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 property 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 academic 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 advantage 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 table, 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.