

Adaptive Counteraction to Denial of Service in Constrained Internet-of-Things Devices

Master Thesis at RISE SICS, Kista.

In the upcoming Internet of Things (IoT) scenario, all connectable devices will be directly available on the Internet. In addition, many IoT devices will be resource-constrained, with limited memory and network resources, as well as battery-powered. This makes them particularly exposed to Denial of Service (DoS) attacks, which can make them less reactive or even unable to serve legitimate requests. The goal of the project is to implement and experimentally evaluate a security solution that reduces the impact of DoS attacks against resource-constrained IoT devices, while preserving best-effort service availability. The project will build on a first Java prototype for commodity PCs developed at RISE SICS.

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, as well as issues related to DoS attacks.
- Study the security countermeasure designed and implemented at RISE SICS, propose improvements, and adapt it in order to take advantage of power-saving modes available on IoT constrained devices.
- Learn to program the selected embedded system platform with the Contiki OS.
- Implement and evaluate the security countermeasure on IoT devices. Performance analysis will include evaluation of memory usage, communication overhead, energy consumption, and effectiveness in counteracting DoS attacks.
- 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. Fair Java programming skills are also required. Experience with network and communication security is 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. A successful candidate will have the opportunity to contribute to a European project on IoT connectivity platforms.

Starting time: As soon as possible

Location: RISE SICS, Electrum Building, Isafjordsgatan 22, 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.

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