Master Thesis proposals in Cyber Security and Privacy

The following two projects were offered as CS undergraduate projects but nobody has taken them. However, both projects can be extended to become a Master Thesis in Cyber. There are both theoretical and applied extensions for each project. Also, there are interested parties from Industry in this research (IBM, EMC) and therefore financial support may be possible.

Interested students please contact Prof Ehud Gudes: ehud@cs.bgu.ac.il

1) Title: From Constraint Satisfaction Problem to Access Control Management

- Boris Rozenberg - IBM Research
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- CSP, Authorization, Database Security

- Short description
Role Based Access Control (RBAC) is a widely used access control model. To use an RBAC system, one needs to first identify a complete set of roles, including permission to role assignments and role to user assignments. This process is known as role engineering. Since many organizations already have some form of user permission assignments defined, it is reasonable to identify roles from this existing information. This process is known as role mining. Recently, a method that transforms the role mining problem into a constraint satisfaction problem has been published [1]. The transformation allows to discover the optimal RBAC state based on customized optimization metrics.
What is requested in this project is to extend the proposed method in several directions and to implement the overall approach, using open source CSP solvers, such as [2].

- Required course pre-requisites: no. However, the understanding of CSP fundamentals is needed.
- Programming languages and development platforms: Java

References:

2) A Comparative Study of Distributed Privacy Preserving Algorithms in Map-Reduce

Supervisor(s): Prof. Ehud Gudes and Philip Derbeko (EMC)
For: 1-2 student(s).
Description: The project compares a performance of distributed, privacy-preserving algorithms. The algorithms are implemented on top of Map-Reduce framework (Hadoop 1.x). The requirements of the project:
- Read and understand a research paper describing algorithms
- Implement the above algorithms on top of MapReduce framework.
- Compare the performance of the algorithms in terms of CPU operations and network traffic on various datasets.