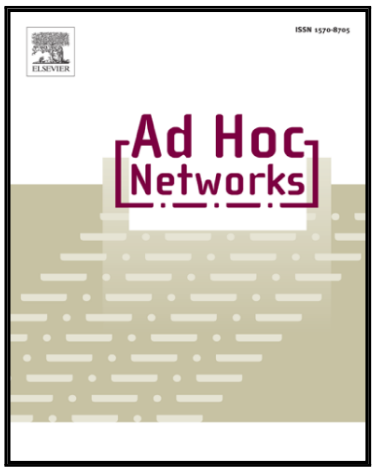

Performance evaluation of DTN protocols to deliver sms in dense mobile network : empirical proofs

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PII: S1570-8705(16)30175-5
DOI: 10.1016/j.adhoc.2016.07.006
Reference: ADHOC 1419

To appear in: *Ad Hoc Networks*

Received date: 3 March 2016
Revised date: 5 June 2016
Accepted date: 12 July 2016

Please cite this article as: Yannick Leo, Anthony Busson, Carlos Sarraute, Eric Fleury, Performance evaluation of DTN protocols to deliver sms in dense mobile network : empirical proofs, *Ad Hoc Networks* (2016), doi: 10.1016/j.adhoc.2016.07.006

Performance evaluation of DTN protocols to deliver SMS in dense mobile network : empirical proofs

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Abstract

In urban areas, the population density is still growing (the population density starts exceeding 20.000 inhabitants per km^2), and so, the density of mobile users becomes very important. People are moving from home to work, from work to active places. One can take benefit of the mobility and the density to justify DTN (Delay Tolerant Network) approach protocol to convey SMS (or alternative messaging services) traffic. Indeed, the mobility of users, especially during the day, create an ad hoc mobile network where the nodes are the smartphones hold by mobile clients. In this paper, their performance evaluations are based on a measurement and analysis of SMS traces coming from a nationwide cellular telecommunication operator during a two month period, we propose several DTN like basic network protocols for delivering SMS. We perform a temporal and spatial analysis of the Mexico City cellular network considering geolocalized SMS to characterize the traffic. Such key characterization allows us to answer the question: is it possible to transmit SMS using phones as relay in a large city such as Mexico City? We define four network protocols to transmit SMS from a source to a destination. We study a mobile dataset including 8 Million users living in Mexico city. This gives us a precise estimation of the average transmission time and the global performance of our approach. Our analysis shows that after 30 minutes, half of the SMS are delivered successfully to destination. On the contrary to the cellular networks, we explain how much the potentiality of the mobile users network can take benefit from complementary properties such as the locality of SMS, the density of phones in Mexico City and the mobility of phone users. Moreover, we show that in a realistic scenario, our approach induces reasonable storage cost.

Keywords: Computer Communication Networks, Network Protocols, Network Operations, Performance of systems, Network Science, Delay Tolerant Network, Routing Protocols

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