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MASTER'S THESIS

Theme

Security for the Industrial Internet of Things (IIoTs) "MITM Attack"

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Abstract

In various applications, Industrial Internet of Things (IIoT) networks have become a fundamental part. These networks rely on the Time Slot Channel Hopping (TSCH) protocol, which provides efficient communication capabilities. However, it is still vulnerable to MITM attacks. This thesis addresses this type of attack and its impact on IIoT networks.

This type of cyberattack involves stealing device identities, injecting fake data, and also using replay attacks to flood the network. We propose a new encryption mechanism based on the dynamic Fibonacci sequence and XOR logic operation to hide the identity of the real sender and protect data.

Simulation results using the Contiki-NG simulator show that our mechanism is highly effective against this attack, preventing identity theft and data decryption, thus enhancing network security.

We take into considiration the devices resource contraints while addressing these security vulnerabilities. therefore, we can say this research advances the protection of IIoT networks, ensures robust security . Achieving maximum security in constrained devices can be achieved through innovative cryptographic approaches.

Keywords: IIoT, TSCH , Fibonacci sequence, Dynamic key, MITM attack, TSCH Security.

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