Three Significant Trends in Mobile Security: Threats and Solutions

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Three Big Trends

1. Malware for mobile devices
2. Mixing of sensitive and non-sensitive data
3. Snooping

For each topic, we will discuss:

- Current state
- Emerging trend
- State-of-the-art and emerging solutions

What Mobile Devices Do We Mean

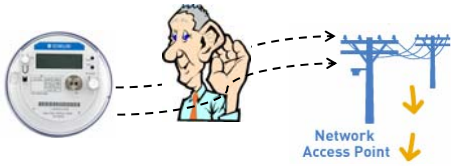
Trend 1: Malware

- Current state:
  - Isolated to small number of mobile devices, no outbreaks spreading wildly as in wired devices
  - Malware packaged as legitimate apps on app stores; releases private data of individuals
- Emerging trend:
  - Trend in medical devices from just monitoring to control; already there for smart meters
  - Drive-by downloads from web browsers
  - Worms spread by near field communication protocols such as Bluetooth
- State-of-the-art and emerging solutions:
  - You
  - Anti-malware products from well-known AV vendors from the desktop world
  - Strengthening the web browsers, which often build on the same code base
  - Single-purpose devices

Trend 2: Mixing of Sensitive and Non-sensitive Information

- Current state:
  - Same device used for multiple purposes: consider radiologist with medical images on her cell phone
  - Lack of non-porous boundary between the applications
  - When data connection is used (3G, etc.), it is not protected in the same way that wired corporate communication is
- Emerging trend:
  - Different applications sharing the same infrastructure, e.g., the location service
  - Information leak from one application to another
- State-of-the-art and emerging solutions:
  - Silos in the form of virtual machines
  - Solutions from the desktop world for preventing privilege escalation: data execution prevention and address space randomization

Trend 3: Snooping



- Current state:
  - Weak or no encryption
  - Static keys for long-lived operation
- Emerging trend:
  - Applications are becoming such that it is worthwhile to snoop
  - Computation capacity is increasing faster than communication capacity
- State-of-the-art and emerging solutions:
  - Stronger and dynamic encryption
  - Data hiding at source
  - Behavior-based detection to handle tampered or compromised sources

Unifying Themes

- We are increasingly living in a mobile world
  - Past economic driver being seen with the mobile world
  - Rush to new functionality before strengthening the functionality
  - However, economics from the dawn of the wired world do not apply here – mobile world is being born surrounded by threats
- Three trends that are motivating security research in the mobile world
  - *Malware*: from the isolated few-node cases to raging in the wild
  - *Mixing of sensitive and non-sensitive data*: co-hosting different kinds of data on a single multi-purpose device
  - *Snooping*: open communication channels, in publicly accessible places – unique challenge in the mobile world

Presentation and references to source data available at:
Dependable Computing Systems Lab (DCSL) web site
engineering.purdue.edu/dcsl