

基于Steiner树的层次型无线传感器网络安全组播协议

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摘要：

在基于查询的无线传感器网络中，组播技术的应用可大幅减少传感器节点的能量消耗，延长节点寿命。针对大型无线传感器网络组播协议性能不高，且易遭受攻击等问题，提出了基于Steiner树的层次型无线传感器网络安全组播协议。该协议主要运用Steiner树与分簇网络的思想，将Steiner树的高效性与簇的高扩展性相结合，提高了无线传感器网络组播效率，均衡了网络能量消耗，延长了网络生命周期，并在此基础上加入安全通信机制，以抵御各种网络攻击并确保组播数据的安全性、完整性与可验证性。最后通过理论证明及模拟实验表明本协议适用于大规模无线传感器网络，具有较低能耗及较高安全性。

关键词：无线传感器网络；Steiner树；簇；安全组播

Steiner-Based Hierarchical Secure Multicast Protocol for Wireless Sensor Network

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Abstract:

By applying multicast technology, the energy consumption can be significantly reduced, and the life time of nodes can be extended in query-based wireless sensor networks. The multicast protocol for large-scale wireless sensor networks from existing literature is usually low performance and low safety. For this reason, a steiner-based hierarchical secure multicast protocol for wireless sensor network is proposed in this paper. The main idea of proposed protocol is based on steiner tree and cluster topology. Multicast efficiency can be improved since high-efficiency of steiner tree and high-scalability of clustering. Besides, the energy consumption of nodes can be balanced, and the life time of network can be extended. Furthermore, the protocol adopts secure communication mechanism to prevent from various network attacks and ensure the data security, integrity and verifiability. Based on the analysis and simulation results, it is shown that the proposed protocol is suitable for large-scale wireless sensor networks.

Keywords: Wireless Sensor Network; Steiner Tree; Cluster; Secure Multicast

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