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

Symphony: Distributed Hashing in a Small World

1   Goal of the Project

The Distributed Hash Table Symphony [3] is based on the Kleinberg Model
[4]. The nodes of a Symphony overlay are positioned on a unitary ring and
have some links to a set of close peers on the ring and a constant number of
long-range links to remote peers (*lonk range links*) uniformly distributed on
different distance bands.

The long range links are chosen at random by an *harmonic distribution*
which favours the creation of long-range links when the system has a few nodes,
the creation of links with closer nodes when the ring has a larger number of
nodes. An example è is shown in Fig. 1.

Figure 1: A Symphony Overlay

The project requires the implementation of the following functionalities of
the *Symphony* overlay:

- *Join* of the node to the overlay

- *LookUp* of a key

The implementation of the voluntary leave of a node from the overlay is
optional. To implement the different system functionalities, refer to the slides

of the course and to [3]. A set of experimental results which enables the validation of the complexity bound presented in [3] must be presented.

The simulation must be implemented by *Peersim*, [1], or by the Peerfact-Sim.KOM [2] simulator.

2   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 positively evaluated.

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

References

[1] *The Peersim Simulator* http://peersim.sourceforge.net//

[2] *The PeerfactSim.KOM Simulator*
    http://peerfact.kom.e-technik.tu-darmstadt.de/

[3] G. S. Manku, M. Bawa and P. Raghavan, *Symphony: Distributed Hashing in a Small World* USITS 2003, 4th USENIX Symposium on Internet Technologies and Systems, pp. 127- -140, March 2003.

[4] J. Kleinberg, *The Small-World Phenomenon: An Algorithmic Perspective,* 32nd ACM Symposium on Theory of Computing (STOC 2000), 2000, pp. 163–170.