

Reliable Broadcast Communication in Mobile Ad-hoc Networks

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Abstract

A fundamental issue of distributed computing consists in finding concepts and mechanisms that are general and powerful enough to allow reducing (or even eliminating) the underlying uncertainty. This uncertainty is created by asynchrony, failures, unstable behaviors, non-monotonicity, system dynamism, mobility, low computing capability, scalability requirements, etc. Mastering one form or another of uncertainty is pervasive in all distributed computing problems.

This talk focusses on how speed of nodes create uncertainty in a distributed systems with mobile nodes in terms of problem cost and problem solvability. In particular the talk will address the specific problem of geocasting and show how speed of nodes impact geocasting solvability and how speed affect geocasting cost. For the one-dimensional case of the mobile ad-hoc network, we provide an algorithm for geocasting and we prove its correctness given exact bounds on the speed of movement. This analysis formally verifies the intuition that the faster nodes move, the most costly it would be to solve geocasting.

Interestingly, the set of steps we followed (i.e.,the model, the way solvability problem has been tackled and how the tradeoff bounds on the cost of solvability has been established) for analyzing geocasting can be a general canvas within which analyzing the uncertainty due to node speeds introduced within other distributed computing related problems working on the top of a mobile settings.