

Peer to Peer Systems: Final Project
Master Degree in
Computer Science, Computer Science and Networking
Business Informatics
Accademic Year 2013/2014

Gossip Based Counting in Dynamic Networks

1 Goal of the Project

The goal of the final project is to define a gossip protocol to average, sum or find minima and maxima over node values in a large, distributed, P2P dynamic network. The protocol has been proposed in [1] and is exploited, for instance, to count the total number of nodes in a network. The project requires to implement at least a protocol for counting the nodes of the P2P network.

The gossip protocol is structured into two modules: the *Count* and the *Beacon Module*. In the *Count Module* the information from every node is combined and then spread to all the nodes again. Each node initially has a single token. Nodes periodically select a random neighbour and give this neighbour all their tokens.

The *Beacon Module* is introduced to speed-up the aggregation process. A *beacon* is a node whose location information spreads through the network by means of gossip. The goal of this node is to guide messages toward each other so that they can be aggregated.

An interesting characteristics of the proposed algorithm is the management of network dynamicity. The aggregation process is restarted whenever a node joins or leaves the network.

2 Experimental Results

The project must be implemented by the *Peersim* simulator [2] or by the *PeerfactSim.KOM* simulator [3]. It is required to present a set of experiments measuring the most important characteristics of the protocol. The student can refer to the experiments defined in [1] or define/integrate these with a new originally defined set of experiments.

3 Further Information

The student may join a group of at most two persons for the realization of the project. Each group must submit the following documents:

- A documentation of the implemented classes
- A report including:
 - a general description of the project choices.
 - a set of graphics reporting some experimental results

The student must submit a printed version of the relation and of the code (pdf format) at the reception of the Department of Computer Science and an electronic version of these documents by the Moodle System.

The project must be submitted one week before the date of the oral examination/of the discussion of the project (recall that the oral examination is waived if the student has submitted at least 2 of the assignments proposed during the course and they have been positively evaluated).

For problems related to the project, you can contact me during the question time, on Thursday, from 15 PM to 18 PM, or by a skype call (skype contact: lauraemiliaricci)

References

- [1] R. van de Bovenkamp and F.A. Kuipers, and P. Van Mieghem, *Gossip-based counting in dynamic networks*, Proc. of IFIP Networking 2012, Prague, Czech Republic.
- [2] *The Peersim Simulator* <http://peersim.sourceforge.net/>
- [3] *The PeerfactSim.KOM Simulator* <http://peerfact.kom.e-technik.tu-darmstadt.de/>