Part3 -- P2p

The entire system was built at application-level with the combination with several protocols over point-to-point TCP. The only centric server plays as an index directory that provides the storage and searching of the information of the clients including their names and IP addresses to identify them in the network. The clients would access and retrieve the information they need from the server with their unique identification to establish connections with other clients.

The clients mentioned under the communications with the centric server are also treated as peers when it comes to another aspect. Each peer plays as client’s and/or server’s role as needed at same time while data has been exchanged with other peers.

1. Ascendancies over client/server model

The obvious features that p2p model brought to us, which client/server model does not have, are boosting network traffic efficiency and subsiding the probability of single-point-failure’s occurring and saving the cost on building and maintaining server. Furthermore, the p2p model beats over client/server model on a branch of sides as,

(1). Privacy

For client/server model, data is always saved in servers where the data is easily attacked and hacked even though is under encryption. But data localization in p2p model provides a good way to keep high privacy in business transaction. There is no centralized storage for clients’ data. No one in the system has the global view of the whole system, and a peer is only able to communicate with others who are involved in the same transaction. Therefore, the feature guarantees that the exchanging of valued business information will be circumscribed within the related stakeholders to protect the privacy of business activities.

(2). Scalability

The system has huge potential to scale up to meet future needs, nevertheless it is based on centralized model. The efficiency of responding to clients does not depend on how many clients have been registered in the server. Because the pairs, which include the unique ID, the name and the IP addresses of clients, do not occupy too much space to be saved in the server and they are easy to search with indexing in NoSQL database.

(3). Fault tolerance

Due to the localization of data, single-point-failure of index server in centralized model will not have any effect on business data. If the communication has been established between clients, the system works flawlessly, even a failure happened to index server. Serval backup index servers could fix this failure efficiently by selecting one from them simply as primary server which has the same content as one that is out of service. If the failures come to peers, they would catch up the transaction process immediately by retrieving information from other transaction related peers.

1. Distinction with Pure p2p model

Gnutella was the first pure p2p network which was knowns as with its file sharing. It has high tolerance due to one failure will not have effect on another. However, in Gnutella’s network, each peer keeping their own index may cause flooded queries in the network that consume significant network bandwidth. So compared two models from this aspect, centralized model which used in the system won the game. One peer connects to another one directly with the IP address of connected one which is sent back from index server, then the peer queries data. The process avoids the network overlay that happens during indices being located.

1. Difference with hierarchical model

In hierarchical model, instead of keeping by index server, the indices of nodes are managed by super nodes that connect to it. There is no doubt that the hierarchical model may more extendable than the centralized one. When speaking of complexity, however, the model need more sophisticated algorithm to select super nodes, which is vulnerably. So the hierarchical model that enables fast speed transmission for files is unnecessary for this system where only some small-sized data are exchanged.

1. Advantages over other popular apps in centralized model

The famous application implemented with centralized network model was Napster. Napster took the advantages from the model to share music between users without boundaries. However, it was against law due to spreading the unauthorized copyrights of the songs. In contrast, the system will never hit copyright infringement. The content the peers shared are order information including a list of product, the details about customer, supplier and carrier, and tracking information.

Part4 -- hybrid P2P networks based on dynamic users

Essentially, the system itself relies on a hybrid P2P network which coordinates two different kinds of network models, which are pure P2P and client/server model as discussed. With the flawless combination, the hybrid network inherits the advantages from both sides. The design of centric index server avoids the flooding in p2p network, and the features of P2P enable the possible to scale and lower fault’s happening. The network the system based is also dynamic. It is created by the customer who placed an order, and terminated when the transaction has been completed. Some researcher has developed a strategy building ephemeral social communities to save people from emergency. It establishes connections using p2p and groups people together who link their social network account to the application where disaster happened, then ends when everything is clear. Whistle, as it is called, conveys the important information to us. So the system has been built with similar network, but the network runs dynamically upon the stakeholders in each transaction. The process of each order contains two steps which is showed in the pattern below, building the connection and sustaining, and confirming the order is completed and destroying the ephemeral network.

