Thesis title: Blockchain and smart contracts Technology in IoT applications

Thesis description:
Blockchain technology applications are currently being investigated and developed. They are currently used to build decentralized and trustless applications. Many applications exist and new start-up companies are appearing every now and then. The following are few examples. Namecoin is a blockchain application for registering domain names. Bitmessage is a decentralized message service for exchanging peer-to-peer encrypted messages. Filecoin is a cryptocurrency and a distributed storage service. One interesting application that might change the business landscape is transferring the ownership of assets where the same transactions moving money on a cryptocurrency blockchain act as moving the ownership of the asset under order of transfer. Transfer of ownership is realized by the so-called smart contracts which remove the need for a trusted third party during agreements between the current owner and the new owner. Another interesting application is in building decentralized Internet of Things (IoT) platforms enabling a secure and trusted data exchange between smart IoT devices. IBM and Samsung developed a platform called ADEPT (Autonomous Decentralized Peer to Peer Telemetry) using the Ethereum smart contract platforms to build decentralized IoT applications.

References
5. ADEPT. https://archive.org/stream/pdfy-0dhcC00bbEnd053.../IBM%20ADEPT%20Practitioner%20Perspective%20-%20Pre%20Publication%20draft%20-%207%20Jan%202015_djvu.txt

Tasks:
- Investigate the security of smart contract applications and develop a solution to current existing security issues.
- Identify the pros and cons of using the blockchain technology in IoT applications.
- Investigate the security and privacy of decentralized IoT blockchain applications and develop solutions for them.

Competence:
- Cryptography
- Programming (C/C++, python).
- Peer-to-peer networking.

Applications should include a brief personal letter, CV, and recent grades. In your application, make sure to give examples of previous programming or other projects that you consider relevant for the position.

Expected start time: As soon as possible

Location: SICS Swedish ICT AB, Lund

Contact person/s: Dr. Mohamed Ahmed Abdelraheem (Mohamed.abdelraheem@sics.se)
About SICS
SICS Swedish ICT is a leading research institute for applied information and communication technology in Sweden. SICS is a part of Swedish ICT Research AB, a non-profit research organization owned by the Swedish government and industry. SICS’ mission 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. SICS is an active participant in collaborative national, European, and other international R&D programs.

SICS Security lab main research areas are Cloud Security, Security in the Internet of Things (IoT) and Secure Virtualization. The Security Lab is distributed between two locations: one part of the group sits in the main office in Kista, while the other part are pioneers in our relatively new SICS offices in Lund.

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