

Design and implementation of secure industrial network

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The evolution of industrial networks reached a new milestone by the integration of new services and computing power, while increasing the interoperability and the decision accuracy. Adopting this new plethora of technologies and services led to the rise of new design challenges in terms of security, reliability, scalability and especially to the stability of these cyber-physical industrial systems. The work presents a network design methodology for large scale industrial networks including the monitoring, routing and anomaly detection services, formulated as a multi criteria optimization problem. Several conflicting objectives such as minimizing the costs, increased reliability, increased detection accuracy, alongside of a large number of constraints including transport detection and processing capacity, bounded delay, are characterizing the design problem. To assure the scalability of the industrial system, it is necessary to identify correctly the system behavior, the correlations between the observed variables and, if feasible, to design a hierarchical network architecture. This way, the detection devices placed alongside different layers enable the isolation of cyber attacks and occasional failures. Finally, the proposed industrial network security services should not inhibit or not compromise the behavior of control loops.