Topic 2: Routing in Peer-to-Peer Networks

1 Guidelines

Resource location is the most prominent problem in P2P networks. To locate
desired resources, each peer should be able to forward queries to a subset of
neighbor peers that are more closer to the destination than any other peer. In
this topic, you should focus on the issue of routing in P2P networks. There are
three main ways in which routing are performed in terms of the structure prop-
erty of the P2P networks. In the first section, you should introduce the routing
strategies in the unstructured P2P networks. The routing strategies in this type
emerge from the earliest P2P systems, such as Gnutella and FreeNet. After the
introduction of the basic routing strategies, you should then discuss the advanced
or modified versions of these basic methods that have been invented by the aca-
demic community, such as iterative deepening, expending ring, routing indices
and so on. In the second section, you should describe the routing approaches in
the structured P2P networks, such as CAN, Chord, Tapestry and Pastry. In this
kind of P2P systems, both network structure and data placement are tightly
controlled. Each peer uses semantic-free index to forward lookup queries to the
peer that is numerically closest to the destination. The most prominent advan-
tage of the structured P2P system is that a theoretical routing bound could be
given even in the adverse case. After the introduction of the distributed hash ta-
ble, you further discuss some novel routing approaches, such as Viceroy, Canon,
Skip Graph, P-Grid, and BATON. Last, in the third section, you should discuss
the routing methods used for the hybrid P2P systems. This type of P2P systems
combines the advantage of both structured P2P systems and unstructured P2P
systems, but avoids the disadvantage of both. In this topic, obviously, you cannot
introduce all routing approaches employed in the current P2P systems, but with
the description of the basic routing methods, you can give a good hint of which
kind of P2P system will be more suitable for a specific application scenario.