

IWWAN 2004

Dynamic Mobile IP routers in ad hoc networks

TNO Telecom



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Overview

- Background
- Network concept
- Solution
- Conclusions

Background



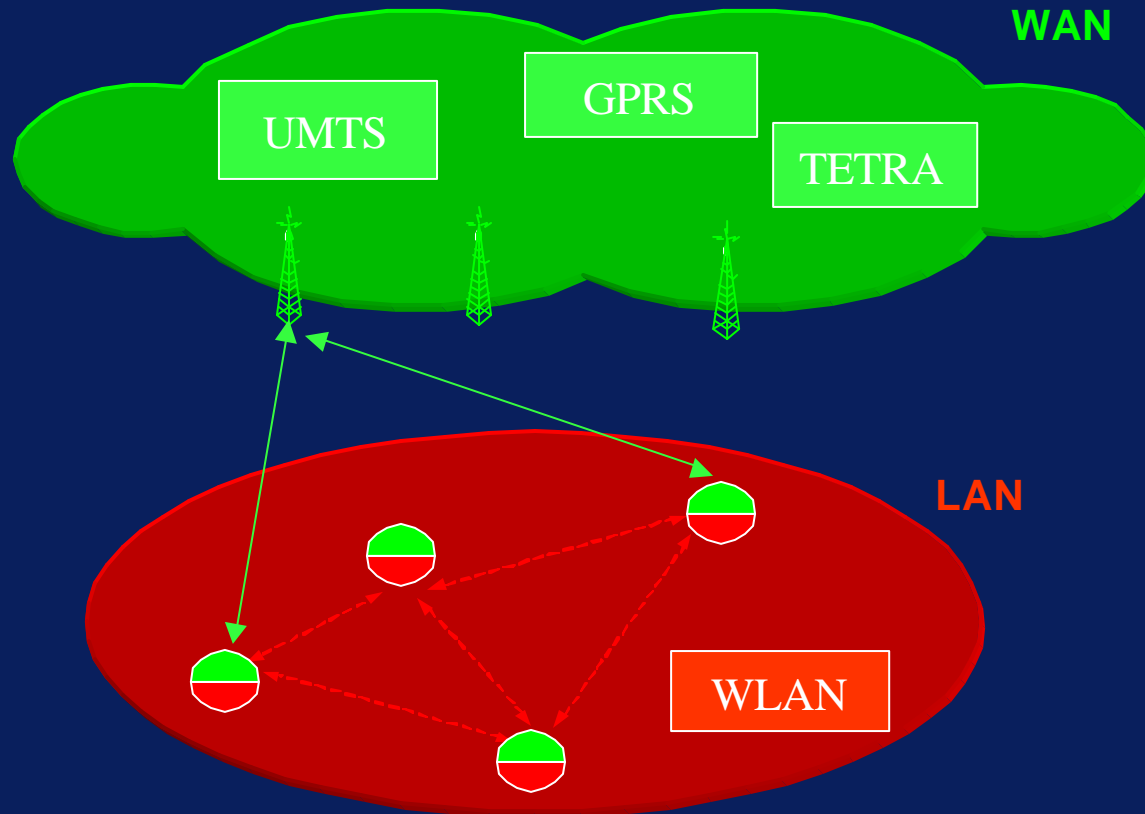
Scalable PErsonal ARea Services (Spears)

Objective: Creation of a robust service platform for operation in a heterogeneous network environment

Target user group: emergency service personnel, firefighters

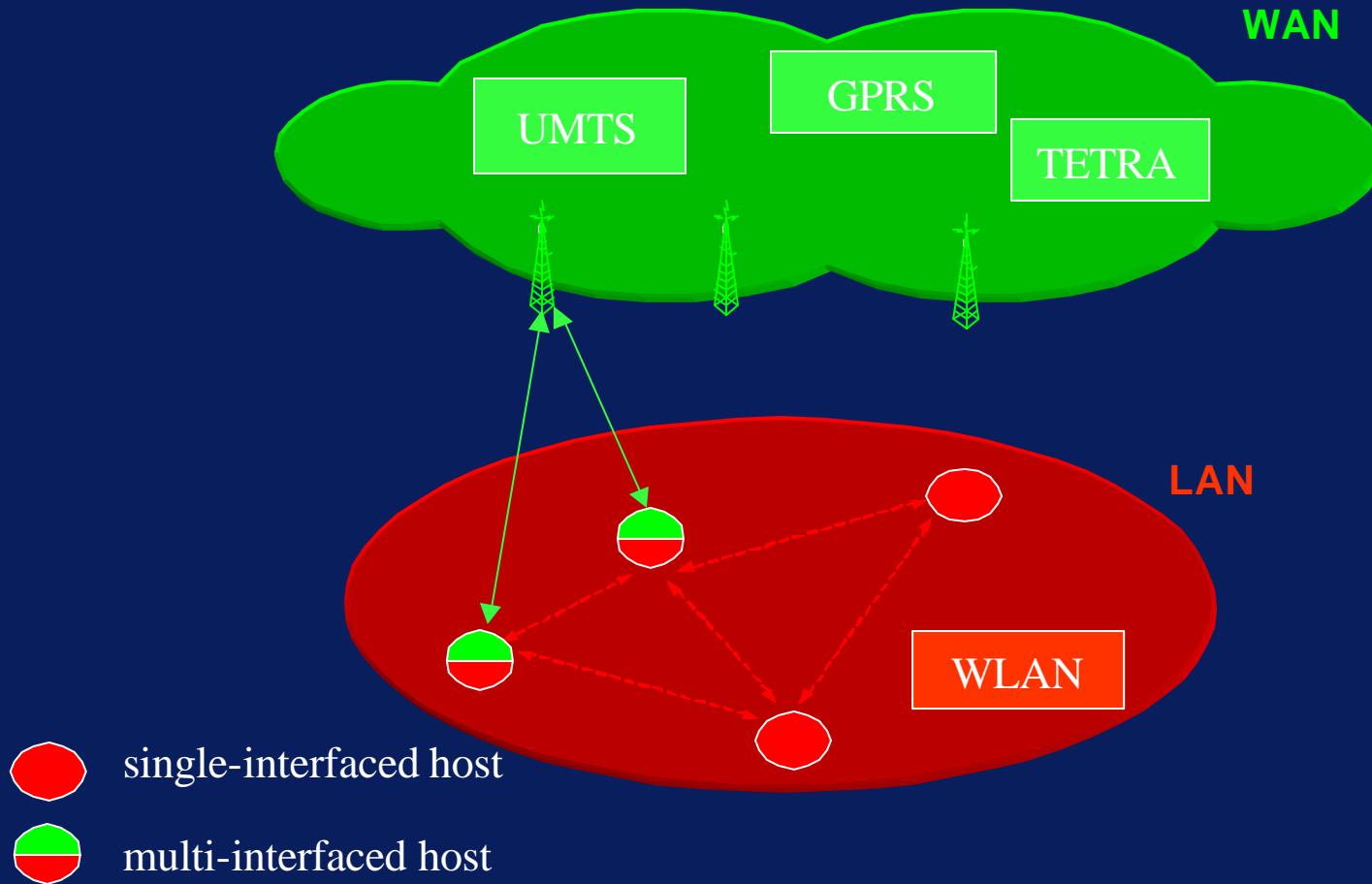
Part of the Freeband Impuls Program, funded by the Dutch government

Network Concept

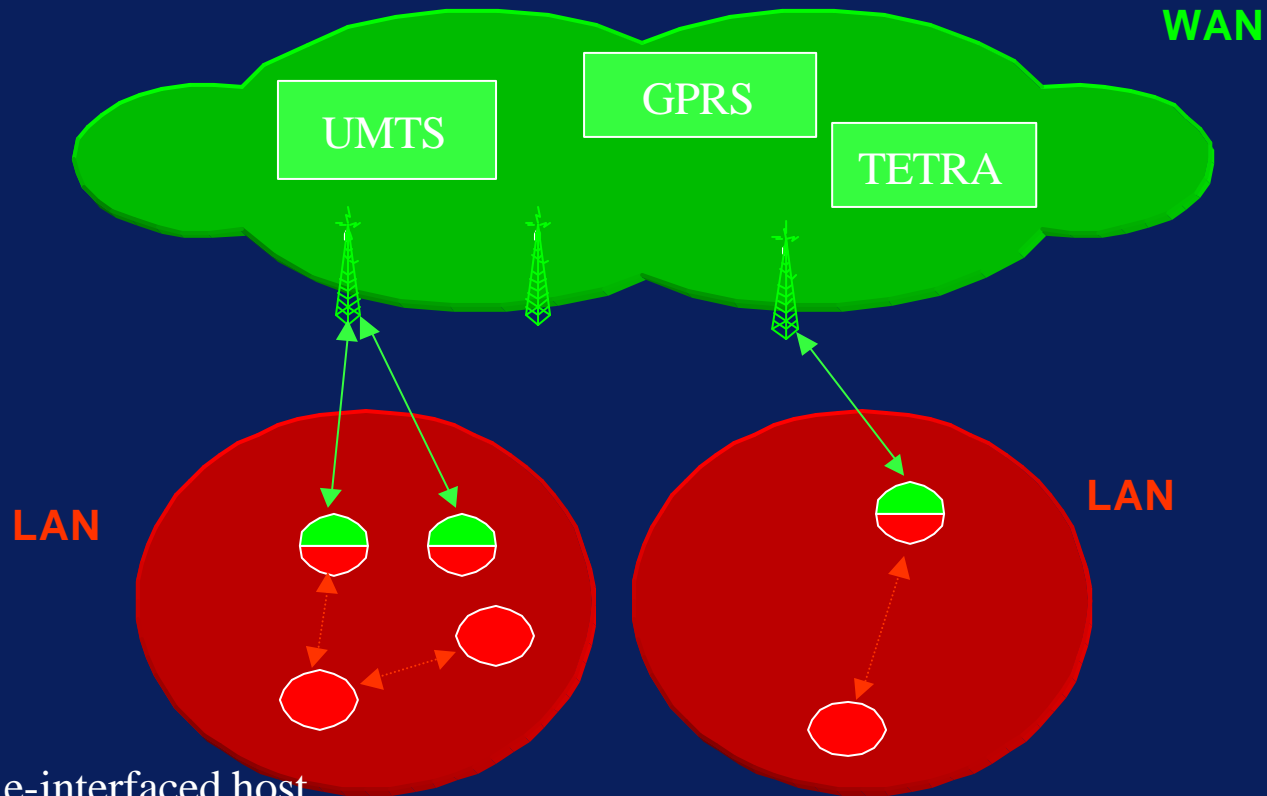




 multi-interfaced host

Network Concept



Network Concept



-  single-interfaced host
-  multi-interfaced host

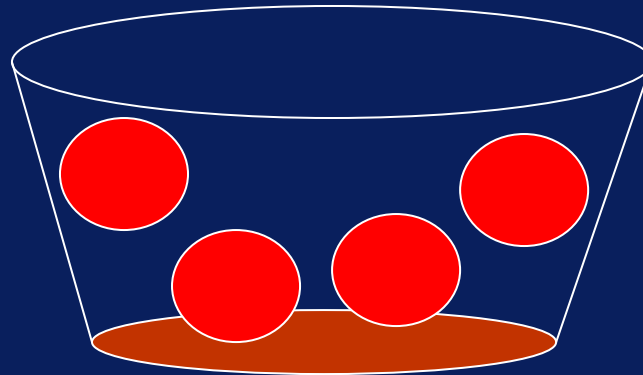
Ingredients

mobile IP

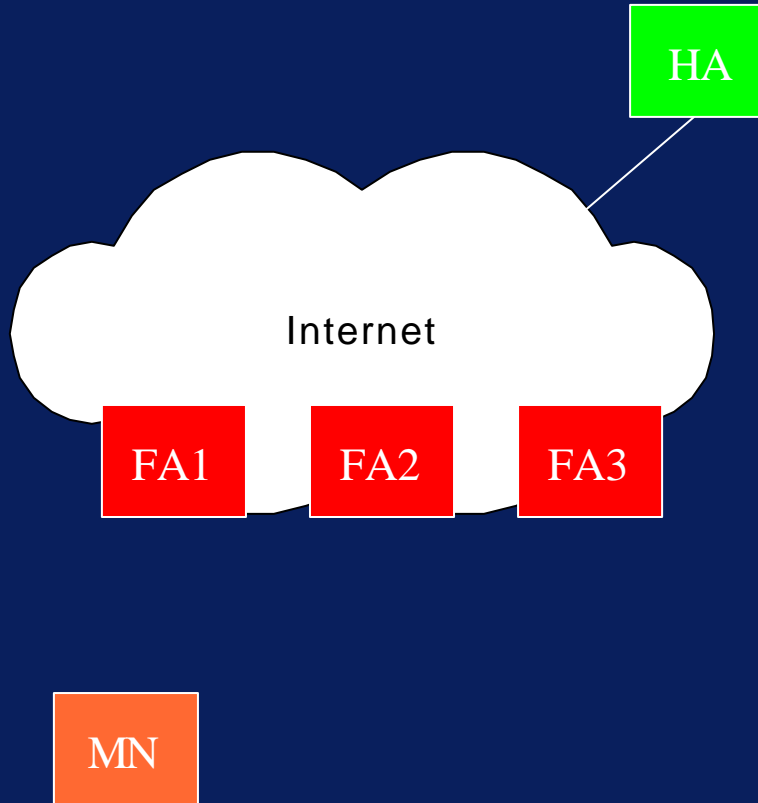
IP based networks

ad hoc routing

multiple radio technologies
GPRS, UMTS, WLAN



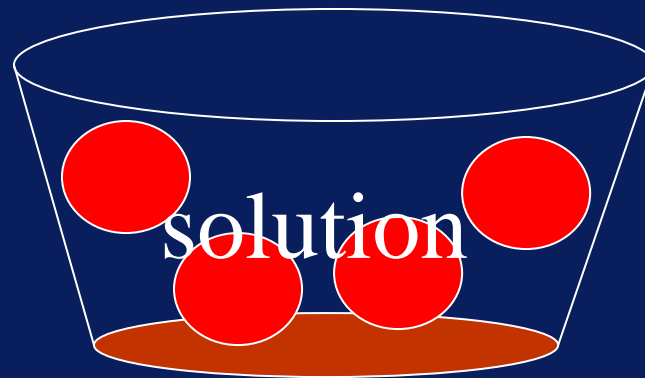
Basic mobile IP



Mobile node changes point of attachment on the access network. HA is aware of the IP address at which the MN is currently reachable.

Not able to support mobility of routers.

Ingredients



Solution

Dynamic mobile IP router

- Combines mobile IP and ad hoc routing
- Acts as a gateway for nodes in the ad hoc network that are one or multiple hops away
- Provides access to services offered by nodes in the network to nodes in the Internet or isolated parts of the ad hoc network
- Takes care of traffic re-routing at the HA to mobile nodes using its routing services when making a handover on the WAN
- Sets up a bi-directional tunnel to the HA
- Forwards ad hoc routing protocol messages to isolated parts of the ad hoc network through the HA

Implications

Mobile IP Router

- new element that combines HA, FA and MN functionalities

Mobile Node

- changes of router advertisements
- additional tunnel setup to the Mobile IP router

Home Agent

- aware of mobile routers
- functionality to handle handovers of mobile routers

Comparison with other approaches

Difference with other mobile router approaches

- In other approaches the mobile router does not take part in the ad hoc network and does not use the capabilities of the ad hoc routing protocol to take care of routing in the mobile access network

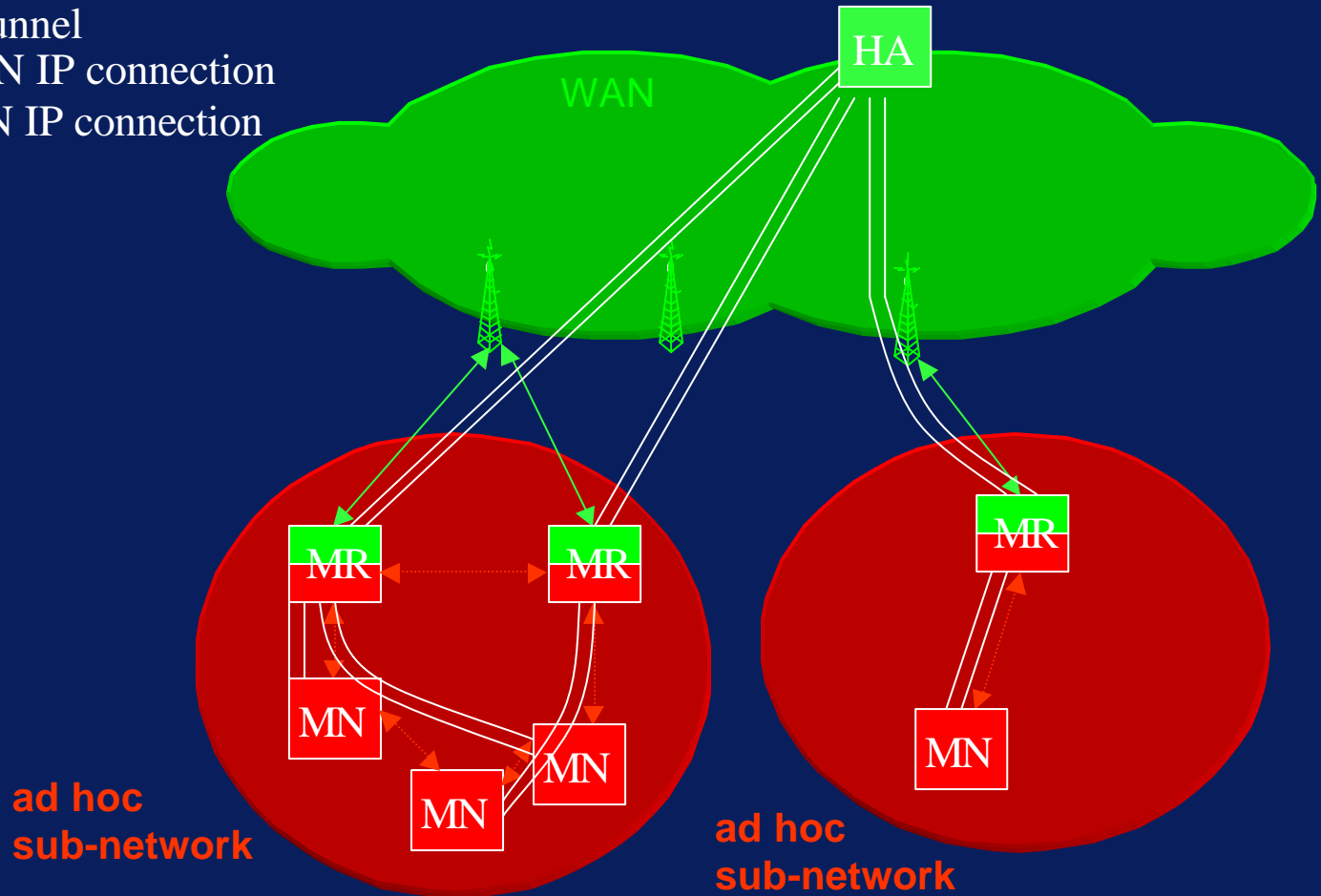
Advantages

Advantages of the mobile IP router

- Mobile nodes can be multiple hops away from the Mobile IP router
- A mobile ad hoc subnet can contain multiple Mobile IP routers
- No need for additional elements in the access networks
- WAN can be used as a fallback option for parts of the ad hoc network that are not within each others range

Network concept (detail)

- ==== IP tunnel
- WAN IP connection
- LAN IP connection



Conclusions

The use of dynamic mobile IP routers enables:

- 1. A completely mobile ad hoc network in which all nodes are globally reachable at a fixed IP address**
- 2. A robust heterogeneous network environment**
- 3. Multiple gateways in an ad hoc network which can dynamically be chosen by the other mobile nodes**
- 4. A geographically distributed ad hoc network running over different IP subnets**

Thank you for your attention



Questions

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