The Reputation-Based Resource Management on Peer-to-Peer Network
Presented by Shao-Feng Wu
2004/11/04
Outline

• Resource management.
  -Goal: to improve the problem of searching efficiency
  -Using reputation model.
  -Defining reputation score.
  -How this management works?
• Peer selection.
• Incentive mechanism.
• Searching priority.
• Conclusion.
Resource Management

• Reputation Model:
  - Each servent rates the partner according to its experience during the transaction.
  - Two reputation value:
    1. Resource reputation
       - Summarizes the past record of evaluations submitted for the resource.
    2. Servent reputation
       - Servent contribution score (SC) According to the resource a servent provides.
       - Servent evaluation score (SE) According to the evaluation from other servents.
Resource Management

• Example of resource reputation

The evaluation is mainly depend on the latest rating.
Resource Management

• Example of servent reputation
Resource Management

• Implementation
  - For each resource, the server maintains a set of resource ID and resource reputation score.
  - The server also maintains a set of servent ID, servent contribution score and servent evaluation score.
How the Resource Management Model Work?

When a new servant joins the network:
Phase 1
- Sending a file list to the central server.
Phase 2
- Locating target resource/servent.
Phase 3
- Selecting and downloading target resource.
Phase 4
- Voting and updating resource/servent reputation.
Peer Selection

- To select the “better peers” to be supplier.
- Better peers have higher probability to be selected.
- The quality of service of a peer may depend on some characteristics of this peer such as: reputation score, reliability, availability.
Peer Selection

- The idea of peer selection benefits the searching efficiency.
- The query message could be sent more correctly and properly.
- Much redundant message could be avoided.
Incentive Mechanism

• To encourage peers to contribute to the system.
• To promote peer cooperation in the system.
• To avoid the condition of free-riding.
• Like the concept of reputation model.
Example 1

Like the idea of reputation:

Rank-Based:

- Contribution $\rightarrow$ Score $\rightarrow$ Rank $\rightarrow$ Peer selection priority

- The utility is a function of streaming session quality and the contribution cost:

$$U_i(x_i) = Q_i(x_i) - C_i(x_i)$$

where $U$ is utility, $Q$ is quality and $C$ is cost.
Example 2

• Exchange-based:
Comparison

- Rank-Based:
  - adv: more precise computation.
  - disadv : much computation cost.

- Exchange-Based:
  - adv: no complex computation.
  - disadv: is not precise.
Searching Priority

• The concept of “searching priority” achieves the goal of peer selection.
• The idea of searching priority is adopted by many searching mechanism that the searching efficiency could be improved.
• Peers with higher priority will be selected with higher probability.
Conclusion

• The resource management model uses the concept the reputation.
• The concept of reputation helps us to do peer selection.
• Peer selection achieves the goal of improving the searching efficiency of p2p network.
Reference


