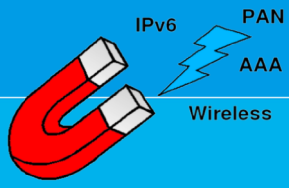
IST MAGNET – My Adaptive Global Network

Martin Jacobsson, Ignas Niemegeers



Personal Networks

Personal Networks is about user-centred wireless communication. The concept starts with the person and his/her devices in the close vicinity. These devices will form a small Personal Area Network (PAN) and will work in full cooperation with each other. Furthermore, this network will interact with surrounding devices, networks and access technologies to create an expanded virtual communications environment. This can include personal devices at home, at office, as well as devices and servers from others. This is what we call Personal Networks (PN).

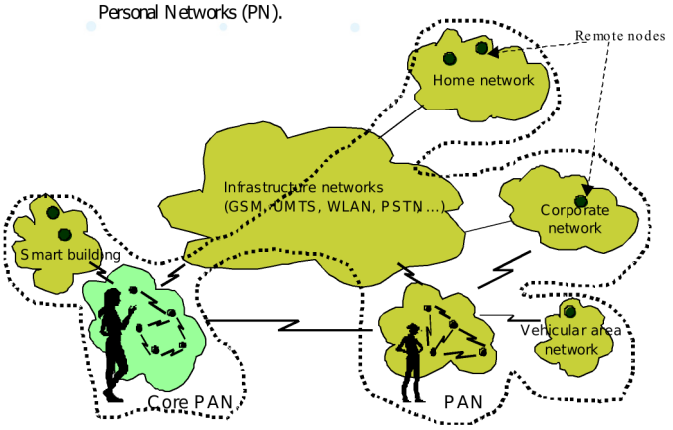


Figure 1: Illustration of the Personal Networks (PN) Concept

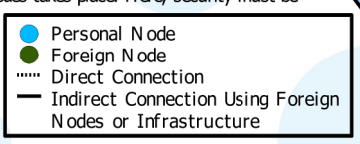
MAGNET Research Topics

The MAGNET project is an integrated project within the Sixth Framework Programme of the EU Commission. MAGNET tries to develop a platform for Personal Networks in such a way that as many of a user's communications needs can be met. This includes understanding and solving challenges such as:

- User's communication needs, motivations and capabilities.
- Business models for service providers, network operators and technology manufactures
- Heterogeneity of wireless communications, devices and applications
- The cooperation of infrastructure-based networks and ad hoc networks
- Autoconfiguration, self-organization and adaptability in all devices and at all levels.
- Service, resource and context discovery
- Naming, addressing and routing in wireless networks
- Security, privacy and accounting

Personal Networks Architecture

As shown in Figure 4, a Personal Network is organised in three layers. The inner most layer is the cluster layer where all traffic is managed by the personal nodes themselves. Traffic that enters a cluster must first be approved by one of the trusted personal nodes of that cluster. No un-trusted node can interfere with the internal routing and communication of a cluster. The second layer is the Personal Virtual Network layer. The communication within the PVN layer depends on routing and forwarding of non-personal nodes. Pre-established security mechanisms can be used to protect the communication within this layer. In the outer most layer, which is called the Personal Network layer, communication with Foreign Nodes takes place. Here, security must be negotiated whenever needed.



Some Typical Personal Networks Scenarios

Personal Networks should offer any time/anywhere communication possibilities such as in the remote babysitting example below. It must facilitate secure and reliable communication between near and distant personal devices such as between a persons mobile phone and a webcam at home.

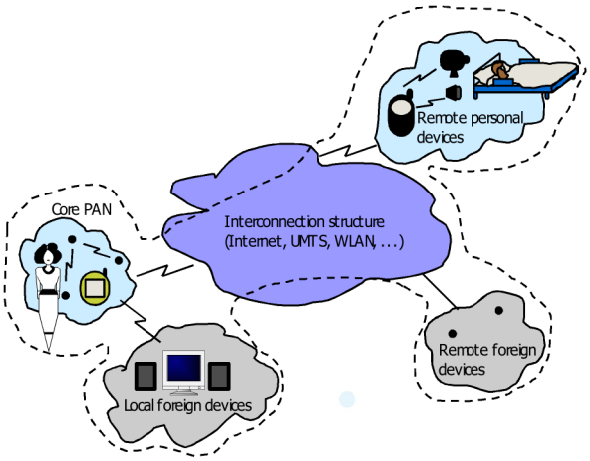


Figure 2: Remote Babysitting Application

Personal Networks could improve productivity of professional workers in their job and at the same time offer rich communication possibilities with loved ones. For instance, a truck driver might both need to access company data back at the office as well as exchange data direct with customers. At the same time, Personal Networks could make life more enjoyable when being away and alone for a long time.

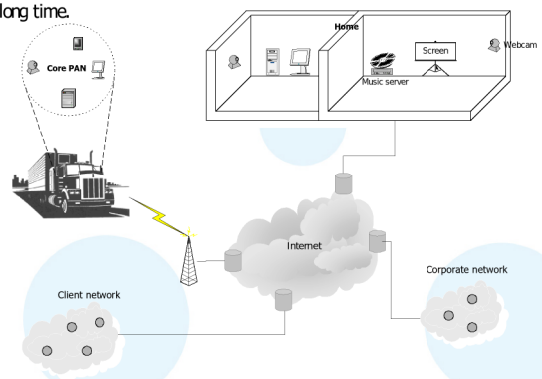


Figure 3: Truck driver on the Road

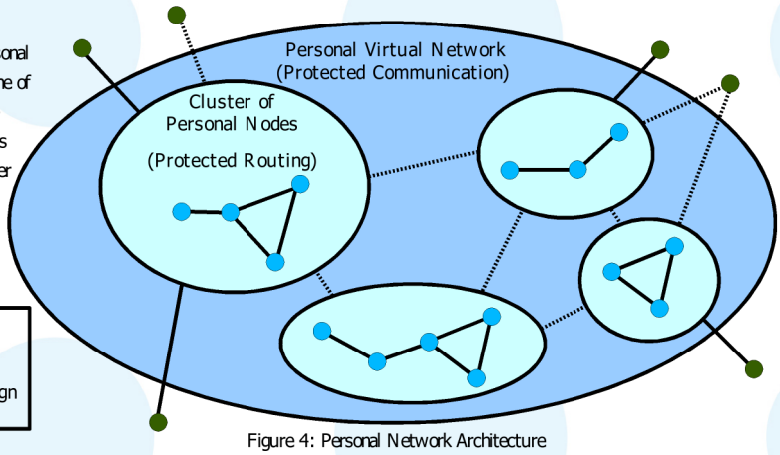


Figure 4: Personal Network Architecture

m.jacobsson@ewi.tudelft.nl
i.g.m.m.niemegeers@ewi.tudelft.nl
Wireless and Mobile Communications Group
TU Delft