Abstract

This paper describes a new peer-to-peer data transfer protocol between a server and a number of clients, called the "Tit-for-Tat" Transfer Protocol (TFTTP), that attempts to achieve the correct incentive structures while fully exploiting inter-nodal bandwidths when downloading huge (typically > 500Mb) data files, and the current research problems associated with the proposed protocol.

The protocol is incentive-compatible and is expected to achieve optimal download bandwidths for a heterogenous set of clients as well as cope effectively with flash crowds.

This protocol is specifically designed to reduce client download time of large files from a specific server on the Internet and also to employ a strategy to reduce the load on the server in the event of a flash crowd.

Flash crowds occur when many Internet hosts all try to simultaneously download a large file from a central server. As the number of connections increases, the data rate each client downloads tends to zero because of the limited bandwidth and processing capabilities of the server.

The main idea behind this protocol lies with the observation that while the server is overloaded in a flash crowd event, the clients have ample amounts of spare resources. Using the spare bandwidth and processing power of the clients to create a dynamic peer-to-peer network is a good way to develop a protocol that greatly reduces the client's download time.

Imagine two computers that are in the same network in Romania trying to simultaneously download a large 500MB file from a remote server located in Singapore. Because of the bandwidth limitations the link between Romania and Singapore has, the download would take around ten minutes. Suppose instead the server gives just a half of the file to the first client and the other half to the second one. Taking advantage of the high bandwidth between them, the two clients rapidly exchange the two halves of the file thus shortening the total download time to a little more than five minutes.

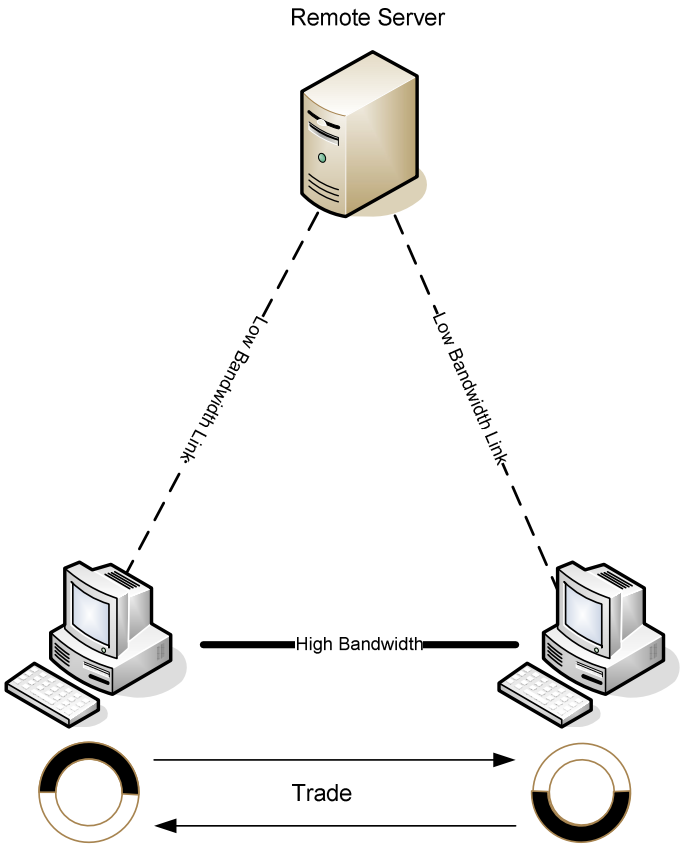

Figure 1 TFTTP basic protocol scheme.