Platform – Independent IP Transmission over Wireless Networks: The WINE Approach

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Outline

- Motivation
- WINE project
  - Architecture
  - Mobility Support
- Discussions
- Conclusions and Future Work

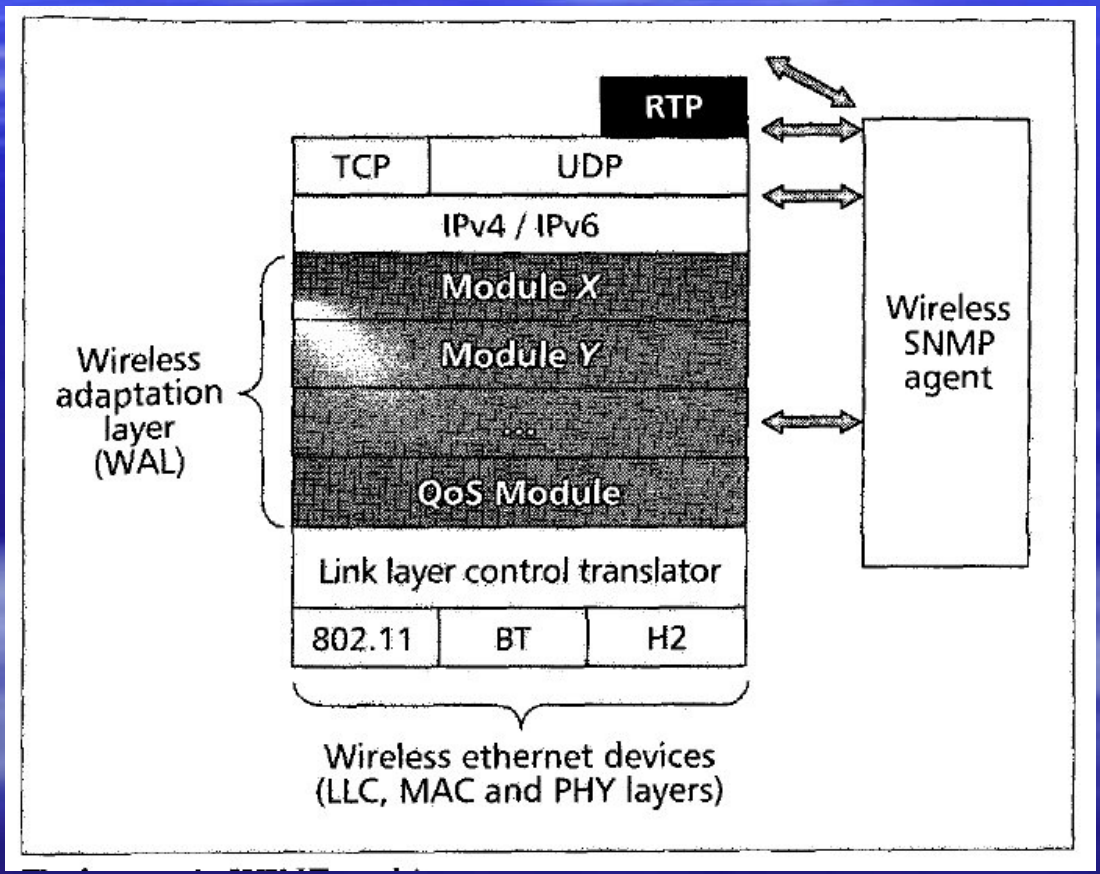
Motivation

- How to enhance the performance of Internet Protocols when operating over WLAN?
  - Implementing a “shim” layer between IP-layer and Link-layer.

WINE

- Wireless Internet Networks project
  - Sponsored by the European Commission.
  - Implementing a wireless adaptation layer (WAL) between IP and link layers.
  - Supporting end-to-end QoS.

WINE Architecture

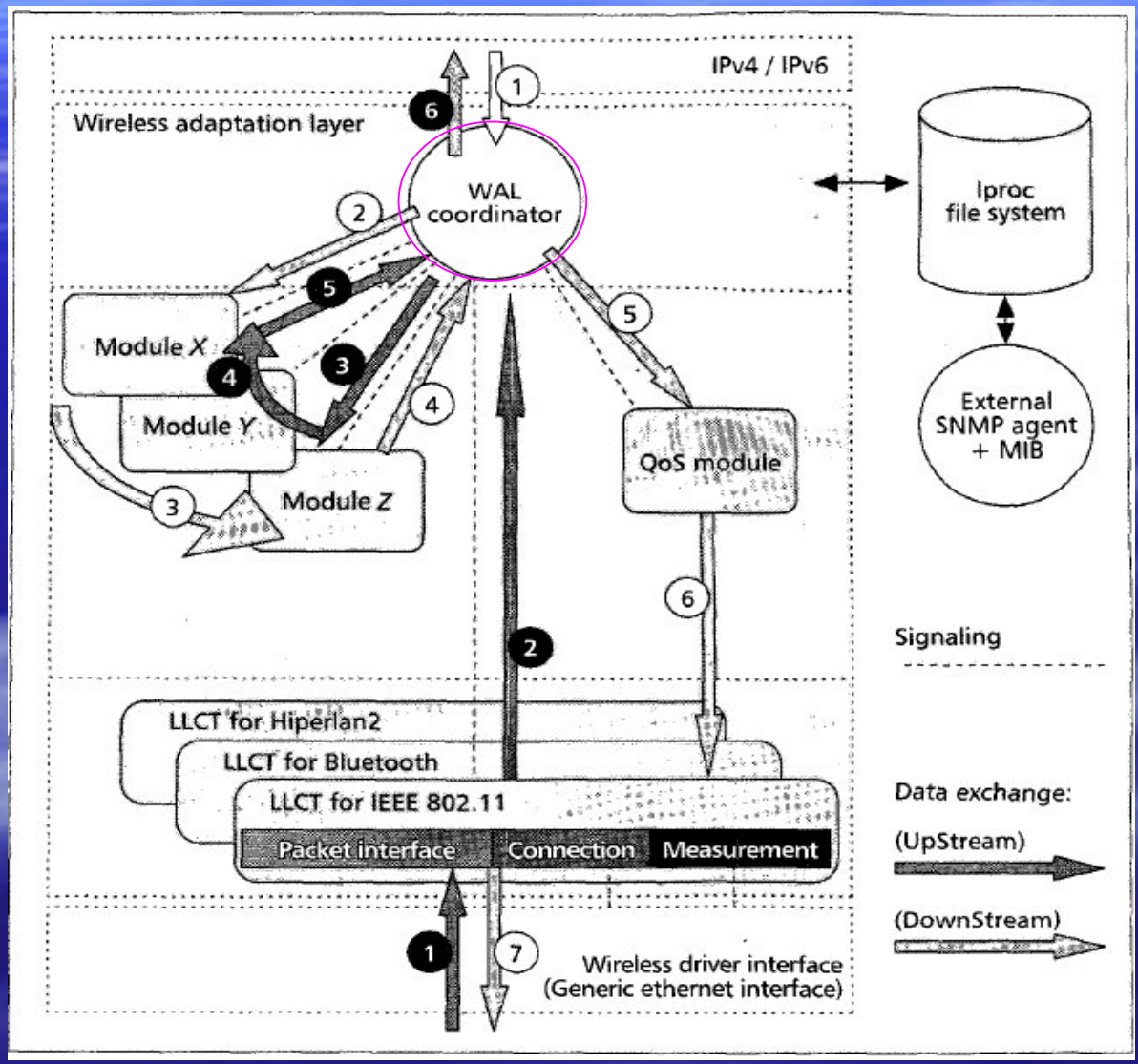


- WAL
  - Adaptation to the observed link conditions
  - IP QoS awareness

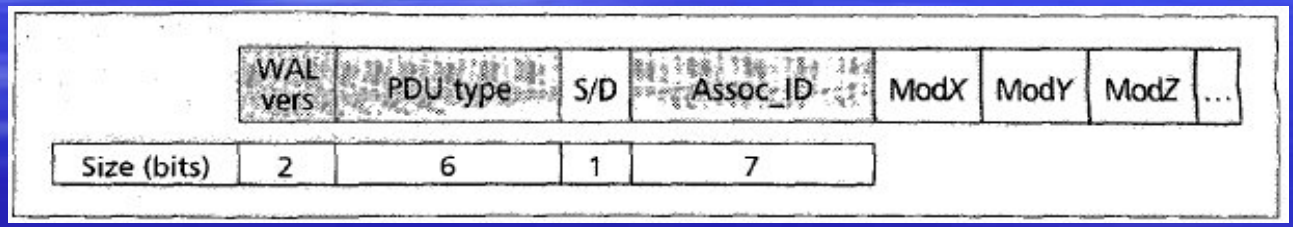
WAL Operation

- Each IP datagram is classified into *classes* and *associations*.
  - class: type of service
    - Audio/video streaming
    - Bulk transfer
    - Interactive transfer
    - Web
  - association:
    - <WAL_class , MT_ID>

WINE Internal Architecture

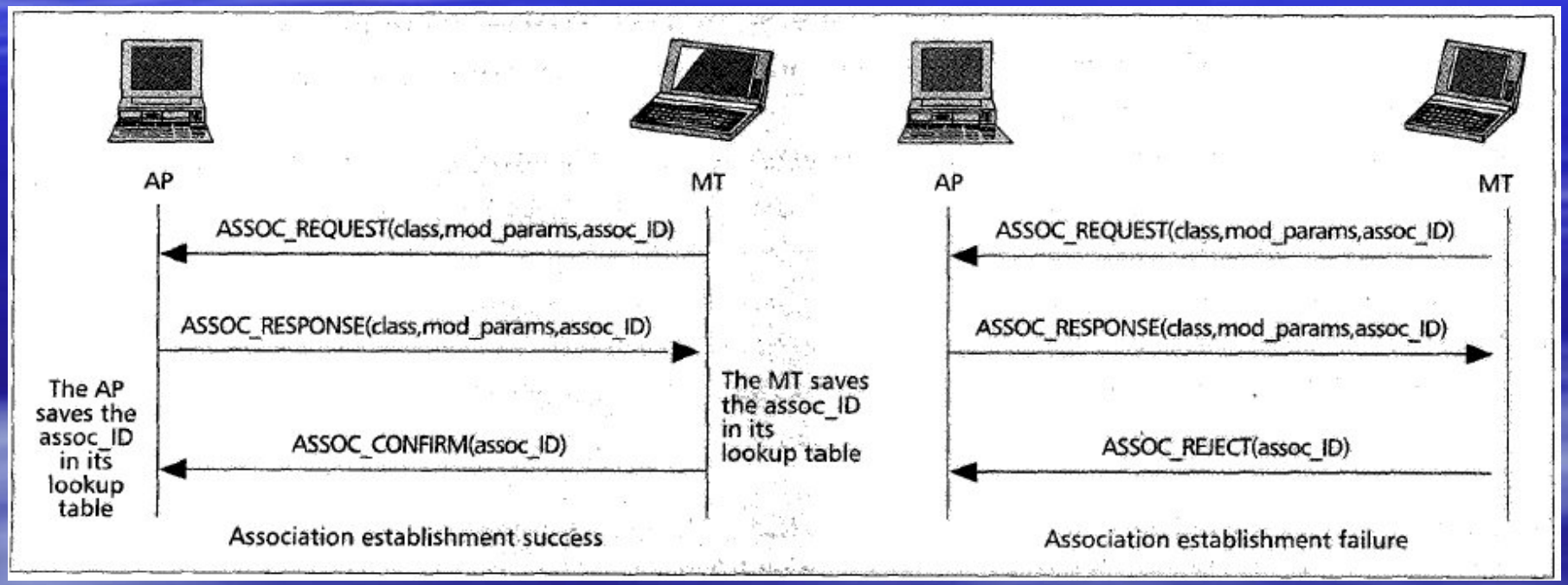


WAL Header Format

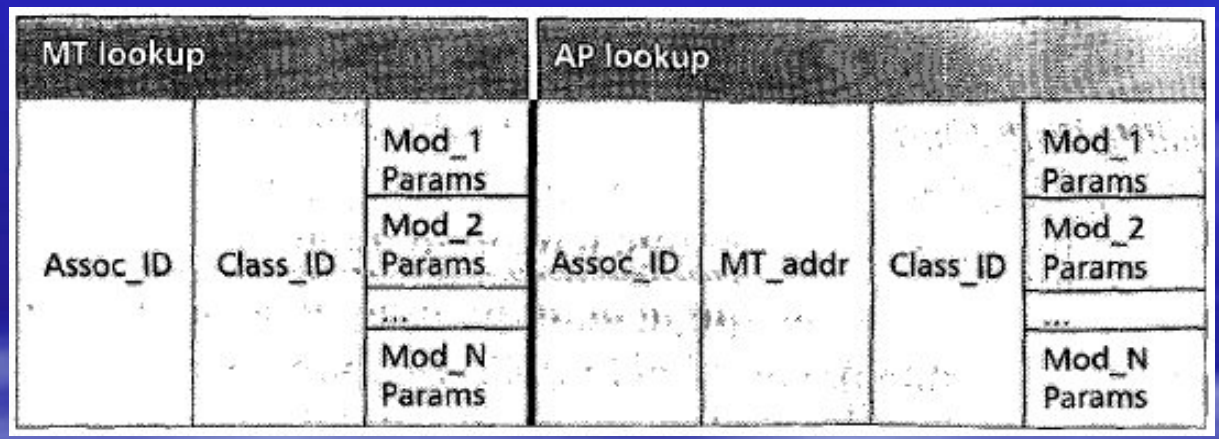


- WAL vers: The WAL version
- PDU: Protocol Data Unit
- S/D: A 1-bit field to distinguish between signaling and data PDUs
- Assoc_ID: Association identifier

WAL Association Establishment Procedure



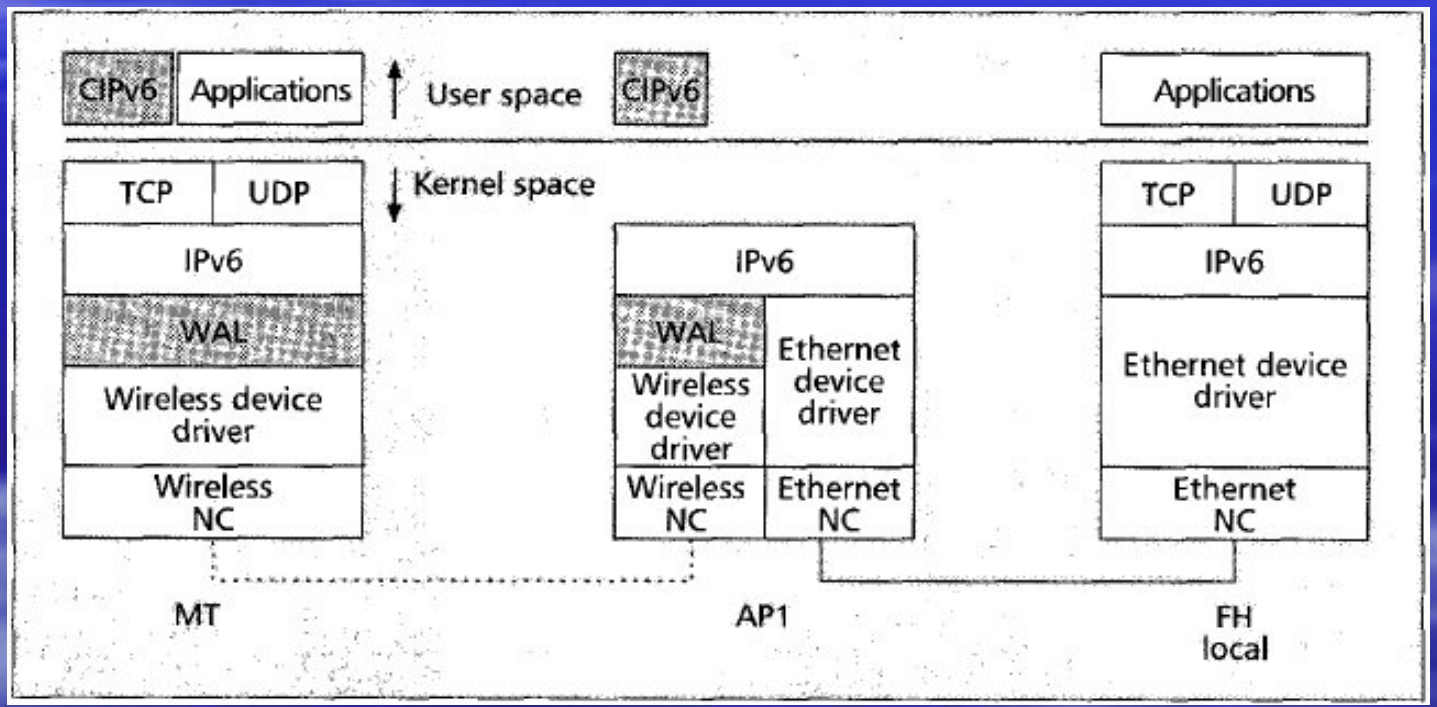
Lookup Tables Format



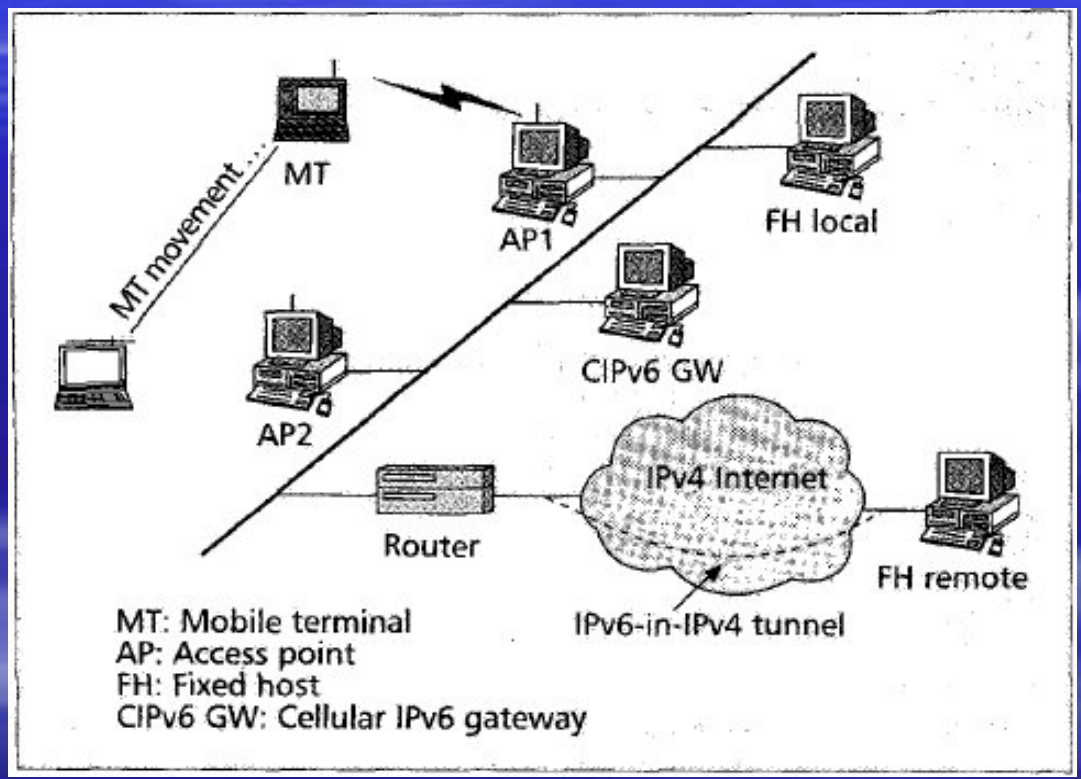
Mobility Support in WINE

- Inter-domain mobility
  - Mobile IPv4, Mobile IPv6…
- Intra-domain mobility
  - Providing connectivity, paging and seamless handover support.
    - Cellular IPv4 [Internet draft]
    - Cellular IPv6 [Internet draft]
    - SIMPLE (Scalable Intra-domain Mobility Protocol using Local Encapsulation)

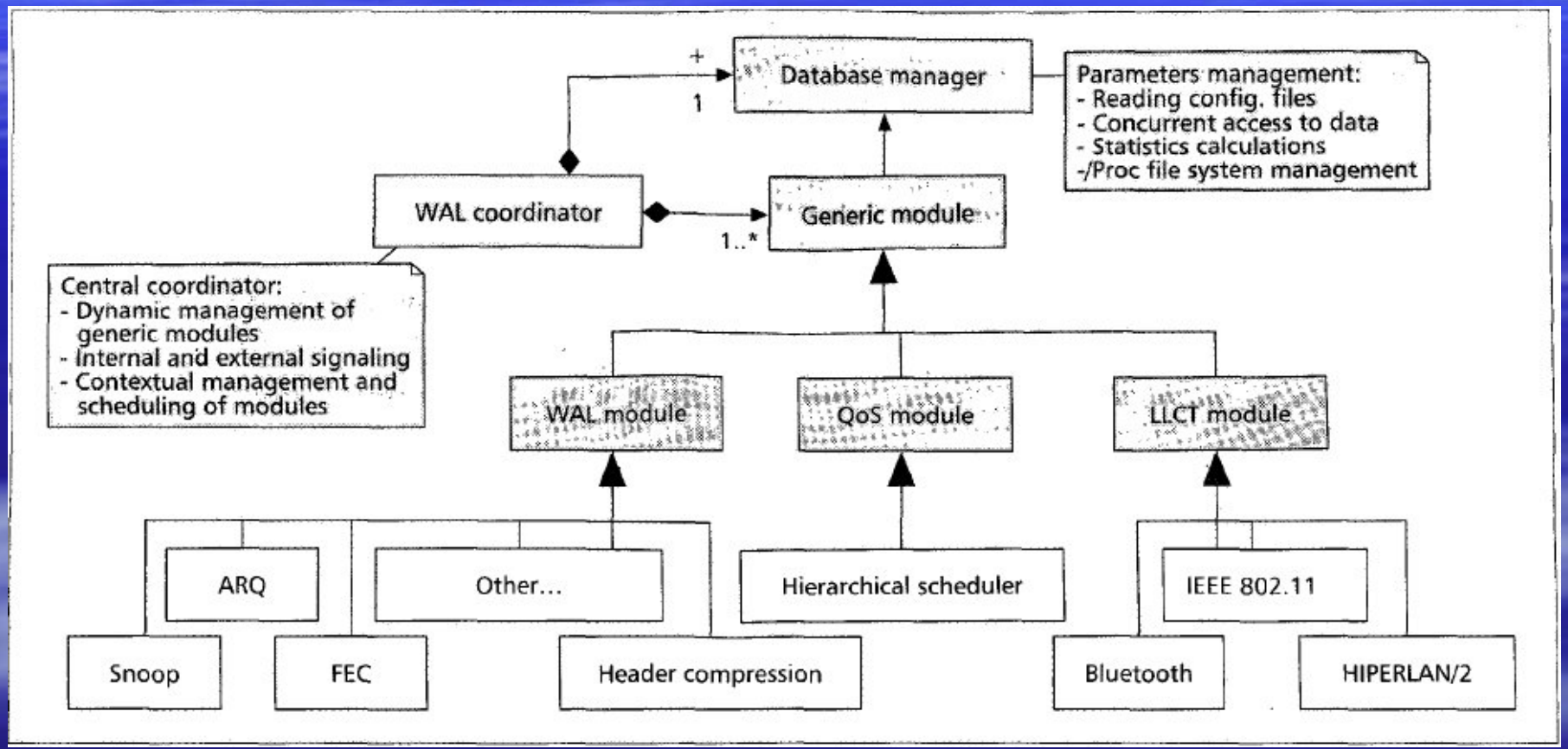
WINE Protocol Stack



Network Topology



WAL Software Architecture



Discussions

- Does it work under Ad Hoc networks?
  - End-to-end QoS support?
- The number of modules should not be too large.
- The processing speed of WAL coordinator?

Conclusions and Future Work

- The WINE project aims to optimize transmission of IP traffic over WLANs.
- One of the key issue of the project is the development of a wireless adaptation layer (WAL) that resides between the IP and WLAN link layers.
- How to cooperate with 3G or other networks?