

# WIP

## An all-wireless mobile network architecture

### Project Presentation

Thessaloniki, September 28, 2007



Information Society  
Technologies

**FP6-2004-IST4-27402 WIP**

Specific Target Research Project (STREP)



**An All-Wireless  
Mobile Network  
Architecture**

# Consortium

- **UPMC**, Université Pierre et Marie Curie (CO) – FR
- **SAG**, Siemens AG – DE
- **CTTC**, Centre Tecnològic de Telecomunicacions de Catalunya – ES
- **INPG**, Institut National Polytechnique de Grenoble – FR
- **IT**, Instituto de Telecomunicações – PT
- **CERTH**, Center For Research And Technology Hellas – GR
- **Swisscom**, Swisscom Innovations – CH
- **THSA**, Thomson – FR



An All-Wireless  
Mobile Network  
Architecture

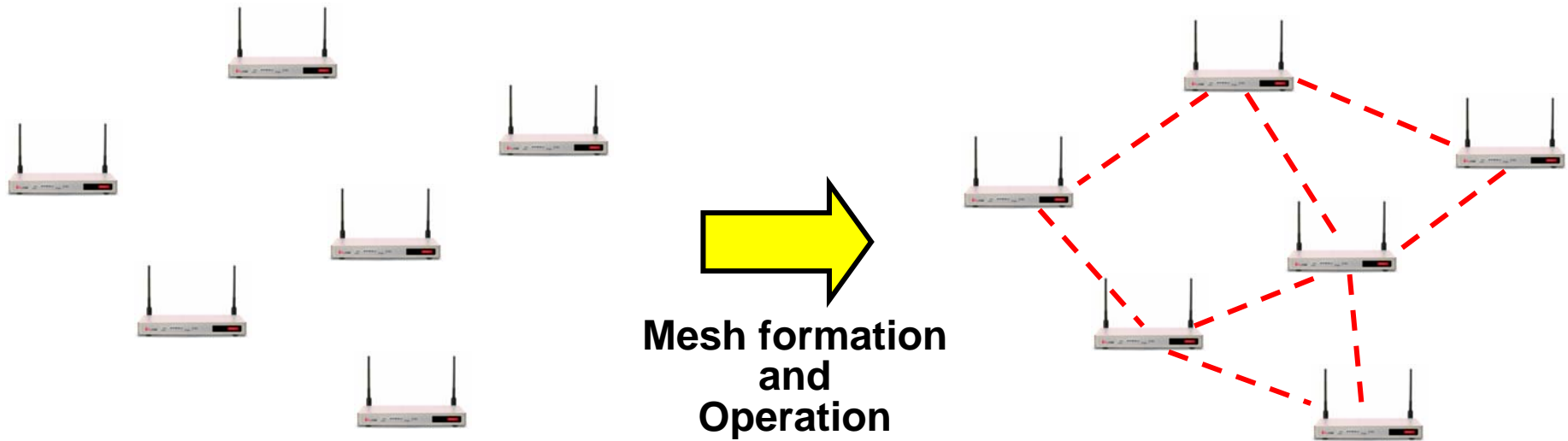
# Context/observations

- **Wired → Wireless**
  - Access points are gradually replacing the wired infrastructure in the last mile
- **Wireless Access Points are everywhere**
  - Deployed in a unorganized fashion
    - → No cooperation!
  - An enabler for mobility
  - A variety of heterogeneous devices

**Much can be obtained from this...**



# A picture



**Mesh formation  
and  
Operation**

# Vision

Core level



Access level

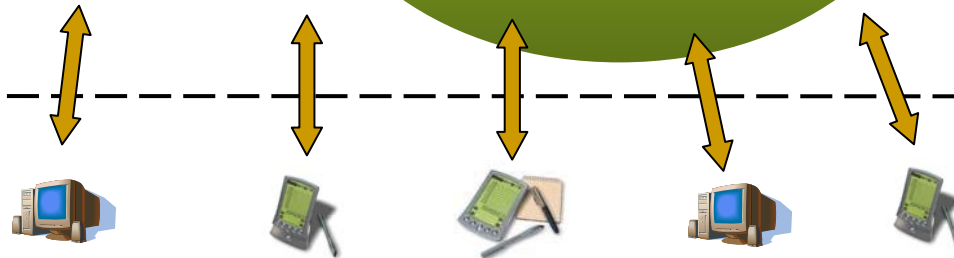
Wireless Community 3

Wireless Community 1

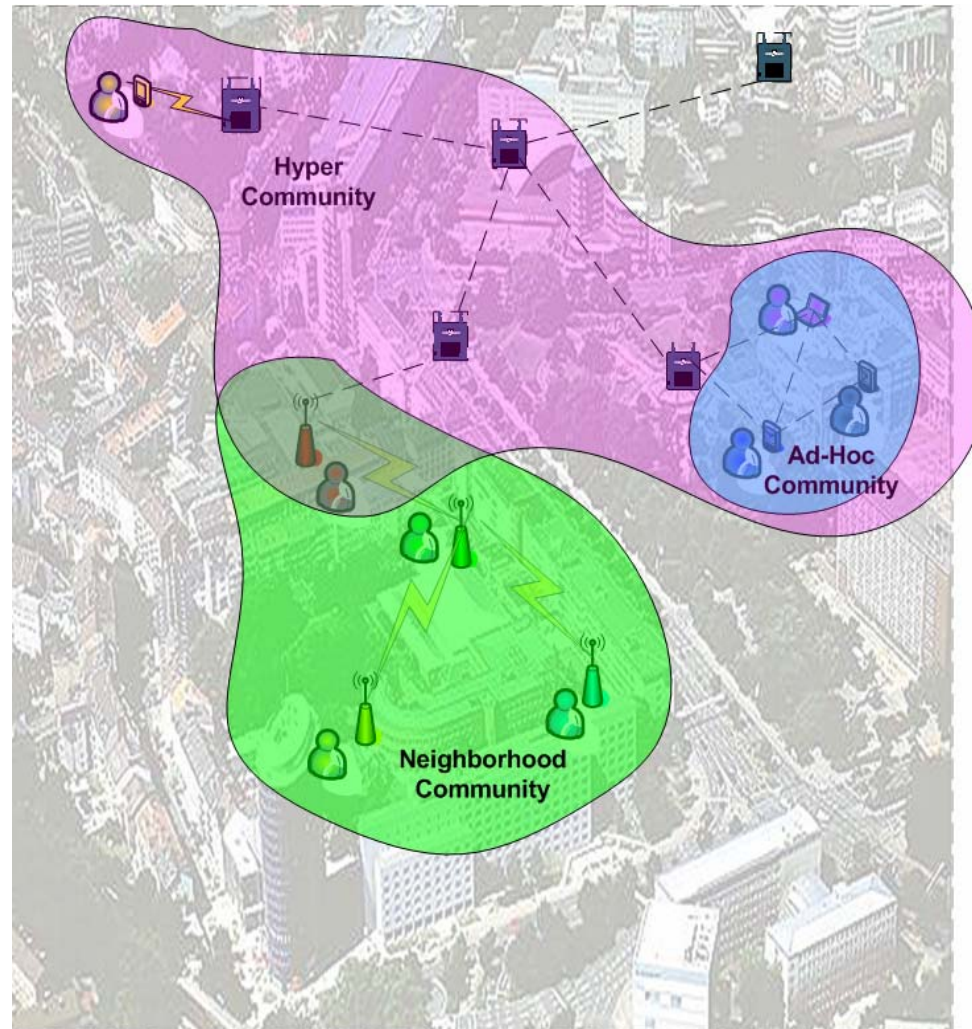
Wireless Community 2



Mobile host level



# Example scenario: Neighbourhood community



# But...

- **The current Internet architecture is not adapted to accommodate this evolution**
  - Existing solutions are incremental, not evolvable
- **Wireless architectures are young**
  - A revised architecture should integrate wireless constraints at an early stage

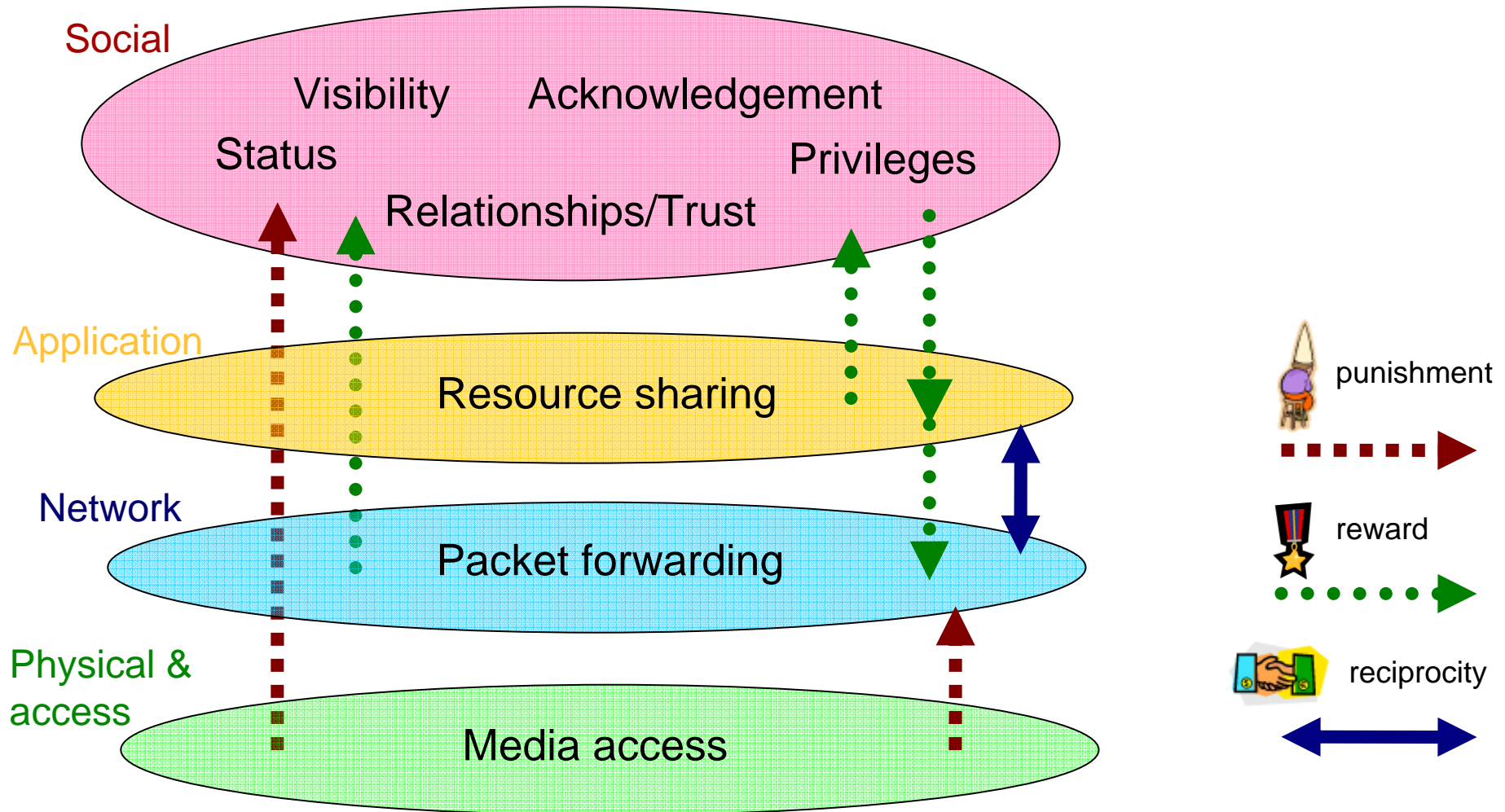


# WIP objectives

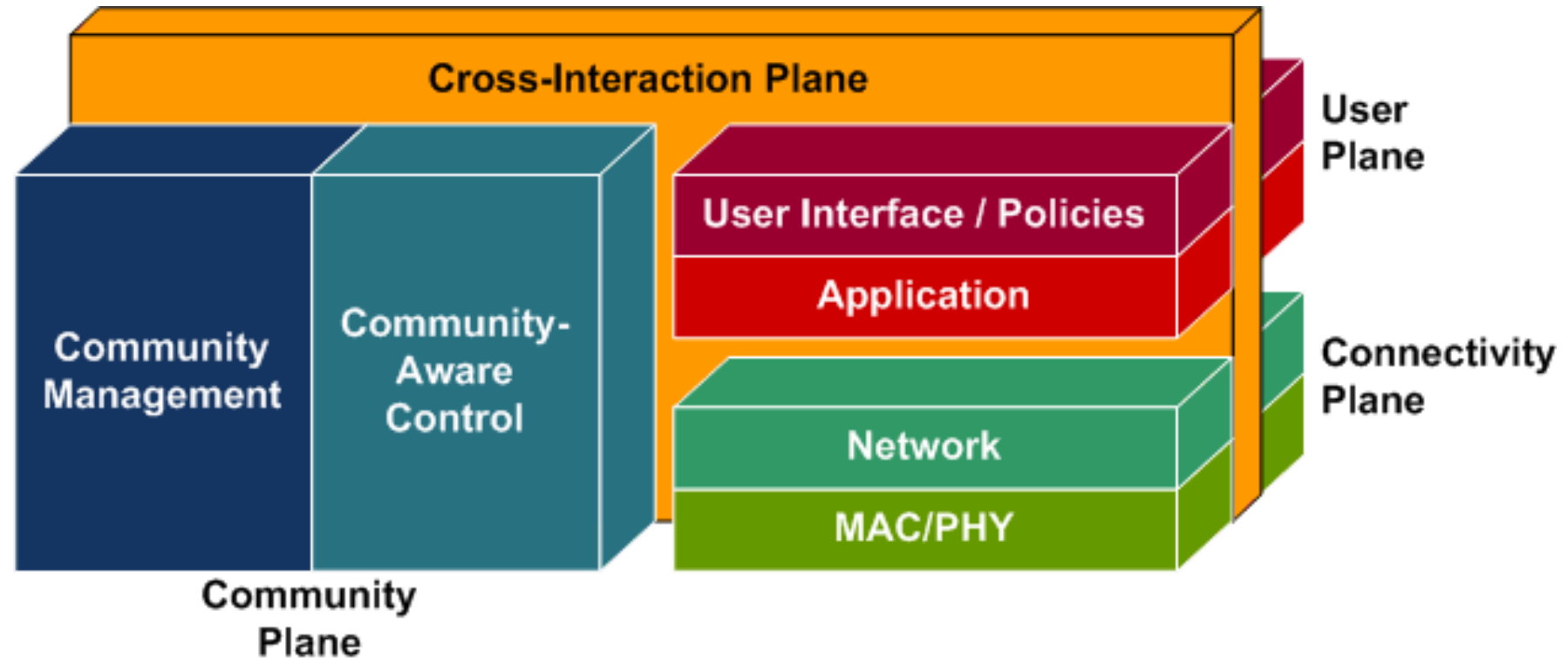
- **Objective 1: Evaluate the current Internet architecture and identify its main limitations in wireless environments**
- **Objective 2: Establish the main requirements for an all-wireless interconnection architecture (Radio Internet)**
- **Objective 3: Design novel solutions for the physical and MAC layers to support the requirements of an all-wireless architecture**
- **Objective 4: Consider mobility as an integrated part of the architecture**
- **Objective 5: Introduce disruptive paradigms towards a community-based architecture**
- **Objective 6: Experimentally validate the proposed WIP architecture**



# Cross-layer incentive mechanisms



# WIP General Architecture



# Work packages

- **WP0: Management**
- **WP1: Global architecture**
- **WP2: Advanced wireless infrastructure**
- **WP3: Seamless mobility**
- **WP4: Applications, experimentation, and measurements**
- **WP5: Dissemination and exploitation**



# Some of WIP current achievements

- Definition of the WIP global architecture and cross-interactions among layers
- Community-aware bootstrapping of neighborhood WMNs
- Innovative approach on cross-layer incentive mechanisms
- Self-organizing user-aware addressing and routing
- Measurement-based self-organization of interfering wireless access points
- Dynamic algorithms for cross-layer association in WMN
- **New efficient mechanisms at PHY/MAC**
- Deployed testbeds (off-the-shelf and custom-made)



# WIP at a glance

- **Project Coordinator**

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- **Project website: <http://www.ist-wip.org>**

- **Starting date: January 1st, 2006**

- **Duration: 01/2006 – 12/2008**

- **Total Cost: €5,7M**

- **EC Contribution: €3,2M**

