

LABORATORY FOR COMMUNICATIONS AND APPLICATIONS LCA

Group Communication in Ad Hoc Networks



What is Group Communication?

Group communication basically implies a many-to-many communication style in a *group*; this goes beyond both one-to-one communication (i.e., unicast) and one-to-many communication (i.e., multicast). Apart from the distinction in communication style, group communication, in most cases, requires certain *reliability* guarantees in terms of the messages sent from source(s) to members of a group.

Group Communication in Ad Hoc Networks

As a leading issue in distributed settings, group communication is also important in ad hoc networks, because these networks are inherently distributed (support from centralized services, even if applicable, may only be intermittently available). However, devising protocols to provide group communication service in ad hoc networks is extremely challenging, due to highly dynamic and unpredictable topological changes. As a result, there is no general solution to this problem, and the protocol design has to take into account requirements of specific scenarios. In this project, we divide the problem into the following two scopes and address them separately:

- Large scale networks where group communications are occasionally used for disseminating important information (e.g., cryptographic keys).
- Small scale networks where group communications are the dominant communication paradigm (e.g., vehicular networks).

Publications

- **NEW!** J. Luo, J.-P. Hubaux, and P. T. Eugster. DICTATE: Distributed CerTification Authority with probabilisTic frEshness for Ad Hoc Networks. to appear in *IEEE Transactions on Dependable and Secure Computing*, 2(4):311-323,

2005.

[[Details](#) | [Full Text](#)]

- J. Luo and J.-P. Hubaux. NASCENT: Network Layer Service for Vicinity Ad-hoc Groups. In Proc. of the 1st *IEEE SECON*, October 2004.
[[Details](#) | [Full Text](#)]
- J. Luo, T. Eugster, and J.-P. Hubaux. Probabilistic Reliable Multicast in Ad Hoc Networks. *Elsevier Ad Hoc Networks*, 2(4):369 - 386, 2004.
[[Details](#) | [Full Text](#)]
- J. Luo, P. T. Eugster, and J.-P. Hubaux. PILOT: Probabilistic Lightweight grOUp communication system for Mobile Ad Hoc Networks. *IEEE Transactions on Mobile Computing*, 3(2):164-179, 2004.
[[Details](#) | [Full Text](#)]
- J. Luo, J.-P. Hubaux, and P. T. Eugster. PAN: Providing Reliable Storage in Mobile Ad Hoc Networks with Probabilistic Quorum Systems. In Proc. of the 4th *ACM/SIGMOBILE MobiHoc*, June 2003.
[[Details](#) | [Full Text](#)]
- J. Luo, P. T. Eugster, and J.-P. Hubaux. Route Driven Gossip: Probabilistic Reliable Multicast in Ad Hoc Networks. In Proc. of the 22nd *IEEE INFOCOM*, March 2003.
[[Details](#) | [Full Text](#)]

Journals

- IEEE Transactions on Mobile Computing
- IEEE Transactions on Dependable and Secure Computing

PEOPLE

Prof. Jean-Pierre Hubaux
Jun Luo

Collaborators
Dr. Patrick Thomas Eugster

RELATED

At EPFL
MICS

Projects
Technion Ensemble
Cornell Horum
JHU Spread
HUJI Transis

