

**Your on the
Street Reporter**



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Effects of Internet Distribution of User Content

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At first glance, a newcomer to the Internet cloud likely wonders how he or she can key-in a single text message...one copy only, and somehow have this text received by thousands of end-users. It certainly beats using a copy machine and stuffing envelopes of a few decades ago, as well as the laborious task of making pen and ink copies of a century ago.

This near-universal access to practically anyone in the world who is an Internet end-user is accomplished by a technique called multicasting. In addition, the design of the World Wide Web provides yet another way for people (millions of them) to reach one another with a single (or very few) email(s) or text message (s).¹

IP Multicasting

Using a powerful Internet technique called IP Multicasting an Internet user can associate many IP addresses with only *one* IP address. The word *many* can translate into sending, say, a copy of a song to thousands of recipients with just a few clicks on the computer or a smart phone key pad. While my assertion is true, the protocol is not often used by an individual, such as this writer. The system places considerable responsibility on ISPs and other Internet providers to manage complex routing tables. Nonetheless, the end-user is blissfully unaware of this burden. Let us see why.

IP multicasting does not require a sender to know a receiver's IP address, or that matter a receiver's existence. The sender need not know how many receivers will receive the sender's traffic. The routers in the network duplicate the packet and insure that the one copy created by the sender is sent to all the parties who belong to a specific multicasting community.

Reserved IP addresses called multicast group addresses are used by senders and receivers to exchange traffic. Receivers use this address to indicate to the network (usually routers) that they wish to receive traffic associated with this address. The routers will create entries in routing tables to insure the interested parties receive the traffic.

Figure 1 shows the idea of IP multicasting. An originator of the multicasting "tree," say a broadcasting site, sends a single packet (or a series of packets) to a router. After having the multicasting tree established with prior handshakes this router duplicates the data and sends it to the next nodes. The figure uses the cloud symbol to note that the router might send many copies of the data to sites inside a cloud. Eventually, the end branch of the tree only receives the traffic. No other sites associated with this tree is interested in the multicast.

¹ Technical Note. Non-user packets (overhead traffic) must be transported between parties for session initiation and synchronization purposes.

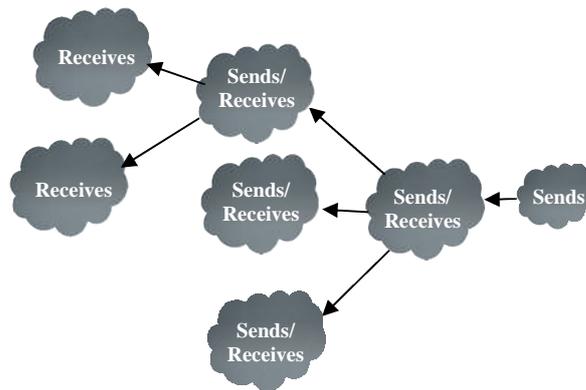


Figure 1. IP Multicasting.

For example, you might be setting up a broadcasting operation for a technology show in a large Las Vegas convention hall. You could send an IP multicast message (an advertisement) to the convention booth and display owners. In turn, if they wished to receive your traffic, they would respond. The IP multicasting software, aided by system engineers, would create the appropriate routing tables.

IP multicasting is a powerful tool for streaming movies and TV programs to a large audience. The system is used on campuses for downloading movies. It is also used for conference proceedings and for hotel video on demand systems.

IPTV

It is likely you have used the Internet Protocol (for)Television (IPTV) or a similar protocol. For example, a movie watcher begins playing a movie. Usually, the playback begins immediately as parts of the movie are being sent, but not the entire file. Thus, the customer can watch the movie before the entire movie has been transmitted. This technique is often referred to as *video streaming* or *media streaming*.

Multicasting Cloud

Nothing is perfect, including multicasting. Using IP Multicasting, a party can send my work (such as *Networking in 24 Hours*), or the work of someone else (such as Bob Dylan's latest hit) to millions of recipients. After creating such a list, with the touching of a few computer keys, this party can do this over-and-over again. Of course, each time the party makes this illegal maneuver, he/she undermines potential income to a musician, such as Bob Dylan or this writer. (The issue of piracy is discussed in other parts of this book.)

Each of the recipients of this multicast can do the same. Nothing prevents a party from creating a multicasting tree, assuming the network supports the protocol. On and on, it can become a cascade of Internet traffic that is over-powering and technically infeasible to stop. It is akin to stemming the water cascading over a water fall. Because of these features, it is possible for hackers to use this system to flood traffic to the point of denying service to network users because of congestion (although many routers and servers contain software to mitigate is kind of hacking).

The multicasting feature of the Internet is a two-edged sword. It saves enormous resources by preempting multiple copies of a packet being sent out over the same link.

However, it facilitates the copying and distribution of illegal copies of copyrighted material.

User Controlled Multicasting

IP multicasting is not the only way to transmit user content to more than one recipient. If the multicast list of end-user receivers is of a modest size, placing the email/text URLs of the receivers into receive copy “(CC)” or receive blind copy “(BCC)” fields of a screen template achieves the same goal as IP multicasting. One advantage of this simpler approach is that the sender has control of who receives the traffic. Figure 2 shows a typical screen that a user can fill-in to do execute a multicast.

The image shows a screenshot of an email composition window. The 'To:' field contains 'MultipleRecipients'. The 'Cc:' field contains 'MultipleRecipients'. The 'Bcc:' field contains 'MultipleRecipients'. The 'Subject:' field contains 'Multicasting'. Below the fields is a rich text editor toolbar with icons for font color (FF), font size (Aa), bold (B), italic (I), underline (U), link, unlink, and a 'Stationery' button. The body of the email contains the text 'Hello to all, seasons greetings.'

Figure 2. Multicasting under the direct control of the sender.

The “To” field can be used as a means for the sender to alert the CC and BCC parties who is sending the message. It is not the conventional “To” address, but an address that all parties know identifies the source of the traffic. For example, I advertise postings on Blog.UylessBlack.com by sending multicasting messages with the “To” of BlacksStreets@aol.com. Those who receive my message know instantly it is from me, and the message is about my blog.

Of course, keying-in scores, perhaps hundreds of email addresses might be prohibitive. One solution is to create the lists in, say, Word. Then simply copy and paste the list into the appropriate window. You can use the Word file to maintain the list.

Caveat

I am not providing these explanations of Internet multicasting to encourage you to create a service for pirated material. Quite the opposite. I have been the victim of pirates myself. I offer this information because it is an essential subject for a reader to understand the ease in which the digital, Internet world can provide a great service, as well as do great damage to the motivation of creating content.

Regardless of the beauty and wonder associated with music, a canary chirps for seed. The more strident critics of Internet-based piracy claim: If the canary is not fed, the canary will eventually stop singing. I agree that the lack or even absence of compensation for an artist’s creativity will stifle the person’s motivation to create. But I offer that many people create for the sake of creation itself. I do not charge viewers for visiting my blog and being able to download hundreds of my works. I do not allow advertising. I continue to create for the joy that creation brings me.

The Web: A Passive Distribution Phenomenon

Using a Website, it is even easier to reach a large audience. But unlike IP multicasting and user controlled multicasting, a website does not initiate the transmission of traffic. That is, the website *passively* waits for surfers to look at its wares, perhaps to look at a picture, buy a book, or post an opinion of the web's pages. Of more serious consequence, perhaps gaining access at the website to copyrighted content that was created by someone else and using it elsewhere for profit.

The multiuser access capabilities of social networks, such as YouTube and Facebook, are extraordinary. Yet, the very nature of the digital world, *ease of copying*, creates enormous challenges to content creators and content providers to, from their perspectives, earn a profit and make a living. To expand on this idea:

[A study] looked at the regions of North America, Europe and Asia-Pacific that encompass all but a small fraction of overall web traffic, found that Internet users shared 9,567 petabytes (about 10 billion gigabytes) of copyrighted files last year, accounting for 23.8 percent of all Internet traffic. Between 2010 and 2012, the amount of bandwidth dedicated to this type of file-sharing increased by nearly 160 percent.²

As discussed in other articles in the series, the passing to others of copyrighted material is not unto itself illegal or even harmful to content providers and content creators. What is harmful is the gaining of income from this material without compensation to the parties that have taken the time and effort to bring this information to the public.

Social networks, again, such as Facebook and YouTube, have procedures in place to protect the rights of copyright holders. I salute them for moving to the fore to address this issue. However, others are not so-inclined to give credit and compensation to the content creators and providers. The bell-shaped curve for ethical behavior finds a substantial population positioned on the left side of the curve: piracy and plagiarism, subjects of upcoming chapters.

Illegal Copying of Multicasted and Web-based Content

A few years ago, sending a part of a pirated book (or for that matter, an entire book) required a lengthy process to send someone illegal material: buying an envelope, purchasing a stamp, filling-in addresses, moistening the stamp and putting it on the envelope, sealing the envelope, taking the envelope to the post office. Because of the inherent limitation of this process, sending copyrighted material to friends and relatives was limited in scope. It did not eat into much of the income of the content creators.

Aside from my role as a person who writes and therefore is against the idea that the information I create is free, I emphasize that all parties---be they content creators, providers, or privateers---ultimately will lose if incentives are not provided for creators to create.

Rewarding creativity is not restricted to rewarding Uyless Black and Bob Dylan for their creating information. It is also about rewarding Edison and Bell for their creating

² <http://www.dailydot.com/business/nbcuniversal-comcast-piracy-study/>.

instruments for the conveyance of information. Granted, copyright and patent laws are different. But their underpinnings are the same and the essence of competition and creativity: Provide a carrot to move the horse forward.

The debate has been narrowed to *what content is on the Internet and who gets the money for making this content available*. Robert Levine says it well, “Like TV, the Internet is only as good as what’s on.”³

If superior content is to be made available on the Internet---wonderful videos such as “Oceans” as opposed to footage of our cousin’s dog passing its contents into the ocean, content consumers must open their wallets. It is not only the ethical thing to do. It is the smart thing to do.

Content Providers and Content Creators: An Inherent Conflict

From the perspective of a content creator, I hold that the large-company content providers, such as Netflix, YouTube, should *amply* share their profits with the content creators, such as musicians and writers.⁴ These providers have the wherewithal to make this happen (usage statistics and the like and are indeed splitting the proceeds (but with a “however,” discussed shortly). In the long run, I am optimistic enough to believe these companies understand that they need high-quality content, and such content will only come if there is incentive for it to be created and produced.

In addition, as discussed earlier, some content providers are becoming content creators. Some are both, such as HBO. As such, these companies cannot continue to take the stand of only a content creator or a content provider.

One problem comes from the small, private content providers who copy material and multicast it to others. Logistically and technically, this practice is not feasible to control and this sort of multicasting is noise on the spectrum of pirating. It is not *the* big deal.

The big deal comes-about when pirated material is posted on public sites. Through the systems described in this chapter, it finds its way into millions of user machines, often pre-empting sales of legitimate products.

Consider the following:

A 2010 study by the Pew Research Center’s Project for Excellence in Journalism found that more than 99 percent of blog links to news stories went to mainstream media outlets like newspapers and networks. File-sharing services are filled with copyrighted music. Seven of the ten most popular clips in YouTube history are major-label music videos. Amid the Internet’s astonishing array of choices, statistics show that most consumers continue to engage with the same kind of culture they did before---only in a way that’s not sustainable for those who make it.

³ Robert Levine, *ibid.*, hard copy, p. 4.

⁴ As discussed later, Google, the owner of YouTube, has implemented its Content ID to address this matter. It has problems, but the intent is important.

[Therein lies the conflict.] Most online companies that have built businesses based on giving away information or entertainment are not funding the content they're distributing.

In Silicon Valley, the information that wants to be free is often the information that belongs to someone else.

[The Internet] "has empowered a new group of middlemen, like YouTube, that benefit from distribution without investing in artists."

The core copyright businesses---music, film, television, and computer software---account for about 6.5 percent of U.S. GDP.⁵

Digital Downloads and Streams: Brother, Can You Spare a Fraction of a Cent?

During the past few years, music streaming has come to the fore. Unlike downloaded music such as iTunes, in which a song is purchased, streaming entails the renting of a song.

How much revenue do the creators take-in for such a single stream of a song? The figure varies widely. As one example, Rosanne Cash, a musician who has won a Grammy, was paid \$104.00 from 600,000 streams. As another example, Marc Ribot's band made \$187.00 from 68,000 streams "of his latest album."⁶ In 2013, Zoe Keating, a popular and gifted cellist, earned \$3,000 from YouTube and Spotify her 2 millions streams.⁷ Here are other examples:

The actual formula for calculating royalty payments for Spotify is very complicated, but *Rolling Stone* gave the royalty arrangement of one band manager. In that situation, if a song is streamed 60 times, the songwriter receives 9 cents and the artist receives 38 cents, which is then split with the label depending on the contract. Using the *Rolling Stone* rates, [The writer of this piece, known as Max] calculated that an artist would make over \$25,000, which would be split with a label, if people streamed their songs 4,053,110 times, the amount the *Atlantic* article says would be needed to make monthly minimum wage. [This writer: Dream on!] I also calculated the combined amount that an artist and label would make using the *Atlantic* rates, which was over \$7,500, less than a third of the money *Rolling Stone* reported would be made. Since the actual Spotify royalty formula is extremely complicated and is different for different artists, I checked a couple other sources to get an idea of which figure was generally more accurate. According to NPR, Erin McKeown, who doesn't have a

⁵ Robert Levine, *ibid.*, hard copy, pp. 3, 6, 7, and 9.

⁶ John Seabrook "Revenue Streams," *The New Yorker*, November 24, 2014, 76.

⁷ Andrew Kern, "Creative Minds Taking a Beating," *Los Angeles Times*, January, 25, 2015, F9.

label, gets \$0.004 per play, which means she would make over \$16,000 if her music was streamed 4,053,110 times.⁸

Ribot explained: “Here’s a simple fact that no one wants to talk about. Spotify says it pays out seventy per cent of its revenues to rights holders. Well, that’s very nice. That’s lovely. But if I’m making a shoe, and it costs me a hundred dollars to make it, and the retailer is selling that shoe for ten dollars, then I don’t care if he gives me seventy per cent. I don’t care if he gives me one hundred per cent---I’m going out of business. Dead is dead.”⁹

We pick up on the subject of digital Internet distribution in later articles. Among other topics, we examine how much revenue the content providers are taking in. Pulling out the crystal ball, we will look into the future of off-line music, movie, and books sales.

⁸ <https://thoughtsofmaxh.wordpress.com/2013/08/06/how-much-money-do-artists-make-from-itunes-or-streaming-services/>. From the blog: Max’s Thoughts.

⁹ Andrew Kern, Ibid.