UNIVERSITI TEKNOLOGI MARA

FRAMEWORK OF TRUSTED WIRELESS SENSOR NODE PLATFORM FOR WIRELESS SENSOR NETWORK

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requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree of qualification.

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ABSTRACT

Wireless Sensor Networks (WSNs) have shown great promise as the emerging technology for data gathering from unattended or hostile environment. The advancement in micro-electro-mechanical sensor technology, wireless communication technology and the recent scavenging energy have gradually expanding the acceptance of WSN related applications. The design of sensors that are small, low cost, low power and combined with its unattended nature has made it more viable and indirectly promotes its popularity for future solutions in various real-life challenges. One of the most challenging yet important security issues in Wireless Sensor Network is in establishing trusted and secured communication between sensor node and base station. While the term trusted has been widely used referring to valid nodes in the group, this thesis refer the term trusted based on Trusted Computing Group (TCG) specifications. With limitations in the present solutions such as late discovery of invalid nodes such in Trust Management System and high energy consumption with external security chip due to the used of Trusted Platform Module chip; a Framework of a Trusted Wireless Sensor Node is presented. The framework incorporates ideas from TCG and Identity-based cryptosystem by Boneh Franklin to ensure trusted and secured communications between sender and receiver which might be between sensor node and base station or between sensor nodes in the network. The research aim to come out with a credential based trusted sensor network to verify the authenticity of sensor nodes in the network. Finally the proposed trusted framework is evaluated for the potential application in resource constraint devices by quantifying their power consumption on selected major processes. The result proved the proposed scheme can establish trust in WSN with less computation and communication and most importantly eliminating the need for neighbouring evaluation such in Trust Management System or relying on external security chip. Finally, proposed works benefit in eliminating clone or duplicated nodes in the WSN thus reduced the number of false and unwanted messages in the Wireless Sensor Network.

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