Peer to Peer Systems
Master Degree in Computer Science,
Computer Science and Networking,
Business Informatics
Accademic Year 2013/2014
Assignment n.1

The goal of this assignment is to check the acquisition of the fundamental concepts of *Distributed Hash Tables(DHT)*.

The student should carefully read two scientific papers. The first one, *Pastry: Scalable, decentralized object location, and routing for large-scale peer-to-peer systems* [1], introduces *Pastry*, a DHT based on *Plaxton Routing* which share some concepts with *Kademlia*.

The second one, *Improving Lookup Performance over a Widely-Deployed DHT* [2] analyses the Kademlia routing mechanism and establishes an analytical framework to examine the effect on lookup performance of adding extra contacts to routing tables. The contacts may be added by increasing the size of the k-buckets or by adding more k-buckets (the latter is the solution implemented in KAD).

The student should present a relation where she/he describes:

- The main features of the *Pastry* DHT. In particular, the student must describe the structure of the Pastry routing table. Since [1] presents a Pastry overlay defined on base-4 identifiers, the student is required to present an example exploiting a basis $\neq 4$. The description of the neighborood set of a node may be neglected. Describe the routing algorithm of *Pastry* by presenting a routing instance using the routing table defined at the previous point.

- A discussion of the analysis of the *Kademlia k-buckets* presented in [2]. In particular, the student should describe how the general framework presented in the paper can be instantiated in the case of Pastry and Kademlia, by presenting a set of examples.

References

[1] Antony Rowstron, Peter Druschel, *Pastry: Scalable, decentralized object location, and routing for large-scale peer-to-peer systems*, Middleware 2001, pages 329-350, 2001, Springer.

[2] Daniel Stutzbach, Reza Rejaie, *Improving Lookup Performance over a Widely-Deployed DHT*, INFOCOM 2006, 25th IEEE Int. Conf. on Computer Communications, 23-29 April 2006, Barcelona.