

MobileMAN: the user becomes the node

Mobile Metropolitan Ad-Hoc Network or MobileMAN: two names for a new concept in mobile telecommunication networks: out goes the central infrastructure, in comes the user, now an integral part of the net. Equipped with the necessary kit, he becomes both node and supplier of services to other users. Funded by EU Framework Programme V, the project is being developed by two SUPSI teams, one led by Silvia Giordano (on the technical side) and the other by Christian Marazzi (on the socio-economic side).

In the information society of the future, we expect to exploit wireless technology by pioneering new principles of network communication. For example, telecommunication networks may be designed that need neither fixed infrastructure nor central authority. We are referring to self-governing networks made up of their very users, who cooperate to circulate information and provide services to one another. On this new paradigm is centred the research project which SUPSI is conducting in collaboration with its European partners. The new kind of communication net consists of a series of wireless devices, called nodes - such as for instance next-generation mobile phones, emergent Personal Digital Assistants and lap-top computers equipped with wireless interfaces - that work together to operate exactly in the same way and fulfil the same functions as the net infrastructure normally does. These systems are known as 'mobile ad-hoc networks' or 'infrastructure-free networks'; and the project zeroes in on communication networks in a metropolitan area, hence the acronym: MobileMAN. Lacking a centralised structure, MobileMAN must of necessity spread its network functions among the nodes available: this in turn makes it imperative for the latter to work closely together and secure the mutual supply of services. The nodes that are neighbouring on or adjacent to



MobileMAN: two users manage to communicate with each other also in the absence of a direct connection. No fixed infrastructure, no central authority.

each other communicate directly, while those that are farther apart rely on intermediary bridging (or relay) nodes. It is proper to this architecture that new applications are conceivable wherever a centralised structure turns out to be non-viable, undesirable, or unnecessary. The project also aims to establish a link between a MobileMAN and Internet. MobileMAN acts as a support for a whole variety of applications, ranging from text messaging transmission (deriving from the popular SMS) to more demanding multimedia (voice and video) services. In the event, they may vary from elementary interactive games to those where the real world merges with or into the virtual ones. This project is expected to have several positive outcomes, sortable into its two main aspects: the technical and the socio-economic. Technically, the most significant results are the development, endorsement, and implementation of MobileMAN architecture. Another anticipated result is the integration and recognition of ordinary services (e.g. SMS and chatting) at the top of the self-organised network. The same applies to the broadening of the scope of these services to new situations, such as multi-medial messaging, spontaneous electronic collaboration, and interactive games. Finally, a socio-economic assessment is in progress to determine the effectiveness of the ad-hoc mobile paradigm and its market potentials.



Traditional mobile network: the central node (aerial) connects the wireless nodes; nodes that are too far away cannot communicate.

Where sociology walks side by side with technology

MobileMAN is an innovative and interdisciplinary project which bears witness to the public's increasingly awareness of, and concern for, the social aspects of information and communication technologies (ICTs). At the express wish and bidding of the European Union, the new ICTs should make it their duty to put society's real needs and problems first. Social and technical aspects go hand in hand; it is therefore worth bearing in mind how much the development of ICTs depends on factors such as people's knowledge, social practices, and individual input. This explains why SUPSI is engaged on both fronts: the technical one through the Department of Informatics and Electronics (DIE) and the social one through the Department of Social Policy (DLS).

MobileMAN network spanning five countries

MobileMan is a project funded by EU Framework Programme V (sector: User-friendly information society - Emergent and future technologies). The project is conducted jointly by five research centres and institutes located in five different countries:

- Consiglio Nazionale delle Ricerche, Pisa, Italy
- The Chancellor, Masters and Scholars of the University of Cambridge, Cambridge, United Kingdom
- Institut Eurecom GIE, Sophia Antipolis, France
- Teknillinen Korkeakoulu, Espoo, Finland
- Netikos SPA, Roma, Italy
- SUPSI - Scuola Universitaria Professionale della Svizzera Italiana, Lugano, Switzerland

■ A new technological platform

One of the main responsibilities of the six partners is to design a new experimental technological platform for ad-hoc mobile networks. Many theoretical surveys have been carried out on ad-hoc mobile networks, but very little has been subjected to empirical observation and appraisal. The project is original for various reasons. In particular, it designs an infrastructure that, however smaller in scale, allows us to put to the test both low-level aspects (efficient resource management) and high-level aspects (the use of applications by a select group of users). To be spared the high costs of developing a new technology from scratch, the project has opted for an adaptation of the popular standard 802.11 (Wi-Fi). Here we see the crucial role of the Department of informatics

and electronics, whose duty it will be to produce both components (low-grade hardware and software) of the physical system of access to the ether by adjusting a commercial product.

■ MobileMAN and its social facets

To grasp the dynamic interactions between technology and society one needs to interpret the new ITCs both by comparison with other technologies and within the socio-cultural context where they are developed and used. The Department of social policy has been commissioned to develop a conceptual and empirical interface between the 'system developers' and the potential 'system users'. The theoretical approach rests on the assumption that ITC users and ITC developers are two classes divided by a momentous gulf. This gulf may block all attempts at anticipating end-users' needs and problems. To bridge the gap, the DSL has put forward a research method known as 'stakeholder design'. The provision of accessible (to end-users) information and communication is a prerequisite for adopting this methodology. Such material will be presented to various categories of stakeholders by means of focus groups. Work is currently in progress on generating information material designed for end-users, to be integrated into the project's web site. Finally, the contribution of the Department of Social Policy in the last stages of the project will consist in speculating (on the basis of empirical evidence) about the socio-cultural potential of the project.

Find out more about the project

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