Device Integration Strategies

FDT®GROUP

Empowering the Intelligent Enterprise

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 has long focused on bringing plants, people and data together. With the new Fourth Industrial Revolution era now here, FDT has strengthened its standard focused on empowering the intelligent enterprise with the release of the new FDT IIoT Server™ (FITS™) platform. The enhanced solution transforms the standard into an information exchange architecture. Empowering innovative business models, FITS features a solid ecosystem of solutions (FDT Server, FDT Desktop, FDT DTM and FDT App) supporting IIoT and Industry 4.0 applications. Built from the ground up with an operating system agnostic environment and a comprehensive security solution, a FITS enabled environment boasts OPC UA integration, mobile device management and a new FDT*hub*™ DTM repository. Designed to be flexibly integrated, the architecture is deployable in the cloud, on-premise, edge or desktop environment supporting FDT's heritage and future as the open, standardized, platform independent architecture for universal device integration and asset management.

Newsletter Contributors
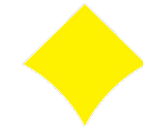
Editorial: FDT – Led by Industry Subject Matter Experts

Sheer talent on-loan from our members drive FDT evolution

Author: Lee Lane, FDT Group Chairman of the Board of Directors

The FDT Group is comprised of an amazing organization of volunteers from our member companies. During any month, there are around 200 people "on-loan" from leading industrial automation companies around the world. These professionals are technical subject matter experts, software engineers, business leaders, and marketing professionals that come together in various committees, working groups, and boards to support

Hailing (Helen) Tan of Endress+Hauser

the evolution of the FDT standard. The FDT Group Board, itself comprised of such volunteers, is incredibly grateful for the sheer talent and dedication these companies make available to the FDT Group.

Today, we celebrate the upcoming retirement of one of our very dedicated volunteer business leaders - Hailing (Helen) Tan of Endress+Hauser. Helen is the Deputy General Manager of Endress+Hauser China and is the leader of FDT Group China, organized under the auspices of the China based CIMA organization. Helen has successfully led the expansion of the FDT standard throughout China including the adoption of the FDT2 Standard as China national standard GB-29618. During her tenure, the FDT Group China Committee has grown to include the leading automation companies in China, reflecting a diversity of technologies and served markets. Helen has also successfully served as an executive bridge between the China organization and the FDT Group international organization, ensuring synchronous messaging and objectives.

Helen's last official FDT action will take place during the China FDT Group meeting in November. Helen has nominated Mr. Yiwei Wang of Endress+Hauser to be her successor. Please join me in thanking Helen for her many years of service and in wishing her a fun and well-deserved retirement from professional life. 退休快樂!

Lee Lane, Chairman of the FDT Group Board of Directors

Mr. Yiwei Wang of Endress+Hauser

Mobile Access to Production Data:
Custom OPC UA Apps for FDT 3.0 Applications

Next Gen FDT/OPC UA IIoT Ecosystem Assists Developers

Author: Dr. Vivek Hajarnavis, Technical Marketing FDT Group

Today, industrial organizations must find ways to effectively manage field devices and reduce overall operating and maintenance costs. They need to monitor the status of critical assets, view equipment health analytics on real-time dashboards, and automate actions based on predictive insights.

Experience has shown that easily customized applications help in connecting, informing and empowering the industrial workforce so they can make better decisions every day.

Automation industry stakeholders can utilize a variety of third-party software developer toolkits and apply the power of the OPC Unified Architecture (UA) to create bespoke Apps leveraging all the data available in the FDT® 3.0 IIoT Server (FITS™) application.

Collaborative Evolution Advances Digital Transformation
Since 2014, the FDT Group and OPC Foundation have worked together to provide greater access to critical information throughout the industrial enterprise. The FDT standard is the hub of real-time information from tens of millions of Device Type Manager™ (FDT/DTM™)-enabled devices installed in the field, while the OPC UA

standard provides an infrastructure to make this information available to thousands of enterprise applications and platforms.

OPC UA is the required vehicle for merging Information Technology (IT) and Operational Technology (OT) assets within current automation architectures. The protocol unites these two sectors and integrates them within a comprehensive information model. In addition, OPC UA is highly efficient and secure, allowing encrypted transmission and authenticated and authorized data access.

FDT technology was originally developed to unify the OT world of disparate networks and devices from different vendors and has

"Your clear path to Asset Excellence"

PRM ®
Plant Resource Manager

Availability + Diagnostics = Predictability

Yokogawa's PRM Plant Resource Manager is an integrated Plant Asset Management solution that enables centralized online monitoring of automation assets. PRM takes a step forward with its capability to create and integrate innovative diagnostics applications. Based on the FDT open standard and armed with the PRM Advanced Diagnostics Application (PAA) environment, PRM integrates diagnostic intelligence and provides a single-window solution for predictive asset management. In addition, PRM synchronises seamlessly with Yokogawa's FieldMate Device Management Wizard.

www.yokogawa.com/PRM
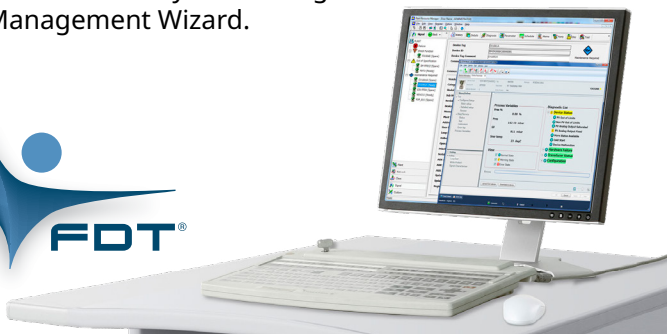
YOKOGAWA ◆

Co-innovating tomorrow ®

Mobile Access to Production Data:
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become recognized as the de-facto industry standard for industrial device integration. Now, with the updated FDT 3.0 standard, it employs an FDT Server natively integrated with an OPC UA Server to provide centralized OT and device data to the IT world. No additional work is needed on the vendor, device, system, or end user sides, since OPC UA is auto-enabled within the FDT IIoT Ecosystem of FDT Servers and DTMs. All authorized OPC UA Clients have access to operational data, and this information can be customized as necessary without requiring OT personnel to assume the unwanted role of the middleman.

Another strength of the FDT approach is that it takes care of the different networks in the automation architecture and presents a common model for field devices. Otherwise,

the user is required to access the Programmable Logic Controller (PLC) or Distributed Control System (DCS) to gather network and device information and map tags to OPC UA. With the FDT 3.0 solution, the FDT Server sits at a peer level to the PLC or DCS and has direct access to all installed devices without the need for intervention or changes to the control environment.

In general, the flexibility of this architecture achieved through harmonization of data in the built-in FDT 3.0 OPC UA Information Model allows access to all devices from different vendors using a variety of bus protocols and networks to communicate across the entire network hierarchy. The FDT Server provides the OPC UA interface that enables secure data transport over the corporate Intranet or the Internet

through an encrypted connection between the server, clients and mobile devices, including Apps.

Next Gen FDT/OPC UA IIoT Ecosystem Assists Developers

The newly launched FDT 3.0/OPC UA IIoT Ecosystem, consisting of an FDT Server and DTMs, delivers

Figure 1. FDT/OPC UA Information Model

universal device integration and a data-centric platform to mobilize the industrial workforce with modern and diverse deployment options, including cloud, enterprise, edge, on premise, and single-user desktop environments.

Within the FITS architecture, the platform-independent FDT Server serves as the pivotal IIoT hub empowering the intelligent enterprise. It is built on top of application business logic that manages all device DTM instances. The FDT Server includes a web services portal allowing access from authenticated mobile devices or any major browser, along with an OPC UA interface for IT/OT convergence and enterprise access in the process, hybrid and discrete automation sectors.
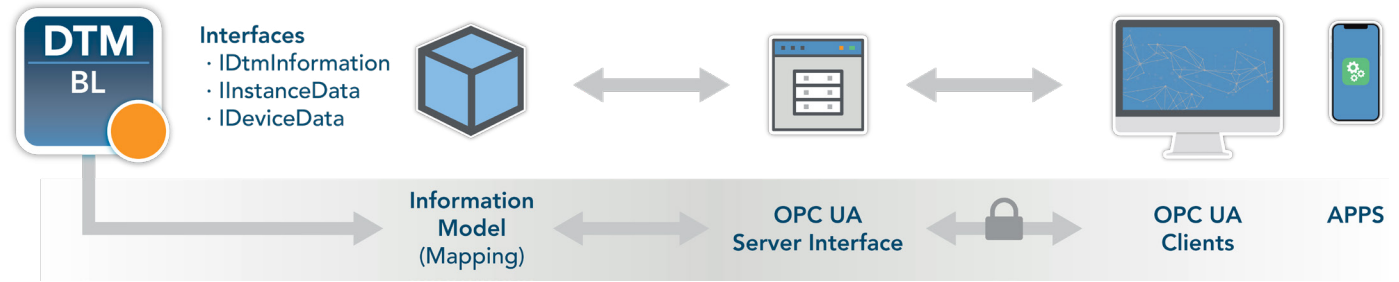
A key feature of the new FDT 3.0 standard is that all FDT Servers and DTMs automatically provide full OPC UA support without additional effort or coding. This means any authorized OPC UA client can browse the project structure in the FDT Server to locate device-specific, real-time information. There is easy integration of live plant floor data into Apps, dashboards and manufacturing execution systems without the need to touch the DCS or PLC configuration. Users have free and easy access to this information through a built-in and fully "wired" OPC UA Server within the FDT Server Common Components developer toolkit. The same holds true for DTM Common Components, as OPC UA is auto-enabled for DTMs. No additional coding or work is needed in either case.

As part of the FDT 3.0 solution, standard integration of information provided by DTMs into the FDT/OPC UA Information Model optimizes

Your challenges +
Workshop with CodeWrights =
Your solution!

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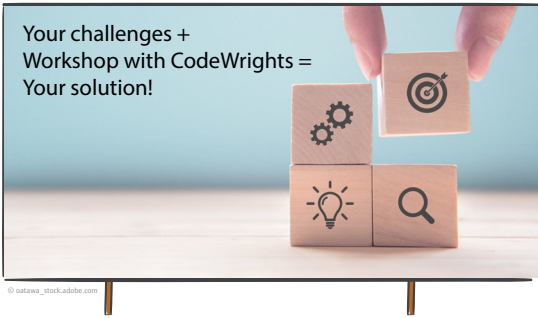
Technologies change. New versions are released, e.g. FDT 3.0 with client-server architecture. At the same time you and your customers need to support brownfield plants being equipped with "older" technology versions.

So you might ask yourself: Which is the version to go for? How do I ensure support for existing installations and safe the investments made? How do I face the future trends at the same time? Is FDT 3.0 our way to realize Industry 4.0 and IIoT and to provide the requested products and services to our customers?

As a founding member and being active in several working groups of the FDT Group CodeWrights knows the history, the present and the upcoming versions of FDT technology. We know about the details, about the pros and cons, the benefits and possible migration strategies.

So this is where CodeWrights steps in.
What is your starting point? What aspects in your product lifecycle shall be preserved? Is there already a target defined? How can you get there? Let's conduct a workshop to find answers to all these questions, to put pieces in place and look at the facts from all sides.

The CodeWrights' approach in such a workshop can be summed up in four steps:

Listen   Comprehend   Decide   Action

Your challenges + Workshop with CodeWrights = your solution!

For more information please visit our website www.codewrights.com or contact our sales department (sales@codewrights.de) for a personal talk.

CodeWrights

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Mobile Access to Production Data:
Custom OPC UA Apps for FDT 3.0 Applications

advanced device diagnostics, configuration and remote asset management. This information model enhances the management of networks and devices, helping to optimize the enterprise by giving

access to data without the need for protocol-specific handling, providing support for a wide range of devices.

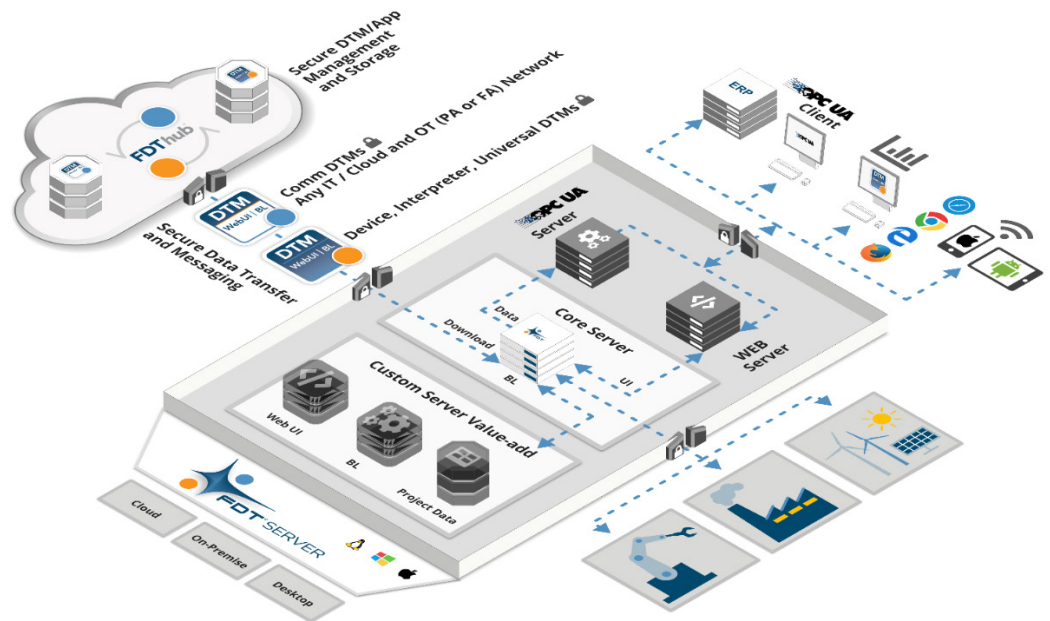**Innovative OPC UA Apps Add Flexibility to Device Data**

Figure 2. FDT 3.0 IIoT Server (FITS™) - Distributive Platform

Third-party developers have begun to develop toolkits to write Apps that can help the IT and OT workforces function more effectively by having device-specific, real-time data available at their fingertips on mobile devices. OPC UA's robust capabilities can be used to build a wide range of custom Apps leveraging the new FDT 3.0 IIoT Server solution.

Thanks to the versatility of the FDT 3.0 architecture, anyone can create customized Apps to meet their needs based off the available diagnostic data—whether it is a customized Key Performance Indicator (KPI) dashboard or an App tailored to a specific family of devices. These Apps offer a new model for providing a customized view of production data via the flexibility of the FDT 3.0 architecture.

Due to implementation of the OPC UA companion specification for FDT, FDT 3.0 applications can access device DTM interface data via any authorized OPC UA Client. This allows the DTMs to be integrated in applications in which OPC UA is used for data exchange or for executing device-specific functions.

Both automation suppliers and end users can develop customized Apps to access device data in the FDT 3.0 Server

environment. Third-party toolkits, available for a wide variety of platforms (iOS, Android and Microsoft) and languages, save developer teams from having to become experts on the OPC UA architecture and eliminate the laborious steps necessary to create an OPC UA Client. Rather, developers can focus on customization aspects including acquiring and presenting their data.
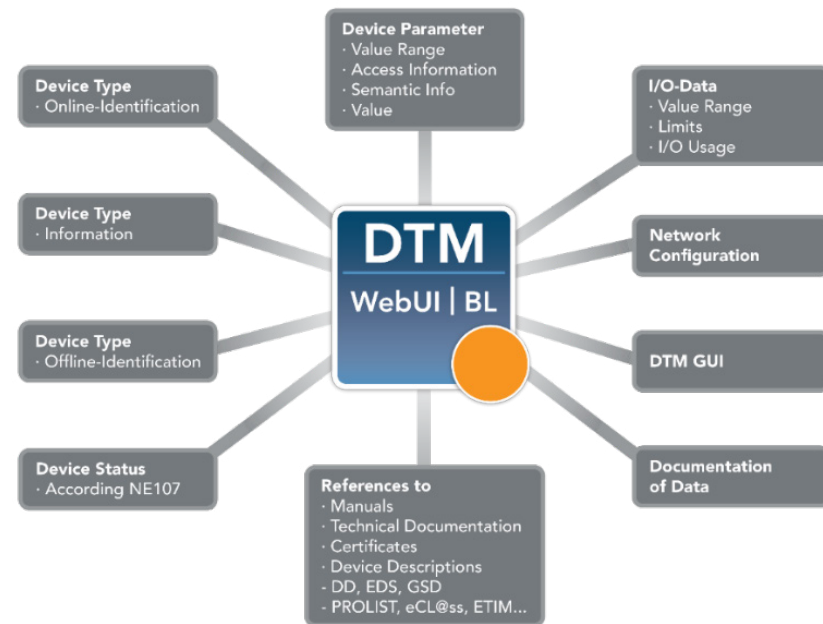
Figure 3. FDT Device DTM Interfaces and Device Specific Functions

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

Mobile Access to Production Data:
Custom OPC UA Apps for FDT 3.0 Applications

The development of custom Apps covers a broad spectrum of use cases in the areas of production operations, asset monitoring and equipment maintenance, among others. For example, with the FDT Server solution integrated with a native OPC UA Server, a remote asset monitoring application can be created to monitor the health of a field device on a different network and to alert technicians if there are abnormal conditions requiring immediate attention. Developers can also create performance dashboard Apps for manufacturing facilities, which employ OPC UA to obtain relevant OT and production data. On the IT side, the availability of real-time data from OT systems allows for the creation of custom reports based on KPIs to help management better evaluate operational productivity, standards compliance, etc.

Robust Communication Model Enables Real-time Data Access

Thanks to the FDT/OPC UA Information Model, users have access to real-time data to make better real-time decisions. All that data is now harmonized within the information model and presented in a logical, defined and uniform manner. Even device-specific information is provided in a standardized way while still customizable based on individual application requirements. The look-up of information is the same for users of all clients, even though the devices may be significantly different. The FITS architecture benefits from both a Client-Server and PubSub communication model approach. Users have the flexibility to choose the method that best fits their needs.

Client-Server

The FDT 3.0 OPC UA Server supports a Client-Server-based request-response communication mechanism between the OPC UA Client and generic client applications. This approach makes the full range of information model access available via services and, in doing so, follows the design paradigm of Service-Oriented Architecture (SOA), in which a service provider receives requests, processes them and sends the results back with the response.

Publish-Subscribe (PubSub)

Going forward, the Publish-Subscribe (PubSub) communication model will provide an alternative mechanism for data and event notification with FDT 3.0. While in Client-Server communication each notification is for a single client with guaranteed delivery, PubSub has been optimized for on change-only, one-to-many configuration. The PubSub approach is essential for secure multicasting, one-to-many publishing, machine-to-machine communication, dynamic network relations, and a number of additional scenarios.

Enabling the FDT OPC UA Server with OPC PubSub communication will significantly reduce communication traffic between asset health monitoring applications and the server application, thus improving performance and making the solution scalable to IIoT requirements. Remote monitoring applications will be able to monitor asset health on a different network in real-time, using bridging protocols like AMQP and MQTT.

Flexible Architecture Benefits the Automation Community

From a broad perspective, the global automation community will benefit from the flexibility of the new FDT 3.0 (FITS) architecture, which supports production data customization for the IT and OT worlds within industrial manufacturing—even though these domains have different interests and requirements. The FITS solution optimizes the connection of diverse automation systems and devices, delivers complete interoperability across both current and emerging standards, and supports the convergence of the business information and plant operating technologies. Best of all, the enhanced FDT 3.0 architecture is scalable to suit the needs of a single manufacturing facility or an entire industrial enterprise.

Both automation suppliers and end users can take advantage of ongoing FDT technology advancements to write customized Apps that leverage the rich data available in the FDT 3.0 OPC UA Server. All the toolkits, information and demos required for App development and testing purposes are openly available to interested stakeholders at https://opcfoundation.org/products.

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Mobile Access to Production Data:
Custom OPC UA Apps for FDT 3.0 Applications

For automation vendors, the FDT 3.0 solution establishes an architecture making it easy to provide a DTM that can be used for integration with service tools as well as creation of a digital twin with accurate information about the supplier's device.

By establishing a single point of access for device data, the FDT IIoT Ecosystem provides a comprehensive and consistent source of information for different service and operation use cases within plant or factory production systems.

Conclusion

FDT Group's FDT 3.0 (FITS) architecture will empower the intelligent enterprise by providing native integration of the OPC UA standard and a single device data interface with mobile access cloud-to-plant-floor. This robust technology will benefit the automation

community by simplifying compliant development of customized, FDT- and OPC UA-based Apps for a wide range of business decisions, industrial operations and maintenance tasks.

EcoStruxure Control Expert

For a simplified automation lifecycle (Release Q4 2020)

Authors: Guillaume Martine and Michel Ausseil - Ecostruxure Control Experts, Schneider Electric

EcoStruxure Control Expert offers a single configuration environment for automation systems based on Modicon M340, Modicon M580 and M580 Safety, as well as Momentum, Premium, and Quantum controllers.

Control Expert has a 16 years history in the field, focused on compatibility and life cycle management. Any version of Controller is supported as well as conversion from older PLC ranges to latest generation "IIoT ready" PAC architectures.

This year, Schneider Electric wants to go even further: The New **EcoStruxure Control Expert V15** with 'Topology Manager' will become a multi-controller, multi-user configuration environment, reducing engineering hours, commissioning and start-up time as well as the overall cost and risk of industrial automation projects.

The design will be intuitive: Users will be able to organize the project in several physical views.

As design progresses the system network will be updated, and IP addresses will be assigned automatically.
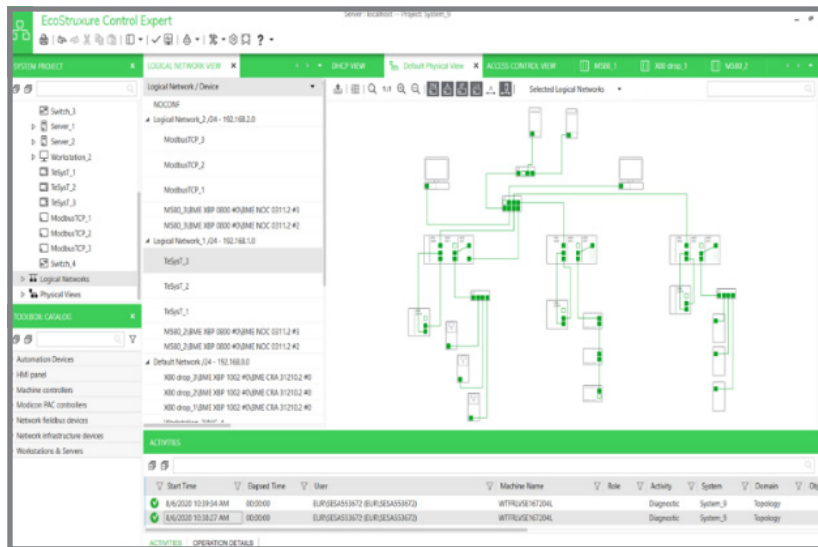
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EcoStruxure Control Expert

History panel will allow users to go back to any previous valid state, with undo/redo functionality.

Copy and paste function will allow configuration of similar assets while the system automatically ensures network consistency.
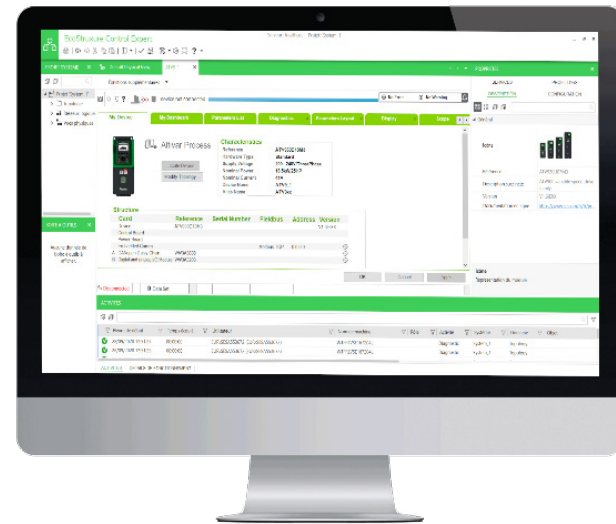
With **EcoStruxure Control Expert** you can configure and diagnose field bus devices (Schneider Electric or 3rd party devices) Modbus TCP or Ethernet IP.

The device DTM audit tool makes it easy to find the required device DTM and immediately check the installation or possible updates.
For devices like Altivar drives or Tesys, users can launch DTM screens for complete device configuration and diagnosis.

Once the system is designed, **Topology Manager** will allow the user to deploy a controller or group of controllers as well as assets in one click, accelerating significantly the real-world deployment.

With **EcoStruxure Control Expert v15**, users will be able to go online to monitor the status of any asset. By moving the mouse over a system element and right-clicking on it, more information - including

real-time operation and configuration, can be displayed, improving the operation and maintenance of the entire system.

EcoStruxure Control Expert v15 will boost engineering productivity, shorten time to market and reduce project engineering costs by providing a single intuitive environment to design, build, commission, operate and maintain an entire plant.

For more, visit: https://www.se.com/ww/en/product-range-presentation/548-ecostruxure%E2%84%A2-control-expert/

Join the FDT Group

FDT is the disruptive technology for modern industrial operations, it is a key enabler of the Fourth Industrial Revolution empowering the intelligent enterprise with innovative business models supporting the Internet of Things (IIoT) and Industrie 4.0 applications.

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.

For membership information, please visit www.fdtgroup.org

FDT Group Members

www.fdtgroup.org
FDT Group AISBL • 5 Industrieweg • 3001 Heverlee • Belgium
Phone: +32 (0)10 22 22 51 - Email: businessoffice@fdtgroup.org
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