Performance Boundaries for SPYC Methodology Used in Querying Wireless Sensor Networks

Alireza Mortezaei (20259692, alirezamortezai@yahoo.com)

SE-499 Independent Study Proposal

Jan 5, 2012

Research Description and Objectives

This research analyzes SPYC[1] methodology in order to find its tight performance boundaries. SPYC is used in querying wireless sensor networks in order to provide privacy for the client who issues the query. This is significantly important when the provider of the network wants to provide query capabilities for the third-party (external) client over the sensor network. The client might want to hide the corresponding regions of an specific query in the sensor network or the order in which she issues several queries. More so, Security becomes a critical concern when several organizations have stakes in a single sensor networks. Although these organizations need to collaborate with one another for administrative purposes, due to diverging interests, they may not fully trust one another. SPYC provides privacy both for internal organizations and for external clients. However, using SPYC would result in some performance overhead as its traditional performance vs security tradeoff. We are interested to find the exact amount of the overhead imposed by SPYC methodology and thus find the exact performance boundaries of this method.

Student Involvement

I will be collaborating with Dr. Mahesh Tripunitara during this research. I took ECE 428 with him and found the topic of network security very appealing. I will be mostly responsible for simulating small

sensor network and performing test scenarios in order to collect data and support the result of Dr. Mahesh Tripunitara findings.

Methodology

I would schedule periodic meetings with Dr. Mahesh Tripunitara in order to clarify the requirement for each step of the progress. After collecting the requirement, I will proceed to implement the network and create the scenarios. After performing the scenarios I present the collected data back to Dr. Mahesh Tripunitara and we discuss and analyze the result. As of the technical aspect of my project, I will mostly be using TOSSIM for simulating the sensor networks.

Expected Achievements and Learning Outcomes

I expect to have a better grasp of the concept of "Performance vs. Security Tradeoff" by the end of this project. I would also like to get more familiar with the various mathematical method used in finding performance boundaries.

References

[1] Carbunar, B.; Yang Yu; Shi, L.; Pearce, M.; Vasudevan, V. Query privacy in wireless sensor network 2007