprise integration and expand worker mobility in today's complex industrial operations.

## Introduction

In order to compete and win in a global, competitive, fast-moving world with increasing customer demands, all kinds of technology must be harnessed and put to good use. But without an effective approach to enterprise integration, all these technologies remain in silos and won't be useful to the business.

The Industrial Internet of Things (IIoT), along with the Industrie 4.0 initiative, is one of the most significant trends in automation technology. A melding of innovations in the fields of computing and commu-

nication, IIoT and intelligent devices are revolutionizing the way users and machines interact, as well as the way machines engage with each other.

## Today's Technology Convergence

It's to every business's advantage to think about how to integrate systems, applications, and data. The need for multi-vendor, multi-platform interoperability is prominent in the industrial environment.



**Figure 1: It's to every business's advantage to think about how to integrate systems, applications, and data.**

## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

Current automation architecture requirements are all about security, reliability and data integration between typically disparate devices and applications that have never been connected before.

Since 2014, the FDT Group and OPC Foundation have worked together to provide greater access to critical information throughout the industrial enterprise. FDT is a well-established integration standard, globally adopted with hundreds of thousands of FDT/FRAME™-enabled control and asset management systems and tens of millions of FDT/DTM™-enabled field devices, while the OPC Unified Architecture (UA) provides an infrastructure to make enterprise information available to thousands of other applications and platforms.

Designed to “Open the Enterprise to Innovation,” the FDT standard intersects the variety of networks attached to intelligent instrumentation and the higher-level systems that interact with these devices. FDT establishes an open, modular and holistic automation architecture that adapts to the changing requirements of suppliers and end-users. FDT incorporates a plant hierarchy based on a physical network topology coupled with a logical topology. The technology supports all the major networks employed in process, hybrid and factory automation, and will accommodate future networks as the industry demands. This approach makes it possible for FDT-based systems to transparently tunnel through disparate networks to gain access, and talk with any end device.

OPC UA, on the other hand, is focused on providing complete

information modeling that allows industry stakeholders to take advantage of a service-oriented architecture enabling previously disconnected devices and applications to work together in a seamless manner. For example, OPC UA enables client applications to connect to server applications without understanding the syntax and semantics of the data compiled into the client application. This approach is all about simple discovery of the capabilities of the server, and efficiently leveraging its services and data.

Both the FDT and OPC standards are open, non-proprietary and independent. They provide adaptability as new protocols gain prevalence in the automation industry, and lay the groundwork for future requirements of the IIoT and Industrie 4.0. FDT’s ability to seamlessly nest or tunnel through a myriad of networks to transparently communicate with end devices demonstrates its pivotal position in an intelligent and connected enterprise.

#### FDT & OPC UA Webinar: Empower a Single Approach to Enterprise Integration

September 14, 2017



[Register Now](#)

FDT Group

## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

Standard integration of information provided by FDT/DTMs into the OPC UA information model is essential for device diagnostics, configuration and remote asset management, as well for integration with manufacturing execution systems (MES). The FDT/OPC UA information model enhances the management of networks and devices, helping to optimize the enterprise by providing access to data without the need for protocol-specific handling and providing support for a wide range of devices.

OPC UA provides a uniform interface for many different client applications, whereas FDT provides network/device configuration and access to devices. The combined FDT/OPC UA approach enables unification of system engineering, configuration and diagnosis in Industrie 4.0.

#### Latest Specification Developments

The FDT & OPC collaboration presents a unique opportunity to take the best-of-breed data and information models for the applications and devices supported by the

FDT architecture and leverage OPC UA information modeling and corresponding services for complete application-to-device integration. This exemplifies the device-to-cloud computing strategy that sup-

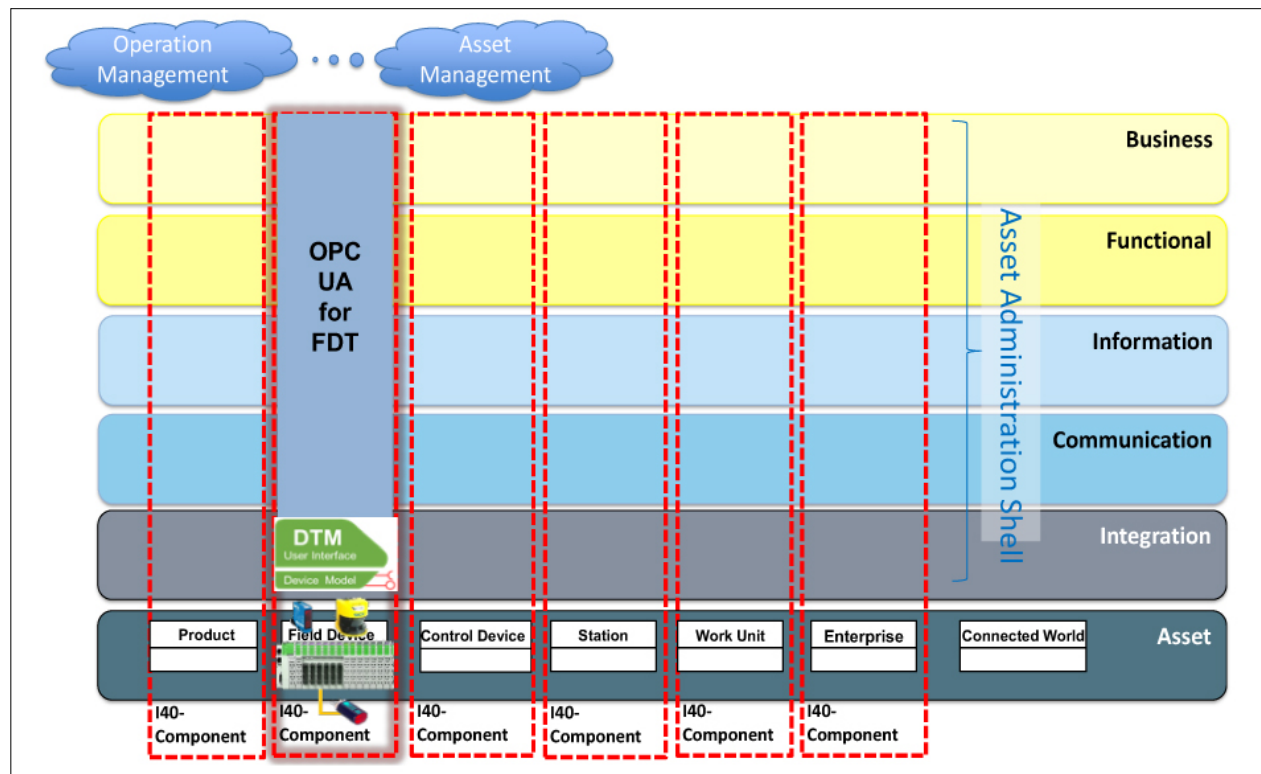


Figure 2: The FDT for OPC UA companion specification provides sensor-to-cloud, enterprise-wide data communication.

## FDT Technology Forum – Register Today



Automation engineers interested in learning more about the comprehensive FDT IIoT Server (FITS™) Architecture; addressing the critical needs of the “Connected World”, designed for mobility, cloud and fog enterprise applications, are encouraged to attend this complementary one day event.

FDT/IIoT Architectural Implementation Discussions and Strategy Topics Include:

- Technology Overview and Insight into Initiatives Enabling FDT IIoT Server (FITS™), the Comprehensive IIoT Architecture
- Sensor to Cloud Integration via FDT and OPC UA
- Simple & Efficient Asset Integration and Operational Lifecycle Management
- Mobile Asset Management Solutions
- Live Demonstrations, Networking Opportunities, and So Much More!

Event Location and Date - Register Today:  
September 12 – California, USA



## Continued FDT & OPC UA Empower a Single Approach to Enterprise Integration

ports configuration, communication, run-time and historical data access, as well as alarming and event services for existing and upcoming devices supported through FDT technology.

In November 2016, the FDT and OPC organizations announced the release of an FDT for OPC UA companion specification for information modeling. It's an important milestone for standard integration of information provided by FDT/DTMs into the OPC UA information model – a key capability for device diagnostics, configuration and remote asset management, as well for integration with manufacturing execution systems (MES).

Intended for implementation by automation system manufacturers in FDT FRAME applications (FDT/FRAMEs™) embedded in engineering systems, distributed control systems (DCSs), asset management systems and other applications, the FDT for OPC UA

companion specification enables true interoperability between applications and devices for configuration, diagnostics and runtime operation. It allows devices and host applications to easily integrate support with IT applications, including information put into the Microsoft Azure cloud. End-users can implement complete log tracking and tracing of information for all aspects of information management, ranging from configuration to runtime operation.

When viewed from an architectural perspective, the FDT/FRAME has access to all control networks in the facility as well as all supported devices attached to the networks. It also has knowledge of the complete control system topology. As a result, the OPC UA server in the FDT/FRAME allows any client application to browse the topology of the control architecture, select an individual device on any network in the topology, and obtain critical opera-



## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

tional data about that device – such as its health, its current output value, its tag information, and a wealth of other information. The FDT/FRAME transparently and automatically handles the routing of traffic across all necessary networks so to the OPC UA client, it appears that the device is directly connected.

Any off-the-shelf OPC UA client with the right security privileges can access the OPC UA server embedded in the FDT/FRAME. An example would be an Android tablet application that acts like an OPC UA client but allows a maintenance technician to ascertain the operational status and health of an asset by interrogating the remote FDT/FRAME as he or she roams the facility. To the operator, it will appear as if the wireless tablet is connected directly to the asset in question.

### Simplifying the Ecosystem Exchange

Process, hybrid and discrete manufacturing industries achieve significant advantages from IIoT-driven integration of data from development, production and suppliers. This permits manufacturing companies to respond more selectively to individual customer wishes, to react more quickly to market requirements, and also to more easily develop whole new business models.

To advance its support for the IIoT and Industrie 4.0, and to simplify the automation ecosystem exchange, FDT Group has developed an FDT IIoT Server (FITS™). It enables mobility, cloud, and fog enterprise applications, as well as sensor-to-cloud and enterprise-wide con-

nectivity. FITS takes advantage of the FDT for OPC UA companion specification enabling sensor-to-cloud, enterprise-wide connectivity for industrial control systems. It simplifies the move to IIoT, combining OPC UA integration, web services and rich control network interoperability to optimize connectivity and information exchange for the next generation of automation. It features robust layered security addressing all components of the server architecture.

Applicable to both Greenfield and Brownfield applications, FITS protects legacy investments in FDT through advanced business logic and well-defined interfaces. It provides for operating system agnostic implementations of the technology and supports the existing integrated architecture.

### PSUG Event 2017

November 13th-14th



Feeling overwhelmed by the daily challenges you face in delivering more with less? Looking for the newest technologies that will let you stay one step ahead of your competition?

Join us for insight to achieving cost and production goals while aligning your business for future automation excellence.

Rockwell Automation

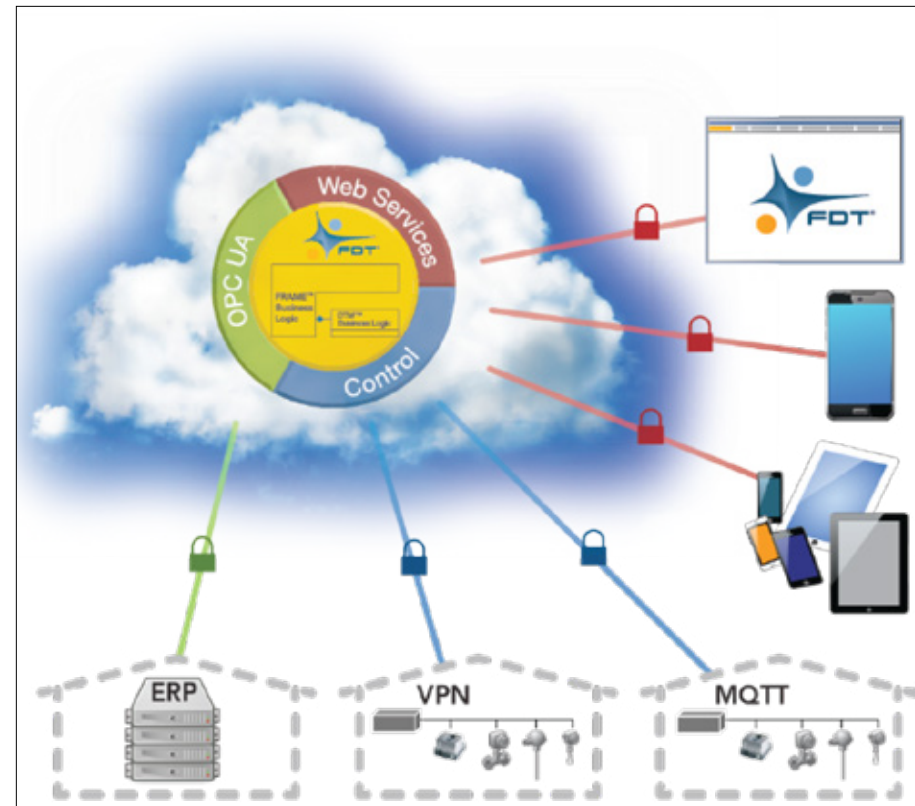
## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

The FITS solution (essentially an FDT/FRAME deployed with FDT/OPC information modeling) employs FRAME and DTM business logic at the heart of its client-server architecture. The FRAME interface seamlessly enables operational lifecycle access to asset, commissioning, diagnostic, prognostic, and other higher-level data. To make these data sources available to the open OPC UA architecture, the data is mapped to the OPC UA information model to present it in a standardized fashion. The FDT/FRAME-enabled system can be configured like any other FRAME. OPC UA-based applications requiring access to information from an FDT/OPC UA server take on the characteristics of an OPC UA client. The client requests a secure connection with the FDT/OPC UA server and begins to access topology, device health and other data.

FITS is specifically developed to broadly extend information exchange in the industrial enterprise. It natively implements OPC UA to enable complete, enterprise-wide connectivity – automatically establishing an OPC UA interface for any client requiring access to the IIoT server, including mobile devices; and making it possible to share information between higher-level applications and the server architecture.

Together, FDT and OPC UA employ a publish-subscribe methodology allowing sensor, network and topology information to permeate the enterprise, including mobile devices, Distributed Control Systems (DCSs), Programmable Logic Controllers (PLCs), Manufacturing Execution Systems (MESs), Enterprise Resource Planning (ERP) systems, the



**Figure 3: The FITS solution simplifies the move to IIoT, combining OPC UA integration, web services and control network interoperability to optimize connectivity and information exchange.**

cloud, IIoT and Industry 4.0.

FDT's network tunneling capability further provides access to

## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

meaningful, real-time plant information and asset health data with NAMUR NE107 diagnostics available throughout the plant topology. Along with robust alarming features, this provides support for robust predictive maintenance strategies.

The FITS solution was recently updated with new features aimed at optimizing asset management, preventive maintenance and other critical functions at modern industrial facilities. They include:

- **FITS prototyping with a focus on Web Services and mobile device use cases.** This includes Web browser and app-based access to the IIoT server. Whereas FDT maintains its core communication and diagnostic capabilities, it now offers remote access to data through mobile devices and web sockets so that other applications can take part in the seamless exchange of information. FITS opens up the automation architecture to allow for more points of access from a data and user interface perspective.

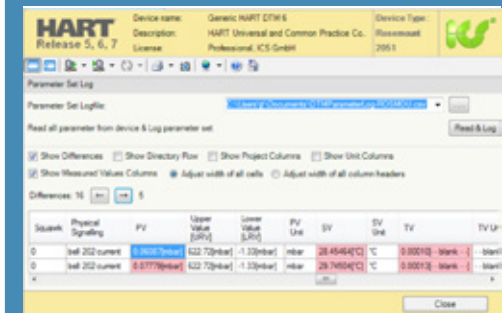
- **Mobility apps delivering enhanced business value and empowering the new generation of industrial workforce.** Placing information and control in workers' hands increases visibility so plant processes and productivity can be transformed to achieve new production and maintenance levels. FITS allows for mobility implementations through either OPC UA or the Web Services portal, and underpins two important use cases for the solution – a web browser client and an app connecting to the server via secure web sockets. Future apps will function similar to a plug-in to an FDT/FAME, but will be

easier to standardize via a Web application programming interface (API).

- **Augmented reality with FITS using a holographic human-machine Interface (HMI) made possible by Microsoft's HoloLens computing device.** Augmented reality is aimed at achieving context-sensitive increases in human perception so as to relocate information transfer, as well as the traditional, screen-based operation of machines, into space itself. With this approach, users can view real-time and analytic data in a hands-free operation. This includes visualizing sensor status, viewing displays of live data and obtaining support for sensor location.

## Generic HART DTM Significantly Improves Field Device Maintenance

### FDT tool simplifies operations



Release 6.1 now meets two more critical customer requirements:

1. The DTM now informs connected users when a new version of the DTM is ready for download
2. A history of parameter settings for all maintained field devices in a plant can be stored for documentation, letting managers see who changed what and when. The DTM supports HART protocol releases 5, 6 and 7 and provides user interfaces in nine languages. [Download the new version here:](#)

ICS GmbH

## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

They can maintain their normal field of view with transparent data glasses; virtual content is superimposed over real/physical content.

#### Role in Global Industry Standards

Deployed in countless automation installations worldwide, FDT technology is incorporated in the international standard IEC 62453, as well as the North American standard ISA103 and China GB/T 29618. Most major system manufacturers today integrate the FDT/FRAME Interface in their solution offerings and more than 8,000 devices are supported by FDT-certified DTMs, making it the most widely adopted standard for integration of devices in industrial control systems.

The FDT standard was accepted as the device integration solution regarding the German Reference Architecture Model Industrie 4.0 (RAMI 4.0). With the availability of the FDT/OPC UA companion specification, sensor-to-cloud, enterprise-wide connectivity is granted with seamless integration and data communications. Remote access to connected machines, production units and devices drives key performance improvements.

At the same time, OPC UA is the one and only recommendation for realizing the communication

layer of the common RAMI 4.0 model. OPC UA offers an essential contribution to the standard, starting from vertical integration via consistency of engineering across the entire lifecycle to horizontal integration. The OPC UA modeling tool will also play an important role for the area of semantics where machines, components and products need to be interpreted and understood.

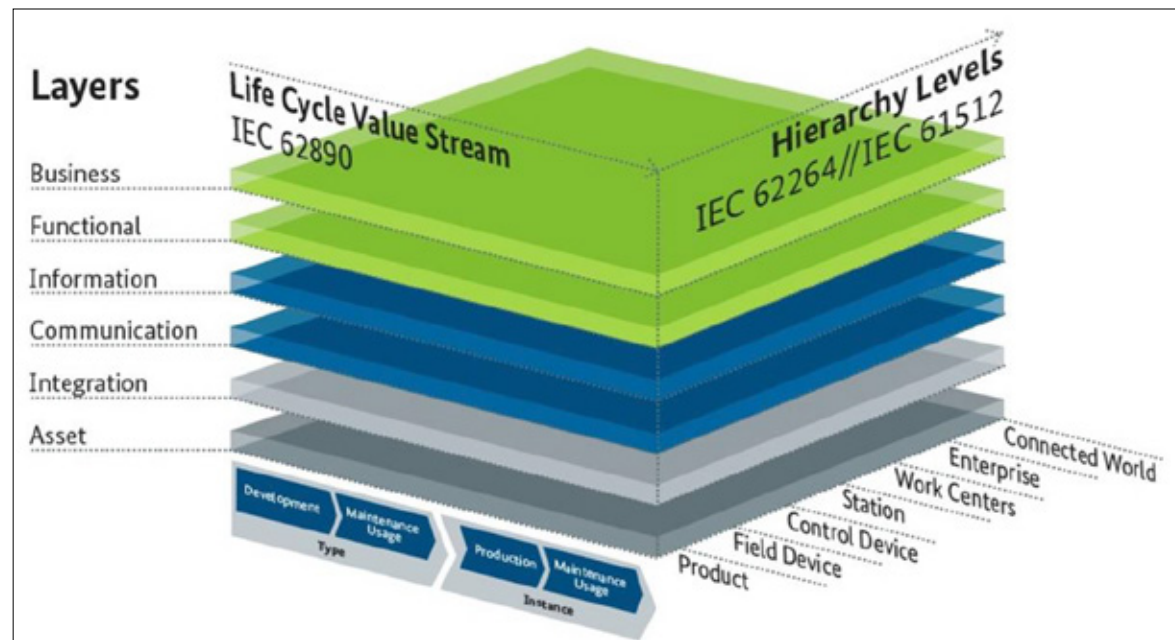


Figure 4: The FDT standard was accepted as the device integration solution in regard to the German Reference Architecture Model Industrie 4.0 (RAMI 4.0).



## Continued

### FDT & OPC UA Empower a Single Approach to Enterprise Integration

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#### Conclusion

A growing number of industrial organizations are looking for ways to bring systems, applications and devices together to get information throughout the enterprise. With integration of the FDT and OPC standards, they have an optimal approach for multi-network intelligent device configuration and data interchange.

FDT has always provided the highest degree of usability of device, diagnostics and runtime capabilities for simple and complex devices, and leveraging OPC UA now provides the complete solution for exchanging this data and information into other applications areas for a single approach to enterprise integration.

# Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets

Brazilian company GranBio avoids unnecessary maintenance work and plant shutdowns with integrated device configuration, asset management and remote access solutions

**B**razil is a dominant player in the bioethanol market. This industry is steadily growing, and biofuel is attracting attention as an environmentally friendly energy source. Production of bioethanol requires a reliable and cost-effective plant automation system, which implements intelligent field devices, collects performance-driven data, and optimizes operations throughout the lifecycle of the processes.

The following article describes how a field device management solution employing FDT® Technology helped a major bioethanol producer streamline device commissioning and maintenance tasks, and at the same time, increase productivity and savings as part of a major Greenfield project.

## Background

Gran Investimentos S.A. (GranBio) is a Brazilian biotech firm that creates solutions to transform biomass into renewable products such as biofuels, biochemicals, nano materials and nutrients. It is located in the municipality of São Miguel dos Campos, in Alagoas, 55 kilometers from port in Maceió.

GranBio is the first company in South America to produce second-



**Figure 1:** GranBio is the first company in South America to produce second-generation ethanol to help with the production of clean energy.

generation ethanol (extracted from cane leaves, bagasse) to help with the production of clean energy. It uses a combination of technologies, including pre-treatment, enzymatic hydrolysis and fermentation, to transform sugarcane straw and bagasse into an advanced clean fuel that does not detract from food production.

## Continued

### Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets

GranBio plans to implement an “intelligent strategy” in the construction of 12 Greenfield plants, ensuring optimal integration, operation and lifecycle management of critical assets. The company’s mission is to achieve integrated business solutions for the conversion of biomass into energy and chemicals, serving its customers with innovative technologies that contribute to a better and safer planet. Based on an intelligent structure of alliances with first-generation ethanol producers and leading technology providers, this model integrates the entire chain of production, from processing raw materials through the final product.

The first of the 12 plants by GranBio, was commissioned in September 2014, as a Greenfield unit (Bioflex 1) and the most innovative project in the sugar-based alcohol industry. The unit has capacity to produce 82 million liters of second-generation biofuel per year.

#### How the plant is controlled

GranBio is dedicated to reducing costs and improving production efficiency throughout the lifecycle of its operation. It employs a process automation strategy incorporating Yokogawa’s CENTUM VP production control system and other control solutions. The Plant Resource Manager (PRM) asset management solution is integrated with the system, and the database for the FieldMate device management tool is synchronized with the PRM database. The control architecture

includes 40,000 input/output (I/O) points for the distributed control system (DCS) and safety instrumented system (SIS), as well as 20,000 I/O points for communication with various subsystems.

At the Bioflex 1 plant, FOUNDATION Fieldbus provides a bi-directional communications protocol used for communications among field devices and to the DCS. Fieldbus segments connect a wide range of digital field instruments such as flowmeters; temperature, pressure and differential pressure transmitters; control valves; and rotameters. The system also utilizes ancillary devices ranging from density and



**Figure 2: The Bioflex 1 operation is dedicated to reducing costs and improving production efficiency throughout the lifecycle of its operation.**

# FieldCare SFE500

## Universal Device Configuration

- Access field devices of all protocols and vendors using DTMs and DDs
- Touch enhanced GUI for tablet use
- Supports 21 languages and Windows10
- Monitor asset health or connect to Life Cycle Management system

[www.endress.com/fieldcare](http://www.endress.com/fieldcare)



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People for Process Automation

## Continued

### Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets

viscosity analyzers, to radar and level switches, and manifolds.

As part of the bioethanol operation, critical rotating equipment like the feeding table, picador, defroster and milling unit must be monitored. Pressure and flow control are particularly critical to the production processes.

All key parameters for ethanol processes are preconfigured in the DCS batch package. When an operator selects a recipe from the package menu, all of the preconfigured settings are selected and downloaded to individual controllers so that each sequence can be automatically started. At a human machine interface (HMI) terminal, an operator can monitor the status of the reactions in process graphic displays, trend displays, alarm summary displays, and control display windows. When each batch operation is completed, the data are compiled for an

automatically generated batch report.

### Enhancing performance capabilities

Configuring digital instruments is no easy task. As industrial instrumentation is more dependent on digital communication, the success of a project will greatly depend on how easily devices are configured to exchange data across digital networks.

Today's intelligent field devices utilize a variety of digital protocols, hence the need for versatile configuration and management tools that effectively support initial setup, daily maintenance, and troubleshooting for the maximum utilization of smart instrumentation.

At the GranBio bioethanol facility, control engineers sought the maximum integration and interoperability of field instruments with the plant DCS; the use of an intuitive and user-friendly asset



## Continued

### Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets

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management solution; and the availability of an easily updated, standards-based \configuration tool. They also required instruments with high availability and robust sensors to reduce plant shutdowns.

Engineers wanted to consolidate all diagnostic information on a



**Figure 3: GranBio's control engineers sought the maximum integration and interoperability of field instruments with the plant DCS.**

single plant asset management application to ensure the utmost performance of instruments. A simple software interface would further allow them to synchronize their databases and configuration tool with the asset manager.

Additionally, the Bioflex 1 site needed software for remote connection to instruments in order to eliminate the lost time involved with going to the field to access devices locally, and to improve the safety of plant personnel and reduce incidents. This included a solution enabling troubleshooting to be performed remotely and monitoring instruments' critical operating parameters to ensure they are functioning according to specifications.

#### Employing advanced technology

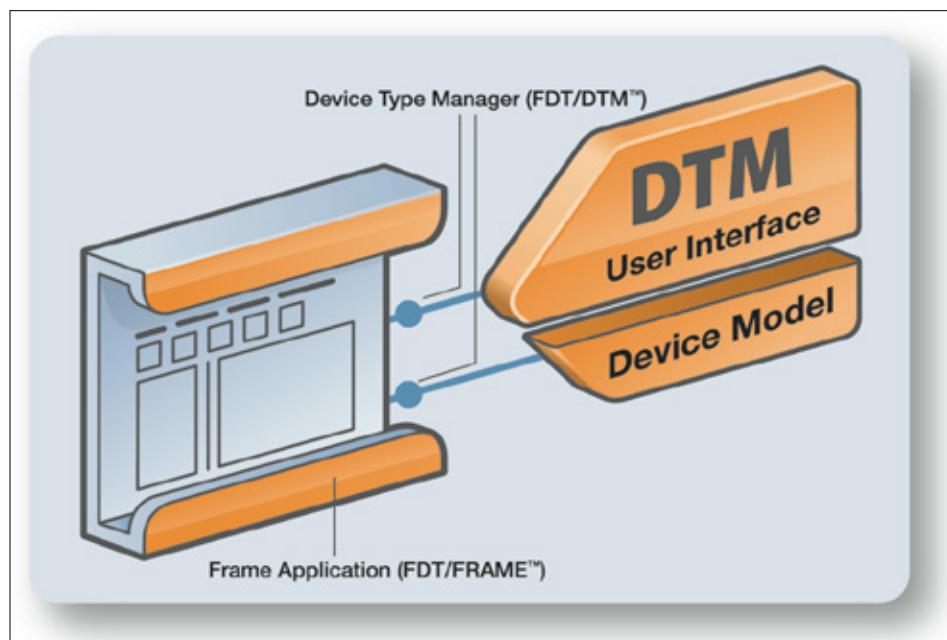
GranBio recognized the importance of implementing intelligent field devices, collecting performance-driven data, and optimizing operations throughout the lifecycle of the processes. Intelligent instrumentation makes it possible to securely get the right information into the hands of expert problem-solvers wherever they are located.

Key to a high level of performance of the Bioflex 1 operation was the implementation of applications, tools and devices compliant with the FDT standard. Recognized as an international (IEC 62453), North America (ISA 103), and China (GB/T 29618) standard, FDT provides a common environment for utilizing intelligent devices' most sophisticated features, as well as a single interface to integrate any device asset and network with access to performance-driven data – sensor to enterprise.

Within the FDT ecosystem, device manufacturers provide Device Type Manager™ (DTM™) software for their products, and FDT/

## Continued

### Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets



**Figure 4: Within the FDT ecosystem, the FDT/FRAME can be embedded in standalone device management tools.**

FRAME™ Applications (embedded in control systems or standalone device management tools), communicate and read those DTMs – regardless of protocol for each device. This enables complete lifecycle access for configuration, operation and maintenance through a standardized user interface, no matter the supplier, device type/function, or communication protocol.

FDT creates a common communication method between devices and control or monitoring systems that are used to configure, operate, maintain, and diagnose intelligent assets. The FDT solution is not a communication protocol, but rather a standardized asset integration and data delivery technology.

With FDT-compliant solutions, GranBio enjoys the flexibility of true open technology and freedom-of-choice in working with different automation suppliers. Interoperability makes it possible to select the best device for a particular application. The company knows that regardless of the installed asset, interoperability will be ensured through the use of FDT drivers (i.e., FDT/DTMs™).

FDT Technology also enables greater access to centralized information via the Industrial Internet of Things (IIoT). The more information engineers and operators have, the easier the decision-making. It is very important to be able to gather all information in a single database in the control room that facilitates fast and informed decisions.

Thanks to FDT, the ability to integrate diverse plant information enables operators to mitigate process upsets and instrument malfunctions. The combination of measured values, valve openings and device diagnostics helps control room personnel identify specific deviations in operation and instrument performance. This capability also allows the rapid segregation of the team that must act to ad-

## Continued

# Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets

dress issues involving maintenance, operation, or processes. When an adverse situation arises, online information is crucial to mitigate the source of the problem.

## Improving work practices

GranBio specified Yokogawa's PC-based FieldMate as the configuration tool for the Bioflex 1 Greenfield project. The choice of this versatile device management solution was based on the need to have a unique tool

for all instruments, including the configuration of FOUNDATION Fieldbus devices, generation of configuration reports, and the use of an interface similar to the asset management application. Engineers also wanted to consolidate various databases and monitor instruments online.

Employing an embedded FDT/FRAME, FieldMate enhances and streamlines maintenance workflow procedures for device configuration, tuning and local maintenance. It is an alternative to costly handheld terminals when implemented in notebook form, providing extended functionality, clear graphical displays, a trend panel and parameter database, maintenance information records, and more.

The FDT-based tool facilitates effective configuration and diagnostic routines. It can be used from the plant's central control room to set field device parameters, and is applied from the beginning of instrument life for maintenance, diagnostics and replacement. The tool is helpful for not only configuring new instruments, but also checking faults, testing instruments and diagnosing problems that could require intervention or replacement.

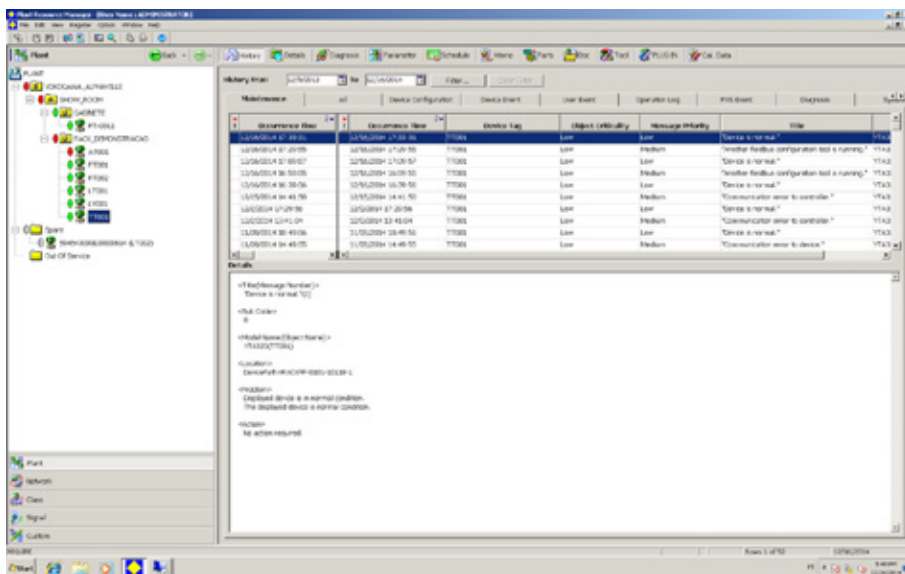
As part of the control strategy for the Bioflex 1 facility, PRM performs various asset management tasks and sends diagnostic information to the DCS. Plant personnel can open instrument status with the system faceplate – greatly facilitating the detection of devices failures or operating problems. With the FieldMate field configuration tool, all activities are synchronized with the PRM database, creating a



**Figure 5: Employing an embedded FDT/FRAME, FieldMate greatly enhances and streamlines maintenance workflow procedures.**

## Continued

# Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets



**Figure 6: The PRM application performs asset management tasks and sends diagnostic information to the DCS.**

unique history record for use in auditing maintenance actions.

Plant operators can now access the status of an instrument directly through the common process control system HMI – greatly facilitating improved performance. When a variable presents suspicious values, it is easy to check for any malfunctions. Operators can decide if the instrument is reliable, and if everything is correct, they can maintain safe operating measures. Centralized information allows

them to make crucial decisions quickly. Moreover, the ability to combine diverse data enables operators to mitigate process problems and instrument failures.

An important feature of this solution is the ability to detect deviations that could lead to asset failure. By implementing a robust asset management application with FDT Technology, the plant can take advantage of effective preventive maintenance strategies. For example, PRM could detect a diagnostic error and alert the maintenance department of an instrument failure. A technician opens the DTM to investigate, decides local action is needed, synchronizes the database with FieldMate, and then goes into the plant to do the repair work.

## Realizing operational benefits

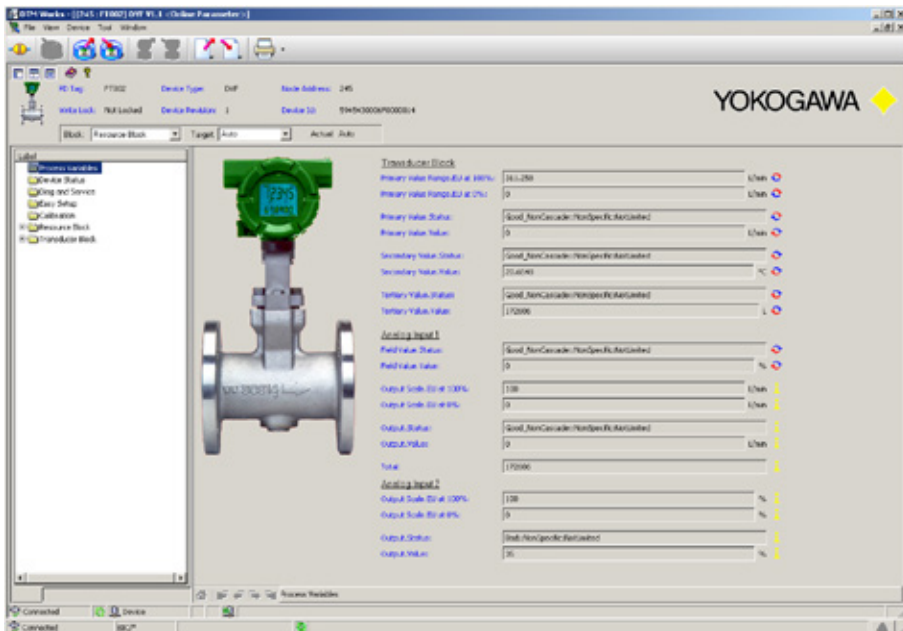
GranBio has realized significant operational and business benefits from its implementation of state-of-the-art automation technology. Acting in a preventive way based on the information provided by interoperable and intelligent plant assets, the company has been able to reduce costs associated with unnecessary interventions, removing equipment from service for tests, and stopping the plant for repairs and maintenance.

GranBio Chief Engineer Cássio Lourenço Aparecida commented: “GranBio is very satisfied with the configuration and asset management tools based on FDT Technology. With these solutions, our criti-



## Continued

# Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets



**Figure 7: FDT/DTMs provide a powerful device configuration solution for plant personnel.**

cal maintenance and operating objectives have been met.”

To date, the Bioflex 1 plant has reduced maintenance costs by 46 percent and lowered costs involved with device interventions and plant shutdowns by 35 percent.

In addition, the availability of remote access has minimized the need to access hazardous industrial areas – reducing worker ex-

posure to risks. Accessing data with mobile devices allows remote analysis by specialists in support of the plant’s maintenance and operations groups. Asset management tasks have gotten simpler and safer, resulting in a 27 percent reduction in incidents and a 15 percent reduction in accidents.

Most notably, the use of FDT-based tools was decisive in executing the commissioning and fast start-up of the Bioflex 1 plant. The user-friendly interface, coupled with intuitive descriptions, enabled the rapid training of assembly and maintenance personnel. The FOUNDATION Fieldbus protocol provided access to various parameters using FDT/DTMs in a single environment. This contrasts with the use of handheld devices with complicated menus, which can lead to frequent errors.

Furthermore, remote access to instruments enabled greater agility in work practices, thus allowing commissioning to be completed in advance of the project deadline. Remote access to instrument information enabled the maintenance group to create routines for verification, and preventive maintenance plans were created based on the health status of the instruments.

The return on investment (ROI) from this Greenfield project occurred during the commissioning period. All technology investments were justified by time and cost savings in the completion of configuration work. The new tools employed by plant personnel are now reducing maintenance and operational costs.

## Continued

### Bioethanol Producer Employs Advanced Automation Technology to Optimize Integration, Operation and Lifecycle Management of Critical Assets



**Figure 8: Remote access to instruments enables greater agility in work practices.**

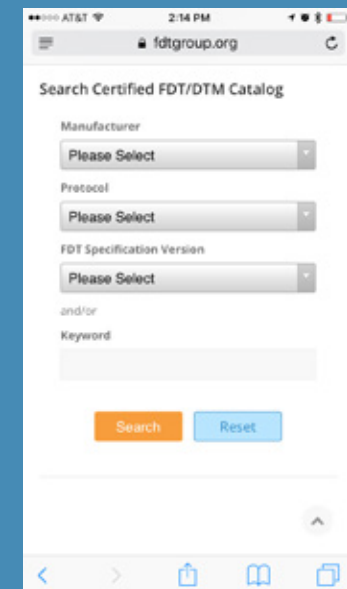
## Conclusion

At GranBio's Bioflex 1 plant in Brazil, an advanced tool integrating commissioning, configuration and startup tasks, together with online monitoring and recording of asset-related events, enabled the creation of an intelligent infrastructure to work preventively.

At the heart of the plant's device management solution is the ability to access open instrument information directly from the DCS. Integration of plant-wide controls with a robust asset management capability facilitates the diagnosis of failures and effective operational decisions.

Due to its successful implementation and use of the FDT standard, GranBio has decided to standardize on the technology for its remaining 11 Greenfield plant projects and all future automation investments.

## Searching for FDT/DTMs™ Just Got Easier



FDT Group's website is the one-stop-shop if you're looking for certified DTMs™ for your intelligent devices. The upgraded product catalog features new filter & search capabilities and is mobile friendly!

FDT Group

# Mixed Topology Architectures Can Benefit from Integrated Asset Management Strategies

Versatile tools give users central & remote access to all devices, paving the way to efficient plant operations

Decades of operation, modernization, and expansion have left many chemical plants a somewhat haphazard mix of different process automation and control systems, remote IO subsystems and field devices from different suppliers. The components may use different communication protocols such as HART, PROFIBUS PA or FOUNDATION Fieldbus. Additionally, ISA100 wireless devices have

been applied to add measurements in remote locations and on rotating/moving equipment.

Increasingly, FDT® (IEC 62453) technology is being deployed to bring all these protocols together in a single environment, paving the way towards efficient plant asset management and a transition to the Industrial Internet of Things (IIoT).

The use of an innovative open, independent standard such as FDT will help any process control system user operate plants more efficiently and with fewer employees. Reducing employee requirements is important because specialized and experienced instrument technicians and maintenance engineers are increasingly difficult to recruit. There are other areas where major savings can be made; e.g. repair time is saved when maintenance engineers can directly access a device from a PC.

FDT is a central tool for gaining these benefits. It is comprised of two main software components. The FRAME™ application provides a common run-time environment with single-point access to connected devices. It uses a Device Type Manager™ (DTM™), a device driver for an intelligent device or communication component within digital networks. A DTM or collection of DTMs are plugged into an FDT/FRAME™ enabled system - simplifying device integration allowing the cascade of device data to flow freely throughout the architecture



**Figure 1: FDT-enabled systems makes it easier to access field equipment in many facilities that use more than one communication protocol with central and remote access with versatile tools.**



## Continued

### Mixed Topology Architectures Can Benefit from Integrated Asset Management Strategies

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with lifecycle management for configuring, operating and maintaining any device throughout the connected plant.

Yokogawa's Plant Resource Manager (PRM), an FDT/FRAME-enabled plant asset management system, has features such as a device master function for maintaining an asset database and multiple views to visualize asset hierarchies according to IEC 61512 through Plant, Network or Class Views. PRM has a Device Patrol function that uses a scheduler to periodically acquire device status information. It features a status decision engine to display color coded information, including NAMUR NE107 functionality, on all hierarchy levels. When a diagnostic message is initiated by the field device, the device DTM is launched to obtain detailed information and/or access device parameters.

Mobility is becoming commonplace as tablets and smart phones are used to view data from different locations. FieldMate, Yokogawa's device management tool that runs on a tough tablet or notebook pc, gives users a perfect solution for portable device maintenance even in hazardous areas. An important advantage is that its database can be synchronised with PRM, resulting in a single maintenance information database.

In the past, if there was an issue with something like a level measurement in a remote location of the plant, a maintenance engineer had to go out into the field to check the device. FDT-enabled systems like PRM allow maintenance engineers open access to intelligent device DTMs to investigate and troubleshoot problems at any level in



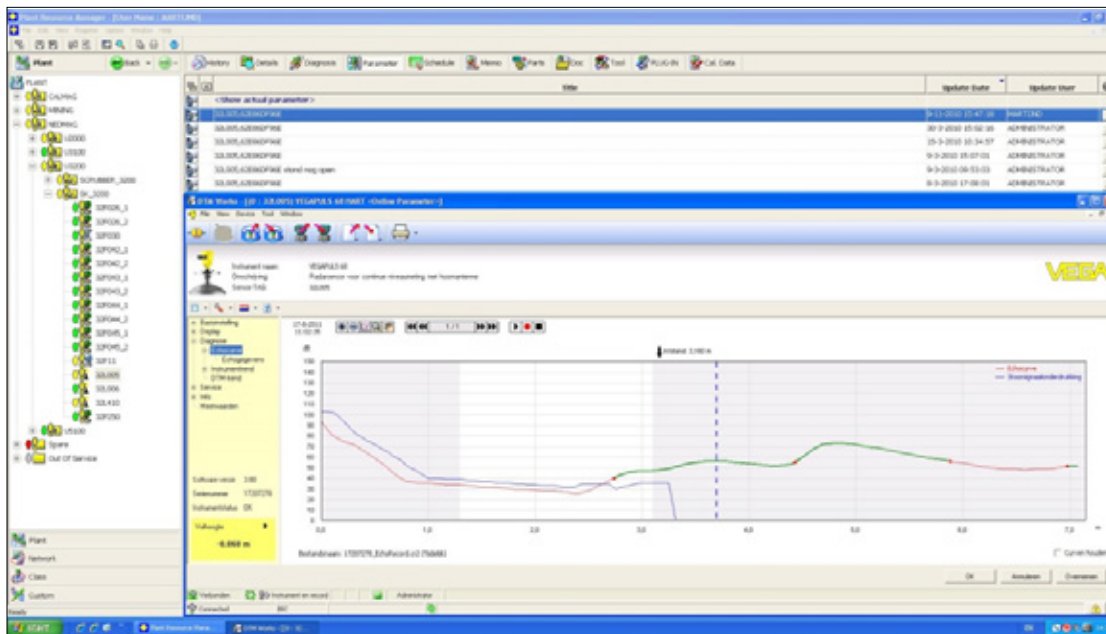
**Figure 2: Remote monitoring improves work practices and safety for plant personnel.**

the mixed architecture topology. The engineer can immediately tell whether an instrument is incorrectly configured or dirty even though the device is kilometers away.

FDT enables the path to proactive maintenance, removing the inefficiency that comes when preventive maintenance is performed or repairs came after something went wrong. The combination of digital communications, FDT and versatile tools give users central and remote access to all devices in the plant by drilling down through the



## Continued Mixed Topology Architectures Can Benefit from Integrated Asset Management Strategies



**Figure 3: PRM screen – Presentation of Device Patrol warning and opened device-DTM for radar level sensor. The DTM shows the level in the tank, possible false echoes and contamination or damages of the antenna.**

hierarchy for performance driven data. The PRM Device Patrol function continuously monitors all devices in the plant. The user is immediately alerted when a device status changes. The DTM lets techni-

cians investigate what's wrong and take appropriate action. A significant improvement in maintenance efficiency is achieved.

Today, FDT is a well-established integration standard, globally adopted with hundreds of thousands of FDT/FRAME-enabled control and asset management systems and tens of millions of FDT/DTM-enabled field devices. For tomorrow's IIoT and Industrie 4.0 solutions, FDT Group has developed a solution known as "FITS™" (FDT IIoT Server) which continues FDT's established strategy of providing well-defined interfaces and common components, while also laying the foundation for a modern, integrated automation architecture. Systems like Yokogawa's PRM that employ the new FITS architecture will protect legacy investments but set the stage for mobility, cloud, and fog enterprise

applications.

Learn more by visiting:

<https://www.yokogawa.com/solutions/products-platforms/solution-based-software/asset-management-software/>

# Join the FDT Group

FDT Technology continues to be at the forefront of industrial automation advancement, with a truly open and standardized architecture to address the critical needs of the 'Connected World' of the Industrial Internet of Things (IIoT) and Industry 4.0. FDT Group has a strategic vision focused on the "Connected World" enabling a FDT/IIoT architecture supporting mobility, on-the-wire security, and comprehensive interoperability through an ecosystem of automation vendors providing tomorrow's new adaptive manufacturing assets.

Join other leading companies in the FDT Group today. There are unique advantages for the entire industrial automation industry – end users, suppliers/developers, service providers, universities, and individuals.

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