DTLS profile for access control in the Internet-of-Things

Thesis description

The Internet of Things (IoT) will include a high number of resource-constrained devices directly available on the Internet. Many of them will be configured as Servers, exporting different kinds of resources to requesting clients. RISE SICS has designed and developed an Authorization Framework for the IoT, where an Authorization Server releases Access Tokens to requesting Clients, so granting them to access protected resources on the Server. An “IPsec profile” has been developed and implemented in order to contextually establish a secure IPsec channel between the Client and the Server. The goal of the project is to implement the alternative “DTLS profile”, experimentally evaluate its performance, and compare it against the available “IPsec profile”. The project will build on prototypes of the Authorization Framework and the “IPsec profile” developed at RISE SICS for the Contiki OS.

RISE SICS will provide background information and the necessary guidance during the course of the thesis. The tasks of the Masters student for this thesis are:

- Study IoT communication and security protocols.
- Study the authorization framework and its IPsec profile designed and implemented at RISE SICS.
- Learn to program the selected embedded system platform with the Contiki OS.
- Study, implement and evaluate the DTLS profile for the authorization framework on IoT devices. Performance analysis will include evaluation of memory usage, communication overhead and energy consumption, as well as a comparison against the alternative IPsec profile for the authorization framework.
- Document the activities and results as a thesis report.

Competence

We are looking for a bright and motivated MSc student who has fulfilled the course requirements. Good C programming skills are required, as is good spoken and written English. Experience with network and communication security as well as Java programming skills are also a plus.

Applications should include a brief personal statement, CV, and a list of grades. In the application, make sure to mention previous activities or other projects that you consider relevant for the position. Candidates are encouraged to send in their application as soon as possible. Suitable applicants will be interviewed as applications are received.

Start time: As soon as possible
Location: RISE SICS AB, Kista, Stockholm

About RISE SICS

RISE SICS is a leading research institute for applied information and communication technology in Sweden, as a non-profit research organization owned by the Swedish government. The mission of RISE SICS is to contribute to the competitive strength of Swedish industry by conducting advanced and focused research in strategic areas of computer science, and actively promote the uptake of new research ideas and results in industry and society at large. RISE SICS is an active participant in collaborative national, European, and other international Research & Development programs.

Contact person
Dr. Marco Tiloca, RISE SICS AB, Security Lab (marco.tiloca@ri.se)
Rikard Höglund, RISE SICS AB, Security Lab (rikard.hoglund@ri.se)
Electrum Building, Isafjordsgatan 22, SE-164 40 Kista, Stockholm