

Managing Complexity - Minimizing Risk

Balancing system growth against destabilizing risk

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ABSTRACT

As interfaces to the world's most valuable resource, SCADA systems in the water and wastewater industry are subject to great variety of stressors, ranging from malicious attack to regulatory enhancements to constant growth. While there is great buzz around cyber security, precious little attention has been given to properly ensuring the stability of a system against the sheer weight of its increasing complexity. A system that once included a single PC dedicated to managing a few assets is now a highly customizable collection of modules, a node on a network, or a server within a greater architecture of servers. As developers, system integrators, consultants and owners, it is incumbent upon us to ensure systems remain stable and supportable while minimizing risks.

To identify such risks, one need only look at the typical large SCADA architecture. Dedicated server racks overflow with numerous, dedicated servers on dedicated networks, each component given a subset of tasks. These components are then woven together with proprietary implementations of standard communication technologies. Further, many software implementations encompasses a complex matrix of modules from different manufacturers, requiring careful maintenance planning and attention to component version compatibility. In mission-critical systems, these complexities are exacerbated as redundant components are introduced. Systems must now not only be aware of the components to which they communicate, but must be able to carry out automated fail-over procedures.

While the final result may be a comprehensive SCADA solution, each distinctive component, be it software or hardware, adds complexity. The difficulty lies in finding a balance between enhancing operational reliability and introducing excessive complication. This paper focuses on strategies to minimize complexity in mission-critical architectures and methods to identify risks in existing systems and migrate to lower-risk architectures.

ABOUT THE AUTHOR

Blair Sooley is an Account Manager with Trihedral Engineering Inc. He holds a Bachelor in Electrical Engineering from Dalhousie University in Halifax, and an MBA from St. Mary's University. Blair has been working in the controls industry for 18 years and in the water and wastewater sector for 10 years.