Security Considerations in M2M Communications

Applied Research Issues & Projects in the Austrian Institute of Technology (AIT)

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Overview

- Who we are and what we do
  - Organisation
  - Department
  - Research topics
- How we address research topics in projects
  - Running
  - Coming
  - Planned
- Get involved: User and Advisory Board
Federal Ministry for Transport, Innovation and Technology

Federation of Austrian Industries

50.46% 49.54%

Austrian Institute of Technology (AIT)

- ~ 1,100 Employees
- Budget: 120 Mio. €
- Business Model 40:30:30
AIT R&D Program – Safety & Security Department

**System Safety**
- Highly Reliable Software and System Safety
  - Highly Reliable Software and Hardware

**ICT – Security**
- Future Networks and Services
  - eGovernment
  - secure smart grids
  - secure cloud computing

**Data Safety**
- Digital Memory Engineering – Safety
  - management of large and complex data
  - eGovernment,

**Infrastructure Security**
- Intelligent Vision Systems – Security
  - 3D vision
  - high performance vision
  - multi-camera networks

4 pillars for Safety & Security in the Electronic Universe

06.11.2013
Research Programme ICT Security

Research goals:
- Development of methodologies and tools for Secure System Design
- Application-oriented research in the areas embedded Systems, M2M, eGovernment, Critical Infrastructures, Smart Grids, eHealth, etc.

Examples:
- Evaluation of MS SDL or other standard RAM in a M2M context
- Development of new CC Protection Profiles – and automation of its evaluation (tool chains)

We are working on tools for managing the complexity of implementing efficient security mechanisms!
Techn. (Application) Topics

- Traffic Control
- Cloud
- Critical Infrastructure
- CCTV
- Governmental Telecommunication
- E-health
- E-Government
- Automotive
- M2M
- WLAN
- Smart-*
- Automatisation
‗The Cloud‘

- **A Method** to abstract over physical hardware

```c
#include <cloudstdio.h>
define Nbr of CPUs dynamic

main() {
    cloudprintf("Hello World ");
}
```

- Flexibility
- Scalability
- Redundancy
- Uniform Security Measures

- „Single Point of Failure“
- Origin of „Failure“ is hard to isolate (per Definition)
M2M and the Cloud

Application domains:
- ATM CCTV
- Smart-Meter
- Smart-Home
- Smart-Health
- Smart-Cities
- ...

- Limited local compute capacities
- Global view required

source: smekal.at
Example: CCTV @ ATM & Cloud

- Search performance e.g. „Man with red ski mask“
- Techn. challenges due to modular architecture (Outsourcing)
- Legal challenges reg. data protection & SLA
AIT – ICT Security Projects

National and international research project examples:
- Architectural security analysis
- Risk-Management
- Data protection
- M2M, Smart-*, Cloud, CI
Overview

- 10 Partner from Austria, Finland, Germany, Greece, Spain and the UK
- Project budget 4.8 Mio, partially funded by EC FP7
- **User driven**

Topics

- Combination of technical and legal aspects regarding log gathering (SLA management, data protection)
- Novel risk assessment methods regarding CI & Cloud
- Understand Cloud behaviour ("monitoring", forensic analysis, anomaly detection, "root cause analysis", "resilience")
- Guidelines for secure operation of CI in the Cloud & "Service Assurance"
- Real life evaluation scenarios
Smart Grid Security Guidance (SG)²

- KIRAS Project runtime 2 years, 11/2012 – 11/2014
- Smart Grid security aspects in an Austrian context

Partner:
- AIT Austrian Institute of Technology
- Technische Universität Wien
- SECCconsult Unternehmensberatung GmbH
- Siemens AG, Corporate Technology Österreich
- LINZ STROM GmbH
- Energie AG Oberösterreich Data GmbH
- Innsbrucker Kommunalbetriebe AG
- Energieinstitut an der JKU Linz GmbH
- Bundesministerium für Inneres
- Bundesministerium für Landesverteidigung und Sport
Arrowhead

- Arrowhead – Improvement of efficiency and flexibility and sustainability in the industrial context via smart-* and e-mobility and virtual energy markets. AIT’s Focus: Architectural Security Analysis
- Runtime 4 years, 78 Partner (Austrians: TU Graz, Campus 02 – FH Graz, AIT, Evolaris, AVL, Invineon)
HyRiM: Hybrid Risk Management for Utility Providers

- Development and evaluation of Hybrid Risk Metrics for coupled complex critical infrastructure networks

- Development of tools and methods for risk assessment for utility providers in the face of novel threads (e.g.: Advanced Persistent Threats)

- Definition of security architectures for utility providers for e.g. BYOD scenarios
SPARKS – Smart Grid Protection Against Cyber Attacks – EU FP7

Research Topics
- Analysing, Modelling and Simulating Smart Grid Cyber security Vulnerabilities and Threats
- Developing a Reference Security Architecture for Smart Grids
- Research and Development of Security Mechanisms and Tools
- Economic Analysis and Quantification
- Legal and Privacy Related Aspects and Policy Recommendations
- Demonstration of Project Results in Simulated and Real Testbed Environments

Partner
- AIT, Energie-Institut Linz GmbH (AT)
- EVB - EVB Energy Solutions, a Diehl company, AISEC - Fraunhofer AISEC, IABG, SWW – Stadtwerke Wunsiedel (DE)
- KTH Kungliga Tekniska högskolan (SE)
- L+G - Landis + Gyr (CH), RSA, the Security Division of EMC (CH/IE)
- CSIT - Queen’s University Belfast, Centre for Secure IT (UK) UTRC United Technologies Research Center (IE)
User and Advisory Board (UAB)

Most AIT projects include opportunities to get involved via a UAB, which provide:

- Information in annual workshops
- Proactive information regarding research outputs
- Direct channel to researches to steer research direction

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