

# Research of P2P Offline Download based on Hybrid P2P Network

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**Abstract**— The Peer-to-peer (P2P) computing has been one of the hottest technologies today, which is popular in distributed file sharing. There are many famous download applications developed such as BitTorrent, Emule, etc. They have been widely studied in terms of network topology, performance and incentive algorithms. Through these kinds of research, many useful functions have been implemented like virtual currency policy which has an incentive effect on free-riders (users who only get resources from others but do not share their own to others in return). In this paper we proposed a new mechanism called P2P Offline download Model. Through providing offline P2P download service, we believe it provides a new way to solve serious problems in real P2P network such as low download speed, huge power cost, etc.

**Keywords**— P2P, Offline Download, Hybrid P2P Network

## I. INTRODUCTION

This Peer-to-peer download software has become one of the main applications in internet. Different from the conventional centralized network, a peer to peer (P2P) network is an overlay network, which is distributed, and tries to accumulate bandwidth of network participants. It is characterized as Distributed Processing resource sharing and parallel transmission, which provides the users with more resources, greater available bandwidth and better service quality.

The basic principle for P2P network is that a node (user) can simultaneously be a client and a server. That is, the user can download files while at the same time uploading its files to other users. P2P Node is not dependent on central node, but on network edge node. It realizes the resource discovery and sharing of self-organization and peer-to-peer cooperation. Therefore, it possesses such advantages like self-organization, expandability, robustness, error-tolerance, load balancing, etc.

Based on network topology, P2P network has been classified into the following three types: (1) Pure P2P network (2) Hybrid P2P network (3) Super node P2P network

(1) Pure P2P network:

In pure P2P there is no central router. Every node is a Peer. It is a total democratization of the peer group nodes. Nodes

of pure P2P exchange resource and service directly with each other without a server.

(2) Hybrid P2P network:

In hybrid P2P network, first peers get metadata from sever. Once the peer connection each other established, they can communicate directly. In Hybrid P2P, nodes are divided into two classes, Ordinary Node and Search Node. The search nodes constitute an area with its neighbouring ordinary nodes. As a result of the ordinary node could search files first in local area. So it could scotch congesting in network quite efficiently and a cert extent to boost the load balancing in the whole network.

(3) Super nodes P2P: Different from pure P2P network, in super node p2p, P2P software will analyse every node automatically, and will select the node with larger bandwidth and high performance works as Super node. Then Super nodes will get together and play the role of server.

For these three kinds of P2P overlay network, there have been many studies of network topology, performance and incentive algorithms. Even through these kinds of research, many useful functions have been implemented like virtual currency policy. Systems such as Karma are famous for using virtual currency account for each user. Through money markets mechanism, it has an incentive effect on free-riders (users who only get resources from others but do not share his own to others in return).

But there still several serious problems exist in real P2P network, which we will talk about in next section. And later we will propose a new mechanism called offline P2P download for improving the problems.

## II. PROBLEMS IN P2P DOWNLOAD NETWORK

In real P2P Download Network, problems such as free-riders and fault reputations have been focused by many researches. Except them, when we take part in real P2P network, there are still much troublesome we have to face.

In this section, we collect troublesome which mostly happens around us.

1 The bandwidth of Internet is narrow. Even using the P2P software such as BitTorrent and Emule to download files, download speed is very slow.

2 Usually at companies and schools, P2P download was shut down so that you cannot get access to P2P network.

3 When you download files through P2P network on your PC, you may not fully enjoy other internet services.

4 Sometimes if your friends do not know how to use P2P download; you could not easily help them.

5 When you download P2P files on your personal pc, you have to make your pc connect to internet all the time. So it will be a huge power waste and of course bad for environment.

In this paper we want to make a new service which can provide offline P2P download. So that problems we talk above could be improved greatly.

### III.P2P OFFLINE DOWNLOAD MODEL

As P2P network faces so many serious problems we talk above, we need a method to alleviate these kinds of problems. By now most popular P2P software like BitTorrent, Emule has not been implemented a useful mechanism to make P2P network more efficiency. So in this section, we will propose a P2P offline download model, which is designed as below.

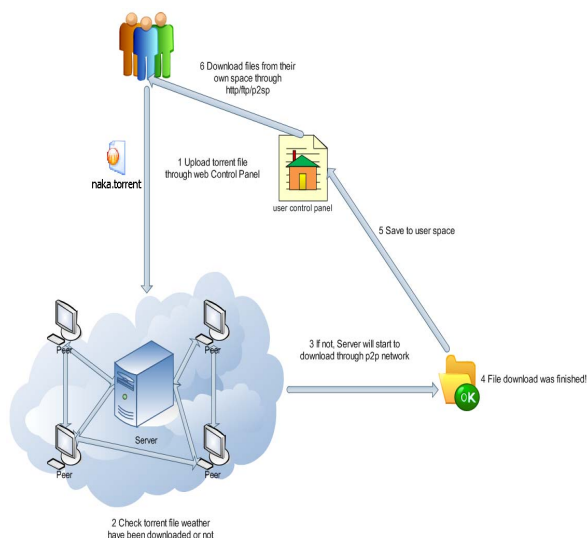


Figure 1. P2P Offline Download Model

- 1 Upload torrent files which you want to download to User Control Panel.
- 2 Check whether torrent files have been downloaded or not.
- 3 If not, P2P File Download Server will start to download automatically.
- 4 File download is finished.
- 5 Downloaded files will be saved to user own storage and email to tell user.
- 6 Download files from their own space through http / ftp.

### IV.DOWNLOAD CONTROL FLOW

In this section we illustrate control flow about how a peer node downloads a file and what messages are exchanged during the file downloading service.

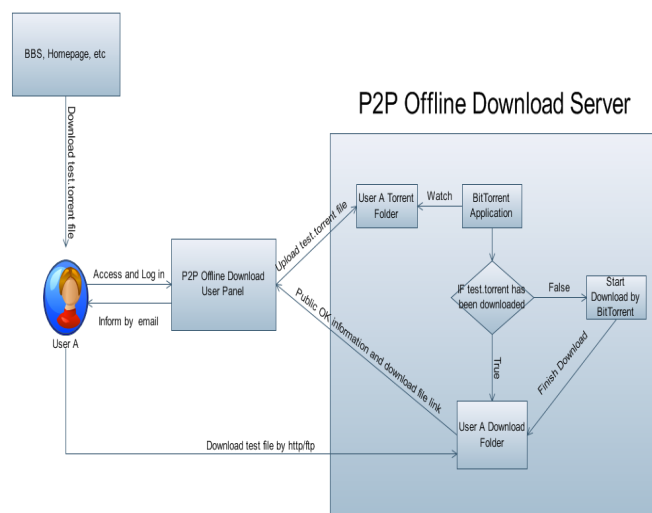


Figure 2. P2P Offline Download Control Flow

At first User A get torrent file from some homepage or bbs. Then User A access and log in P2P Offline Download User Panel. Through it, User A upload torrent file to User Torrent Folder which is created for each user in P2P Offline Download Server. Meanwhile, BitTorrent Application in server side will watch User Torrent Folder. Once torrent file is uploaded, BitTorrent Application will check the torrent weather it has been downloaded already. If it is downloaded before, BitTorrent Application will start to download the file through p2p network. When p2p file download is finished, system will public OK information in User Panel and send an email to inform User A. At last User A could easily get the file from P2P Offline Download Server by ftp/http protocol.

### V. ADVANTAGE OF PROPOSED MODEL

- In this section, we summarize merits which can get from our proposed P2P Offline Download Model. They are:
- 1 Offline download servers will download for you at a high speed.
  - 2 You can download files using http / ftp protocol after offline download was completed.
  - 3 You can turn off your PC even that offline download server will be still downloading your files.
  - 4 You could enjoy other internet services even when you download files by p2p network.
  - 5 You can find and upload torrent files for your friends. After download finished, your friends can get files directly from offline download server.

### VI.EXPERIMENTAL IMPLEMENT

Based on our proposed model, we made an experimental implement of P2P offline download model. The implement environment is listed in the table below.

Table 1. Implement Enviroment

|                  |                     |
|------------------|---------------------|
| Operating System | Windows Server 2003 |
| Language         | Chinese             |

|                                |                                                                                |
|--------------------------------|--------------------------------------------------------------------------------|
| <b>Processor:</b>              | Intel Core(TM)2 Duo CPU E6550<br>2.33GHz                                       |
| <b>Memory</b>                  | 2038MB RAM                                                                     |
| <b>System<br/>Manufacturer</b> | Dell Inc Inspiron 530s                                                         |
| <b>Software</b>                | Apache/2.2.8(Win32)<br>PHP/5.2.6<br>Mysql/5.0.51a<br>BNBT/8.1 Beta 3<br>Embtor |

download tool which can control downloads on servers manually.

### VII. ANALYZE OF PROPOSED MODEL

In this section, we analyse P2P offline download model. Since our proposed model is based on hybrid P2P network, it needs P2P download servers to provide service. Also in our proposed model, users need their own storage to store files downloaded by server. In this scenario, the most important thing is cost, which means that charging for using download server and users' own storage will become a key point of P2P offline download Model.

About the cost, nowadays price of server and online storage is getting cheaper. In some years, there is a good chance that 1G online space will only cost 0.1 dollar. At that time, P2P offline download service will become more and more popular.

### VIII. SUMMARY AND CONCLUSIONS

One of the biggest challenges in designing P2P systems is to give users much more convenience to get the resource what they want. It is crucial that the download speed is fast enough and getting P2P files even in an environment where the p2p ports are shut down.

This paper presents a flexible and powers saving P2P offline download mechanism for P2P systems.

By providing control panel to users for uploading torrent files and using P2P download servers, our proposed model can offer users some new convenient services such as offline download and no need to keep your PC open during the downloading process all the time. Further, the saved bandwidth for users could be used for other internet services. Moreover, our proposed model builds a new and efficiency mechanism which is still not implemented on other famous P2P systems like BitTorrent or Emule.

Since the consuming of P2P download server and online storage will make cost happen. With the technology developing quickly, thus the cost will not be considered to be a big negative factor in our proposed model in the future we believe.

About future works, next step we would like to improve the cost factor of using P2P offline download service. By now we think we could add virtual money policy to give users incentive to take part in P2P offline download service. Since economic behaviours will be added next step, we would like to make simulations and evaluate our proposed model. Also considering the huge market of mobile network, for the further steps we also want to discuss how to provide P2P offline download services for mobile phone users. At last there is still a big problem which is the management of the downloading server, such as replacement strategy, backup policy. So we will consider the impact of downloading server design in our future design.

### IX.ACKNOWLEDGMENT

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Figure 3. P2P Offline Download User Panel

As shown in Fig.2, we first make P2P Offline Download Panel for users. Through the panel, users can log in and upload torrent files which they want to download. After uploading, servers will detect it and start to download files automatically. After finishing downloading, servers will put files on special space for each user. Then users can get files at any time they want by using http / ftp download.

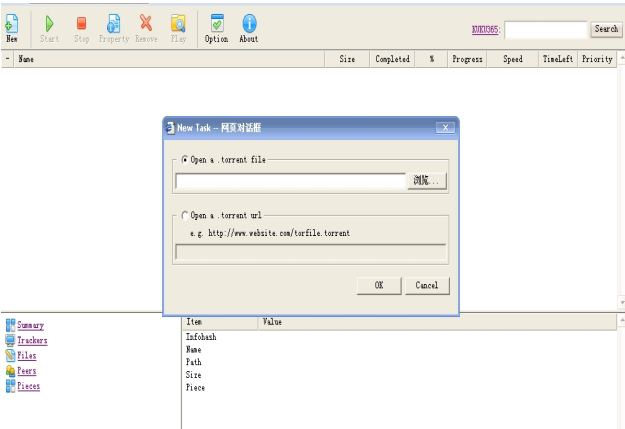


Figure 4. Web P2P Download Control Tool

As shown in Fig.3, consider that users could set up download parameters themselves; we also provide a web P2P

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