School of Computer Science
Dissertation
Carlos Sanchez

A RISK AND TRUST SECURITY FRAMEWORK FOR THE PERVASIVE MOBILE ENVIRONMENT

ABSTRACT

A pervasive mobile computing environment is typically composed of multiple fixed and mobile entities that interact autonomously with each other with very little central control. Many of these interactions may occur between entities that have not interacted with each other previously. Conventional security models are inadequate for regulating access to data and services, especially when the identities of a dynamic and growing community of entities are not known in advance. In order to cope with this drawback, entities may rely on context data to make security and trust decisions. However, risk is introduced in this process due to the variability and uncertainty of context information. Moreover, by the time the decisions are made, the context data may have already changed and, in which case, the security decisions could become invalid.

With this in mind, our goal is to develop mechanisms or models, to aid trust decision-making by an entity or agent (the truster), when the consequences of its decisions depend on context information from other agents (the trustees). To achieve this, in this dissertation, we have developed *ContextTrust* a framework to not only compute the risk associate with a context variable, but also to derive a trust measure for context data producing agents. To compute the context data risk, *ContextTrust* uses Monte Carlo based method to model the behavior of a context variable. Moreover, *ContextTrust* makes use of time series classifiers and other simple statistical measures to derive an entity trust value.

We conducted empirical analyses to evaluate the performance of *ContextTrust* using two real life data sets. The evaluation results show that *ContextTrust* can be effective in helping entities render security decisions.

Date: Thursday, **May 2**, 2013

Time: **10:00 AM**

Place: Devon Hall room **220**

Committee Members: Dr. McGovern
Dr. Fagg
Dr. Hougen
Dr. Trytten
Dr. Lee