Security Challenges and Opportunities in BIONETS

Bruno Crispo
University of Trento
crispo@dit.unitn.nl
BIONETS

- BIOlogically-inspired autonomic NETworks and Services
- One to many → one-to-one → many-to-one
- Support heterogeneity of different nature
- Autonomic, self-* properties
- Natural equilibrium in very large communities
- Peer-to-peer
Technical Security Challenges

- **Adaptiveness to different capabilities**
  - Cheap device using only SK interacting with expensive AP supporting full blown crypto
  - Avoid the problem of the weakest link

- **Security Configuration**
  - Continuous patching
  - Context-aware security policies
  - Usability - rethink completely the UI (we still use many passwords).... biometrics as password are really a bad idea
Technical Security Challenges (2)

- **No more security perimeter**
  - The disappearing outsider attack.
  - Unattended devices will be the norm

- **Self-evolving security**
  - Not clear if security can be a self-properties
  - Solving the composability is a pre-requisite

- **Key Distribution and Management**
  - Not clear if security can be a self-properties
  - Solving the composability is a pre-requisite
Technical Security Challenges (3)

• Trust and Reputation
  - We can wait for a worldwide PKI....it will be a long wait
  - Reinventing the PGP wheel may not be enough
  - Reputation must be objective to be useful
  - Challenge: how to select a random set

• Risk Control and Mitigation
  - In many cases it’s just matter of risk not trust
Technical Security Challenges (4)

• Privacy
  - Underestimated and avoided.
  - Location privacy
  - Many devices answer to any reader. Collection of information will be easier and containment of private information more difficult
  - Correlation and data mining. No clue about who can access our private information
  - Gap between regulation and technology will get bigger and bigger. Privacy divide
Challenges and Dangers

• Bio-diversity
  - Essential in nature to contain epidemics and important factor to the evolution. She should avoid a single worm to collapse the all infrastructure

• Minorities
  - Many users can be prevented to use the services/infrastructure because minority so their services will be defeated by the most popular one
Conclusions

• Exciting new research challenges

• We don’t have solutions yet to many of them

• The easiest solutions may turn to be the wrong answer

• Ants are not the only colony in nature, whales for example sometimes show a more bizarre behaviour