

UNIVERSITÀ DEGLI STUDI  
DI TRENTO

Dipartimento di Informatica e Telecomunicazioni



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# Security Challenges and Opportunities in BIONETS

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# BIONETS

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- **BI**Ologically-inspired autonomic **NET**works and **S**ervices
- 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

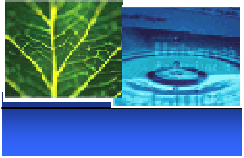
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- **Adaptiveness to different capabilities**
  - Cheap device using only SK interacting with expensive AP supporting full blown crypto
  - Avoid the problem of the **weakest link**
- **Security Configuration**
  - Continuous patching
  - Context-aware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

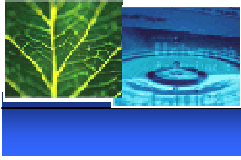


# Technical Security Challenges (4)

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- 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

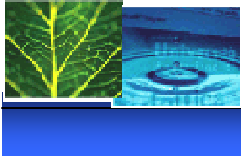
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- **Bio-diversity**

- 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

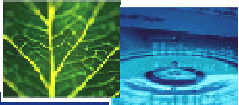


# Conclusions

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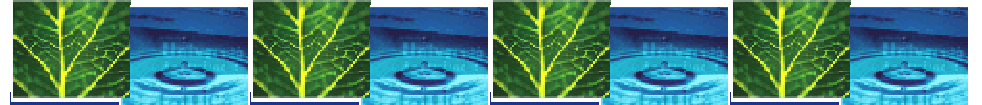
- Exciting new research challenges
- We don't have solutions yet to many of them
- The easiest solutions may turn to be the wrong answer
- *Ants are not the only colony in nature  
whales for example sometimes show a more  
bizarre behaviour*





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