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## An Interdisciplinary Understanding of the Economic and Political Policies behind Network Neutrality in the United States

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Major: Integrated Computer Science/Technologies and Society

**An Interdisciplinary Understanding of the Economic and Political Policies behind Network  
Neutrality in the United States**

**A Pathway to Free and Open Internet**

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**Appendix**

**ISP** - Internet Service Provider

**NSF** - National Science Foundation

**FCC** - Federal Communications Commission

**(IP) addresses** - Internet Protocol

**CALEA** - Commission on Accreditation for Law Enforcement Agencies

**B** - Bandwidth

### **Abstract**

The focus of this paper is to explore the associative benefits to why network neutrality in the U.S. benefits the fundamental principles of freedom of speech and expression. While at the same time gaining a deeper understanding of why politics may incentivize or undermine data collection by billion-dollar conglomerate companies such as Tiktok and other internet service provider companies. In doing so, this paper will review internet privacy regulations on a federal level and examine the history of the FCC's regulatory practices on ISPs over the last three decades. Lately, this paper will discuss the economics behind network neutrality and how they influence the everyday American consumer.

## Introduction to the Internet

The idea of the internet was first conceptualized in the late 1950s, as a way for scientists and computer engineers to share and store information across large analog databases in the hopes of forming a unified network. An Oxford professor known as Christopher Strachey first patented the idea in 1959 under the concept known as “time-sharing”. The greater idea was for multiple computer resources to be combined at the same time in order to create a larger multitasking computational system. In 1960, Joseph Carl Robnett Licklider an American computer scientist, furthered this idea of “time-sharing” when he went on to propose the idea of a unified computer network in his paper “Man-Computer Symbiosis.”<sup>1</sup> The initial concept was meant to circumvent the speed at which information is stored and processed while envisioning a computer-human symbiosis.

Fast-forward to the 1990s and the release of Web 1.0, the internet was primarily restricted to government use only as access was rarely available to the public. In 1992, the U.S. Congress passed the Scientific and Advanced Technology Act, which allowed educational institutions and the National Science Foundation(NSF) access to the internet for research purposes. Eventually, what is widely known as the “dotcom boom” or the beginning of web 2.0 all culminated with the end of the NSF’s government-sponsored access to the internet in 1995. Commercial access to the internet prompted the implementation of several regulations, starting with the Telecommunications Act of 1996, which enforced high-rate internet speeds for all consumers and incentivized affordable rates. This act was a part of the FCC's larger goal of achieving “universal service,” that being universal access to communication services by all Americans. During this time, regulations were primarily monetarily driven which prompted the rise of a

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<sup>1</sup> Licklider, J. C. "Man-computer Symbiosis (1960)." *Ideas That Created the Future* (2021): 201-12. Print.

capitalistic market. This capitalistic market was built around the evergrowing consumerist market, meaning internet users could choose which internet service providers (ISPs) best suited them. Thus, the rise of ISPs caused the emergence of competitive broadband service, allowing consumers to choose from a capitalist market and a multitude of options. In the late 1990s, The first substantial commercial internet providers were contracted as a part of the National Information Infrastructure plan in 1996, which was a government initiative to build communication networks nationwide. Unbeknownst to future analysts and policymakers, ISPs became a vital component to the internet's accessibility. This was very apparent in the early stages of the internet, as the FCC's Second Computer Inquiry allowed ISPs to bypass regulatory barriers that would normally restrict the sale of "enhanced service." Many ISP took advantage of the protections provided by the loose restrictions the FCC implemented in order to incentivize a competitive market. Federal regulations had classified U.S. ISPs under "enhanced services," which exempted them from traditional telecommunications charges and meant that ISPs did not have to contribute payment towards the government's universal service fund or provide subsidies for telecommunications in rural and low-income areas. As a result, ISPs not only became data pipeline providers but also became the primary providers for web hosting and domain name registration. In stark contrast to today's modern ISPs, the focus was less on the monetization of high-speed internet access and centered on the wide distribution of internet protocol (IP) addresses.

Moving into the early 2000s, the aggressive market system that the Clinton-Gore administration had fostered throughout the 1990s had subsided in favor of the telecommunication monopoly system that we see today. In a 2005 legal decision by the FCC and the United States supreme court, broadband internet service providers no longer were regulated by the CALEA

due to surveillance concerns. This is widely known as the catalyst that prompted the need for net neutrality as ISP had reached a status above general FCC-regulated industries such as radio and television. Taking advantage of an ever-growing free market, broadband internet service providers gave consumers several options to choose between affordable internet services or pay for higher speeds depending on their region and disposable income. Proponents of net neutrality feared that the institution of predatory practices by internet service providers would create a lopsided dynamic in which lower-income U.S. citizens would not be able to afford access to high-speed internet. These concerns only grew as the internet progressed into “Web 2.0,” which is known as the modern-day internet.

### **History of the FCC and How its Regulatory Practices Affect the Internet Today**

Similar to the regulatory history of radio within the United States, the internet is constantly undergoing a series of changes that is dominated by user traffic and monetized. In the early 1910s, congress established the development of broadcast radio hoping to make access to the radio more accessible. With these new developments that incentivized public use came stricter regulations and monitoring. This came with the Radio Act of 1927, which restricted the use of private and public radio transmissions and was mainly concerned with vessels under distress occupying channel frequencies<sup>2</sup>. Later in 1934, the Communication act of 1934 was passed and helped further establish the FCC otherwise known as the Federal Communications Commission, which ended up becoming the lead broadcasting authority amongst telephone, telegraphs, radio, cable television, and most recently certain aspects of the internet. However, modern-day communications entities such as the FCC have gone through many evolutions of

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<sup>2</sup> Ling, Fei-Yang, et al. “Research on the Net Neutrality: The Case of Comcast Blocking.” *2010 3rd International Conference on Advanced Computer Theory and Engineering(ICACTE)*, 2010, doi:10.1109/icacte.2010.5579492.

increased and decreased regulation such as the Fairness Doctrine being abolished in 1987, which enforced anti-monopoly laws amongst television providers. Many of the same growing pains can be seen with the ever-expanding use of the internet as the number of people who have access to the internet increases.

Specifically, amongst big data companies, increased use of the internet provides more incentives for companies to infringe upon user data in order to gain a profit. This has become a growing issue as proponents of net neutrality are in fear of their data being monitored. Furthermore, proponents of net neutrality argue that a neutral net will foster free speech and lead to greater democratic participation on the internet. Former Senator Al Franken from Minnesota fears that without new regulations, the major internet service providers will use their position of power to stifle people's rights. He calls net neutrality the "First Amendment issue of our time". The past two decades have been an ongoing battle of ensuring that all people have equal access to an unrestricted platform, regardless of their ability to pay. The FCC's overall consensus about net neutrality is to focus on making an open and more affordable internet. The divide on net neutrality comes down to the difference between free speech and freedom of information.

Over time, the FCC passed more regulatory policies that would be in favor of net neutrality and restrict harmful practices by many ISPs. In 2015 the FCC reclassified ISP under Title II common carrier regulations, which meant that the FCC could supervise and monitor service rates. This allowed the FCC greater sanction over ISPs and gave them the right to ban or unban unjust service rate practices as they saw fit. Proponents of net neutrality saw the 2015 regulations as a prosperous step forward in the hopes that internet services would become more affordable.<sup>3</sup> However, in 2017, the Trump administration deregulated many restrictions imposed

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<sup>3</sup> "Anthony J. Pennings, Phd." *US Internet Policy, Part 1: The Rise of ISPs: Anthony J. Pennings, Phd.* Web. 16 Dec. 2022.



by the FCC and reclassified ISPs under Title I Information Services, which all the services of internet providers to go unmonitored. Since then, the United States Congress has attempted to pass several legislations in support of net neutrality but has been unsuccessful in garnering enough support.<sup>4</sup>

Furthermore, modern-day regulation in favor of net neutrality has primarily advanced on a stateside basis with states such as California passing data protection laws in 2018 and 2021. These state legislations are made possible by states as long as states feel that the FCC is promoting predatory consumer practices. In 2018, California pass the Net Neutrality Act, as a measure against ISPs. This act would prevent internet service providers from slowing or blocking lawful internet traffic and counteract zero payment ratings, which allowed ISPs to receive compensation for providing “free” internet services to users while still receiving pay. In relation to stateside regulation, federal regulation divulges two main ideas of thought. How should regulation of ISP be imposed, as it has no longer become a debate on whether or not affordable internet is beneficiary for the American public, but a debate on data consummation/monetization? Lately, does net neutrality pose a threat to national security in the sense that foreign nations would be able to collect user data from American citizens?

### **Understanding Network Neutrality in the United States**

Network neutrality is the understanding that all internet service providers must treat all users equally and offer consistent rates across all forms of communication via the internet. Intensional slow loading or infractions on freedom of information, expression, and speech are all growing concerns for regulators. Fundamentally, net neutrality should inherently provide all walks of life accessible to the internet regardless of demographics. Initially, network

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<sup>4</sup> "Anthony J. Pennings, Phd." *US Internet Policy, Part 1: The Rise of ISPs: Anthony J. Pennings, PhD.* Web. 16 Dec. 2022.

accessibility was application blind<sup>5</sup>, meaning that applications, content, and services were indistinguishable when running over a network. At the time this allowed for greater user-control over the user-data collection and gave any user control over how they chose to interface with network providers. Within the last three decades, access to the internet has grown exponentially as has the technological capabilities of network service providers. Service providers are now able to monitor and identify any application or content in use under their network. This expansion of technology has created a polarizing discourse over whether internet providers are infringing upon user privacy. Proponents of network neutrality maintain that service providers primarily have economic incentives and that access to user data is harmful to the overall social-economical environment of the internet. The FCC has further echoed these concerns as a potential national threat, as further globalization of applications such as TikTok has inadvertently given countries such as China the ability to mass monitor foreign users. Network neutrality is Conversely, opposition towards network neutrality mainly argues that regulations could stall the development of new internet technologies and can inhibit free speech. Either way, both sides agree that network neutrality is becoming of greater significance and is being recognized as not only a national issue but also a global concern. The FCC and congress have unanimously agreed to investigate the social media application TikTok owned by ByteDance as a potential national security threat.

### **The Economics Behind Network Neutrality**

Our current system incentivizes ISPs to have a monopoly on consumer data and internet access, meaning they can control the bandwidth and speed at which the user receives content.

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<sup>5</sup> Van Schewick, Barbara. "Network Neutrality and Quality of Service: What a Nondiscrimination Rule Should Look Like." *Stanford Law Review*, vol. 67, no. 1, 2015, pp. 1–166. JSTOR, <http://www.jstor.org/stable/24247331>. Accessed 26 Nov. 2022.

This becomes an issue when we introduce a stratified system based on socioeconomic status in which individuals have the potential to pay for better internet services based on their income. Once we extrapolate the deeper intentions behind the monetization models promoted by ISPs, we can observe that Internet service providers are incentivized to collect and sell user data to advertisers in order to boost profits, while at the same time offering minimal bandwidth speeds to customers who pay for inexpensive internet services compared to those who pay for high-speed internet services. This allows ISP companies the ability to discriminate internet accessibility and bandwidth distribution amongst consumers. Meaning, that the majority of the available bandwidth is being funneled towards users who have the ability to pay for better Services rather than being evenly distributed amongst all internet users. <sup>6</sup>This problem becomes increasingly concerning when you take into account that ISPs offer zero-price “slow-lane” services and free “fast-lane” services. Allowing ISPs the availability to discriminate by employing a more restricted option versus the option that allows them to charge more, raises the risk of the “slower” option being the only non-exclusionary choice.

In figure 1, we can see the basic use of bandwidth technology and distribution by ISPs. Internet Service providers have limited amounts of available bandwidth, however, want to maximize the available households they can reach while still making a profit.<sup>7</sup> In order for households to receive content/services, they must bypass a “pipe” controlled monopoly. The pipe contains available bandwidth which is denoted as  $B$ . This can be understood as an ISP’s available

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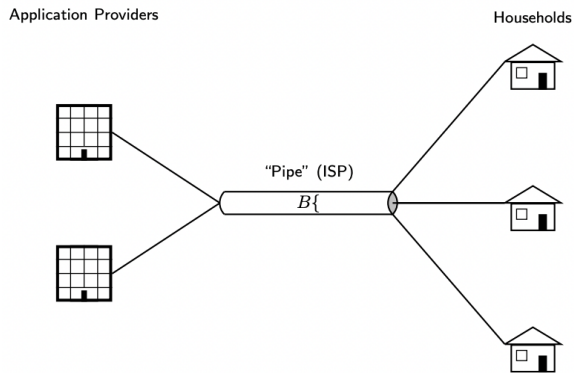
<sup>6</sup> Caves, Kevin W. “Modeling the Welfare Effects of Net Neutrality Regulation: A Comment on Economides and Tåg.” *SSRN Electronic Journal*, 2010, doi:10.2139/ssrn.1585254.

<sup>7</sup> Economides, Nicholas, and Benjamin E. Hermalin. “The Economics of Network Neutrality.” *The RAND Journal of Economics*, vol. 43, no. 4, 2012, pp. 602–29. *JSTOR*, <http://www.jstor.org/stable/41723347>. Accessed 16 Dec. 2022.

“units” or capacity. ISPs can dictate how many units are serviced to each household base on the

division of units which can be represented as  $B_1 \dots B_J \sum_{j=1}^J B_j = B$ .

**Figure 1**



**Figure 1:** Schematic representation of technology.

If we assume there is a continuum of household providers who are all paying for minimal service packages, there then becomes a surplus of available bandwidth, giving internet service providers the opportunity to profit from saving expenditures in order to relocate the surplus as high-speed service options in order to maximize profits. The division between “high-speed” and “low-speed” options allows service providers to throttle the least convenient option until the only option for households becomes the most profitable one for the internet service providers. These issues become further apparent when you take into consideration that ISPs are also competing against other communication services. One of the most notorious examples was the issue of former conglomerate telecommunications company Sprint (now a subsidiary of the telecommunications company T-mobile) throttling Microsoft's Skype service. A study done by the University of Massachusetts concluded that Sprint's Internet services were throttling

Microsoft's Skype service by up to 34%.<sup>8</sup> This issue was particularly concerning because Skype relied on Sprint's wireless internet service in order to make Skype more accessible to lower-income customers.

One of the most prominent solutions to work around these predatory models of monetization presented by the FCC has been for ISPs to set up a zero-pricing model that standardizes bandwidth and access to content. This would allow ISPs to set up a complementary monetary model that allows for a more managed service that provides non-predatory “fast-lane” services. This could potentially create an equilibrium amongst all working-class customers and those willing to pay for “fast-lane” services while keeping the bandwidth distribution fairly even amongst households.

### **Conclusion**

Over the last 30 years, the use and accessibility of the internet has grown exponentially, as it is now widely available to over billions of users worldwide. Within the U.S., previous regulations of the internet by the FCC and congress have encouraged a system in which internet service providers are incentivized to monetize access to the internet as much as possible. Such archaic models have been shown to cause a myriad of issues in terms of fair access and distribution to the internet regardless of socioeconomic status, thus creating an imbalance of bandwidth distribution. The distribution of bandwidth by ISPs becomes a greater issue when freedom of speech is taken into consideration. The distinction between freedom of speech and freedom of information is a nuanced issue that is only exacerbated by United States’s capitalist market economy, as ISP has the power to throttle or suppress access to certain content.

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<sup>8</sup> "Sprint Is Throttling Microsoft's Skype Service, Study Says." *Los Angeles Times*. Los Angeles Times, 08 Nov. 2018. Web. 16 Dec. 2022.

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