

Recent Technologies, Security Countermeasure and Ongoing Challenges of Industrial Internet of Things (IIoT): A Survey

ABSTRACT

The inherent complexities of Industrial Internet of Things (IIoT) architecture make its security and privacy issues becoming critically challenging. Numerous surveys have been published to review IoT security issues and challenges. The studies gave a general overview of IIoT security threats or a detailed analysis that explicitly focuses on specific technologies. However, recent studies fail to analyze the gap between security requirements of these technologies and their deployed countermeasure in the industry recently. Whether recent industry countermeasure is still adequate to address the security challenges of IIoT environment are questionable. This article presents a comprehensive survey of IIoT security and provides insight into today's industry countermeasure, current research proposals and ongoing challenges. We classify IIoT technologies into the four-layer security architecture, examine the deployed countermeasure based on CIA+ security requirements, report the deficiencies of today's countermeasure, and highlight the remaining open issues and challenges. As no single solution can fix the entire IIoT ecosystem, IIoT security architecture with a higher abstraction level using the bottom-up approach is needed. Moving towards a data-centric approach that assures data protection whenever and wherever it goes could potentially solve the challenges of industry deployment.