

CASE STUDY

Developing Calibration and Configuration Functionality for a Renowned Test Equipment OEM

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UTTHUNGA TECHNOLOGIES

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The Client

The client is a Fortune 500 company, well-known for its precision calibration and instrumentation equipment. A leading authority in industrial test, measurement and diagnostics, the client prides itself for keeping industries around the globe up and running.

Client's Challenge

The client has a huge product portfolio of handhelds for configuration and calibration of industrial field devices such as flow meters, gauges, actuators etc. Inherent in the big product basket was the issue of function specific and protocol specific products. A major challenge that the service personnel of the client's end customers were facing was that they had to carry a multiple handhelds. Depending on if they wanted to configure or calibrate the field device(s) a separate handheld was needed. This was further complicated, because no single handheld supported more than one communication protocol. The reality of the plant floor is field devices can communicate over any of these standard protocols: HART, PROFIBUS, FF, and others.

After deep internal brain storming and discussions, the client decided to have the configuration and calibration functionality in a single handheld, and further also have it support HART, PROFIBUS and FF protocols.

Scope of Work

The complete work involved developing the functional modules for calibration, configuration and communication via all the three protocols mentioned above. An important part of the implementation was to support DD (Device Description) files, i.e. the enhanced software of the handheld will be able to import the DD file of the field device under test and display the various screens for the operations. The support for generic DD was also to be implemented to account for the scenarios where the DD file is not available.

Other high level brief of the work involved:

- Analyze the requirement in detail by keeping the end user (commissioning and service personnel) environment and usage behavior in mind
- Develop the user interface to provide information on the calibration methods, configuration parameters, diagnostic capabilities, and commissioning features
- Use the SDC-625 source code (HART), DD Service Kit (FF) provided by FieldComm Group and the iFak EDD interpreter for Profibus PA.

Solution Provided by Utthunga

Utthunga designed and developed the handheld software with the core features of calibration, configuration and communication. The following points detail the solution provided by Utthunga:

- Developed the framework for the communicator module that includes related business logic
- Created the user interface to meet the required calibrator and configurator functionality
- Accomplished the Device Driver (EDD) development by following HART standard, EDDL standards and the iFak EDDL interpreter standard for Profibus PA
- Developed the components to perform various operation on different protocol
- Set up the test environment to simulate the field device functionality
- Created test suites to validate the technology
- Developed automated unit test using Google Test framework for all the components
- Delivered detailed design
- Developed the EDDL engine with dynamic loading feature of the preconfigured procedures/methods at the request of the host application. DDS gets the method information which includes the method definition, DDL item description from the device DD files (or in its absence from the generic DD file)
- Method execution: Method interpreter executes the method at the request of the host application.
- Maintaining the operational parameter values

Technology/Products Used

- Ubuntu embedded Linux platform with native C++
- DDS Foundation Fieldbus interpreter and iFak EDD interpreter
- SDC 625 interpreter code base by FieldComm Group
- HART 5 and HART 7 Protocol Specification
- Softing stack for FF
- FF DDS Protocol Specification and iFak EDD specification

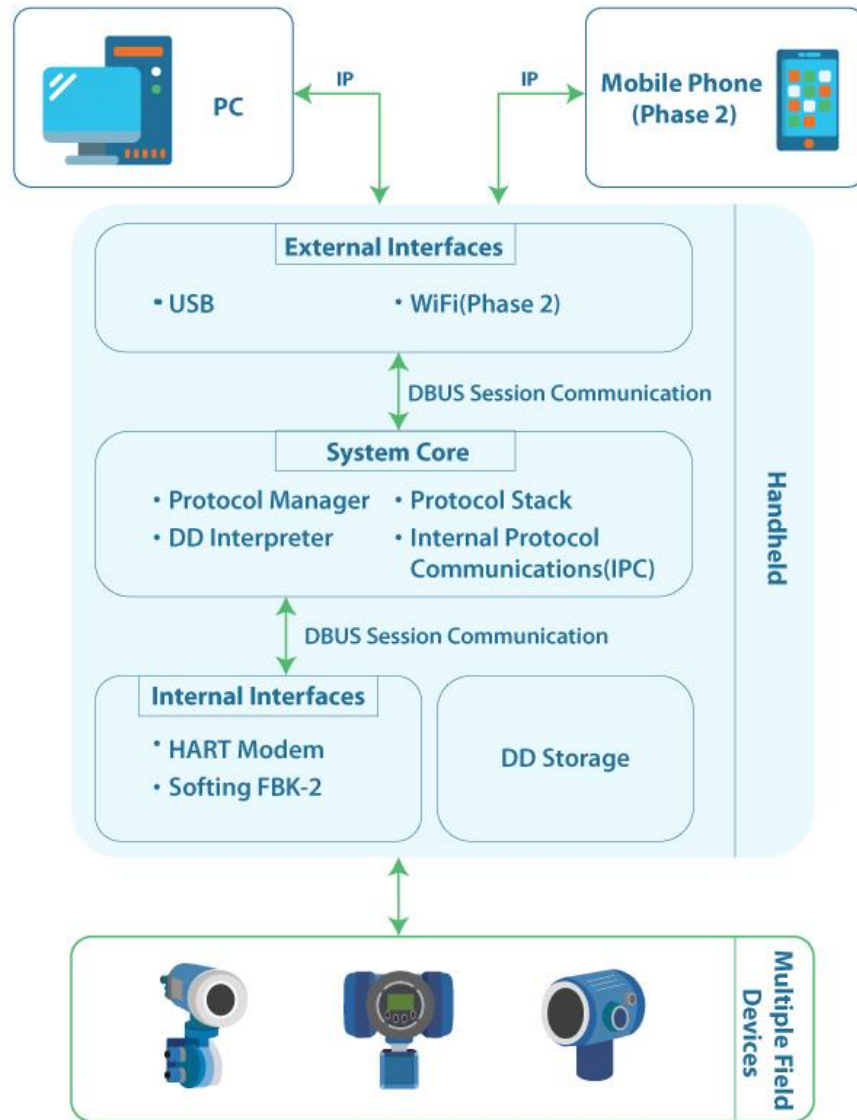


Figure 1: Block diagram representation of the calibrator

Implementation and Specific Learnings

With the team at Utthunga having prior experience working with the mentioned protocols and building various tools and applications to interface with field devices, the risks in implementing this projects was almost nil. Having said that, the team still acquired new knowledge and learnings in the course of this project:

- Understood and gained in-depth knowledge of calibration and configuration instruments
- Further polished the know-how and enhanced expertise of Foundation Fieldbus, HART and Profibus PA protocol stacks
- Widened our experience with different EDD host applications operating with EDD interpreter

Benefits for the Customer

The client achieved tangible benefits as a result of implementing this project. Mentioned below are a few keys benefits realized by the client:

- Significant increase in market reach given availability of both configuration and calibration functionality via various protocols from the same handheld
- Increased end customer satisfaction as the load of the service kit significantly reduced
- Added greater value to the customer by supporting DD files
- Client's in-house software team acquired in-depth know-how of EDDL technology

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