Body:

Motivation

Modern IT systems are open and very dynamic. They consist largely of independent modules, which act autonomously, and are orchestrated by meaningful organizational rules. We have learned from nature, that different kinds of species independently live together in an ecological system, yet also follow rules. IT-Ecosystems is a research project that addresses adaptive infrastructures, control of semantic diversity, as well as human-environment-machine interaction.

The project started in February 2009 and L3S was responsible for human-environment-machine interaction with the focus on smart devices in local communities. Since May 2011 L3S additionally contributed in the field of communication and interaction of smart devices with focus on security and privacy. Ubiquitous smart devices form complex systems, in which individuals communicate with each other via providers’ networks or directly. The diversity brings along different challenges for the research in the field of security and privacy of users. In this context, L3S modeled and developed systems, identified security and privacy issues, and designed and evaluated usable countermeasures.

Challenges & Highlights

Threats to mobile smart devices and countermeasures are often hard to evaluate: Theoretical models are mostly limited. Field studies can be quite expensive if a great number of people have to be equipped with devices. Real world data as location traces have unsuitable accuracy and are hard to obtain. At last, the evaluation of threats in real environments is limited by legal and ethical boundaries. To overcome some of these limitations, L3S developed a simulation framework that can be used to evaluate threats and countermeasures with a high number of participants on real world maps. The simulation complements existing research methods if the number of users and interactions and legal or ethical boundaries come into play. Simulations are often limited to one environmental model with a specific degree of detail. To relax these restrictions of the simulation environment and to broaden the degree of detail of the mobile security and privacy simulations L3S started to work on coupled sub-simulations with different environmental models.

The simulation approach has been chosen to overcome real world limitations. Since real environments may differ from the simulated ecosystem, L3S works on the connection of a simulated world and the real world: On the one hand many users can be simulated to evaluate a real world system. And, on the other hand, some real persons – represented by their real smart device and its actions – can be integrated into the simulated world interacting with lots of other devices.

Potential Applications & Future Issues

Security and privacy issues still have to be evaluated on the real systems due to technical details and implementation aspects on these devices. The developed simulation framework can be used to evaluate security and privacy in the big scale, when limitations render real world evaluations impossible. The combination of different tailored environmental models and the connection of the simulated and the real world are promising ways to evaluate complex systems in the future.

Software

The Mobile Security & Privacy Simulator has been published on github.

Project abstract:

Modern IT systems facilitate different types of communication and interaction and by this are breeding grounds for security and privacy issues. The complexity and diversity of potential threats is much higher in the ecosystem of mobile smart devices than in traditional networked systems due to multiple ways of communication and interaction. The rising number of devices, their ubiquity and the diverse interactions between the devices complicates the design and use of countermeasures as well.
Project duration:

Bibsonomy show project publications:
0
Bibsonomy use tabs to list publications:
0

Members:
henne

Project manager:
Dr. Benjamin Henne

Project research areas:
Distributed Services
Security & Privacy

URL:
http://www.it-ecosystems.org/

Research Area:
E-Science

Status of the Project: