

# Epistemic Gossip Protocols

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## Abstract

A well-studied phenomenon in network theory since the 1970s are optimal schedules to distribute information by one-to-one communication between nodes. One can take these communicative actions to be telephone calls, and protocols to spread information this way are known as gossip protocols or epidemic protocols. Statistical approaches to gossip have taken a large flight since then, witness for example the survey “Epidemic Information Dissemination in Distributed Systems” by Eugster et al. (IEEE Computer, 2004). It is typical to assume a global scheduler who executes a possibly non-deterministic or randomized protocol. A departure from this methodology is to investigate epistemic gossip protocols, where an agent (node) will call another agent not because it is so instructed by a scheduler, but based on its knowledge or ignorance of the distribution of secrets over the network and of other agents’ knowledge or ignorance of that. Such protocols are distributed and do not need a central scheduler. This comes at a cost: they may take longer to terminate than non-epistemic, globally scheduled, protocols. A number of works have appeared over the past years (Apt et al., Attamah et al., van Ditmarsch et al., van Eijck & Gattling, Herzig & Maffre) of which we present a survey, including open problems yet to be solved by the community.

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