case study

LEVERAGING IT TECHNOLOGY INTO FDT 3.0 SPECIFICATION REALIZES FITS™ ARCHITECTURE

Accelerating the evolutionary journey into the Fourth Industrial Revolution

Summary

FDT (IEC62453) is a technology which allows integration of devices and networks to engineering tools, e.g. for industrial control systems (ICS) and asset management systems. This paper introduces the latest FDT 3.0 technical specification which enables the FDT IIoT Server™ (FITS™) architecture concept. FDT 3.0 addresses end user requirements (total platform independence, support of fieldbus protocols, centralized DTM repository, and NAMUR Open Architecture). Additionally, this paper provides an overview of the FDT Server and its components, including a natively integrated OPC UA Server and a Web Server, and how to get started with FDT 3.0 development with FDT Server Common Components.

Challenge

Smart Manufacturing and Next Gen IIoT and Industry 4.0 technology solutions are rapidly growing and so is the industry's need for standardized, data-centric and mobile platforms for brownfield and new greenfield applications in the process, hybrid and discrete markets.

Solution

The FDT 3.0 IIoT Server (FITS™) platform, is accelerating the evolutionary journey of the organization and its technology into the Fourth Industrial Revolution. Developed from industry-driven feedback and providing a bridge between the currently installed FDT-base and next generation solutions, the updated standard empowers an FDT-based IIoT ecosystem to meet the demands for digitalization and Industry 4.0 applications.

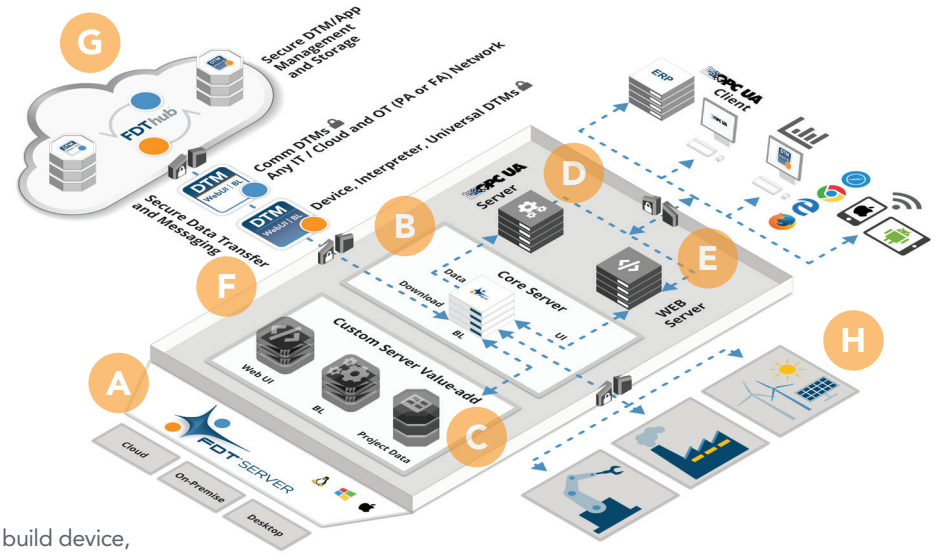
Result

The latest advancements in FDT® 3.0 technology will drive a wider range of worker mobility applications in the Information Technology (IT)/Operational Technology (IT) environment. They help standardized and optimize industrial organizations and their operations and maintenance departments by enabling cloud-based enterprise data access, device diagnostics and mobility applications; modernizing asset management practices; and improving predictive maintenance programs.

Download the Paper at IEEE Explore

This paper was presented in 2020 at the 59th Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE) and is now recognized and published with IEEE and available for purchase. Please click the download button that takes you to the IEEE site for more information.

How the FDT IIoT Server Solution Works



A **FDT Server**

- Utilizes .NETCore open source software to build device, cloud and IIoT applications.
- Compatible with a choice of operating systems, including iOS, Linux and Windows.
- Offers a variety of deployment options, including cloud, edge, on-premise and air-gapped.
- Employs Server Common Components relieving the developer of integrating the standard into products, allowing them to focus on value-added capabilities.

B **Core Server**

- Functions as IIoT data hub for the FDT Server.
- Included in Server Common Components.
- Incorporates DTM user interfaces and business logic.
- Stores, instantiates and executes DTMs, which are always kept up to date via the FDT*hub* repository.
- Provides the FDT topology information.

C **Custom Server Value-add**

- Integrates into a larger system for enhanced functionality, including higher level, complex systems such as asset management applications, PLC tools and DCS/engineering applications.
- Utilizes Server Common Components with all the basic coding groundwork for business logic, project data and Web UI, which system vendors can customize by adding their own wrapper for branding purposes.

D **OPC UA Server**

- Leverages a client-based environment.
- Enables IT/OT integration and gateway to data and health information.
- Allows developers to leverage industry-standard OPC UA Server included in the Server Common Components, or easily exchange it for their preferred OPC UA Server.
- Supports ERP/MES to optimize enterprise-level connectivity, plant availability and quality yield production.
- Offers OPC UA client/server-authenticated access to plant application data.
- Utilizes Publish-Subscribe environment for real-time data exchange.

E **Web Server**

- Leverages a browser-based environment.
- Mobilizes field device management.
- Transforms OT access for improved asset management and maintenance.
- Enables browser-based access to physical plant/facility assets using authenticated computer, tablet or phone, or via DCS, PLC, asset management application, etc.
- Programmed into Server Common Components however, system vendors may replace the preprogrammed Web Server with their server of choice.

F **Security**

- Provides encrypted communications using Transport Layer Security (TLS).
- Utilizes on-the-wire-security for enabled industrial automation protocols.
- Implements role-based user security.
- Supports 509v3 certificates for authentication.

G **FDT*hub*™**

- Enables convenient access to all certified Device and Communication DTMs in a single repository.
- Supports cloud-based deployment with automatic device discovery.
- Available as a local server for on-premise, air-gapped deployment.
- Supports machine-to-machine communications with 509 certificates for machines with authorized access.

H **Remote Facility Connections**

- Allows a single server to support multiple facilities.
- Provides access to FDT*hub* DTM repository.
- Optimizes security and connectivity via TLS, 509v3 certificates, authentication, authorization, and encryption.
- Compatible with VPN for IT environments, edge with a gateway for a specific protocol such as MQTT or AMQP and Intranet — ensuring communication stays within the secure enterprise network.