

# Webcasting and P2P Networks: A Threat for Intellectual Property Protection

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**Abstract**—Webcasting is the real time transmission of audio and audiovisual works to the public in a digital format over internet. It is similar to broadcasting but uses special technology to reduce the size of the digital files being sent. Webcasts are widely available to anyone with a computer connected to internet. With the coming of wireless and broadband technologies, webcasting opens new opportunities for authors and performers to expose and market their works to new audiences, and for the public to enrich their understanding and appreciation of cultures from around the world. Peer-to-Peer (P2P) technology provides users to use internet to exchange files with each other directly or through a mediating server. This is a threat to copyright industry. This paper aims to provide an overview of webcasting, explains how it differs from broadcasting, Peer-to-Peer networks and the intellectual property rights issues in webcasting and Peer-to-Peer networks.

**Index Terms**—webcasting, broadcasting, streaming, simulcasting, peer-to-peer, copyright

## I. INTRODUCTION

Webcasting is seen as a new model of content delivery on the internet providing automated and, possibly personalized delivery of services. Webcasting is the Internet broadcasting of streaming audio possibly accompanied by streaming video so that it can be viewed via a Web browser on a personal computer [2]. In case of webcasting of audio, video and animation the user receives the content when it is transmitted but without retaining a copy of it. Webcasting works on the basis of “Push Technology” [1] which means content is delivered to the user upon request. The push technology is useful in many different types of applications. The push technology has been used for a number of years in the financial world, in live news feeds and cable television. One of the more common uses today is the automatic downloading of software upgrades and fixes and the delivery of news information to workstations. Push is useful to the end user because it prequalifies appropriate information, thus cutting down on research time. It is also vital to the companies or services that use push to sell their products and services. The push technology is also capable of matching prequalified advertising banners to match the specific demographic. This means higher advertising rates and greater profit potential. Companies are at great advantage for making use of the push technology. They no longer have to rely on someone to search a site for out-dated material. However,

information must be relevant to the business strategy, otherwise it wastes company resources. The push technology also applies to entertainment and leisure, not just business news and stock updates.

P2P network is a type of network in which each workstation has equivalent capabilities and responsibilities [10]. This differs from client/server architectures, in which some computers are dedicated to serving the others. A P2P network does not have the notion of clients or servers but only equal peer nodes that simultaneously function as both “clients” and “servers” to the other nodes on the network. The P2P connection means that it’s a direct link, the file is being directly transferred from one computer to another, it is not going through any mediating server. Napster, Gnutella and Kazaa are popular examples of this kind of software [9]. Recently these networks have led to massive reproduction and distribution of copyrighted works. Armed with digital and communication technologies, ordinary people have the competence to set up huge distribution networks of digital products in which everything is available for free and the producer gets nothing.

## II. CONTENT DISTRIBUTION ON THE INTERNET

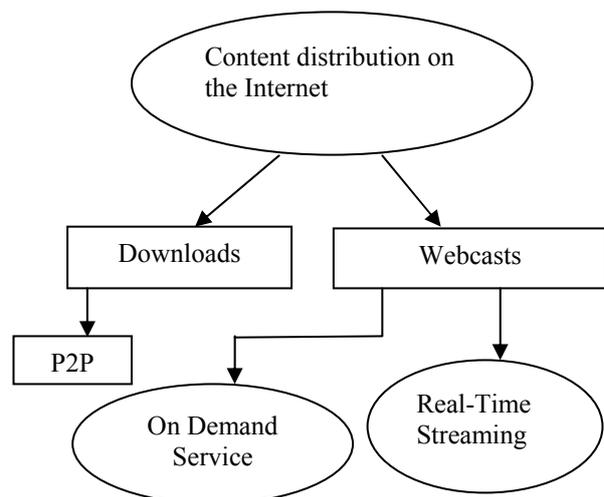


Figure 1. Different ways of Content distribution on Internet

From a technical perspective, there are two principal methods for users to access sound and images or a combination of both over the Internet. The first method is downloads, whereby a file on a server is accessed by a remote user, transmitted over Internet in the form of packets to the user’s machine and saved there locally [3].

The second is webcasts or streaming which has been defined as an Internet data transfer technique that allows

users to see and hear audio and video files without lengthy download times. The host or source 'streams' small packets of information over the Internet to the user, who can access the content as it is received. The stream may be a real time transmission or it may be an archived file. In streaming, the files are not saved locally on the users machine. Webcasting could be further divided into on-demand service and real time streaming. On-demand service refers to the webcasting which can be activated by an individual used at his place and at a time individually chosen by him, where as in case of real-time streaming, content is streamed at a chosen time by the webcaster. The content originates from one or more servers that make it accessible via the internet. Each recipient requests the program from the initial server and is issued a separate stream from the source to his or her address.

On-demand streaming applications can be broadly classified into two types : *near* and *pure* on-demand streaming. Near on-demand applications use techniques such as batching where the user has limited choices in making a request and controlling the stream. Pure on-demand streaming applications, though, have higher bandwidth requirements, allowing clients not only to request the video to be streamed but also to have complete control over the stream [4].

Webcasting is a point-to-point technical process. Even though the same program is transmitted to multiple recipients, it is transmitted via a point-to-point bi-directional communication, instigated by the user. In other words, there is an individual connection between each user and the source of the streamed content( host) and such point to point streaming to multiple individual users takes place in parallel [5].

Broadcasts over the Internet may appear in conjunction with on-screen text and graphics. The audio or audiovisual broadcast data comprise streams that generally are separable from the data that appear as text and graphics on-screen. When viewed together, the user is provided with a rich multimedia experience which is unavailable through traditional broadcast media. These text and graphics may provide additional information concerning the broadcast material, and may incorporate hypertext links from which the listener or viewer can access additional information concerning the events or works being broadcast, or can be linked to e-commerce web sites where the listener or viewer can learn about and purchase of goods and services related to the webcast.

A number of internet broadcasters retransmit the signals of radio stations. Radio stations also retransmit their own signals via webcasting. This retransmission is referred to as simulcasting [6] which means the process of disseminating the same broadcast over two different transmission systems. For example the sound of a TV program can also be played over a radio station. Webcasting opens new opportunities for authors and performers to expose and market their works to new audiences and for the public to enrich their understanding and appreciation of cultures from around the world. For example, an internet channel from India, China, USA or France will attract listeners/viewers from around the world primarily because it provides a window to local

information, news, customs and arts. Thus webcasting is a source for information, culture and commerce of all nations and cultures in a way that transcends the normal physical limitations of terrestrial communications, or the channel bandwidth restrictions of satellite broadcasting. It also unleashes new opportunities for artists and performers to market their works on a global basis.

### III. COMPARISON BETWEEN BROADCASTING AND WEBCASTING

In the case of broadcasting, users can simply access the broadcast by switching on the receiver as the signal transmitted by the broadcasting station is direct and present, whereas in webcasting, users must access a server and incite its facilities to transmit back the information. Unless specific technological restrictions are applied, webcasts can be accessed from almost any point on earth. The broadcasts will be via satellite, cable or over the air is regulated by agencies or government and hence there is a limitation in their reach in terms of geographical coverage. On the internet, there are no restrictions on the number of programs offered.

Webcasting activities can be initiated with modest investments. Streaming services can be adapted to the consumers' preferences. In webcasting, transmission is always interactive at the machine level. The transmitting server is in active contact with the receiving machine, verifying the success of the transmission by exchanging the status reports. This is not the case with broadcasting, where the main transmission is only one way.

### IV. INTELLECTUAL PROPERTY RIGHTS

Intellectual Property has taken a prominent place on the web [8]. Nowadays, content providers need to know which practices on the web can result in potential legal problems. Intellectual Property Rights can be classified broadly into 2 categories:

a) Copyright- which includes literary and artistic works such as novels, poems, plays, films, musical works, drawings, paintings, photographs etc.

b) Industrial property which includes inventions (patents), trademarks, industrial designs etc.

By virtue of section 14 and 51 of the Indian Copyright Act, reproducing any copyrighted work, issuing copies of the work to the public or communicating the work to the public could amount to copyright violation [8].

### V. BROADCASTING PIRACY ON THE INTERNET

Enormous marketing revenues are generated because of the massive appeal of television programs. Huge investments and costs are involved in broadcasting. Due to the rise of new recording and transmission technology, broadcasting piracy has become a main problem.

The pirate could steal the signal and bundle it with its own advertising and transmit the same to the public via the Internet thus competing with the original broadcaster. In a digital environment, piracy is a severe threat since a digital

signal once received can be perfectly cloned and reproduced. Pirates are increasingly able to obtain perfect copies of broadcast programs from which multiple copies and internet downloadable or streamable copies can be made and redistributed. Webcasting is vulnerable to piracy because of the ease with which contents can be accessed and copied. Large segments of the public have access to broadcasting services and at the same time copying devices have become cheap and commonplace.

Webcasting organizations make use of encryption systems so that only the authorized viewers could access the programming content. But piracy could affect the market for encrypted transmission. The pre-broadcast program carrying signal also faces the issue of signal theft. The pre-broadcast program carrying signal is the electronic signal which is sent by the communications link from the site of an event like sports, news or cultural to broadcasting organizations. These signals are not intended for reception by the public, but for use by the broadcasting organizations in their broadcasts. Similarly a broadcasting network also send such signals to its affiliated broadcast stations. Pirates can intercept the signals with their content either at the stage of the pre broadcast transmission or at the stage of the actual broadcast. Since pre-broadcast signals are often digital, pirates are able to obtain perfect digital clones of the program carrying signal. The practice of retransmission of terrestrial radio stations over the air broadcasts via the Internet has also raised copyright concerns.

The minimum rights granted to the broadcasting organizations under section 37 of the Indian Copyright Act, 1957 and Article 13 of Rome Convention, 1961 are rebroadcasting of their broadcasts, fixation of their broadcasts, the reproduction of fixations of their broadcasts and the communication to the public of television broadcasts if such communication is made in places accessible to the public against payment of an entrance fee [7,8]. The object of the protection under section 37 of the Indian Copyright Act, 1957 and article 13 of Rome convention, 1961 is not defined. But according to section 2(dd) of the Indian Copyright Act, 1957, [8] the signals themselves are protected and not to the content of what they transmit. The content part is independently protected as such. So, protection is granted to broadcasting organizations for their signals independently of the copyright and related rights protection of the content.

## VI. VARIOUS P2P NETWORKS AND THEIR LEGAL IMPLICATIONS

### A. Napster

Napster was created by Shawn Fanning in 1999 and it quickly became popular around the world and pioneered the concept of P2P file sharing. With Napster, individual people stored files that they wanted to share typically mp3 music files on their hard disks and shared them directly with other people. In order to download a free music file first of all one had to become a member of Napster service by downloading the Napster software on one's computer. After implementing the Napster software the computer became a small server able to make files available to other napster users [11].

But for the music industry, Napster was a big automated way to illegal copy copyrighted material. The music industry was against Napster because people could get music for free instead of paying for a CD and any music downloaded was considered a loss of business opportunity. When the industry sued Napster under a claim of copyright infringement, the Napster's defence was that it contained no copyrighted music files on its servers. It just had a list of what is available on Napsters user computers and if at all anyone is liable for copyright infringement, it is the person who downloads the copyrighted product or the person who makes it available and not Napster itself. But the court had sufficient reasons to injunct Napster for copyright infringement [9]. Napster was related to music files and that too specifically mp3 files. But the other P2P softwares like Gnutella and Kazaa allow any type of files to be transmitted and downloaded.

### B. Gnutella

Gnutella is a variation of Napster in which there is no central server to store the names and locations of all available files. One has to install a version of Gnutella on one's computer and type in the name of the song or film. The machine knows of at least one other Gnutella machine somewhere on the network because it has been told the location of the machine by typing in the IP address, or because the software has an IP address for a gnutella host preprogrammed in. The machine sends the file name typed into the Gnutella machines it knows about. These machines search to see if the requested file is on the local hard disk. If so, they send back the file name and machine IP address to the requester. At the same time all of these machines send out the same request to the machines they are connected to and the process repeats. After getting all of the search results the machine directly contacts the computer that has the desired file [9]. It is an extremely simple way of distributing a query to thousands of machines very quickly.

### C. Kazaa

Kazaa is the latest version in the P2P technology. It is built on a technology called the fast-track technology. This is different from Gnutella in the manner that this software actually converts certain good quality computers in a particular network into super nodes which perform the listing function. The P2P searches occur through users in these super nodes. A super node contains a list of some of the files available and where they are located [9]. The Kazaa software first searches the nearest super node to a user and then refers his search to other super nodes and so on.

Millions of people around the world have downloaded various P2P software and are increasingly using them to exchange music, movie and software files which leads to copyright infringement. For audiovisual industry, Napster was a loud wake up call. Section 51(b) (ii) of the Indian Copyright Act says *anyone who distributes either for the purpose of trade or to such an extent as to affect prejudicially the owner of the copyright, he shall be deemed to have infringed the copyright in a work* [8]. But in the case of P2P networks, there is no one person managing the affairs. The entire thing is managed by a software and that is already out and lakhs of people have made copies of the same.

## VII. CONCLUSION

To protect webcasting, the definition of broadcasting should be updated in two ways. First, the definition should encompass ancillary data that may be included in the transmission. Internet transmitting organizations may send related and ancillary text, graphics and images along with the audio or audiovisual works. Such data may include information concerning the works being performed, information concerning the performers, links to websites where the viewer can purchase the audiovisual works being broadcast. Article 14 of the Rome Convention states that the term of protection shall last at least until the end of a period of twenty five years computed from the end of the year in which the broadcast took place. Section 37 of the Copyright Act, 1957 on the other hand states the term to be twenty five years. So the term of protection for webcasts should be coextensive with the term of protection for other broadcasts.

The legal frameworks applicable to broadcasting like procedures for the allocation of frequencies, rules relating to the public mandate, local cultural content and rules for the protection of young people is normally specific and well defined. Because of technology, the same activities can now be undertaken and transmitted over the internet without any rules or regulations. It is just a matter of time when national governments should realise the importance of regulating webcasting otherwise the entire regulations for the broadcasting sector will be rendered redundant.

In the case of P2P networks, the loss of control over their own digital products has sent the digital product industry into shock and panic. In recent times the figures of piracy are massive and unbelievable. This trend if continues, has the potential of disrupting the traditional balance in the copyright regime and also alter the business models of our society, If taken to extreme, P2P networks could land us in a situation where there are no working artists or programmers. It is upto the law makers to ensure that the laws of copyright adapt to the new technological environment in a way that feeds and encourages creative activity rather than in a way that inhibits it.

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