THE IMPACT OF FILE SHARING BASED ON THE PEER-TO-PEER TECHNOLOGY

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ABSTRACT

The development of ICT had enabled file sharing to be implemented easily. The file sharing technology is being developed due to the vast growth of information. However, there are some drawbacks such as data collision, file copying, security and others. This paper focuses precisely on the Peer-To-Peer File Sharing Technology that includes Napster Architecture and GNUTELLA Architecture. This also, to show how Napster Architecture violates the copyright law and how GNUTELLA Architecture manages to outbeat the law. However, there are questions that we need to think about such as how secure you are in the Peer-To-Peer File Sharing Technology?

Keywords: Peer-to-Peer File Sharing

INTRODUCTION

Computer users that are in the file-sharing scene tend to adapt themselves in what is the most popular and common trend these days. As for example, when people talk about music cultures of the world, users will always tend to refer to MTV music and when users think about free Internet music, they will refer to KazaA as their gateway.
What is file-sharing? In a layman language, file-sharing is a program that's been implemented in order to enable many users to have access to the same data file at one time (maybe limited to viewing purposes only) or accessing data file on a first comes, first served basis.

PEER-TO-PEER TECHNOLOGY

In these challenging world of networking, system of file sharing had gone way beyond the limit. It is just like nothing is impossible of getting stuff like free music, files, programming tools, programming codes, video clips and lots more other knowledgeable information.

So what is meant by Peer-To-Peer technology? As stated in the article by Sandvine," *Peer-To-Peer Technology refers to any relationship in which multiple, autonomous devices interact as equals. A Peer-To-Peer network is a type of network in which workstation may act as clients (request for data) and server (offering data) and/or servent (both a client and a server). Peer-To-Peer technology enables the sharing of computer resources and services including information, files, processing cycle and storage by direct exchange between system* ".

THE EVOLUTION OF PEER-2-PEER

With the existence of Napster, KazaA, GNUTELLA, Morpheus and many others, the increase of data transfer has rose drastically across the Service Provider Network. A client would connects to the network through a computer that stays online for 24 hours a day for 7 days a week whose purpose is to provide address for the client to connect to. This computer is known as the "*hostcache*". How is this computer connected? It's connected through the Internet Protocol address which is being supplied by the "*hostcache*", then you can start searching for the file needed. When you start to search then will the process of file sharing started. The client would send out query packets with the required name of file that you are interested. A query has a **TTL** which means that it has the time-to-live, a number that determines how many times the query is being passed on. Hence the passing process won't go on and on without stopping.

CENTRALIZED FILE SHARING NETWORK

Have you heard about Napster a few years back? Napster was considered existed in the first generation of the Peer-To-Peer technology. During Napster blooming days, about 60 million Internet surfer would visit this website in a period of one month. However due to its copyright violation, the court of law had ordered Napster to close down their services. By the way, why is Napster so important at that time to the Internet surfer? Well, Napster gives away free music to the Internet surfer, these is because Napster have a powerful and enormous gigantic database. Almost all selections of songs are available on the Napster, so you can hear almost any music that you want from the Internet without paying a single cent. What make Napster closed down? Where was weakness? And the answer is the architecture of how Napster was set up. The architecture of the design of Napster was the weakness. The court decided that Napster was circulating copyright infringement. Below is a brief set up of Napster architecture.

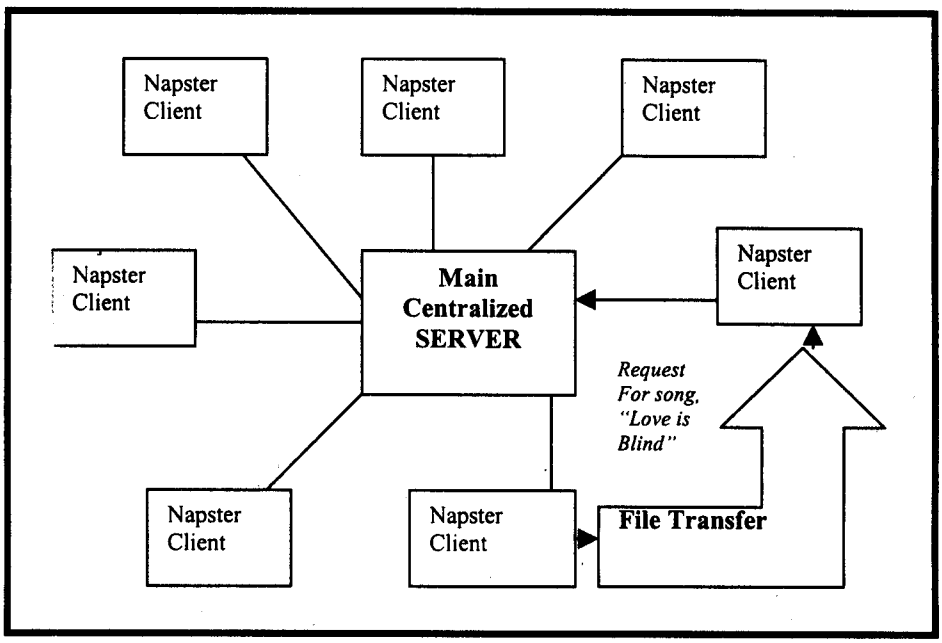

DIAGRAM 1 : Illustration of Napster Design

In the Napster design, the main centralized server only works to maintain the directories of all the shared files stored. Each time a user logged out or on, the directories would be updated. Please note that there are no actual files stored in the main centralized server.

Ordinarily, a web server is used to hold up information and a web browser would be used by all web users to connect to the server and then view the information. However, Napster used the concept of file sharing where individual users can store files that they want on their hard disk and then shared it with the others. The user needs to run a Napster software in order to make the file sharing possible. So we can say that each computer acts as a small scale server.

When Napster was closed down, 100 million users across the globe felt the lost and became restless due to disable to share information especially the free music. But is was only a matter of time before another system came along to fill the vacant gap that Napster had left.

THE DECENTRALIZED FILE SHARING NETWORK

After the centralized concept of Napster did not make it, there emerged a new file sharing technology that is known as GNUTELLA. GNUTELLA is just like Napster but the architecture is designed in such as way that the court won't be able to order it to close down .The similarities between GNUTELLA and Napster is that both uses software to run. Their users need the software in order to get connected in the respective network. GNUTELLA also have their users place files that they want to share on their hard disk and make sure the files are available for everyone to download in the peer-2-peer style. The only great differences between these two

file sharing technologies, in GNUTELLA there is no main centralized database that knows all the available files in the GNUTELLA networks .The computers in the GNUTELLA network would only communicate among themselves about the available files through the distributed query approach .Due to these respective features, GNUTELLA is save from the copyright violation and the court cannot shut down their services.

In the GNUTELLA design architecture, each client act as servent and it operates as both client and server to the network. Illustrated below is the GNUTELLA design architecture.

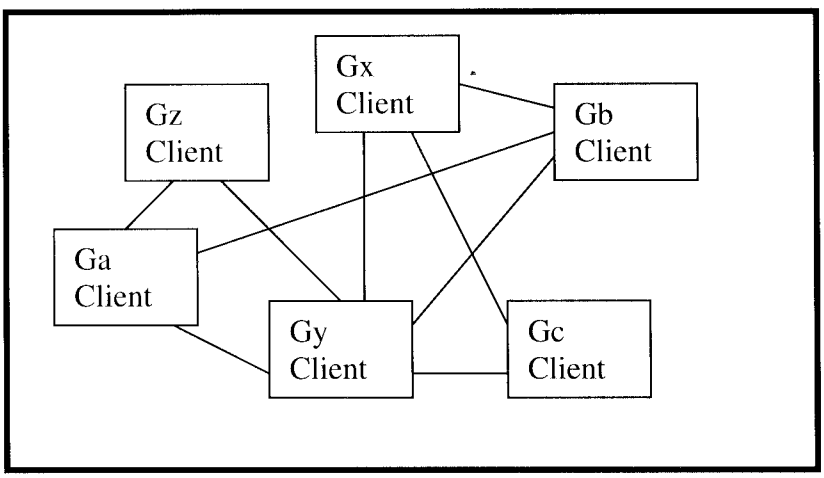

DIAGRAM 2 : Illustration of GNUTELLA design

Let's discuss about the diagram illustrated above, how do they shared files in the above design? First of all, the client have to be in the network, that is the GNUTELLA network, so we call it the Client Gx. Why I called it Client Gx ? Because it's client Gx that is equipped with GNUTELLA program. These Client Gx would initiate the query by sending request to another computer that is in the GNUTELLA network, say we call this computer, Client Gy. Then this Client Gy will send the query to the others that is connected in the network. As you can see, it will get connected like a linked from one to another as though the network is potentially continuous. But please don't forget that the linking process is being taken care off by the "Time-To-Live" constraint. The advantage of the GNUTELLA approach is that it works all the time. As long as you have one machine running GNUTELLA software, you would be able to query the GNUTELLA network. No court order can shut the network down, because there is no one computer that controls everything. However there are disadvantages such as

- You might not get the file that you wanted from all the available computers in the network.
- Queries might take sometime in order to get the response completed.
- You need to remember that your computer is part of the network, hence your machine is liable to answer request and then passing the query to another computer an also in the process of routing back the responses as well. So you need to sacrifies your bandwidth in order to handle the request from the other users. The latest Peer-To-Peer technology adapts the decentralized structure due to its stability.

CONCLUSION

There are some drawbacks of the file-sharing technology, for the example data collision can happen. Sometimes duplication of files may leads to ultimately to confusion among the member in the workgroup. Security needs to be updated from time to time. This is to prevent invaluable data record being lost. Besides the drawback, the main advantage of file-sharing is sharing of resources in a lot of form, from information to tools.

However there are some questions that we need to think about. That is how much financial demand had file-sharing actually causes? Can we regard file –sharing as stealing? Or can we regard it as free advertisement or just like a radio station, free airtime? May be file sharing in the organization won't be a big problem because there is an administrator with yearly budget given by the management. What we are most concerned about is file-sharing via the internet, who will bear the operating cost when everything is free of charged? So as a user, you won't be surprise that a small fee will be charged for the purpose of operating cost in the near future.

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