Future Research Needs and Trends in Trustworthy ICT

Evangelos Markatos
FORTH-ICS
A world of change

- The **technology** is changing
- The **society** is changing
- The **attackers** are changing
The technology is changing

- **Mobile** phones
- **Smart** environments
  - Smart power meters,
  - Smart homes, appliances
  - Smart cars, city cars
- **Disappearing** computers
Things Babies Born in 2011 Will Never Know

- The separation of work and home
- Wires
- Hiding
  - Can you hide in an on-line world?
  - Privacy?

The society is changing

- New ways of interaction: social networks
  - Who are your friends?
- Always “available” culture:
  - People are accessible 24/7 for work and fun
  - Important decisions are taken “on the go” from a mobile phone
- We depend on technology
The attackers are changing

“… potential (cyber)attacks against network infrastructures may have widespread and devastating consequences on our daily life: no more electricity or water at home, rail and plane accidents, hospitals out of service”

Viviane Reding
VP of European Commission
What did we do?

- Created three **working groups** of experts in:
  - Malware and Fraud
  - Smart Environments
  - Cyberattacks
- Brainstorm on Emerging Threats
- Created a list
  - of research areas
- Got feedback from the **Industrial Advisory Board**
This is what they came up with
Malware and Fraud
Malware and Fraud

- Malicious Hardware
  - Compromised routers, processors,
- Attacks Against the Cloud
- Advanced Malware
  - Propagating in social networks
- Mobile Malware
  - Malware for mobile devices (e.g. phones)
- Information Risks – Data gathered
  - Government-collected data
  - Data collected by service providers
- Targeted Attacks
Smart Environments

- **Accessibility**
  - Routers, ad hoc networks, smart meters, etc.

- **System Complexity - maintainability**
  - Too many sensors/computers in a smart home
  - Are all my devices up-to-date?

- **Attacks against the non-ICT component**
  - False sensor data
    - Heat, radiation, pressure, etc.
Cyber attacks
Cyber attacks

- Web Services and Applications
- Privacy
  - Target private data e.g. in social networks
- Critical Infrastructures
  - Power supply?
  - Emergency services? 911 (US) 112 (EU)
- Smart, Mobile and Ubiquitous Appliances
- Insiders
- Network Core Attacks
Suggested Research Areas

- Privacy
- Targeted attacks
- New and Emerging technologies
- Mobility
- Usable Security
Privacy

- Help users gain control of their data
- Protect them from disclosing their data
  - Do I really need to send all these tracking cookies around?
- Detect attempts
  - to correlate data
  - to de-anonymize user accounts by correlation
Targeted Attacks

- Collect and analyze data
  - Of targeted attacks
- Create data repositories
  - Exchange Data among international partners
- New Defense approaches
- Understand the financial motives and structures behind these attacks
- Prevention at the ISP level
New and Emerging Technologies

- Cloud Computing
- Social Networks
- Smart meters
- SCADA networks
Mobility

- Mobile phones
- New tools
  - To be deployed on smart phones
  - for attack detection/prevention
Usable Security

- Focus on the weakest link
  - i.e. human beings
- Interdisciplinary efforts
  - Engineering, system security, psychology, etc.
Summary

- Everything is changing
  - Technology, society, attackers
- We need to understand new attacks
- Focus on
  - Privacy
  - Targeted attacks
  - New and Emerging technologies
  - Mobility
  - Usable Security
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