

# Privacy Challenges for the Mobile Internet



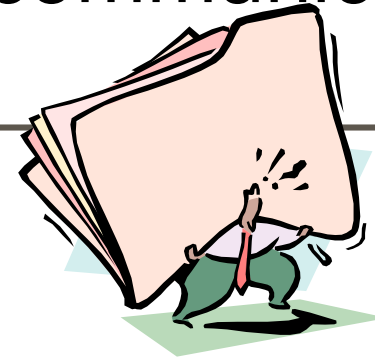
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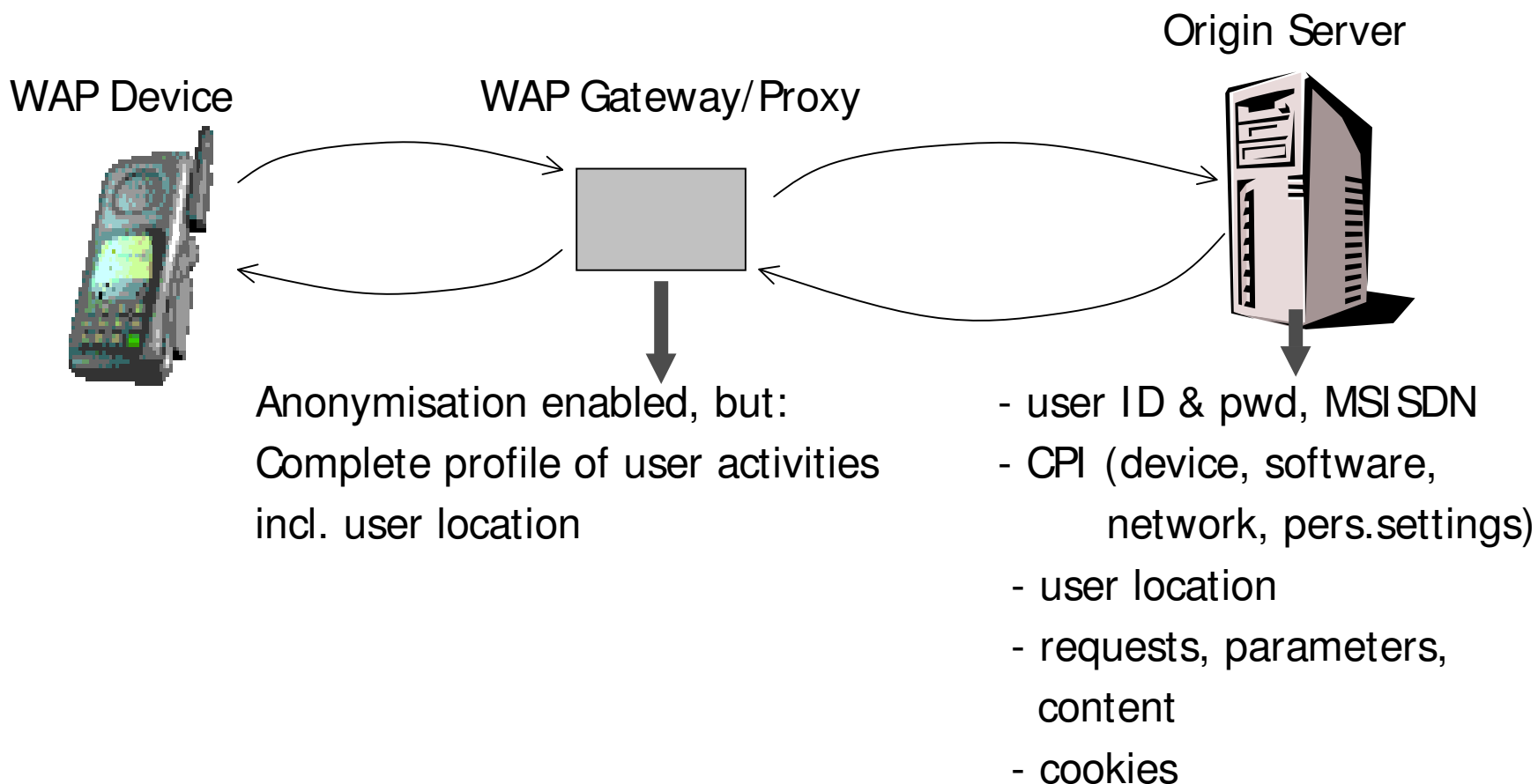
# Privacy Definition-

*Alan Westin, 1967*

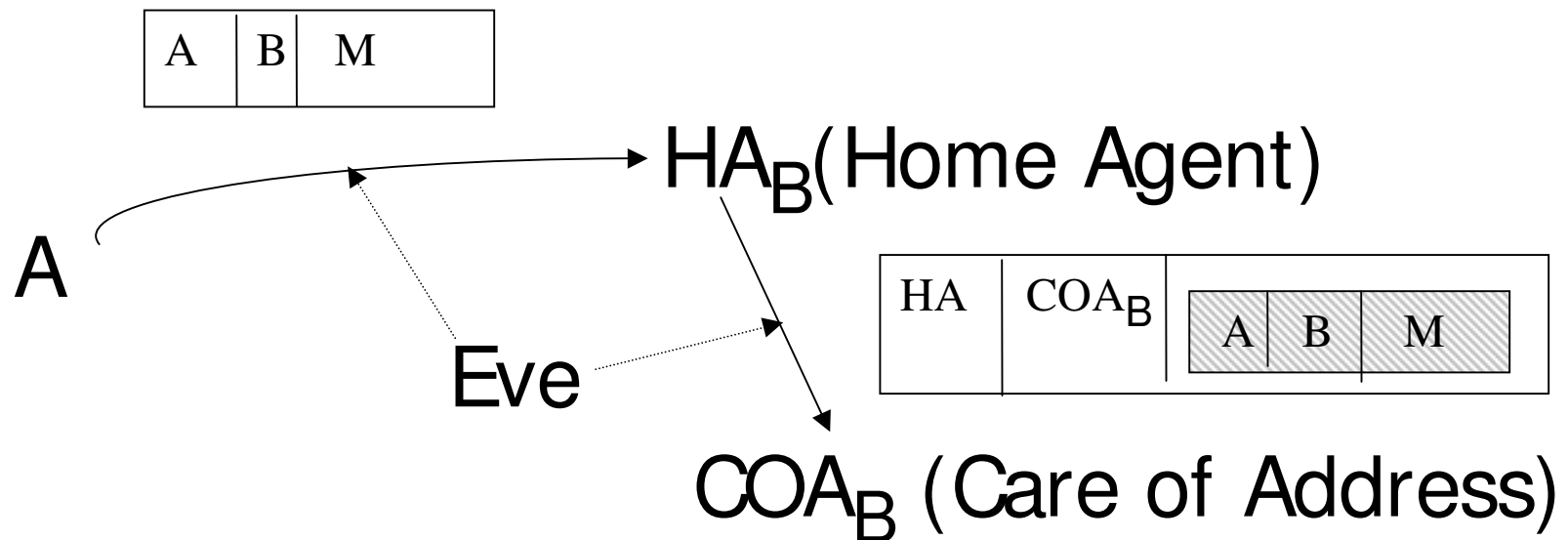
“Privacy is the claim of individuals, groups and institutions to determine for themselves, when, how and to what extent information about them is communicated to others”



# WAP Privacy Issues

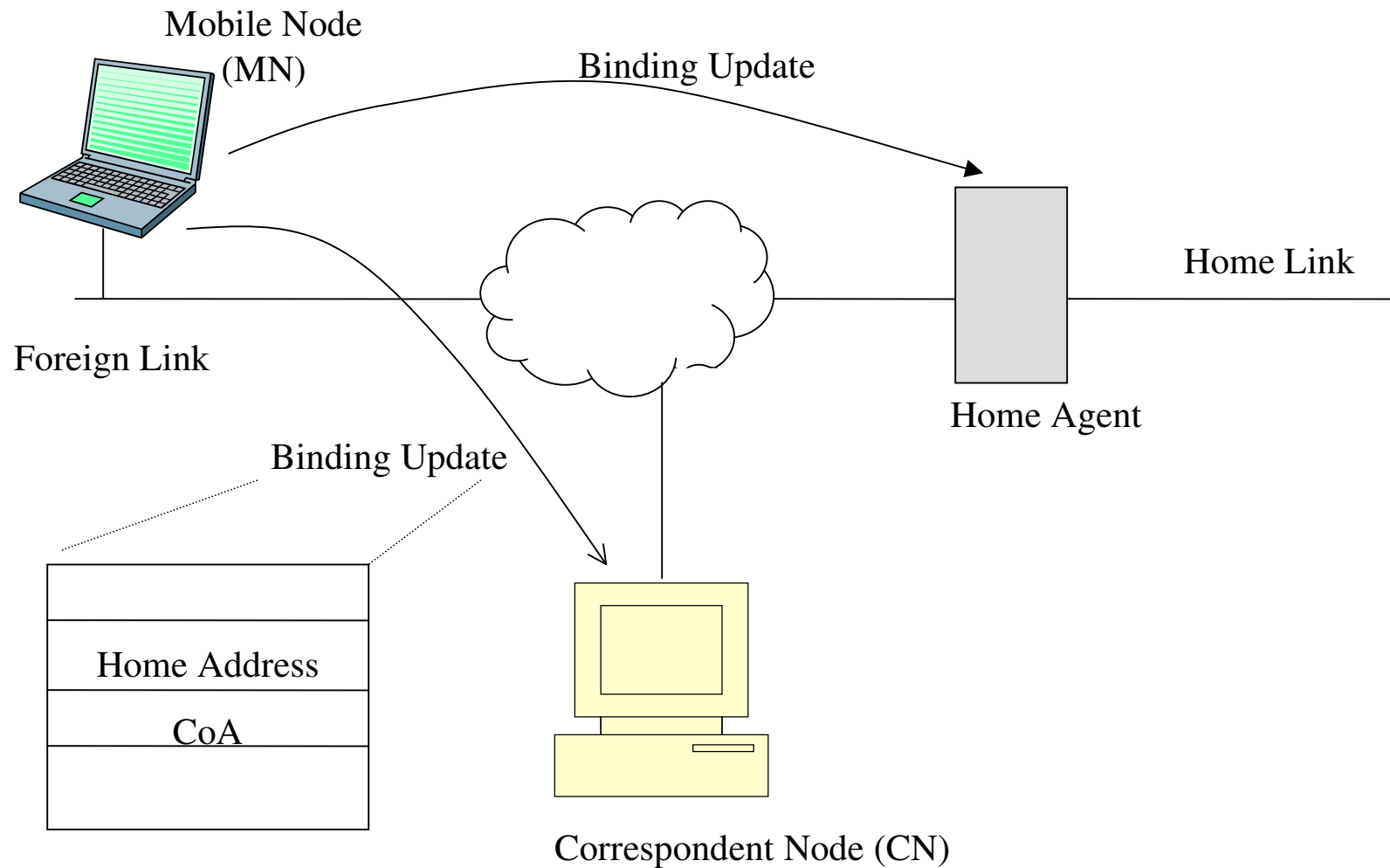


# MobileIP Privacy Issues



→ *Eve and HA<sub>B</sub> can trace B's positions*

# Location data in Mobile IPv6 traffic data – Binding updates



# Mobile IP Privacy Problems

- Home Agent, CN, eavesdropper can trace mobile node's position and movements
  - "Relative Positioning" of two mobile nodes possible
- > Traffic Data contains sensitive Location Information

# EU directive for privacy in the electronic communication sector

## ➤ **Traffic data (Art.6):**

- Must be erased or made anonymous upon completion of transmission
- Processing for billing purposes permissible
- Processing for the purposes of value added services/marketing with the consent of the subscriber/user

# EU directive for privacy in the electronic communication sector

## **Location data other than Traffic data (Art.9):**

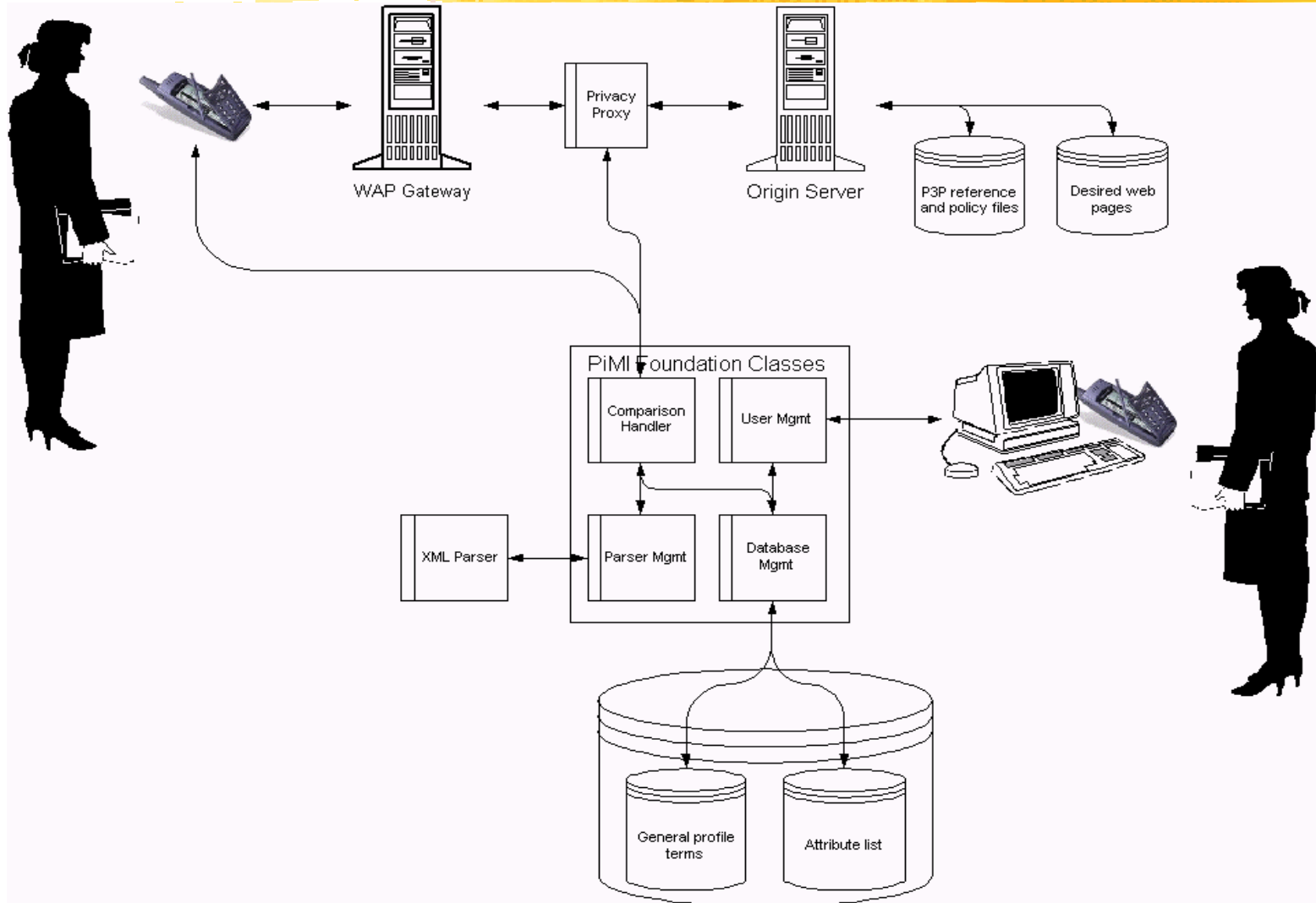
- May only be processed when made anonymous, or with the informed consent of the user/subscriber
- Where consent has been obtained, the user/subscriber must still have possibility of temporarily refusing the processing of location data

# Need for Privacy-Enhancing Technologies (PET)

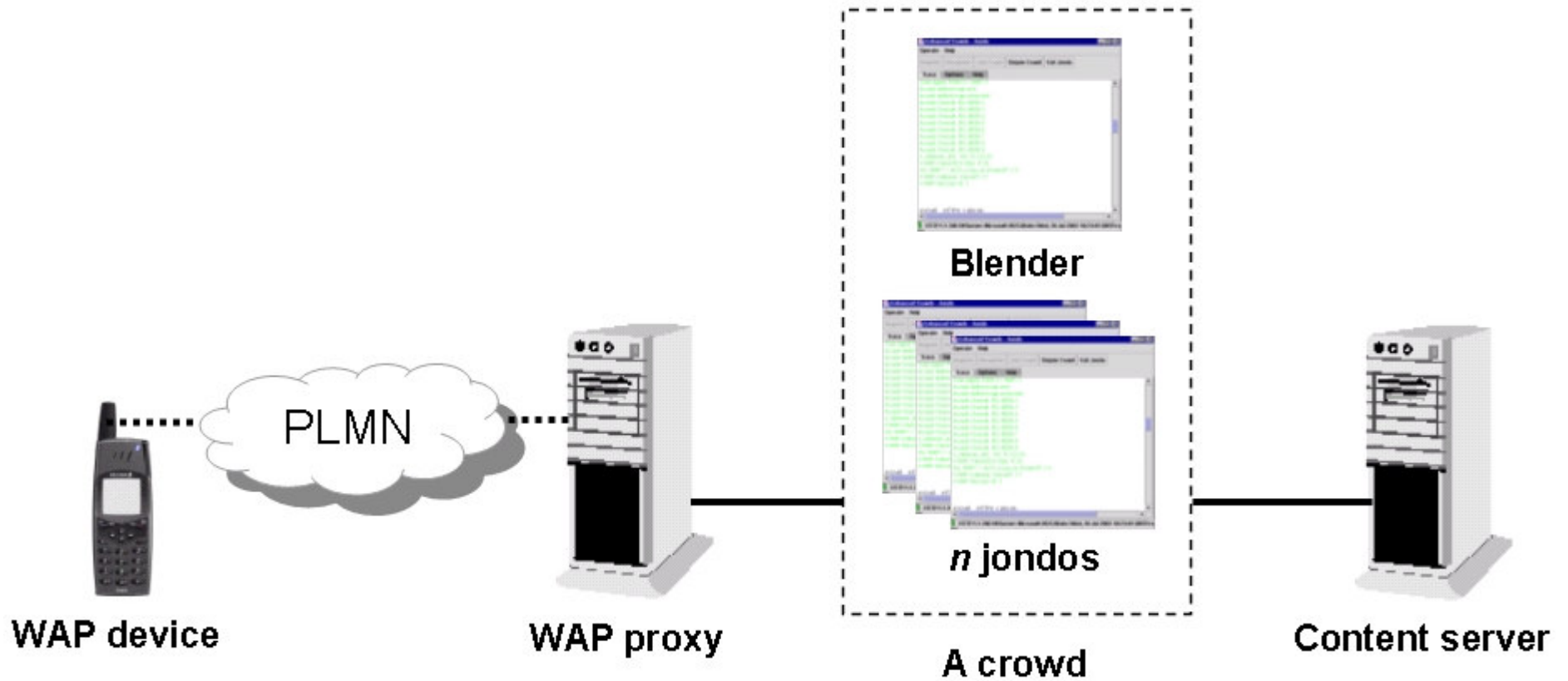
- **Control of data collection/ processing according to legislation**
  - P3P (Platform for Privacy Preferences Protocol)
  - Identity Management
  - Privacy Access Control Models / Enterprise Privacy Policies
- **Minimizing/ avoiding personal data**
  - Mix nets
  - Crowds

# PiMI Prototype

(Ericsson – KaU cooperation)



# mCrowds



WAP 1.X case with WAP Gateway/Proxy

# Conclusions



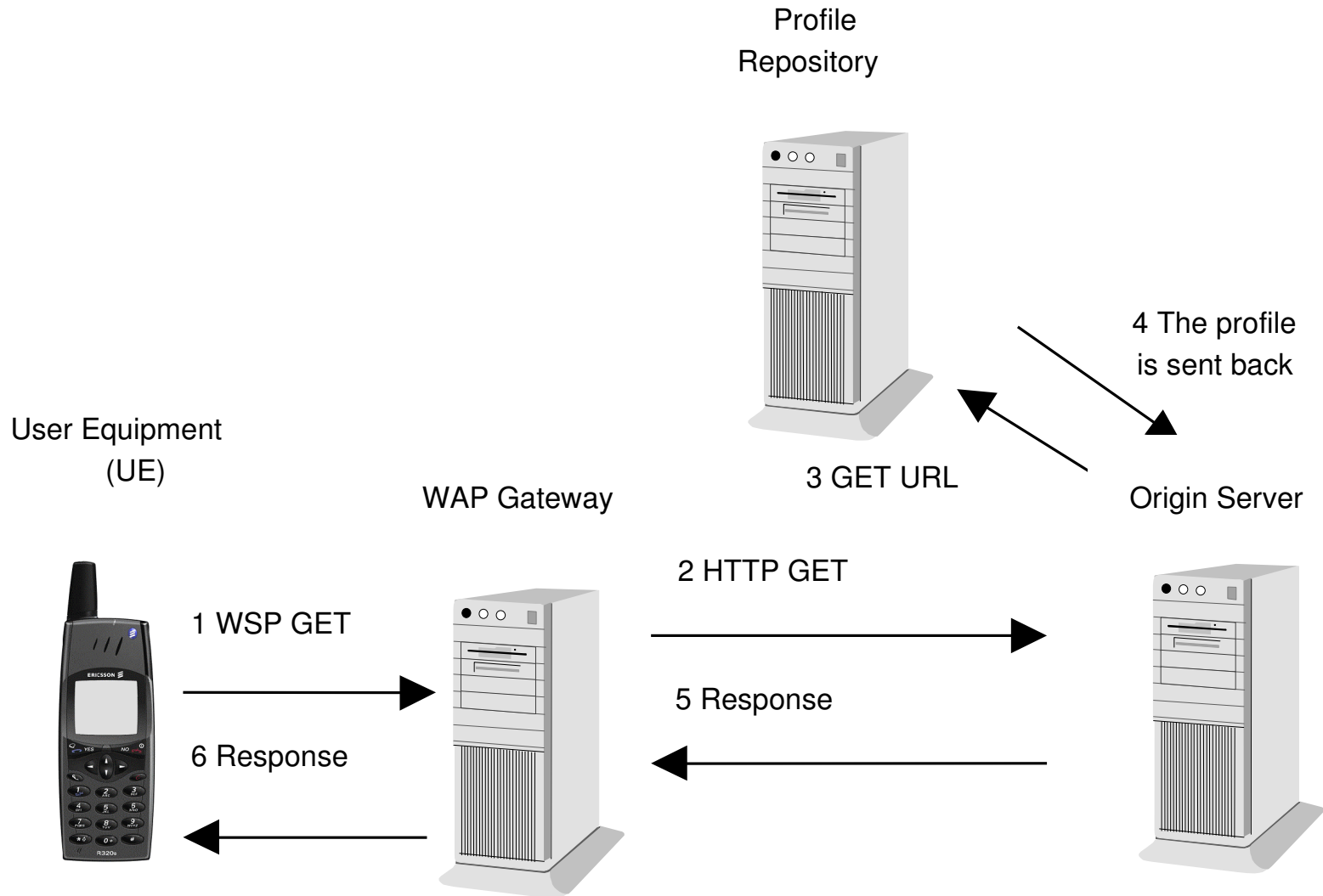
- Location privacy not sufficiently addressed by legislation
- PETs needed to address Mobile Internet privacy problems



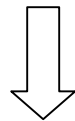
**Questions ?**

<http://www.cs.kau.se/~simone/>

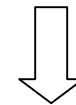
# Composite Capabilities/ Preference Profiles(CC/PP), UAProf



# IPv6 address



For routing packets to the right network, identifies the current link of a Mobile Node

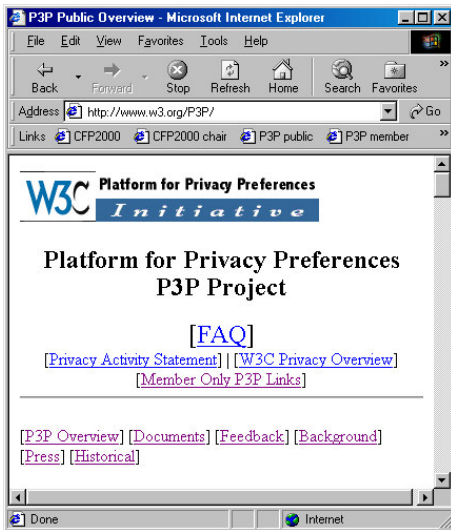


Identifies the specific node on the network

# P3P for informed consent

User Agent

Web Server



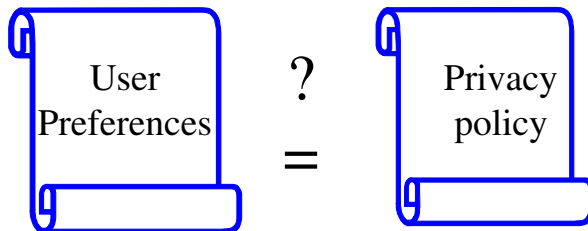
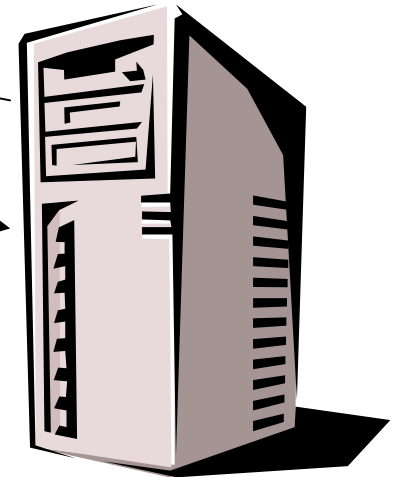
*request P3P policy reference files*

*send P3P policy reference files*

*request P3P privacy policy*

*send P3P privacy policy*

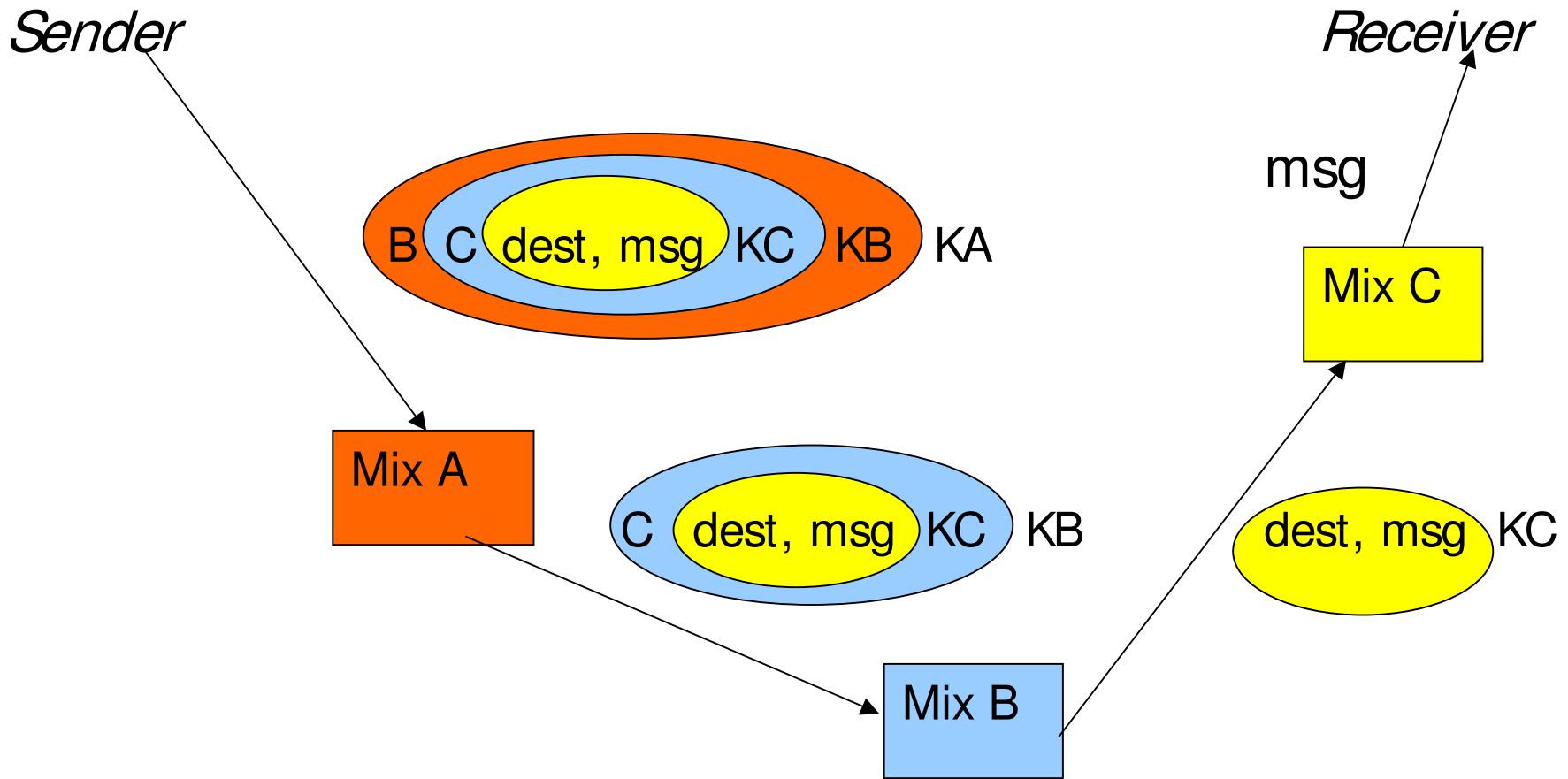
*request web page*



# P3P to protect CC/PP, UAProf

- Minimal profile conveyance
- Users select two profiles
  - One for trust relations
  - One for relations...
    - Before P3P agreement (within safe zone)
    - With non-P3P enabled sites
    - With non-reliable sites
    - For push initiators

# Mix nets for anonymous communication



# Mix nets for the Internet

- Onion Routing (Naval Research Center)
- Freedom Net (Zero Knowledge Inc.)
- Web Mixes (TU Dresden)
- Flying Freedom (KTH / Sweden)

# Mobile Internet - Exposed data

