Motivation

High-level abstractions for dynamic networks need to be developed and supported by middleware for easing the development of pervasive applications. The definition of such abstractions shall be derived from both features of the network and architectural principles elicited for mobile software systems. In this context, we have in particular studied group management over ad hoc networks, which allows abstractly characterizing the mobile network on top of which the application is intended to execute and to manage the network on behalf of the application. Related issues include characterizing and reasoning about the functional and non-functional behavior of the participating peer nodes, and in particular dealing with security requirements and resource availability that are crucial in the mobile environment. **Research**

There has been extensive research on group management and related group communication services in the context of fixed networks, with special emphasis on providing availability properties. However, proposed solutions cannot be applied directly to mobile wireless networks due to the network's highly dynamic topology. This has led to adapting the management of group membership to the specifics of MANET. Various solutions towards group management over MANET have, then, been investigated over the last couple of years, each targeting specific applications. However, a distinctive set of key attributes may be identified for MANET-based groups, which may further be exploited to design a generic group service that is to be customized by applications.

We have elicited key attributes for group management over MANET, in particular based on applications published in the literature. Those attributes amount to setting membership constraints in relation with the location, connectivity, authentication and supported QoS of group members. We have then introduced a group service that is generic with respect to membership constraints, and realizes three basic functions: discovery of group members, initialization of the group, and management of the group's dynamics. Implementation of the generic group service is further being addressed in the context of the WSAMI middleware . Finally, we have studied two instances of groups that build on our generic group service and allow supporting ambient intelligence scenarios that are respectively related to mobile collaborative work and QoS management in the home network.

Group management further requires adequate security support. In this context, we have studied security mechanisms for MANET in collaboration with the INRIA CODES project-team. Our results relate to the design of a group key agreement protocol among members of the group, which accounts for resource constraints of participating nodes. **Contributors**

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Supporting Grant

- [IST_OZONE](#) -- New Technologies and Services for Emerging Nomadic Societies

Related Software

- [WSAMI: A Middleware Infrastructure for Ambient Intelligence based on Web Services](#)

Publications

Titre [Protocoles cryptographiques pour les réseaux ad hoc](#) AuteursBhaskar Raghav DétailThèse: Ecole Polytechnique X (03/07/2006) Accès au texte intégral

Titre [Maximal Group Membership in Ad Hoc Networks](#) AuteursFilali Mamoun; Issarny Valérie; Mauran Philippe; Padiou Gérard; Quéinnec Philippe DétailIn *6th International Conference on Parallel Processing and Applied Mathematics : PPAM 2005* (2005) 51-58 Accès au texte intégral

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