Trust@FHH - IF-MAP Research Projects and Open Source Software

Josef von Helden

Trust@FHH Research Group
Hochschule Hannover
University of Applied Sciences and Arts

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Trust@FHH

Team
- Prof. Dr. Josef von Helden
- 3 research associates
- 3 student research assistants

Research Field
- Trusted Computing
- Network & Mobile Security

Research Projects
- TNC@FHH, IRON
- tNAC, ESUKOM, VisITMeta

Website: http://trust.inform.fh-hannover.de
Agenda

1. Research Projects At A Glance
   - ESUKOM
   - VisITMeta

2. Latest News On iron* Open Source Software
   - ifmapj
   - irond
   - ironvas

3. Live Demo
ESUKOM

General information

- Started 10/2010 - ends 09/2012
- Consortium
  - 2 research institutions (FHH, Fraunhofer SIT)
  - 3 german companies + several international associate partners
- Funded by German Federal Ministry of Education and Research
- http://www.esukom.de
Project Goals

... to develop a real-time security solution for enterprise networks that works based upon the correlation of metadata.

Motivation

- Growing adoption of mobil devices (smartphones)
- Smartphones are special: always-on, apps, sensors, constrained resources ...
- Impact on enterprise security?

Idea

- Develop a network-based security system for monitoring smartphones
- Gain benefits from collaboration of already deployed security tools
- IF-MAP as technological basis for sharing security related metadata
Correlation Engine - Abstract Model

Signature Components
- Signature
  - id
  - desc
  - feature-set \{f1, f2, ..., fn\}
  - context-set \{ctx1, ..., ctxn\}

Boolean combination of

Policy Components
- Policy
  - id
  - desc
  - ruleset \{R_1, R_2, ..., R_n\}

create/change/delete

Core Components
- Category
  - id
  - value
  - desc
  - cardinality

Feature
- id
- value
- desc
- type
- ctx-params

Belongs to

Context-related Components
- Context Parameter
  - id
  - desc
  - type
  - value

Has set of

Context
- id
- desc
- context-param-set

Boolean combination of

Anomaly Detection Components
- Hint
  - id
  - desc
  - feature-set \{f1, f2, ..., fn\}
  - procedure

Evaluates set of

Anomaly
- id
- desc
- hint-set \{H_1, H_2, ..., H_n\}
- context-set \{ctx1, ..., ctxn\}

Boolean combination of

Rule
- id
- desc
- if (condition) do (actions)

Action
- id
- desc
- operation
- target
Overview

- IF-MAP 2.0 client
- Context-related Pattern Matching and Anomaly Detection
- Decision making based on simple policies: if (a and b and c) do x

Approach

- ESUKOM tools publish vendor-specific metadata for smartphones - so called features
- irondetect holds appropriate subscriptions (one for each smartphone that gains network access), continuously polls for updates of features
Live Demo
Vendor-specific Metadata I

Why not using standard metadata?
- Context-related detection is based on context-parameters (time, location, other-devices, ...)
- Context-parameters are needed on a per feature basis (i.e. per metadata)
- Standard metadata should not be extended by vendor-specific attributes

Approach
- ESUKOM specific metadata for features
- ”Abuse” of identity identifiers to model feature hierarchies
VisITMeta

- New research project, started April 1st, 2012, duration 3 years
- Funded by German Federal Ministry of Education and Research
- Focused on visualization of IF-MAP metadata
- Based on the experiences gained with irongui
- Will provide features like:
  - View of history
  - Animation of changes within the metadata
  - Support for large graphs with methods for easy navigation
About
- Lightweight IF-MAP client library written in Java
- Works on a wide range of platforms, including Android

Latest progress
- ifmapj is used by ESUKOM partners to implement their IF-MAP clients
About
- Open-source IF-MAP 2.0 server
- Written in Java

Latest Progress
- IF-MAP 2.0 server has gotten several improvements
- Performance was drastically improved (now performs 100k updates in less than 30 seconds on commodity hardware ... with enough memory)
About

- Brand new IF-MAP 2.0 client
- Integrates vulnerability scanner OpenVAS into a MAP environment
- Provides Publisher and Subscriber functionality
- Written in Java and Scala, uses ifmapj

Subscriber

- ironvas subscribes to request-for-investigation metadata
- Creates scan config, targets and tasks for new devices in OpenVAS via OMP

Publisher

- ironvas publishes vulnerability reports from OpenVAS to a MAPS
- Each vulnerability is published as event metadata element, with entries like CVE information, significance, ...