Data Node Configuration Tool

By
Richard Brueggman
Founder, President, & CEO
Data Science Automation, Inc.
USA

and

Ronald J. Cochran
Engineer, Measurement & Automation
Data Science Automation, Inc.
USA

Category:
Industrial Measurements and Control

Products Used:
LabVIEW 8.2

The Challenge:
The Client needed to have an application to configure a high number of Compact FieldPoint units. In addition to selecting the channels the system was to make available to the outside world, the application also needed to support changing the IP address of the cFP controllers.

The Solution:
Using LabVIEW, Data Science Automation was able to create an application that allowed the user to program and change the IP address on the customer's FieldPoint units without the installation of any additional software on their computers.

Abstract:
The client needed to be able to configure the large number of Compact FieldPoint systems that constituted their data acquisition network. This tool needed to locate the available units on the network, provide a consistent, clear interface for programming them and verifying that the cFP systems are indeed returning the correct data. Moreover, all this had to be done while minimizing the software installed on the customer's computers. DSA found the solution to all these requirements in LabVIEW.

Introduction
The usual way of configuring a FieldPoint system is through the tools that come bundled with it – specifically Measurement and Automation Explorer (MAX). However, for one customer, this general purpose tool had two problems. First, it was general-purpose. To reduce training costs and the likelihood of error, the customer needed an interface that identified units and channels using their application-specific nomenclature. Second, this utility required the installation of a separate application on all their computers that was not integrated into their application. To meet the challenge of developing an integrated, customized cFP editor, the customer chose Data Science Automation.

Keeping with the customer's requirement that the system be able to walk inexperienced users through the process of working with the cFP systems in a step-by-step manner, when the configuration editor launches, it presents the user with a selection dialog for specifying the editor's basic operating mode. "View Mode" is a read-only mode that allows the user to browse through configuration settings without the danger of inadvertently changing something. "Configure Mode", on the other

hand, allows the operator to change a unit's configuration but not see live data coming in. If the operator makes no selection in 10 seconds, the editor defaults to View Mode.

The customer's acquisition network consists of mobile cFP systems mounted on trucks. Therefore, the system next prompts the operator to enter the number of the truck that the operator wishes to view or configure. Once a number is entered, the application looks-up the IP address for that truck and starts displaying the system's incoming data. Depending on whether the cFP backplane has one or two acquisition modules installed, the display varies slightly. Figure 1 shows a typical View Mode display from a two-module (32-channel) system. The Configuration Mode screen is the same, except the columns for displaying the live data are absent.
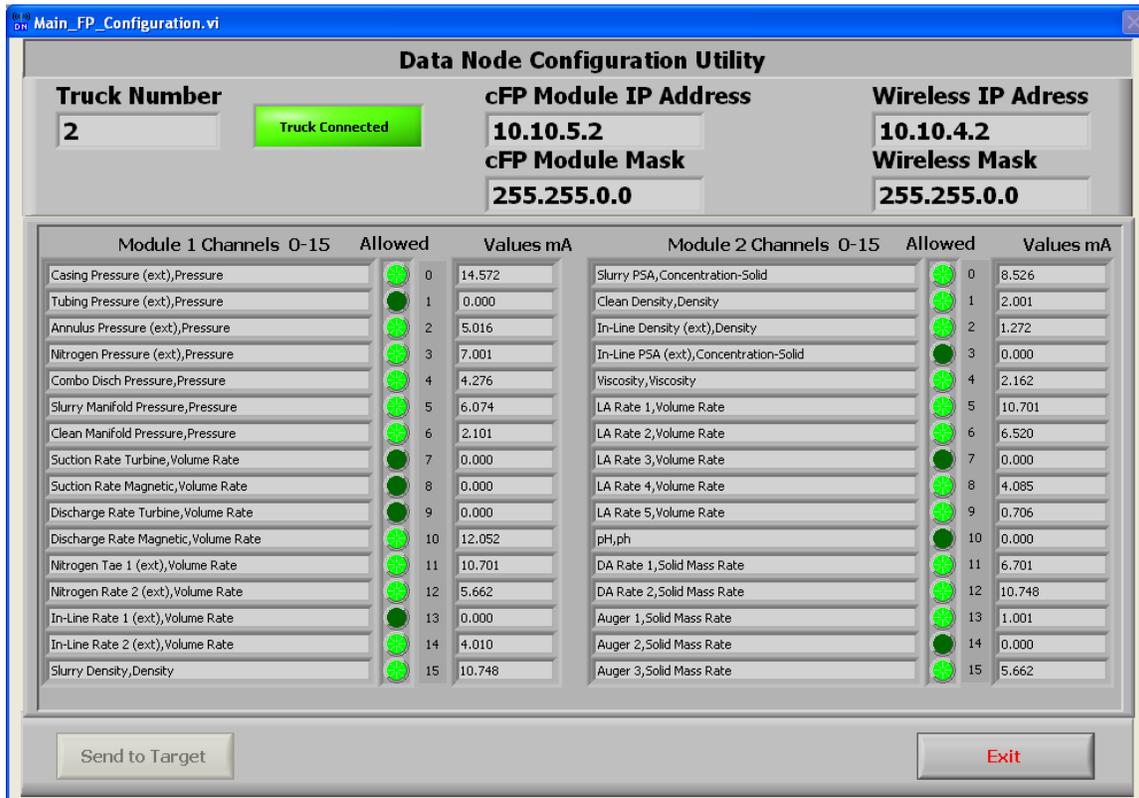

Figure 1 – This display shows a 32-channel acquisition system. For a 16-channel system, the columns for displaying Module 2 are not present. The screens for configuring a system are the same except they lack the columns for displaying the incoming data.

For new systems that have not yet been configured, the process is very much the same, except that before the system can be configured, its IP address needs to be configured. Hence, after selecting the truck of interest, the operator is presented with a list of all the cFP units currently on the local network (Figure 2). From this list, the operator selects the unit to configure. Note that the operator does not enter in the IP address to be assigned to the selected unit. Rather the software uses the truck number to look-up the intended IP address in a configuration file.
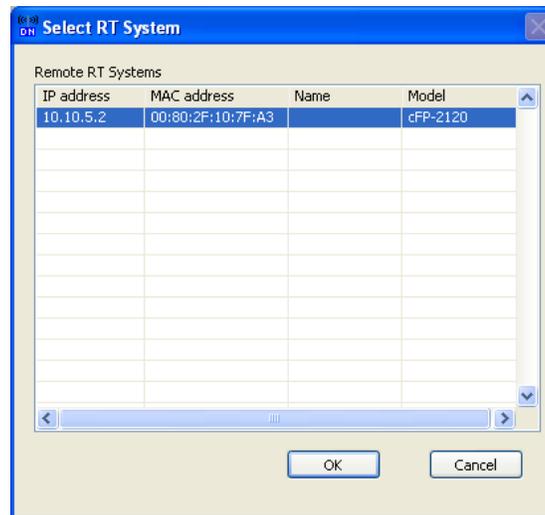
Figure 2 – Select RT System

With the network addressing now set, the software uploads to the using a baseline configuration and checks to see how many AI-111 modules are installed, and where they are located. From this point on, editor operation is the same as for an existing unit.

Because the software assumes a single type of acquisition module is present, the extent of the editing available is limited to changing the name of a channel and enabling or disabling it. Once the operator is satisfied with the setups, clicking the *Send to Target* button causes the software to upload the new configuration to the cFP system, reboots the controller and switches the software into View Mode.

The Result

Using LabVIEW software, Data Science Automation was able to provide the customer with a cost-effective tool for managing a large number of cFP units. Moreover, because this tool could be integrated into their existing application, the customer's bottom-line didn't suffer the expense of needing to train personal without programming knowledge to configure acquisition systems using complex general-purpose application