

CASE STUDY

Device Driver for Digital Valve Controllers for a Leading OEM

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UTTHUNGA TECHNOLOGIES

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Device Driver for Digital Valve Controllers for a Leading OEM

The Client

One of the leading industrial automation giant specialized in Manufacturing, Production, and Lifecycle Services for Valves, Actuators & Regulators and other plant assets.

Challenge Faced by The Client

Client is the manufacturer of a wide variety of industrial products including smart valve positioners, ball and sliding stem valves, steam conditioning equipment, and actuators.

They were in need of developing a Device Driver/Device Type Manager (DTM) that allows the user to

- Perform Device Setup for 150+ Actuator types, Partial & Full Stroke methods
- Monitor the health check of the instruments
- Configure the input/output configuration parameters
- Extend the instrument's monitoring and diagnostic capabilities

They wanted their device driver to be complaint with the FDT 1.2 standards to operate in various frame applications including DCS.

It was a crucial time for them to deliver the device driver to the market with very limited duration.

Scope of Work

The scope of work is to develop the device specific software component (Device Type Manager - DTM) with various features support. This involved

- Analyze and understand the Digital Valve Controller's existing Device Description, User Interface Requirement Document, and other complex requirements in depth. This provides the calibration methods, configuration parameters, diagnostic capabilities, and commissioning features of the Digital Valve Controller
- Identify the missing features from the Device Description which needs to be included as part of the Device Type Manager by comparing with the device manual and User Interface Requirement Documents
- The Device DTM should be complaint with the FDT 1.2 standards and follow the defined FDT Style Guidelines

- Increase the usability of the method flow by comparing with the existing Device Description
- The Device DTM testing to be carried using 10 different FDT frame applications including the DCS on 10 different operating systems
- Execute all the functionality and performance test cases with 8 different actuator and value setup to ensure that there is no breakage in the behavior of the software
- Enable multiple language support for the Device DTM

Solutions Provided by Utthunga

The client's requirements were analyzed in detail by visualizing and keeping the end-user perspective in mind.

Based on the requirement analysis of the entire process, and understanding the end user environment and needs, Utthunga proposed below solutions for the client's challenges.

- Set up the test environment to work with the existing Device Description and to have complete understanding of the device functionality
- Create mockups for complex methods like Device Setup, Auto Tuning, Stroke Value, Linearization, and Calibration. The actual Device Setup method flow had 100+ screens, which had been simplified into 20+ screens without changing any algorithm or the flow of the method logic
- Develop the Device DTM by following FDT 1.2 standards and to perform the pre-compliance test, which would save the time that is spent for fixing the issues during the FDT certification process
- Follow the Human Centered Design to create the alert icons and smart controls for increased usability
- Eliminate duplicate screens and methods and regroup the device specific parameters in an effective way for better user experience. This will avoid the number of clicks performed by the user
- Provide multiple language support with very minimal development efforts by only providing the resource strings in XML
- The Device DTM shall work on any FDT 1.2 standard complaint frame application
- The Device DTM shall be complaint with the PROFIBUS PA Profile 3.02 and related attributes shall be added in the Device DTM for identification purpose

Technology / Products Used

- FDT Standards 1.2
- PROFIBUS PA Profile 3.02
- .Net Framework 3.5

Implementation and Specific Learnings

- Understand and gained knowledge on the Valves, Actuators, and Positioners
- Proficiency in converting the complex features to simple control valve setup, auto tuning, and monitoring
- Gained experience with working on different DCS systems

Benefits for the Customer

The client was able to achieve tangible benefits in various aspects

- The single Device DTM shall be used to work with 150+ Actuator types and Actuator sizes
- Quick and on-time demonstration/deployment of the device DTM resulted in gaining the trust of new customers and actively engaging them
- Reduced the development efforts for this project from 12 months to 7 months while providing high quality deliverables using Utthunga's proprietary framework
- Reduced the time spent for executing the complex methods flow, which in turn saved time during commissioning
- Same device configuration can be loaded to N number of device by using upload & download operations

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