SMARTY: Secure Software Update Deployment for the Smart City

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Participating Parties

- Department of Electrical and Information Technology, Lund University
- Department of Computer Science, Lund University

Funding: SSF

Goals

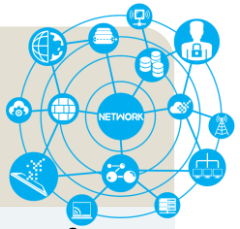
Advance the research in topics related to **updating** devices in a Smart City context

Vulnerability analysis
A reason for updating

"Improving technical and organizational aspects of discovering, analyzing and prioritizing vulnerabilities"

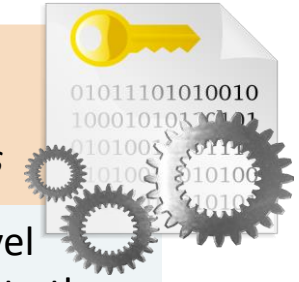
Device management
Handling the devices receiving updates

"Enable management of devices, such that service updates can be rolled out securely, quickly, and consistently"



Network security
Configurable and adaptable network

"Investigate new and improved techniques for security and privacy in network communication, using trusted computing and SDN"



Applications
Designing secure smart city applications

"Propose new applications based on novel cryptographic primitives that contribute to the realization of the smart city vision."

Implement and demonstrate parts of the research in actual environments

Participating parties

Görel Hedin
(project lead)

Boris Magnusson

Dept. of Computer Science

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Paul Stankovski Wagner

Christian Gehrmann

Dept. of Electrical and Information Technology

Martin Hell (prev. project lead)

debricked

Elena Pagnin

CHALMERS

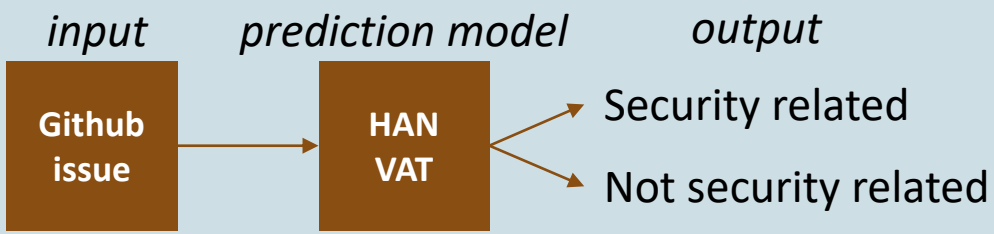
Nicolae Paladi

CanaryBit

Selected Results, vulnerability analysis

Security classification of GitHub issues using machine learning

- Vulnerability issues and patches often lack CVE documentation
- Predict security relation for Github issue using ML



E. Wåreus, A. Duppils, M. Tullberg, M. Hell. Security Issue Classification for Vulnerability Management with Semi-supervised Learning. ICISSP 2022.

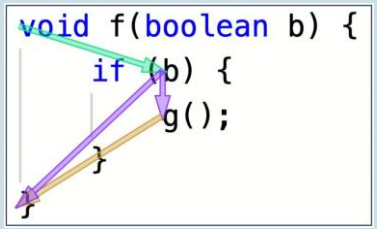
collaboration

debricked

Demand-driven source-code analysis

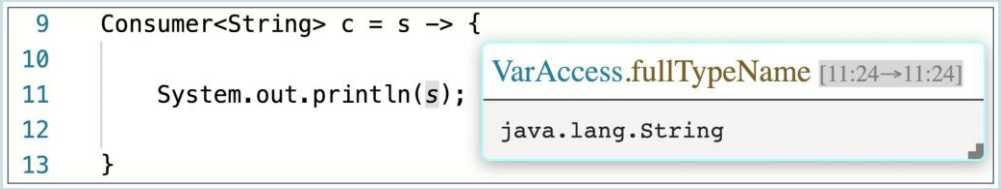
- Efficient custom client analyses, e.g., for detecting vulnerabilities
- *Recent result*: interactive tooling for debugging analyses

control-flow graph



A. Risberg Alaküla, G. Hedin, N. Fors, A. Pop: Property Probes: Source Code Based Exploration of Program Analysis Results. ACM Software Language Engineering 2022.

type inference



collaboration

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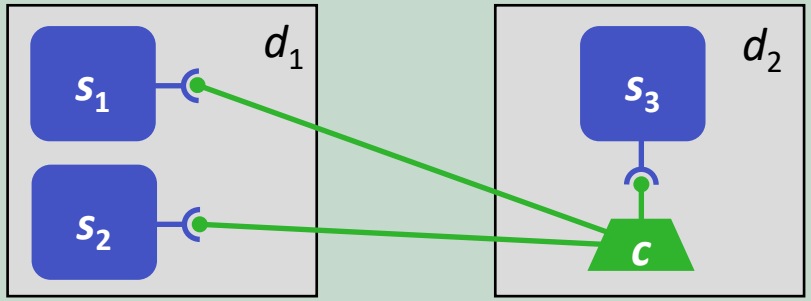
Device management and Demonstrator

Domain-specific language for composing systems of microservices

Alfred Åkesson. ComPOS - a Domain-Specific Language for Composing Internet-of-Things Systems. PhD thesis. 2021.



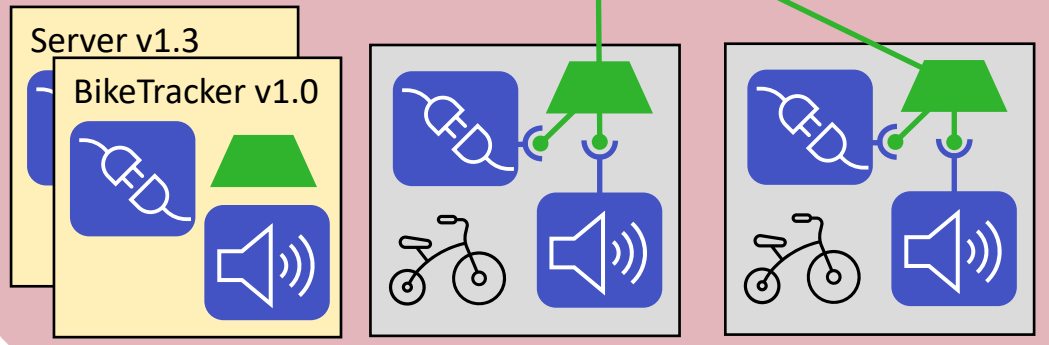
devices with services and compositions

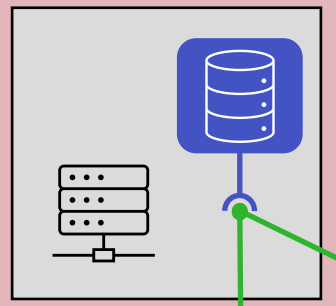
used in

System configuration and update. Demonstrator at H22 City Expo in Helsingborg.

System update:
- device configurations
- system configurations
- gradual update

configurations





Distributed system:
Automatic detection and tracking of stolen bike batteries.

open-sourced as part of

PalCom Middleware Toolkit for IoT

TECHNISCHE UNIVERSITÄT DRESDEN

H22 Helsingborg Sweden

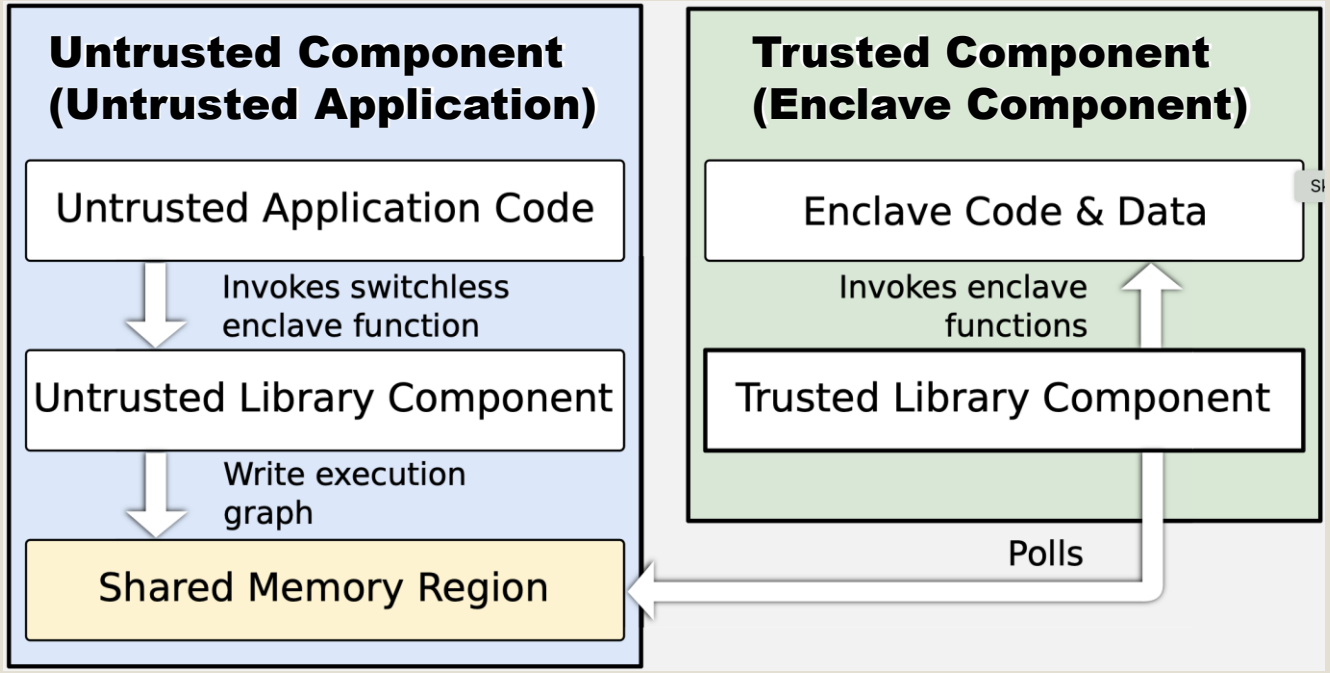
HBG CITY

• itACiH •
DIGITALT STÖD FÖR SÄKER SJUKVÅRD I HEMMET

Selected Results, network security

Speeding up IO performance for enclave workloads

Svenningsson, J., Paladi, N. & Vahidi, A.: SGX-Bundler: speeding up enclave transitions for IO-intensive applications, CCGRID 2022.



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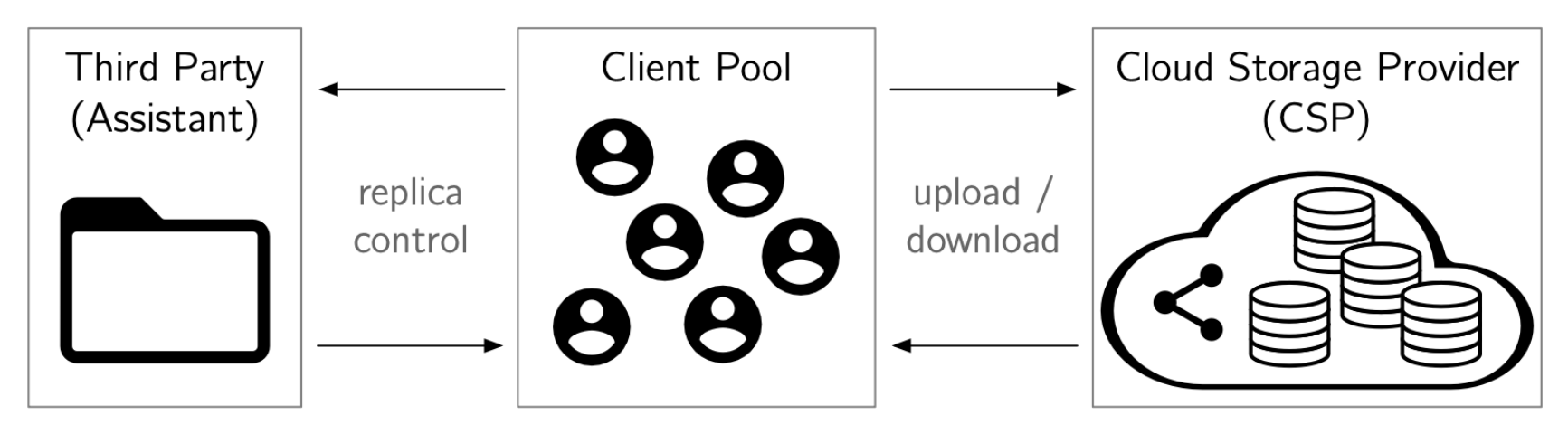
RI. SE

CanaryBit

Selected Results, Applications

Secure cloud storage with storage cost reductions

R. Vestergaard, E. Pagnin, R. Kundu, and D. Lucani: Secure Cloud Storage with Joint Deduplication and Erasure Protection. CLOUD 2022.



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Chocolate Cloud

More information and videos

SMARTY

https://smarty-project.github.io/SSF-SMARTY/

Happy to get more collaborations