

HMI testing of multiple PLCs using simulations on Virtual Machines

Marcelo R Avendano^{1*} and Kevin Patel¹

¹CDM SMITH, One Glen Lakes, 8140 Walnut Hill Lane, Suite 1000, Dallas, Texas, USA, 75231

(*correspondence: avendanomr@cdmsmith.com)

FORMAT: 30 minute PowerPoint presentation

KEYWORDS

Simulation, SCADA, Virtual Machines, HMI, Multiple PLCs

ABSTRACT

The ideal program is one that will not need any debugging after installation. However, this is usually not the case. Debugging is a programming process which is as important as programming itself. One of the challenges for an HMI programmer is to minimize the time and therefore the cost that is spent developing an SCADA application. To minimize the time spent debugging during the installation of an interface, it is necessary to have a simulation phase during the development process to solve some problems before the system is installed on site. This is an industry practice that usually provides a good result, and vendors nowadays offer developers different packages to simulate a PLC with the HMI system to test the logic and communications between HMI and PLC.

Nevertheless, larger systems require more than one or two PLCs, and the software capabilities limit the developers to the simulation of only one PLC at a time. This will only allow limited tests to the system that is being designed.

This study was part of an implementation project by CDM Smith for one of our clients, and takes advantage of the use of virtual machine environments to overcome that limitation by using several PLC simulator packages hosted in different virtual machines. With this approach a workstation will be able to simulate several PLCs connected to a single HMI. This will provide a faster, and potentially a cost effective, alternative to the current practice that includes either testing in a lab with several PLCs or fixing the issues in the field where the client will be expecting fast resolutions.

About the Authors:



Marcelo R. Avendano, EIT: graduated in Electrical Engineering from the Pontificia Universidad Católica del Perú in 2010 and is currently an Automation Specialist at CDM Smith where he develops SCADA systems for different projects in the Area.



Kevin Patel, P.E. has been working in the field of water/wastewater for over 9 years. Kevin's experience includes designing, integrating and programming instrumentation and control (I&C) systems primarily for water and wastewater treatment facilities. He is a current member of the ISA101, ISA105, ISA106 and ISA18 committees related to HMI, testing, automation, and alarming. He has a bachelor's degree in Computer Engineering from Texas A&M University in 2003 and completed his MBA from the University of Texas at Dallas in 2011. He is currently an automation engineer and project manager at CDM Smith's Dallas/Fort Worth, Texas office.