Lab - Researching Peer-to-Peer File Sharing (Instructor Version)

Instructor Note: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Objectives

Part 1: Identify P2P Networks, File Sharing Protocols, and Applications

Part 2: Research P2P File Sharing Issues

Part 3: Research P2P Copyright Litigations

Background / Scenario

Peer-to-peer (P2P) computing is a powerful technology that has many uses. P2P networks can be used to share and exchange music, movies, software, and other electronic materials.

The use of P2P networks to upload, download, or share copyrighted material, such as movies, music, and software, can violate the rights of copyright owners. In the P2P file-sharing context, infringement may occur, for example, when one person purchases an authorized copy and then uploads it to a P2P network to share with others. Both the individual who makes the file available and those making copies may be found to have infringed the rights of the copyright owners and may be violating copyright law.

Another problem with P2P file sharing is that very little protection is in place to ensure that the files exchanged in these networks are not malicious. P2P networks are an ideal medium for spreading malware (computer viruses, worms, Trojan horses, spyware, adware, and other malicious programs). In 2010, Cisco reported increases in P2P activity, coupled with recent P2P malware developments, suggesting that P2P file shares are becoming increasingly favored by users and malware attackers alike.

In this lab, you will research available P2P file sharing software and identify some issues that can arise from the use of this technology.

Required Resources

Device with Internet access

Part 1: Identify P2P Networks, File Sharing Protocols, and Applications

In Part 1, you will research P2P networks and identify some popular P2P protocols and applications.

Step 1: Define P2P networking.

a. What is a P2P network?

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A P2P network allows each computer in the network to act as a client or server for the other computers in the network, allowing shared access to various resources without the need for a central server.

b. What are some advantages that P2P provides over client-server architecture?

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In P2P networks, clients provide resources, which may include bandwidth, storage space, and computing power. This property is one of the major advantages of using P2P networks because it makes the setup and running costs very small for the original content distributor. As nodes arrive and demand on the system increases, the total capacity of the system also increases, and the likelihood of failure decreases. If one peer on the network fails to function properly, the whole network is not compromised or damaged. In contrast, with a typical client–server architecture, clients share only their demands with the system, but not their resources. In this case, as more clients join the system, fewer resources are available to serve each client, and if the central server fails, the entire network is taken down. The decentralized nature of P2P networks increases robustness because it removes the single point of failure that can be inherent in a client-server based system.

c. What are some disadvantages of P2P networks?

A P2P network is decentralized, making it difficult to administer. Security is difficult to implement and maintain, allowing for the possibility of copyrighted material and malware to be transmitted over a P2P network.

Step 2: Identify P2P file sharing protocols and applications.

a. Identify some P2P file sharing protocols used today.

Answers will vary, but can include: Ares, BitTorrent, Direct Connect, FastTrack, eDonkey, Gnutella, MANOLITO/MP2PN, OpenNap, 100BAo, Aimster, Applejuice, Freenet, GnucleusLAN GoBoogy, KuGoo, OpenFT, MUTE, Soribada, Soulseek, Xunlei.

b. What are some popular P2P file sharing applications available today?

Answers will vary, but can include: ABC [Yet Another Bit Torrent Client], Ares Galaxy, Azureus, BCDC++, BearShare, BitComet, BitSpirit, BitTornado, BitTorrent.Net, DC++, eMule, G3 Torrent, Gnotella, Gnucleus, Grokster, GTK-gnutella, iMesh, iMesh, Kazaa, LimeWire, Mactella, mIMAC, MLdonkey, Morpheus, Napigator, NeoModus Direct onect, Overnet, QTorrent, Shareaza, uTorrent, Warez P2P,WinMX.

c. What P2P file sharing protocol is attributed to producing the most P2P traffic on the Internet today?

Answers may vary, but most of the peer-to-peer traffic is likely from BitTorrent, after the demise of LimeWire. As of January 2012, BitTorrent is utilized by 150 million active users (according to BitTorrent, Inc.). At any given instant, BitTorrent has, on average, more active users than YouTube and Facebook combined (this refers to the number of active users at any instant and not to the total number of unique users).

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Part 2: Research P2P File Sharing Issues

In Part 2, you will research P2P copyright infringement and identify other issues that can occur with P2P file sharing.

Step 1: Research P2P copyright infringement.

a. What does the acronym DMCA stand for and what is it?

The Digital Millennium Copyright Act (DMCA) is a United States copyright law that implements two 1996 treaties of the World Intellectual Property Organization (WIPO). It criminalizes production and dissemination of technology, devices, or services intended to circumvent measures (commonly known as digital rights management or DRM) that control access to copyrighted works. It also criminalizes the act of circumventing an access control, whether or not there is actual infringement of copyright itself. In addition, the DMCA heightens the penalties for copyright infringement on the Internet. Passed on October 12, 1998, by a unanimous vote in the United States Senate and signed into law by President Bill Clinton on October 28, 1998.

b. Name two associations that actively pursue P2P copyright infringement?

The RIAA (Recording Industry Association of America) and the MPAA (Motion Picture Association of America) have instituted legal actions against a number of P2P file sharing sites and individuals.

c. What are the penalties for copyright infringement?

Penalties, both civil and criminal, can be severe. Civil penalties may include actual damages and profits, or statutory damages (maximum amount of $30,000 per work that is infringed). Moreover, the court can also award reasonable attorney's fees and costs and increase the damages in the case of a willful infringement (maximum amount of $150,000 per work that is infringed). Criminal penalties can include fines and imprisonment.

d. What are the file sharing copyright laws in your area? Are they more strict or less strict than those in other areas of the world? How aggressively do enforcement agencies in your area pursue those who share copyrighted material?

Answers will vary depending on locale.

Step 2: Research other P2P issues.

a. What types of malware can be transported through P2P file sharing?

Answers may vary, but can include: adware, computer viruses, spyware, Trojan horses, and worms.

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b. What is Torrent Poisoning?

Torrent poisoning is the act of intentionally sharing corrupt data or data with misleading file names using the BitTorrent protocol. This practice of uploading fake torrents is sometimes carried out by anti-piracy organizations as an attempt to prevent the P2P sharing of copyrighted content, and to gather the IP addresses of downloaders.

c. How could identity theft occur through the use of P2P file sharing?

If the P2P client software is incorrectly configured it may provide access to the personal information and files stored on your computer.

Part 3: Research P2P Copyright Litigations

In Part 3, you will research and identify some historical legal actions that have occurred, as a result of P2P copyright infringement.

a. What was the first well-known P2P application that specialized in MP3 file sharing and was shut down by court order?

Napster; originally released in 1999 and was shut down by court order in July 2001. It was co-founded by Shawn Fanning, John Fanning, and Sean Parker. At its peak there were 25 million users and 80 million songs, and the system never once crashed.

b. What was one of the largest P2P file sharing lawsuits ever?

In May of 2011, the law firm Dunlap, Grubb and Weaver (aka the U.S. Copyright Group) launched the largest BitTorrent lawsuit ever, suing 24,583 BitTorrent users for sharing the film Hurt Locker.

Reflection

1. How can you be sure that the files you are downloading from P2P networks are not copyrighted and are safe from malware?

There is no absolute assurance that P2P files are free of malware and not copyrighted. Use P2P file sharing applications at your own risk.

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