An Architectural Framework For Describing Supervisory Control And Data Acquisition (SCADA) Systems

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Two recent trends have raised concerns about the security and stability of Supervisory Control and Data Acquisition (SCADA) systems. The first is a move to define standard interfaces and communications protocols in support of cross-vendor compatibility and modularity. The second is a move to connect nodes in a SCADA system to open networks such as the Internet. Recent failures of critical infrastructure SCADA systems highlight these concerns. To ensure continued operations in times of crisis, SCADA systems, particularly those operating in our critical infrastructure, must be secured. Developing an abstract generic framework for defining and understanding SCADA systems is a necessary first step. A framework can provide the tools to understand the system’s functions and capabilities, and how components in the system relate and interface with each other. This thesis examines and describes SCADA systems, their components, and commonly used communications protocols. It presents a matrix approach to describing and defining the features, functions and capabilities of a SCADA system. Two small SCADA systems, using industry standard components and simulating real world applications, were designed and constructed for this thesis to provide context for applying the matrix approach.

Book Information

File Size: 6475 KB
Simultaneous Device Usage: Unlimited
Publication Date: March 22, 2012
Sold by: Digital Services LLC
Language: English
ASIN: B007O15TFY
Text-to-Speech: Enabled
X-Ray: Not Enabled
Word Wise: Not Enabled
Lending: Not Enabled
Enhanced Typesetting: Enabled
Customer Reviews
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