

To Improve the Searching Efficiency on P2p Network System

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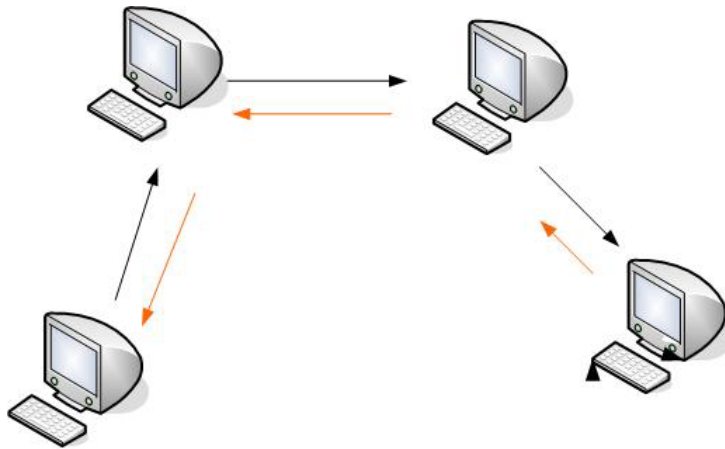
Outline

- P2p searching mechanism.
- The problem of p2p searching.
- To solve such problem.
- The concept of group.
- Selectively searching.
- Discussion.
- Conclusion.

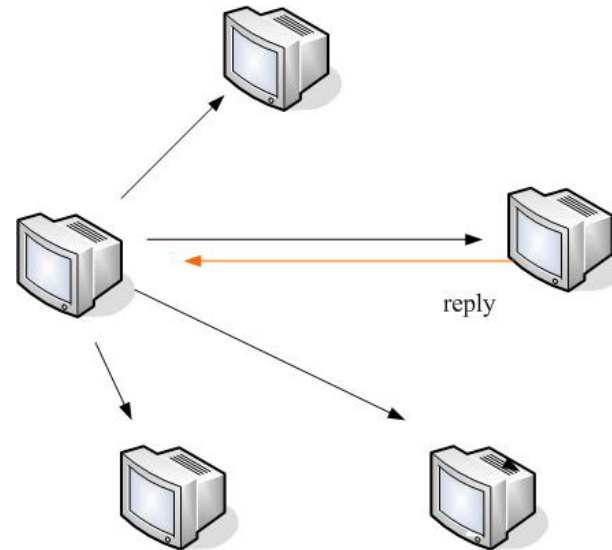
P2p Searching Mechanism

- Poor p2p(Unstructured):

- Flooding

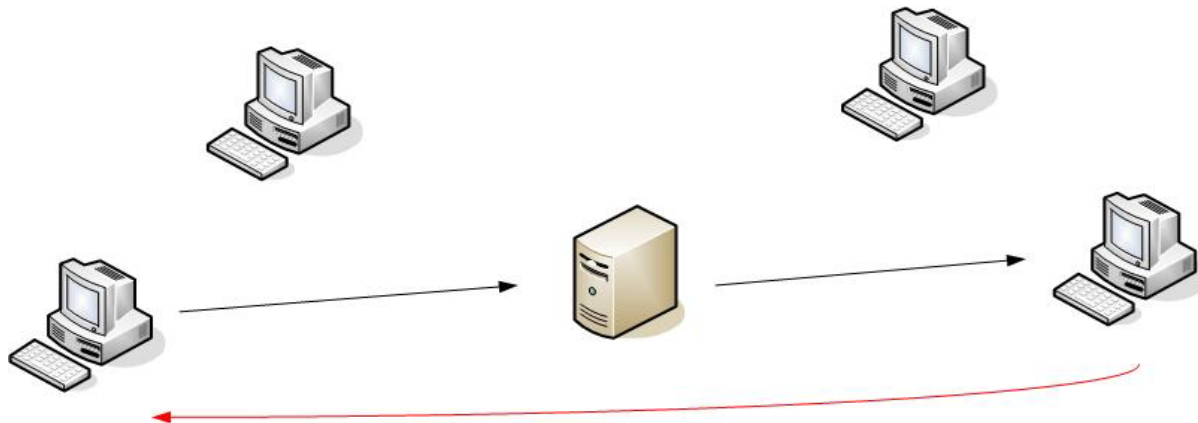


- Broadcast



P2p Searching Mechanism

- Hybrid p2p:
 - Need a central server to receive query message.
 - The central server helps the requesting peers to find supplying peers.



The Problem of P2p Searching

- The number of message may be too large.
- Too many redundant messages will cause the inefficiency of the system.

To Solve Such Problem

- Limit the searching range.
- Reduce the number of redundant message.
- Two kinds of method:
 - Group
 - Selectively searching

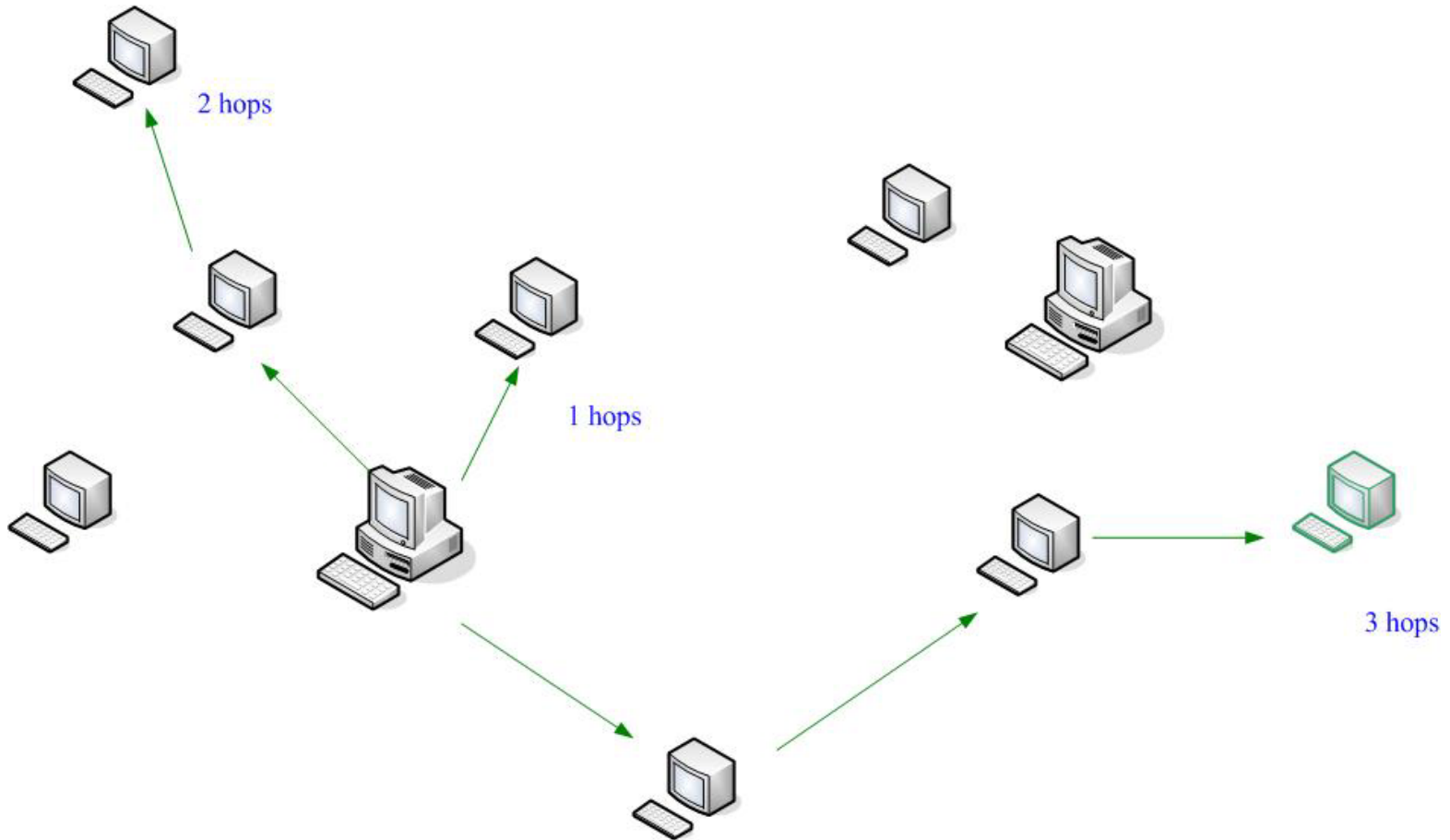
The Concept of Group

- Limit the searching range in a group.
- Assign each group a server (super peer).
- Construct another overlay called “super peer overlay” to perform the communication between different groups.
- How to form peer groups ?
 - Different methods result in different “group characteristic”.

(1) Limit the Number of Hops

- Define an upper bound k which indicates the number of hops.
- In a group, each peer can communicate with others by no more than k hops.
- It is convenient for peers in the same group to communicate.

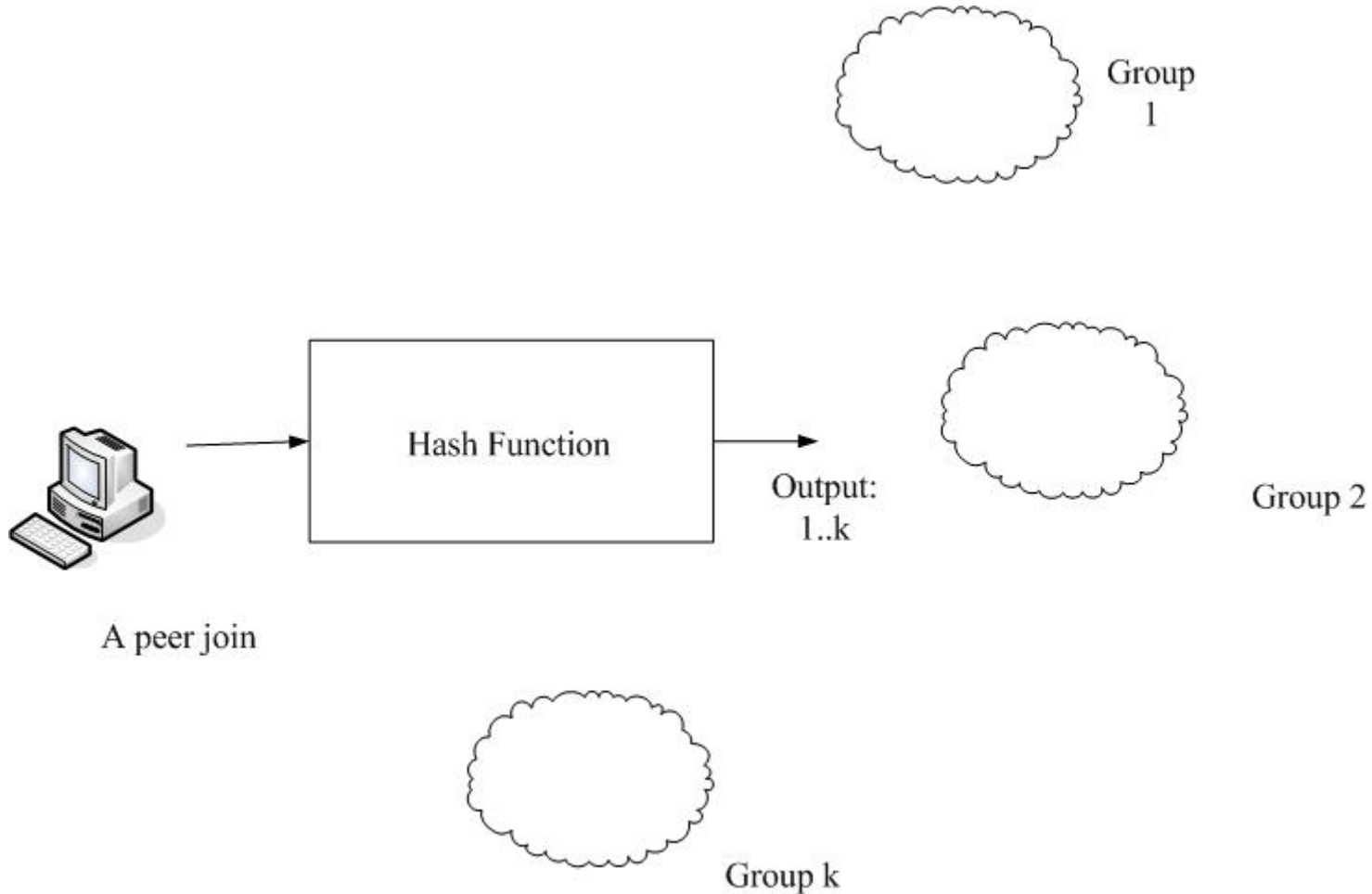
(1) Limit the Number of Hops



(2)Hash Function

- Each peer provide a “key” value.
- Design a hash function and use the key value as its input.
- The output of the function decide which group a peer would join.
- The function maps a peer into a group.

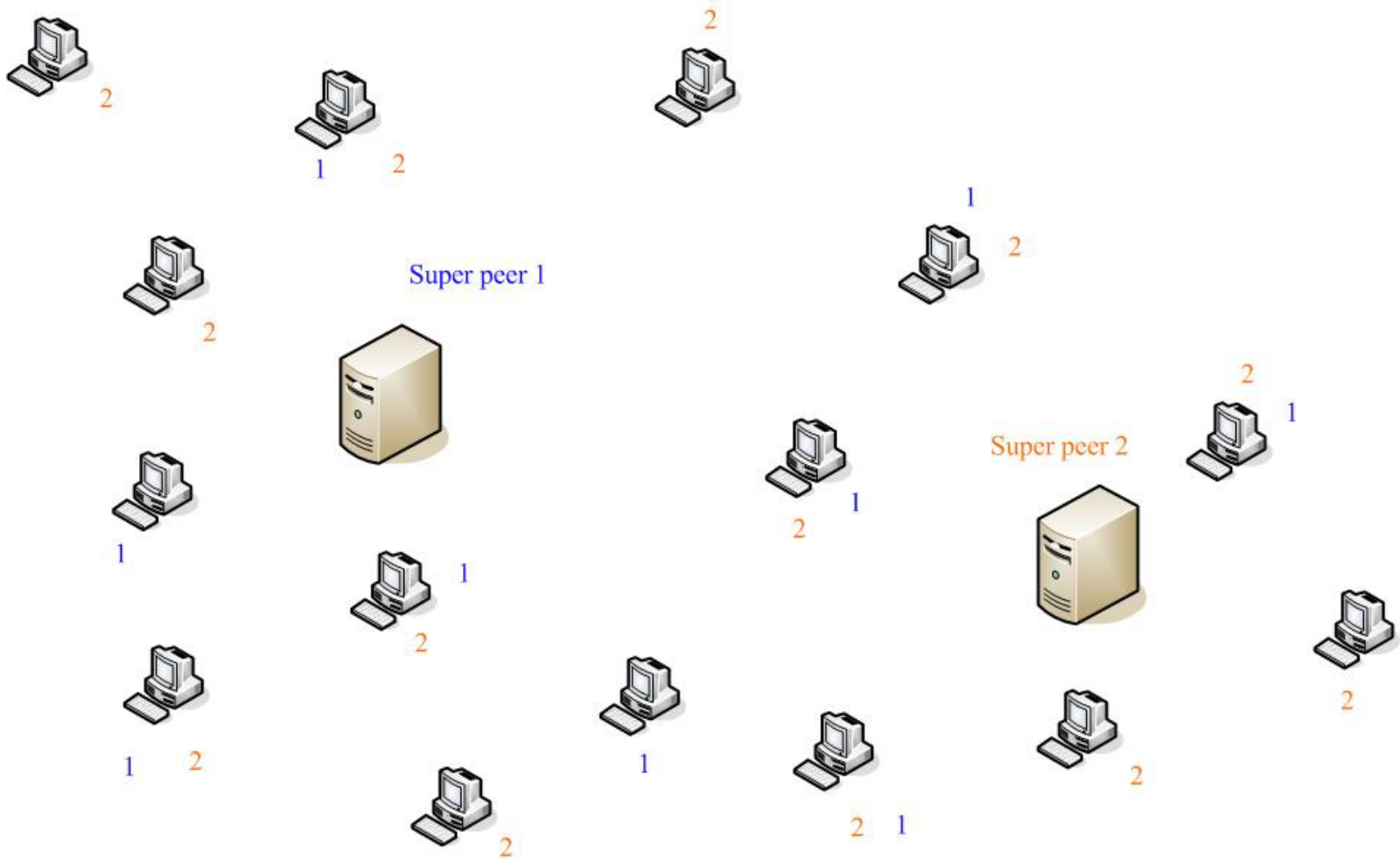
(2) Hash Function



(3) Interest Group

- Peers with the same interest (file type) form a group.
- A peer may belong to multi-group.
- We can do searching in some specific groups depend on the information type we want.
- Each group has its own “characteristic”.

(3) Interest Group



Comparison

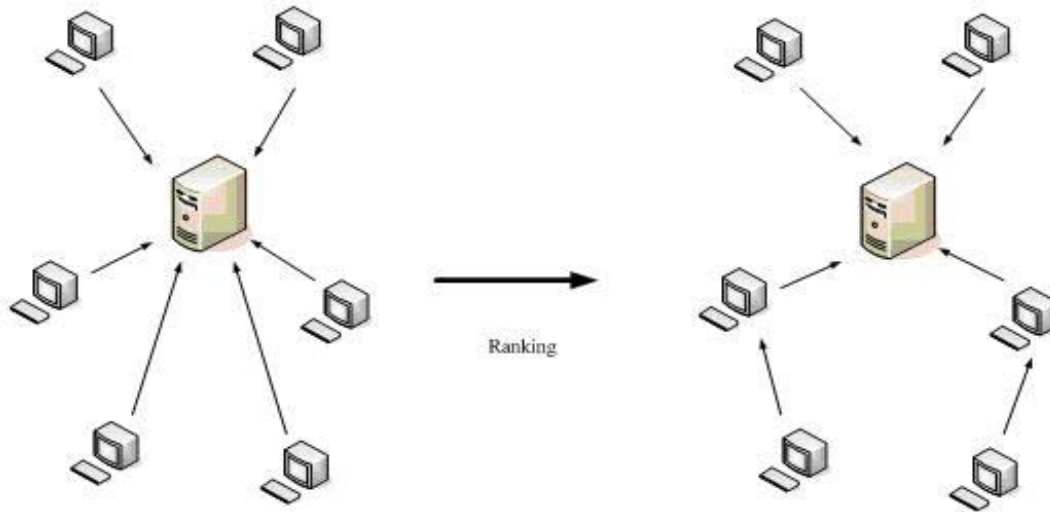
- Limit the number of hops:
Easily connect within a group.
- Hash function:
No special idea but easily compute.
- Interest group:
It is convenient for a peer to search the information of the same type but is a little hard to implement.

Selectively Searching

- (1) Ranking
 - To reduce the connection complexity.
- (2) Reputation
 - To provide peer information that indicates which peer is better than others.

Ranking Mechanism

- Each peer compute the ratio of query hits and query message.
- By the ratio computed above, each peer can change its connection.



Reputation System

- Compute a reputation score for each peer.
- The higher score of a peer means that we can find the data we want in this peer with higher probability.
- The reputation system is dynamical(The reputation score changes rapidly).

Reputation System

- To compute the reputation score:
 - U: Upload credit
Increase the reputation score.
 - D: Download credit
Decrease the reputation score.
 - S: Share credit
Increase the reputation score.

Discussion

- Comparison:
 - Ranking: for some peer
 - Reputation: for all peers
- Both ranking and reputation reduce the connection complexity.

Conclusion

- To improve the searching efficiency:
 - Group:
 - Limit the number of hops
 - Hash function
 - Interest-based
 - Selectively connect:
 - Ranking
 - Reputation system

Reference

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