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# Rulemaking in the name of a free and open Internet

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# NAVAL POSTGRADUATE SCHOOL

**MONTEREY, CALIFORNIA**

# THESIS

**RULEMAKING IN THE NAME OF A FREE AND OPEN INTERNET**

by

Bradley Teemley

September 2010

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Network neutrality is a principle dictating that traffic flowing over a network does so without discrimination. Whether government regulation is necessary to ensure the Internet as we know it is perpetuated in today's relatively neutral state is being debated more and more, as use of the Internet becomes more vital to everyone on a day-to-day basis and content grows at an incredible rate.

The Federal Communications Commission (FCC) in 2009 decided to act in this regard and proceed in an attempt to identify rules that will preserve a free and open Internet. The basis of these rules are six principles that the FCC has proposed (directed at broadband providers) that outline what it believes will maintain a free and open Internet. Debate has formed among three groups:

- Those favoring this sort of regulation by the government
- Those who determine it is unnecessary
- Those who propose that the FCC, has no authority granted by Congress to implement its proposed rules.

This thesis examines the debate, formulates conclusions, and proposes recommendations that will ensure the Internet remains the incredibly effective innovation tool into which it has grown.

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**RULEMAKING IN THE NAME OF A FREE AND OPEN INTERNET**

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Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF SCIENCE IN COMPUTER SCIENCE**

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# ABSTRACT

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AT&T | American Telephone and Telegraph Company |
| BOC | Bell Operating Company |
| DOJ | Department of Justice |
| DSL | Digital Subscriber Lines |
| EFF | Electronic Frontier Foundation |
| FCC | Federal Communications Commission |
| FRC | Federal Radio Commission |
| FTC | Federal Trade Commission |
| ISP's | Internet Service Providers |
| NOI | Notice of Inquiry |
| NPRM | Notice of Proposed Rulemaking |
| VoIP | Voice over Internet Protocol (VoIP) |
| SBC | Southwestern Bell Telephone Company Internet Service Providers |

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# I. INTRODUCTION

Network Neutrality, a concept associated with the Internet, has, in the last few years, become an issue due to the increased importance of what the Internet provides for individuals, business, government and education. While no formal definition exists, a management guideline where content, regardless of its type, receives no discrimination while travelling across a network, characterizes network neutrality (Internet Society, 2010).

The Internet today is essentially a neutral network. However, debate exists regarding whether government regulation, in some form, is necessary in order to maintain the Internet in its present form. Network providers including telecommunications companies such as AT&T and Verizon and cable companies such as Comcast have invested billions of dollars in creating and maintaining their networks under a business model based on the current situation and conclude that a change in the regulatory status of their networks is both unnecessary and potentially harmful. Illustrating the position of these companies is this quote from Edward Whitacre, the former CEO of AT&T:

> How do you think they're going to get customers? Through a broadband pipe. Cable companies have them. We have them. Now what they would like to do is use my pipes for free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using. Why should they be allowed to use my pipes? The Internet can't be free in that sense, because we and the cable companies have made an investment and [for] a Google or Yahoo! or Vonage or anybody to expect to use these pipes for free is nuts! (O'connell, 2005)

Others, including application providers, search engines such as Google, government organizations such as the Federal Communications Commission (FCC), and many influential individuals involved in the creation of the early Internet, determine that regulation is necessary to perpetuate the Internet in its present form. These individuals cite a number of reasons that, in their opinion,

make regulation necessary. The reasons cited include the ever increasing, importance of what the Internet provides, the over dependence of everyone involved on the companies that provide the networks over which the data on the Internet flows, as well as specific instances where network providers involved have initiated network management practices that go against the principles of network neutrality. Taken as a whole, these factors suggest a need for regulation to maintain the Internet as it exists today.

## A. THE STATE OF THE INTERNET TODAY

The Internet, in its current state, is essentially a neutral network. Exceptions to this rule exist, but for the most part, packets arrive at their destination without discrimination. The exceptions mentioned consist of some justified exceptions based on the needs of the forwarding technology, such as VoIP, and the more publicized exceptions made by broadband companies for economic reasons. A truly neutral network, as described earlier, would forward traffic completely without regard for the content contained within the packets it was forwarding. By this purist definition, certain applications running on the Internet would be useless if this were the case today. Applications such as streaming video and Voice over Internet Protocol (VoIP) would not be able to operate if today's Internet were truly neutral, and because of this, certain technical exceptions exist, and are accepted, without adding to the current debate. In general, beyond those accepted deviations today's Internet is essentially neutral.

Several instances, however, have occurred where network providers have discriminated concerning content or volume, and these examples provide enough evidence to proponents of the need for regulation to justify regulation of networks. Perhaps the most famous and almost certainly the most pertinent example of discrimination by a network provider is Comcast's blocking of the peer-to-peer file transfer service BitTorrent, which became news in 2007. This particular case was aggravated when Comcast subsequently denied this practice

in testimony to the Federal Communications Commission (FCC). The case is ongoing, but oral arguments in January 2010 did not favor the FCC and have further fueled the network neutrality debate (Comcast v. FCC, 2010).

## B. THE FCC'S NOTICE OF PROPOSED RULEMAKING REGARDING NETWORK NEUTRALITY

The FCC is the organization that has taken the lead in policing incidents of discrimination by network providers and since 2005, the FCC has been basing its oversight of access to the Internet on an Internet policy statement consisting of four principles it deemed users of the Internet were entitled to expect. The four principles adopted sought to ensure users had access to any lawful content they chose, could run applications and use services of their choice, connect any legal devices they chose to a network as long as it did not harm the network and support competition among network providers, application and service providers and content providers (FCC GN 05-151, 2010).

In October 2009, the FCC announced a Notice of Proposed Rulemaking (NPRM) regarding the preservation of a "free and open Internet." The NPRM's purpose was to codify the four existing rules in their Internet policy statement and add two new rules. The additional rules sought to prohibit discrimination of content by network providers and to force network providers to make their network management policies available to users of their networks. This NPRM is currently accepting public comment; when complete and if passed, these rules will dictate how network providers must regulate their networks (FCC GN 09-91, 2009).

## C. OBJECTIVE AND SCOPE

The objective of this thesis is to examine the current debate concerning whether rules or laws are necessary in order to maintain network neutrality within the Internet. History, including the history of the FCC as well as the history of telecommunications regulation, will be examined in order to make conclusions

and recommendations on what the correct course of action in this situation is. The following research questions will be answered:

1. Is some sort of regulation of network providers necessary in order to maintain the Internet, as we know it today?

2. Based on the history of telecommunications regulation, what affect will regulation, whether it is the NPRM proposed by the FCC, a law passed by congress or some other regulatory measure have upon the Internet?

3. Does the FCC have the necessary jurisdiction to impose rules that constrain network providers?

4. Besides enacting a regulatory measure, in broad measure across all network providers, what other actions will ensure that network providers act in the best interests of not only themselves but the users of the Internet.

The scope of this thesis is to determine the effects of proposed regulation that seeks to dictate how network providers, provide access to the Internet. An examination of the history of both telecommunications regulation in the past 100 years, as well as the regulatory history of the FCC, will assist in making this determination. Additionally, consideration of the thoughts of both the proponents and opponents of legislation that perpetuates network neutrality will help determine the merits of any anticipated course of action. The thesis is limited in that it is simply predictive, and only history will allow us to fully understand the result of actions taken in this matter.

## D. ORGANIZATION

Chapter II will provide Background information revolving around the history of telecommunications regulation, prior network neutrality decisions and the early Internet. Chapter III will examine the origins and regulatory history of the FCC as well as the Telecommunications Act of 1996. Chapter IV will evaluate the positions of those who propose regulation and those who consider it unnecessary. Chapter V will outline the proposals of those same proponents and

opponents as well as my own recommendations. Chapter VI will provide conclusions and recommendations for future work.

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# II. TELECOMMUNICATIONS REGULATION AND INTERNET HISTORY

## A. TELECOMMUNICATIONS REGULATION HISTORY

### 1. Telegraph, Telephone, Cable Television and Common Carriers

In June 1934, President Franklin Deleanor Roosevelt signed the Telecommunications act of 1934 as part of the New Deal. The purpose of the act was to regulate communications and commerce and to improve wire and radio communications in order to provide the United States with a world-class and dependable communications system. Within the act, there exist seven titles. Title II describes the regulatory guidelines concerning common carriers. A common carrier is a business that transports people, goods or services with the authority to provide these services granted and overseen by a regulatory body. Earlier in 1934 also saw the creation of the FCC, and it now served as the regulatory body that would oversee the common carrier status of wire and radio communications. Common carrier status would regulate the status of telegraph, telephone and finally, cable television, and would eventually contribute to the breakup of the one of the largest telecommunications monopoly in history, that of American Telegraph and Telephone (AT&T). The advent of data networks and the Internet created the need to classify another service to deal with the specifics of data flow; these would be termed “information services” (Furchtgott-Roth, 2006).

### 2. Information Services

The Telecommunications Act of 1934 would remain in effect until 1996, when President Bill Clinton signed the Telecommunications act of 1996 into law on February 8, 1996, some 62 years later. The development of Internet service providers (ISP’s), cable over the Internet and digital subscriber lines (DSL) dictated the need to classify Internet services as a type of service within the act. Difficulty arose when classifying Internet over cable lines and Internet over DSL,

as these services were provided by the same service that had previously been classified as a common carrier. Eventually, however, Internet access, however it is provided, was classified as an "information service," and these services were classified within Title I of the communications act and were not considered common carriers. These services, not regulated as common carriers, have come under the auspice of the FCC under its ancillary jurisdiction mandated in Title I (Nuechterlien & Weiser, 2007).

## B. COMPUTER NETWORKS REGULATORY DECISIONS (1960–PRESENT)

By the 1960s, innovators had begun to utilize the capability of communications through computers transmitting data over the existing infrastructure of the telephone industry. The FCC quickly realized the tremendous potential of this fledgling technology and began to contemplate its position about the position it would take in regard to the regulation of computer networks. The result of its contemplation over the next several years would become three inquiries into how it would regulate these networks, called the Computer Inquiries (Cannon, 2003). These inquiries, which history considers extremely effective, mark the first attempts at regulation of enhanced services, or what we would now call high-speed Internet, and are important to revisit to set the baseline for events to follow.

### 1. The Computer Inquiries

#### *a. Computer I*

The issues the FCC considered most important in 1966 and attempted to address in Computer Inquiry I, included whether to, and to what extent, data processing services should be regulated and whether existing companies considered common carriers would be permitted to participate in offering these services. The real outcome of this first inquiry was the creation of a clear separation between what would was considered an unregulated data processing service and what comprised equipment and infrastructure that

composed the regulated voice communications networks. History notes that Computer I was an important first step that separated computer networks and the voice industry that set the stage for the beginning of the Internet as we know it (Cannon, 2003).

### *b. Computer II*

Computer Inquiry I remained in effect until May 1980 and defined a clear distinction between basic and enhanced services. Basic services were those that could be regulated and enhanced services would remain unregulated. This played a large part in shaping what the Internet would become. However, Computer Inquiry I also prohibited BOC's from entering into the enhanced service market. The FCC modified this in the Computer II inquiry. The FCC had realized that the enormous resources of these companies would greatly contribute to the development of data communications. Computer II allowed these companies to enter the enhanced service market, but only under two conditions. First, any telephone company that intended to offer enhanced services could do so only under a completely different corporate entity and this new corporation would act as a standalone entity. Second, a telephone company selling its underlying communications capability, the regulated portion of the network, would have to separate or "unbundle" this from the enhanced service and sell it to any and all in a non-discriminatory manner. In other words, it would have to sell the regulated portion to its own enhanced service corporation for the same price as it would sell to any ISP (Nuechterlein & Weiser, 2006).

### *c. Computer Inquiry III*

While the FCC felt the corporate separation between the enhanced service provider and the basic service provider, this requirement was extremely costly to the companies that wished to participate in both markets. In 1985, the FCC repealed the requirement to create a separate corporation for providing enhanced services and instead put in place regulations that would ensure the intent of separating the services was fulfilled. Computer Inquiry III also

strengthened the FCC's stand on the unbundling of these services. This was meant, in part, to ensure that the regulation of enhanced services remained clearly under the auspice of Title I of the communications act (Cannon, 2003).

#### *d. Computer Inquiry Legacy*

The Computer Inquiries as a whole strengthened the position of information services as non-regulated or lightly regulated. They are considered a great success, and when Congress amended the Communications of in 1996 to its present form, much of the intent of the Computer Inquiries remained intact. The Computer Inquiries also set a precedent for the FCC's position on the subject at the time, and the FCC was considered a champion of light regulation in this area in the 1980s and 1990s, when the Internet was developing. Many also believe that these policies were one of the key elements ensuring the Internet's early success.

### 2. Cable and DSL Supreme Court Rulings

By the late 1990s, the popularity of receiving Internet access through a cable TV modem was becoming popular, and with this popularity came questions about how or if this service would be regulated. Two specific questions would become important issues. The first question asked whether to classify cable Internet service as a Title I or Title II service. The second question was necessary because of a unique aspect of the structure of the cable service itself. In the case of cable Internet service, the company that provided the service owned the entire infrastructure that delivered the service. This differs from service provided through a phone line because the phone line delivers the service, but one of many providers of Internet access could provide the service. In the case of cable, the cable company owned the cables delivering the service, and through an ISP affiliated with the company, it provided the service itself. The second question now became whether the cable companies should open their delivery service to other ISPs to offer the service through the cable company's infrastructure. In a series of rulings involving the FCC, the Court of Appeals for

the Ninth Circuit court and finally the Supreme Court, it was determined that Internet service through cable modem was not a telecommunications service and was thus unregulated. Additionally, it was decided that cable companies would not be forced to open their networks to other ISPs. Today, the case of *National Cable & Telecommunications Association et al. v. Brand X Internet Services et al*. defines the fate of cable Internets classification. The result in this case found the Supreme Court overturning a previous ruling by the Ninth Circuit Court and classified Internet access through cable modem as a Title I, unregulated service. (Furchtgott-Roth, 2006).

A similar route to deregulation existed for Internet over digital subscriber line (DSL). In August 2005, the FCC issued a ruling stating that Internet service obtained in this manner was an unregulated information service. This was, at the time, a decision that would greatly enhance the ability of consumers to obtain broadband Internet at an affordable price and in a competitive manner. The U.S Court of Appeals for the Third Circuit Court in Philadelphia more recently reviewed this ruling and upheld the decisions of the FCC in October 2007 (Reuter's, 2007).

### 3. The 2005 FCC Internet Policy Statement

All the significant previous decisions created a trend by the FCC of minimizing deregulation. At this point, the FCC may have realized it needed to create balance in the way it addressed the handling of this industry. Whether the FCC thought it needed to create balance or if was for some other reason, on the same day it announced the deregulation of DSL service it also announced a policy statement regarding what consumers should be able to expect in regard to accessing the Internet. The policy statement issued consisted of four principles directed at broadband Internet providers and designed to protect the consumers using broadband Internet service. The four principles the FCC felt broadband consumers should be able to expect included:

- an expectation to be able to access any legal content on the Internet
- the ability to use any legal application or service, this principle is subject to the needs of law enforcement
- connect any legal device to the network as long as it doesn't harm the network
- Have a competitive choice between broadband, application, service and content providers (FCC 05-151, 2005)

It is important to note that at this time, that these principles were simply the policy of the FCC, and not the result of a Notice of Proposed Rulemaking, as is often how the FCC issues regulation, or as an interpretation of their jurisdiction under the Communications Act or as a law. These principles were nothing more than a policy statement of the FCC, used to guide their decisions in cases where incidents requiring their attention arose.

#### 4. 2007 *FCC v. Comcast* (Bit Torrent)

In 2007, an event that conflicted with the FCC's four Internet principles did occur. Users of broadband Internet service provided by Comcast Cable utilizing a file-sharing service called BitTorrent began to experience trouble utilizing the service. Eventually, complaints began to emerge and the FCC investigated Comcast concerning the possibility that Comcast was blocking access to BitTorrent. Comcast originally denied the accusations, but after time, it did admit to blocking BitTorrent from time to time for purposes that benefited its network as a whole. The FCC then issued a ruling informing Comcast that blocking BitTorrent violated its policy and ordered them to cease. Comcast complied with this order, but then took the matter to court in the case that most visibly represents the debate that is network neutrality. This case was finally decided in April 2010, with the U.S. Court of Appeals for the District of Columbia deciding

that the FCC did not have jurisdiction concerning dictating to Comcast how it would regulate its network (*Comcast v. FCC,* 2010).

### 5. 2009 FCC's Notice of Proposed Rulemaking and the National Broadband Plan

In October 2009, during the period the Comcast trial was underway but before the outcome of the case, the FCC announced a Notice of Proposed Rulemaking (NPRM) seeking to codify the four existing principles created in the 2005 Internet policy statement and add two additional principles. Together, these six principles would form the basis for FCC rulings. The two additional rules sought to ensure:

- nondiscrimination by requiring that, subject to reasonable network management, broadband providers treat all lawful content, applications and services in a nondiscriminatory manner and;
- transparency by dictating that broadband providers disclose, subject to reasonable network management, how they managed their networks including any information required by users in order to satisfy the other principles of the NPRM (FCC 09-191, 2009).

At about the same time that the FCC announced the NPRM, it also began announcements surrounding a national broadband plan. This would be a government-sponsored initiative that would examine broadband in the United States and seek ways to increase its availability to greater numbers of people. The FCC until now had not been involved in broadband infrastructure and this plan was the beginnings of a change in that regard (Schatz, 209). One can imagine the significant investment the national broadband plan represents instantly raises the level of interest of the government in regulation of the Internet. Considering this raised level of interest, one can imagine the link between the FCC's NPRM and the looming implementation of the National Broadband Plan.

## C. ORIGINS OF THE INTERNET, MAJOR MILESTONES AND ITS INNOVATORS

Today's Internet has become a tool of magnificent power. Its impact on education, research, world economies and indeed most aspects of life has become almost ubiquitous. In October 1995, the Federal Networking Council (FNC) announced a resolution that defined the term "Internet" as referring to the global information system that:

- Is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ones;
- is able to support communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) suite or its subsequent extensions/follow-ones, and/or other IP-compatible protocols; and
- provides, uses or makes accessible, either publicly or privately, high level services layered on the communications and related infrastructure described herein (Internet Society, 2010)

This definition comes almost 30 years after the innovation and collaboration of many scientists enabled the first two host computers on the ARPANET to communicate with each other on October 3, 1969 (Beranek, 2000). The Internet has changed greatly since then and a discussion of the origins of the Internet and those who were integral in its beginnings are vital to a discussion of how or if regulation that seeks to perpetuate network neutrality is necessary.

### 1. DARPA and the ARPANET

In August 1962, J.C.R. Licklider while working at the Defense Advanced Projects Agency conceived of a globally interconnected group of computers from which individuals could access data and applications from anywhere. Licklider

discussed his ideas with a group of scientists, including Lawrence Roberts, which would be his successors at DARPA of the importance of his thoughts on networked computers (Leiner et al., 1997).

Before the mid-1960s, communications circuits operated on the dedicated end-to-end concept of circuit switching. In July 1961, Leonard Kleinrock, a professor at Massachusetts Institute of Technology (MIT) published a paper on a concept termed packet switching. As opposed to circuit switching requirement for a dedicated circuit for a communications session, packet switching would break down message data into packets and be transmitted in pieces to be rearranged later by the receiver of the message (Internet Society, 2010). Utilizing the vision he described by Licklider and the packet switching concept Lawrence Roberts was able to connect a computer in Massachusetts to one in California through a dial-up line (Leiner et al., 1997).

Roberts now realized that computers could communicate through packet switched networks, but how difficult it was and the need for in depth research on a full-scale implemented network. A “request for proposal” (RFP) was released which sought a network that consisted of four interface messages processors (IMP’s - essentially the first routers). The RFP stated that once this four-node network proved successful it would expand to 15 nodes. A researcher at Bolt, Beranek and Newman Corp. (BBN) won the contract that sought the development of the IMP’s themselves (Beranek, 2000). UCLA, the Stanford Research Institute, the University of California at Santa Barbara and the University of Utah all received contracts to act as host sites (Beranek, 2000). UCLA installed the first IMP host site in September 1969 quickly followed by the second IMP at the Stanford Research Institute in October. On October 3, 1969 the first message was passed and network communications was born (Internet Society, 2010). By December 1970, the Network Working Group (NWG) led by Steve Crocker had finished what the group termed the Network Control Protocol (NCP), the host-to-host communications protocol of the ARPANET and predecessor to TCP. By this time, the ARPANET had added several different

host sites and with the advent of a communications protocol researches at these host sites could begin developing applications that would run over the ARPANET (Leiner et al., 1997).

Despite the successful implementation of the ARPANET, by 1972 the difficulty in establishing a node and the limited return of capabilities on an investment in establishing a node meant that the ARPANET was not growing as quickly as anticipated. Two things occurred that year which made the ARPANET more popular. In October 1972, Bob Kahn hosted a large public demonstration of the ARPANET at the International Computer Communication Conference (ICCC); the demonstration was successful and raised the level of awareness of ARPANET capabilities (Kleinrock, 2008). The year 1972 also saw the release of an application with great utility that made the presence of a network over which it could run very important. Ray Tomlinson, also a researcher at BBN, released his e-mail application, at first to make coordination efforts over the ARPANET easier, but other uses for e-mail quickly surfaced. These two events turned the tide for the ARPANET and things quickly grew from there (Beranek, 2010).

### 2. Vint Cerf / Bob Kahn and Transmission Control Protocol (TCP)

ARPANET was a single network composed of nodes all communicating through via the NCP. The Internet we know today is a group of networks with internal communication assigned accordingly by their network managers, but still able to communicate with all the other networks on the Internet which may be using a different internal communication protocol. This type of flexibility was not utilizing simply NCP as the communications protocol and an alternative was necessarily developed. Bob Kahn introduced the idea of open-architecture networking while working at DARPA in 1972. His ideas on the subject relied on four rules that were critical to the development of the Internet:

- Each network would stand independent and no internal changes would be necessary for that network to connect to the Internet
- Delivery of packets was on a “best-effort” basis and if a necessary packet did not arrive at its destination, it would be retransmitted
- Networks connections consisted of “Black Boxes,” later called routers, and these routers would perform no other tasks beyond forwarding packets. Their simplicity reduced the overall complexity of the network
- There would be no overarching control at the operational level (Internet Society, 2010).

In 1973, Kahn realized that in order to implement his ideas on open-architecture networking he would need to understand how to interface his networking protocol with the operating systems involved. Vint Cerf had been involved with the development and implementation of NCP and had an understanding of how to interface networking protocols with operating systems. Together Cerf and Kahn collaborated and wrote the paper that formed the foundation for the networking protocol in widespread use still today. The paper titled “A Protocol for packet network interconnection” published in May 1974, initially described a protocol that relied completely on TCP. Later in order to allow applications to defer using the advantage of the capabilities of TCP, the concept of Internet Protocol (IP) and was now termed TCP/IP. Three groups led by Cerf at Stanford, Tomlinson at BBN and Peter Kirstein at the University College London. This began a long-term development of the specifications of TCP, but by 1980, TCP/IP was the defense standard and ARPANET transferred from NCP to TCP/IP in 1983. It is important to note that TCP/IP’s designed focused on supporting large computers on time-sharing systems. Many worried that TCP/IP would be too complex to operate when desktop computers first appeared in the networks running this protocol (Leaner et al., 1997). One event that cemented TCP/IP’s use worldwide occurred when, in 1985, Dennis Jennings

who was leading the NSFNET announced that TCP/IP would be mandatory on that network. By 1990, TCP/IP had become for all practical purposes the defacto standard on most worldwide networks (Internet Society, 2010).

### 3. The Internet's Leaders and Guiding Bodies

Since its inception, the innovators who designed the protocols and ideas that formed the Internet have worked closely together in the spirit of innovation and this has been integral to the success the Internet has seen. Several advisory boards began arising as early as the 1970s to act as the steering guidance of the Internet; the following is a list of some of those boards, their leaders and its purpose:

- 1970s International Cooperation Board (ICB) formed by Vint Cerf and led by Peter Kirstein to coordinate with European Companies
- The Internet Configuration Control Board, also formed in the 1970s to assist Vint Cerf in the now exploding number of issues surrounding the growing Internet
- In 1983, The ICCB was replaced with a number of different committees led by the Internet Activities Board (IAB) at DARPA
- The Internet Engineering Task Force (IETF) was formed in 1985 as one committee supporting the IAB, engineering quickly became vital to Internet growth and the IETF quickly became a major Internet steering group
- The Internet Society was formed in 1992 and the Internet Society, the IAB and the IETF each formed a niche in guidance of the Internet (Internet Society, 2010).

Throughout the years of its development, these groups openly collaborated and made the decisions that would mark the Internets future. These groups and the individuals who were the leaders have deep-seated feelings about their responsibility about the well-being of the Internet and their authority in

making decisions about its future. Due to perhaps partly their deep-seated feelings about the perpetuation of the Internet in its initial form, many of the innovators of the early Internet are some of the strongest proponents of some regulation.

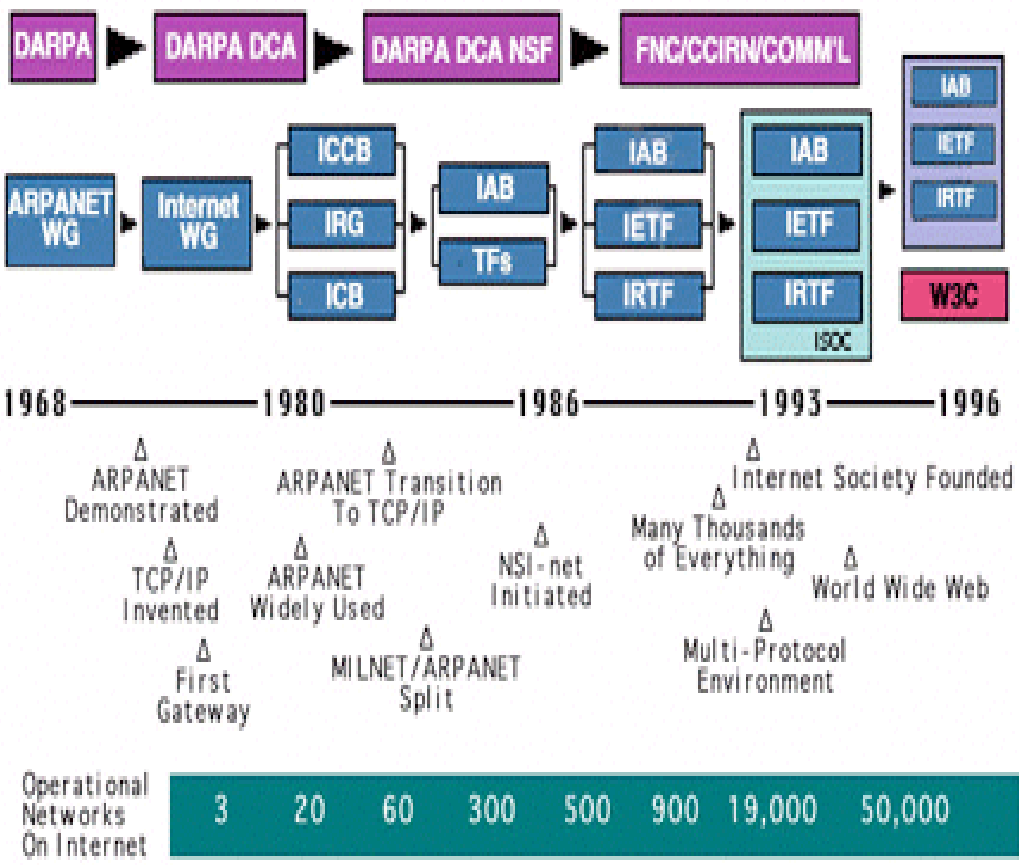


Figure 1. Internet Milestones (From Internet Society, 2010).

## D. CHAPTER SUMMARY

This chapter began by describing historical telecommunications regulation and the changes that occurred with the advent of computer networking. This new type of service, deemed separate from traditional common carriage, was termed “Information Services.” The Computer Inquiries 1–3 were rulings by the

FCC, which outlined their position on information services, and all three of these rulings strengthened the position of Information Services as an unregulated or lightly regulated service.

Technology advanced and soon FCC rulings and court cases would determine whether Internet service obtained from cable companies or over phone lines (DSL) was an information services or would be subject to regulation as a common carrier. In both instances, the result would ensure that Internet service in general, including via cable or through DSL, was an unregulated service. Until this point all FCC rulings and the results of all the court cases that considered these cases had ruled in favor of no regulation or light regulation of high-speed Internet service. However, the same day in 2005 that DSL was deregulated, the FCC also released their Internet Policy Statement that set forth the set of rights the FCC expected that consumers who received Internet service from a provider could expect. This marks a turning point in how the FCC would handle the regulation of access to the Internet and is the first attempt at regulation. The four rules comprising the policy statement also compose four of the six rules set forth in the Notice of Proposed Rulemaking the FCC proposed in 2009.

The chapter ended by outlining the historical achievements that formed the beginnings of the Internet, along with those achievements that ensured its growth. When Bob Kahn was first conceiving the concept that would become TCP, the term that formed the basis of his idea was “open-architecture networking” and the fourth key concept in his idea stated there would be no global control at the operations level. Kahn placed a great deal of importance on maintaining an open Internet with no global control when he designed TCP. He and other scientists had worked together for years in an open and collaborative environment to ensure the Internet’s early success. Considering the collaborative environment the Internet was conceived in, it is no wonder that some of these individuals are some of the greatest proponents of enacting regulation that ensures the Internet continues to operate as a neutral network.

# III. THE FCC

The Federal Communications Commission is the government agency that has regulated telecommunications in the United States since 1934. Since the advent of computer networks, their duties have included regulating the flow of data over computer networks and these new duties have put them at the center of the network neutrality debate. Other government entities, including Congress or the court system exist that could take an active role in any regulation imposed on network providers but it is the FCC, that today, is taking the lead in attempting to impose regulation. This chapter will investigate several aspects surrounding the FCC organizationally and will include discussions on the following:

- the origins of the FCC and its evolution;
- the regulatory history of the FCC, including the decades long relationship with AT&T, the biggest telecommunications force of the 20th century and other examples of FCC regulatory oversights
- A discussion of The Telecommunications Act of 1934 and 1996.

## A. ORIGINS AND BACKGROUND OF THE FCC

The Telecommunications Act of 1934 created the Federal Communications Commission. At inception the FCC was designed to provide oversight to both wireless (radio) and wired (telephone and telegraph) communications. Prior to 1934, the FCC been preceded by the establishment of the Federal Radio Commission (FRC) which acted under the auspices of the 1927 Radio Act. This act had nationalized the electromagnetic spectrum within the United States due to the growing number of disputes involving the ownership of spectrum allocated for radio stations. Radio was the overwhelming focus of the fledgling FCC; however, the original agenda of the FCC did include wired communications (Huber, 1997). Since 1934, when the FCC's scope was mainly to provide oversight to wired and wireless communication, the

telecommunications world has become greatly more complex the duties of the FCC have expanded greatly. Today, the current agenda of the FCC includes the following categories of regulation of interstate and international communications in the 50 states, the District of Columbia, and U.S. possessions:

- Radio;
- Television;
- wire;
- satellite;
- and cable

The leadership of the FCC consists of five commissioners, that are appointed by the President and which normally serves a five-year term. One of the five commissioners is also selected by the President to act as Chairperson (Furchtgott-Roth, 2006).

## B. REGULATORY HISTORY

Businesses understand that regulatory policy is sometimes necessary in order for the government to ensure fair competition between competitors as well as between businesses and their customers. Problems arise for business when the regulatory policy is vague or its effects are not consistent with their intentions. When making judgments concerning the effectiveness of any regulatory body, including the FCC, it is helpful to have a set of criteria with which to form one's judgment. Jonathan Nuechterlein and Philip J. Weiser in their book: *DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET AGE,* suggest a set of four values that an organization, creating policy serving a regulatory purpose, should follow. The values listed include:

- determinacy - developing rules that can be readily ascertained and predictably applied;
- expertise - decision-making institutions have a complete understanding of the technologies involved and the industry;
- neutrality - The regulatory organization maintains a primary focus on maximizing consumer welfare; and
- Humility - an inclination to "respect the market's ability to enhance consumer welfare" and "to give due regard to the unpredictable course of technological and economic change (Nuechterlein & Weiser, 2007).

The following examines the consequences of decisions made by the FCC where the organization has either overstepped its bounds, wasted money and/or time unnecessarily along finally instances where the results of its decisions brought about results different from what were intended. Examples of these missteps occur throughout the history of the FCC, but for the purpose of this examination, these examples are grouped into these areas:

- The FCC's relationship with AT&T;
- The FCC's actions in company mergers;
- The FCC's interaction with the judicial system; and
- Misinterpretation of the Telecommunications Act.

### 1. The FCC and AT&T

Throughout most of its history, the FCC has had the regulation of AT&T as one of its major duties; oversight of AT&T. Examining this relationship gives a chronological record of actions taken by the FCC that had negative effects on AT&T, telecommunications consumers, taxpayers and the telecommunications

industry as a whole. The following is a chronological list of actions taken throughout the FCC and AT&T relationship that illustrate these actions. The following will be specifically discussed:

- A formal investigation of AT&T begun in 1934
- Actions that dictated AT&T's business practices during World War II
- AT&T v. Harry Tuttle and the Hush-a-phone
- Attempted breakup of AT&T & Western Electric in 1949
- The FCC's move away from AT&T being a regulated monopoly
- The Carterfone case
- The 1980s breakup of AT&T

By 1934, AT&T was already a major telecommunications company and when Congress signed the Communications Act of 1934 and created the FCC one of the new agencies major duties was to oversee the dealings of AT&T. In performance of these duties and at the request of Congress, the FCC conducted the first of two formal investigations of the AT&T in 1935. At the time, phone service was considered a natural monopoly and FCC decisions supported AT&T remaining a monopoly for several decades. Specifically in 1935 however, neither Congress nor the FCC offered no reason for the formal investigation that:

- Dragged on until 1938;
- Cost the government two million dollars;
- AT&T one and a half million dollars;
- Resulted with no formal recommendations for change.

Oversight of companies, especially companies as large as AT&T in the 1930, and investigations are a part of this oversight. However, actions of the magnitude describe should be justified, be conducted as quickly as possible and should preferably uncover some reason to justify the investigation in the first

place. This investigation however, is the beginning of a long series of questionable FCC actions in its dealing with AT&T (Lundy, 2008).

A factor that cannot be overlooked in applying telecommunications regulation is whether the regulation will have its intended effect and only its intended effect. Less than a decade after the initial investigation of AT&T, the FCC again intervened in the business dealings of AT&T. In this instance, the FCC's intentions were for the good of the country but the results of their regulation were not what were initially intended. AT&T's network, following the Great Depression and at the beginning of World War II, was in dire need of repair and the company needed to improve its capital position in order to do so. The FCC's policies, during this period, concerning long distance rates however would prevent this. In the name of increasing capacity for calls supporting the war effort, the FCC initiated price cuts on long distance service. These cuts produced a disproportionate increase in demand for long distance and the already diminished network was unable to support the demand. Thus, in an attempt to regulate prices and increase the capacity for long distance calls in support of the war, the opposite effect occurred (Lundy, 2008).

Another aspect of the FCC's regulatory style is its disregard for quick resolution to conflicts unless it suits the agency. In the 1940s, AT&T had a very restrictive policy, referred to as the foreign attachments tariff, against any hardware, except AT&T produced hardware, being placed on its network. The FCC was presented with a challenge to this tariff in 1950 by an inventor by the name of Harry Tuttle. Mr. Tuttle had produced a very simply device referred to as the Hush-A-Phone which fit over the mouthpiece of a phone and prevented conversations from being overheard. This device had no electric parts and was simply a cup that fit over the mouthpiece and muffled conversation. The FCC allowed AT&T's tariff to remain in place five years before finally deciding against Tuttle and upholding AT&T no foreign attachments policy. Subsequently, Tuttle took his case to court and the U.S. Court of Appeals ruled in his favor. This opened the door for the consideration of other foreign attachments to gain

access to the AT&T network. However, the FCC, in what could be considered open opposition to the court's ruling allowed AT&T to rewrite their policy in such a restrictive manner that essentially nothing had changed for those seeking access (Lundy, 2008).

Other unintended consequences caused by regulatory bodies are not immediately realized and this is the case in reviewing the result of a lawsuit begun in January 1949 when the U.S. Department of Justice filed suit against AT&T and its equipment supplier Western Electric. Western Electric was the sole supplier of equipment to AT&T and the suit claimed the exclusive relationship created a lack of competition and sought to break Western Electric apart and separate it from AT&T. The result, which again took over 5 years to come about, of the suit, was a compromise and at the time both sides considered the outcome fair. One of the restrictions placed on AT&T however stated AT&T was restricted to the common carrier telecommunications market. At the time this was an acceptable consequence however, later when the computer industry began what it would become today; AT&T's inability to enter this market would critically limit the company (Lundy, 2008).

Consistency in regulation is also important to the regulated business and consequences can occur when a regulating body changes course too rapidly. While the FCC had been the regulating body of AT&T since 1934, it had done so as the regulator of an accepted monopoly and its regulation sought, usually unsuccessfully to benefit consumers and AT&T equally. The FCC's ability to protect AT&T from competition was questioned in the 1950s when two small companies applied for licenses from the FCC to set up microwave radio systems for internal company communication. AT&T opposed the application stating it would unfairly limit their revenue. The FCC in the end granted the licenses and again this could appear at the time as a small event. In retrospect, it can be seen that it essentially, without intentionally doing so, was the beginning of the end of AT&Ts regulated monopoly (Lundy, 2008).

Another unintended consequences resulting from FCC regulation occurred during the 1960s. In this case, the unintended consequence actually changed the market of the entire telephone hardware industry. The Carterfone was a device that connected a radio to the AT&T network and allowed oil workers to access the phone network in remote locations where only radio was available. The device violated AT&T's "no foreign attachment" policy whereby no other devices besides AT&T hardware would attach to the AT&T network and at the time, AT&T this policy meant that AT&T produced all the actual telephones that resided on the network. The FCC issued its ruling on the Carterfone in 1968 with the intention of now allowing "foreign attachments" to touch the AT&T network. It was in no way their intention in allowing foreign attachments to allow telephones made by other suppliers to be resident on the network. However, in interpretation of this ruling, customers could now attach the phone of their choice, instead of an AT&T proprietary phone only, to the network (Lundy, 2008). With absolutely no intention of doing so, in this very specific ruling, the FCC unintentionally altered an entire industry and now AT&T would compete with other phone suppliers for this market.

After having protected AT&T as a regulated monopoly since the 1930s; actions were initiated on October 27, 1965, that would end that relationship and result in the breakup with AT&T. The FCC initiated a formal investigation in 1965 initially intended to reevaluate how the FCC performed its regulatory actions over FCC and whether their policies should change. During this period, AT&T was further involved in a legal battle with MCI and finally ten years later in November 1974 the U.S. Department of justice filed suit against AT&T claiming AT&T was in violation of antitrust law. The most significant result of this case was the breakup of the AT&T from its 22 Bell operating Companies. Important for a discussion of the FCC is that one of the main intentions of the breakup of AT&T was the creation of a competitive environment. Competition in the long distance and communications hardware markets meant the FCC no longer was required to maintain regulatory oversight of AT&T and AT&T should have at this point

been an unregulated company. The FCC had never been consulted directly on this however and in what can be seen as perpetuating their role in the industry it maintained a strict regulatory position over AT&T even in light of a U.S. Department of Justice ruling (Lundy, 2008).

Even in the drafting of the documents from which the FCC draws its jurisdiction and with express intentions, it is difficult to determine the outcome. The passage of the Telecommunications Act of 1996 was highly anticipated and most thought its intentions of limiting regulation, creating competition and spurring investment would soon follow. However, whether it is due to poor language within the act, the FCC's implementation of the Act, a combination of these two, or any of a host of other possible reasons; the act has not lived up to expectations. In their 2008 paper entitled "A Critical Evaluation of Telecommunication Act 1996," Kashif Azim Janjua, Sahibzada Ahmed Noor and Shahzada Alamgir Khan seek to examine the success or lack thereof of the Telecommunications Act of 1996. As mentioned earlier, one of the Acts intended purposes is increasing competition in telecommunications markets, specifically to include local telephone markets. The research of Janjua, Noor and Alamgir seeks to document the perceived lack of competitive benefits realized after the Act took effect. The author's data shows that competitive entrants into the local phone market have achieved only a small gain in market percentage. It further shows competitive entry into the market has spurred only a small increase in infrastructure investment and that the Regional Bell Operating Companies (RBOC's) that represented a near monopoly before the Act, have reorganized and are now approaching the same position AT&T occupied prior to the Act (Janjua, K. A. et al., 2008).

### 2. Merger Oversight

According to United States Law, the merger/acquisition of companies of sufficient size are subject to review under anti-trust law by the Department of Justice (DOJ) and the Federal Trade Commission (FTC). No written law or

statute affords the FCC any authority in reviewing mergers or acquisitions. The Telecommunications Act of 1996 actually weakened the FCC's status in reviewing major mergers by changes Congress made in the act specifically removing its authority regarding mergers. The FCC remains a force in mergers, however, through its license transfer authority. Through this authority, instead of being officially involved in the merger process it interjects itself by refusing to grand licenses it controls, which will be required after a merger is complete. Thus, the FCC is able to delay (it rarely if ever disapproves) the merger or acquisition of companies until the conditions for the merger meet with the FCC's approval. Besides ensuring that the merger is completed under circumstances satisfactory to the FCC, as opposed to satisfactory, to the two companies involved and the needs of the consumers, the delay experienced before the FCC agrees to the merger is often far longer than would normally be expected if left to the anti-trust laws, the DOJ and the FTC. To illustrate, the Telecommunications Act of 1996 includes language that seeks to limit the delay in any regulatory decision made by the FCC to 90 days; between 1997 and 2002, the average delay in an FCC license transfer application pertaining to a merger was over 200 days. A specific example involved one of the biggest mergers of the late 1990s involving the Bell Atlantic and Nynex merger. In this case, the FCC took 479 days before finally approving its license transfer proceeding.

This kind of regulatory behavior violates at least two of the aforementioned criteria important to maintaining a competitive environment. The simple injection of the FCC into the merger process along with the delay created until the FCC is satisfies creates uncertainty and is in contrast to a determinate regulatory policy. Additionally, the imposing of conditions favorable to the FCC also violates the humility criteria by assuming that the will of the two companies involved and market conditions will not decide if this merger should be successful. Finally, if the FCC's requirements for the merger actually increase cost or decrease quality for the consumer the neutrality principle is broken (Furchtgott-Roth, 2006).

### 3. Judicial System Interaction

As stated earlier, investors and businesses base their actions on existing forces that could include telecommunications policy that is currently in effect or policy anticipated in the near future. Historically speaking, interpretation of the documents that the FCC base their policy recommendations (the Telecommunications act of 1934 and 1996) has created numerous cases of uncertainty where investment or innovation was slowed or stopped until an issue was resolved. These instances become most detrimental when the FCC chooses to investigate a company or industry or when it becomes necessary for either party involved to take a matter to court. The following sections will illustrate a number of instances where FCC intervention was detrimental to a company or industry.

When the FCC and business become involved in more than just a formal investigation of practice; rulings made by the FCC will often need to be reviewed by the court system. The reasoning behind the need for court intervention is often interpretation of the law governing regulation; currently the Telecommunications Act of 1996. The Act was written with the best intentions of clarifying telecommunications regulation, decreasing regulation and increasing competition and passed at a time when both business and government were unhappy with the status quo and felt change was needed. The actual stated purpose of the Telecommunications Act of 1996 stated within the Document is:

> To promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications qconsumers and encourage the rapid deployment of new telecommunications technologies. (Telecommunications Act of 1996, 1996)

Harold W. Furchtgott-Roth served as a commissioner of the FCC from 1997 through 2001, in his book *A Tough Act to Follow? The Telecommunications Act of 1996 and the Separation of Powers,* he provides a host of examples of court cases that took place between 1996 and 2002 related to telecommunications issues and initiated due to FCC intervention. He examines

these cases and identifies two periods of uncertainty businesses experience when FCC rulings come into question. The first period of uncertainty for business begins when the FCC issues a ruling on an issue and ends with a court decision that contradicts the FCC stance. The second period of uncertainty begins when the FCC attempts to reaffirm its stance and ends with a decisive court ruling or in many instances remains unresolved. In cases where the issue remains, unresolved business remains unclear in its direction. FurchtGott-Roth lists eight telecommunications issues where uncertainty is an issue. Only three of the examples eventually had definitive rulings issued and the shortest time to a definitive ruling was four years. Harold Furchtgott-Roth claims these delays are due to the non-determinate nature of the Telecommunications Act of 1996 and the structure of the FCC. He argues that the FCC's dual enforcement and adjudication nature will continue to create issues with unclear resolution until a change occurs in the FCC's makeup (Furchtgott-Roth, 2006).

#### 4. Misinterpretation

Interpretation of the Telecommunications Act of 1996 is historically one of the FCC's biggest shortcomings in its regulatory nature. One of the most egregious examples of the FCC's misinterpretation of the Act is its interpretation of the language that created the Schools and Library Program. Even Congress was amazed at what came of language in the Act meant to provide a discount on telecommunications services to schools and libraries. The following is the exact language in question from the Telecommunications Act of 1996:

> (B) EDUCATIONAL PROVIDERS AND LIBRARIES- All telecommunications carriers serving a geographic area shall, upon a bona fide request for any of its services that are within the definition of universal service under subsection (c)(3), provide such services to elementary schools, secondary schools, and libraries for educational purposes at rates less than the amounts charged for similar services to other parties. The discount shall be an amount that the Commission, with respect to interstate services, and the States, with respect to intrastate services, determine is appropriate

> and necessary to ensure affordable access to and use of such services by such entities. A telecommunications carrier providing service under this paragraph shall—
>
> (i) have an amount equal to the amount of the discount treated as an offset to its obligation to contribute to the mechanisms to preserve and advance universal service, or
>
> `(ii) Notwithstanding the provisions of subsection (e) of this section, receive reimbursement utilizing the support mechanisms to preserve and advance universal service. (Furchtgott-Roth, 2006)

The language is vague; making interpretation difficult is a common criticism of the Telecommunications Act of 1996. However, as is evident, the intent of the above language is not vague and it is very clear that Congress simply meant for schools and libraries to have a discount on telecommunications services and those providers offering these discounts, reimbursed. From this, however, the FCC suggested a $2.5 billion-funded program that supplemented the Universal Service program and subsidize schools and libraries. The FCC's misinterpretation—discovered, debated and even taken to court—remained in place because by that time political support for a program never intended had grown, companies opposing the program were fearful of FCC reprisal and Congress did not have sufficient time to debate its existence. The most significant impact from this program was to the telecommunications providers forced to fund the $2.25 billion that the program finally became from intentions meant simply to provide a discount to schools and libraries on telecommunications service. This example is a breech to the principle of humility discussed earlier. The FCC's actions in this case clearly show its disbelieve that markets will take consumer welfare into account by creating a program clearly not intended by congress and in the face of congress' opposition (Furchtgott-Roth, 2006).

## C. THE TELECOMMUNICATIONS ACT AND NETWORK NEUTRALITY

As previously stated, the legal document from which the FCC draws its authority is the Telecommunications Act of 1934, amended by the Telecommunications Act of 1996. The 1934 Act gave birth to the FCC and served as the governing document for nearly 60 years. By the mid-1990s, however, both business and government were frustrated with the state of telecommunications regulations and in 1996 substantially amended the Telecommunications Act of 1934 and passed the Telecommunications Act of 1996. These documents, written and passed by Congress, sub-divide into six "Titles," which spell out the regulatory policies of different mediums. Title I is "miscellaneous." It states the purposes of the FCC, its mission, how it is organized, etc. and contains a set of definitions. Title II governs communications services of common carriers. Title III governs spectrum licensing and licensees, including mobile radio, DBS, radio and television stations. Title IV is not concerned with a specific medium, but instead dictates procedural and administrative provisions. Title VI governs cable communications, and contains a list of definitions pertinent to its provisions.

In a discussion of the FCC's authority concerning network neutrality regulation; Title's I and II are those with which to be concerned. The computer inquiries had classified high-speed Internet as a lightly regulated "information service"; the Telecommunications Act of 1996 maintained this stance and placed high-speed Internet under Title I. This is an important point, because it announced the intention of Congress that high-speed Internet not be a regulated medium, at least not regulated in common carrier status. If instead, Congress had classified high-speed Internet as common carriage and a Title II service, it would be subject to common carriage regulation, but this is not the case. The FCC in its 2005 Internet Policy Statement and its 2009 Notice of Proposed Rulemaking, which seeks to expand the 2005 policy statement, are relying on "ancillary jurisdiction" over a Title I service. Ancillary jurisdiction is a regulatory and judicial creation said to arise under Title I, but necessarily exercised in

furtherance of a regulatory mandate contained elsewhere—e.g., in Titles II, III or VI. Whether the FCC has the authority to regulate high-speed Internet resides in Chapter V, but for now, it was necessary to provide some background in examining the Telecommunications Acts of 1934 and 1996 (Esbin, 2009).

## D. CHAPTER SUMMARY

The FCC is a standalone federal agency created through Congress' passage of the Telecommunications Act of 1934. The amendment of this act in 1996, passed with the intention of limiting regulation with in the telecommunications industry should have limited the power and scope of the FCC in its regulatory status. In reality, however, the opposite effect exists and the FCC's size, budget and scope have increased dramatically. This chapter sought to outline the history of the FCC since its inception and to document only a few of the missteps that have had major implications to both business and consumers. Harold Furchtgott-Roth, a former FCC chairman and from whom I gathered much of this information, believes he understands the problems associated with the FCC. His belief is that lack of effective oversight by Congress and lack of intervention by either the executive branch or courts creates an agency that has effectively sidestepped idea of separation of powers.

Debate is at hand today as to whether the FCC has authority to regulate access to the Internet. The Internet has become, over the last decade, a tool essential to nearly everyone, including business, academic and government interests and those who seek government regulation to ensure the perpetuation of network neutrality should consider the direction that desire is taking. The only foreseeable governmental response to blanket network neutrality regulation is through the FCC. Congress has, on numerous occasions, attempted and failed to draft legislation in the form of an independent law that would mirror the language in the FCC's NPRM and is unlikely to amend the Telecommunications Act in time to have a positive impact.

The FCC's Chairman Julius Genachowski, in his October 2009 address announcing the FCC's decision to seek adoption of its NPRM designed to describe how access to the Internet will be regulated in the United States, describes an FCC with only the best intentions for a "free and open Internet." The FCC's history, however, is filled with examples of good intentions that turned into examples of unnecessary delays, wasted money, misguided interpretation, unintended consequences and regulatory failures. Those who seek government regulation of the Internet should consider this history before adoption of this NPRM or any regulatory measure designed by the FCC that regulates access to the Internet.

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# IV. NETWORK NEUTRALITY REGULATION POSITIONS

There exist two sides to the debate surrounding the need or lack thereof for network neutrality legislation. One side includes the FCC, a number of the fathers of the Internet such as Vint Cerf, and individuals involved in telecommunications law, such as Tim Wu, who determine that without some sort of governmental regulation, the Internet will change based on inevitable business decisions made by broadband providers. The other side of the debate includes the broadband providers themselves, another group of individuals involved in telecommunications law such as Christopher Yoo, who believe regulation is unnecessary, and a third group that reasons that the current direction the government is taking in regard to how regulation will be conducted is first and foremost not legal. The final group's position grew stronger in April 2010, based on a decision in the *FCC v. Comcast* case. The U.S. Court of Appeals for the District of Columbia Circuit ruled against the FCC in this case, stating that the FCC did not have the proper authority to dictate the management decisions of a network provider. The judge in the case ruled that Congress had nowhere given the FCC authority to regulate the practices of network providers and that the 2005 Internet policy statement which the FCC had based their case against Comcast was insufficient as a regulatory document (Kendall, 2010).

The debate, surrounding network neutrality, grew, side by side with the expansive growth of the Internet and its importance on a day-to-day basis for so many people. However, parties on both sides of the debate essentially agree the concept of network neutrality or more directly that a policy of non-discrimination is valid and that in the majority of instances the Internet today is neutral. The essence of the debate today is what and/or if regulatory intervention is necessary in order to maintain the state of neutrality, we have already. If deemed necessary, the form that the regulation will take is also in debate. This chapter will examine the arguments of both sides of the debate. Examples will illustrate where a lack of competition has already led to activity detrimental to consumers

not just concerning network neutrality but also throughout the history of telecommunications. The argument that government regulation is unnecessary follows. This section will argue that blanket regulation of broadband providers will stifle investment in network growth and that the competition so many say is lacking is actually thriving. A third side, whether the FCC has the necessary jurisdiction as the agent of network neutrality regulation also exists completes the chapter. This section illustrates that nowhere in the Telecommunications Act of 1996 exists language that permits the FCC to regulate access to the Internet. Evidence presented in this chapter supports recommendations and conclusions that offered in Chapters V and VI.

## A. GOVERNMENT REGULATION PROPONENTS

The essence of the argument provided by those who support governmental regulation to ensure the perpetuation of network neutrality is that in the absence of government intervention broadband providers will begin to inject instances of discrimination of content for those utilizing their network. The discrimination in question could take any number of forms. Various forms of discrimination exist and include:

- the direct blocking of certain applications;
- simply favoring certain applications or websites;
- charging content providers to reach customers (access tiering);
- A policy of network providers that hides the specifics of their network management policies, referred to as a policy of non-transparency.

Without question, evidence of this sort of behavior by broadband providers exists. The most visible, and perhaps the example that most vigorously fuels the network neutrality debate, is the blocking of BitTorrent by Comcast. In this case Comcast had been, blocking or slowing the peer-to-peer transfer of large files between members of BitTorrent. The blocking was done without informing its

customers and indeed initially Comcast when confronted with allegations of this behavior denied them (Schatz, 2010). In this case, Comcast acted in the interests of limiting congestion on its network, but other reasons for discrimination exist. In 2006 testimony before the U.S. Senate Committee on Commerce, Science and Transportation Vint Cerf, inventor of Internet Protocol specifically points out the FCC's ruling that the Madison River Telephone Company's blocking of ports used to access Voice over Internet Protocol services through the company's DSL service (Cerf, 2007). In this case, the Madison River Telephone Company was not blocking VoIP applications in order to ease congestion on its network. Instead, it was acting to gives its own telephone service a competitive advantage over the less expensive VoIP technology.

### 1. Lack of Broadband Competition

Those seeking broadband regulation have as their goal, preventing instances of discrimination by network providers. One theory this group offers suggests discrimination will inevitably exist due to a lack of broadband competition in the United States. Tim Wu in his 2006 testimony illustrates 2004 data from the FCC showing that, at that time, 94 percent of Americans had zero, one, or two choices for broadband access. Figure 2 is the actual map from the FCC website showing the United States broadband choices nationwide in 2004. Along with the FCC data, a quote from the conclusion of his testimony illustrates Tim Wu's depth of concern for the level of competition in the broadband market:

> This Mission-protecting consumer choice against market power- is a minimum and appropriate role of government. I would not be here if there were five broadband providers, each competing to give customers the best and fastest service possible…..The problem is the lack of choice in this market. (Wu, 2006)

Proponents of legislation argue this lack of competition will subsequently create market concentration providing the necessary financial motivation for discrimination to exist. Strengthening this position are several instances of

discrimination that have violated network neutrality's guidelines already as well as examples throughout the history of telecommunications that exist to support the claim. Comcast's blocking of BitTorrent and Madison River Phone Companies blocking of VoIP ports most closely associated with network neutrality. In his 2006 testimony, Tim Wu argues that incidents of this type are not specific to the Internet and offers historical precedent illustrating the early telegraph industry where Western Union formed an exclusive partnership with the Associated Press. This exclusive partnership prevented the growth of fledgling news sources. Wu additionally points out AT&T's anti-competitive behavior during the mid-twentieth century, which prevents the use of any hardware other than hardware produced by AT&T on its network.

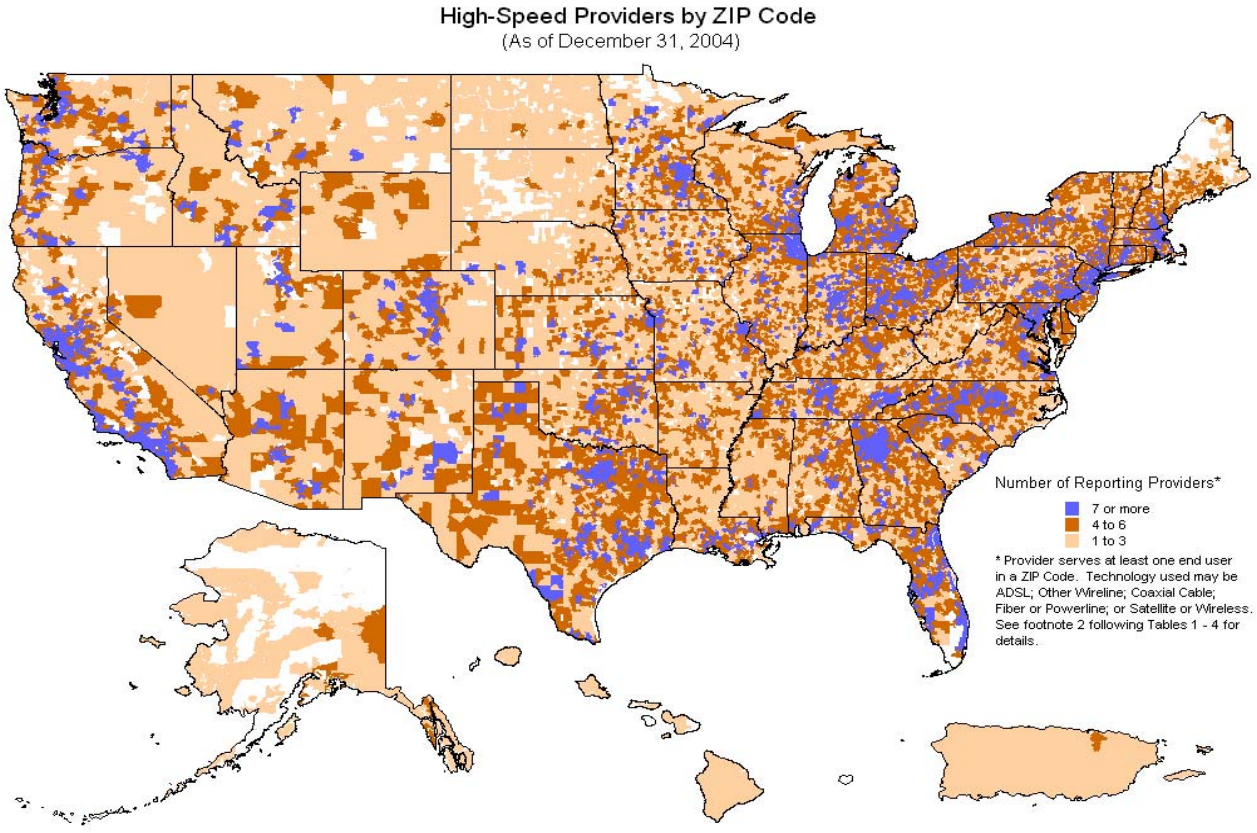


Figure 2. Broadband Options Nationwide 2004 (From Broadband Competition 2004)

### 2. Access Tiering

Another fear that spurs the need for network neutrality regulation for some is the concept of creating separate Internet domains. This theory would have broadband providers creating a separate network that would charge fees to content providers in order for the content of their websites to travel on a faster network. Those who oppose this type of separate network environment see this as more than just broadband providers charging more for a better service. Under this sort of system, content providers pay a fee to be on the faster network. Those opposing a separate faster network point out that today anyone with an innovative idea or intelligent thought to express can post this on the Internet and it will reach anyone wishing to use it or view it. Under this tiered Internet design, if someone has a great idea or thought and wishes it to reach as many people as possible as quickly as possible, they will want to place their content on the faster network which would now not be free. Vint Cerf, in his 2006 testimony to Congress, spoke on the subject of access tiering believing the concept is contrary to the founding principle of end-to-end design:

> Allowing segmentation of the broadband networks into capacious 'broadest-band' toll lanes for some, and narrow dirt access roads for the rest, is contrary to the design and spirit behind the Internet, as well as our national competitive interests. And by definition, favoring some disfavors others …. (Cerf, 2006)

Cerf, along with Tim Wu, also point out that the content providers, that would be forced to now pay a fee to reach the most possible customers are in no way customers of the broadband providers they would be paying. The customers of the broadband companies are the individuals utilizing the bandwidth to view the content of the innovators who create the content on the Internet. The following is Tim Wu discussing the concept of charging companies to reach customers in a debate with Christopher Yoo in the Federal Communications Law Journal in 2007:

> Second, access tiering is another word for charging companies a termination fee—a fee to reach customers of the service provider in question...If you can generate revenue by charging content providers to reach customers, as opposed to charging for bandwidth something happens. The incentives become mixed, as the provider gains an incentive to maintain a level of scarcity and thereby maximize gatekeeper revenue. (Wu, 2007)

Lawrence Lessig is one of the staunchest advocates of the need for network neutrality regulation and in a June 2006 *Washington Post* article, he points out that the neutrality that existed in the early Internet, and survives today is the driving force that made the Internet the incredible tool it has become. This quote from the article illustrates how he believes access tiering will affect the Internet:

> Without net neutrality, the Internet would start to look like cable TV. A handful of massive companies would control access and distribution of content, deciding what you get to see and how much it costs. Major industries such as health care, finance, retailing and gambling would face huge tariffs for fast, secure Internet use -- all subject to discriminatory and exclusive deal making with telephone and cable giants. (Lessig, 2006)

The arguments of Vint Cerf, Lessig, Tim Wu and others who oppose this sort of separate network design do not advocate that broadband providers not be able to charge their customers for enhanced service. They do state that access tiering will cost the consumer more as content providers pass on increased costs but increased cost is not the basis of their argument. Instead, their belief is that by charging content providers a fee to reach the most viewers, what will now exist is an Internet that looks increasingly how major broadband companies want it to look, because those willing to pay broadband providers the most for the fastest access to their networks will have a competitive advantage. The central theme however, for those who oppose the idea of access tiering, is the gradual erosion of the innovation that has made the Internet what it is today. In other words, removing the decision making in regard to what will thrive on the Internet from the hands of the people and placing it in the hands of the broadband

providers not only violates the end-to-end principle on which the Internet was founded, but alters the Internet from a creative tool and turns it into a billboard.

## B. GOVERNMENT REGULATION OPPONENTS

Those who determine network neutrality regulation is unnecessary and/or potentially harmful along with those that believe the manner in which the government is pursuing regulation of access to the Internet has no legal document as its basis, argue the other side of this debate. Their arguments consist of several points including:

- Industry-wide rules regulating access to the Internet are unnecessary and potentially harmful;
- Sufficient competition in broadband market does exist to prevent network neutrality missteps;
- The rules as suggested in the FCC's NPRM would have a negative impact on broadband investment and employment.

The essence of their argument is that the Internet as it exists today is essentially neutral and it is unclear if blanket regulation will even have the desired effect of ensuring the Internet as it is today.

### 1. Regulation Unnecessary and Outcome Unclear

Broadband providers, in general, are not opposed to the concept of network neutrality on the Internet. Shortly after the October 2009 release of the FCC's NPRM, AT&T released the following statement on the public policy page of its website:

> AT&T shares both President Obama's and Chairman Genachowski's vision of an open Internet-an Internet with a level playing field that benefits consumers and stimulates investment, innovation and jobs. (AT&T.com, 2009)

While that public statement seems to point out AT&T's desire to work with the government to perpetuate network neutrality, earlier in October AT&T had

urged its employees to weigh in on the FCC website against the NPRM as written. In a letter from Jim Cicconi (Senior Executive Vice President-External and Legislative Affairs for AT&T), AT&T urges its employees to point out to the FCC arguments including:

- The existing fierce competition for wireless and broadband customers;
- The need for network providers to manage their networks in the best interests of their customers;
- The rules in the NPRM will jeopardize instead of aiding the goals the Obama administration is trying to achieve;
- And that the FCC shouldn't burden the broadband industry, but if it does it needs to do so fairly and that any new rules should apply equally to network providers, search engines and other information providers (Chasik, 2009).

This last request stems from an incident earlier in 2009, which highlights one of the frustrations network providers have with regulation. AT&T had pointed out in September 2009 that Google, one of the loudest voices in the call for network neutrality regulation, had openly violated the FCC's existing principles with actions taken by its Google Voice application. Google Voice had been blocking calls made by its users to certain rural areas, thus reducing its costs. Its competitors are prohibited from acting in this manner by Title II of the Telecommunications Act. Google Voice justified its blocking of these calls by proclaiming itself "not a traditional phone service and shouldn't be regulated like other common carriers". AT&T offered this example to illustrate that the rules as written because they are aimed only at network providers would put the network providers at a competitive disadvantage.

The eventual effect of the regulation, as proposed, is also unclear. Within months of the FCC's announcement of its NPRM, groups that should benefit from the existence of network neutrality rules began expressing concern with the wording of the NPRM. In January 2009, Netflix pointed out their concern with the

"managed services" portion of the NPRM, which Netflix believes would allow network providers to continue to act in the best interests of their networks to optimize bandwidth (Lasar, 2009). The Electronic Frontier Foundation (EFF) takes that argument one-step further. The EFF points out that the NPRM's current wording would not block, but would instead justify the behavior it was trying to prevent. Network providers claiming to act under the premise of "reasonable network management" would then be permitted to partake in the same type of behavior, as did Comcast when it blocked BitTorrent traffic (Esguerra, 2010). These last two examples come from groups that seek to maintain network neutrality. Coupled with the network providers' fears that industry-wide regulation of access will create uncertainty that is destined to curb investment in additional broadband infrastructure, a strong case is presented in opposition of regulation.

### 2. Broadband Competition Today

Proponents of network neutrality regulation have as one of their strongest arguments that a concentration of market power due to a lack of broadband competition creates the motivation for broadband companies to violate the principles of network neutrality. Provided earlier was the FCC's data that illustrated the number of providers of broadband service as of 2004. Figure 4 and Figure 5 illustrate a comparison of the 2004 data with new data current as of December 2008. An examination of the data shows it is clear that while broadband competition is not fully developed nationwide, it is certainly growing and sufficient (more than one or two available providers) competition among providers exists in a majority of the United States. These maps are data representing fixed broadband providers, the rapid growth of wireless broadband providers must now also be taken into account, and Figure 5 is the December 2008 representation of wireless providers in the United States. Table 1, also from the FCC's Web site, is evidence of the variety available—not only in provider, but in the technology used to access the Internet—and lists nine options for consumers requiring broadband access.

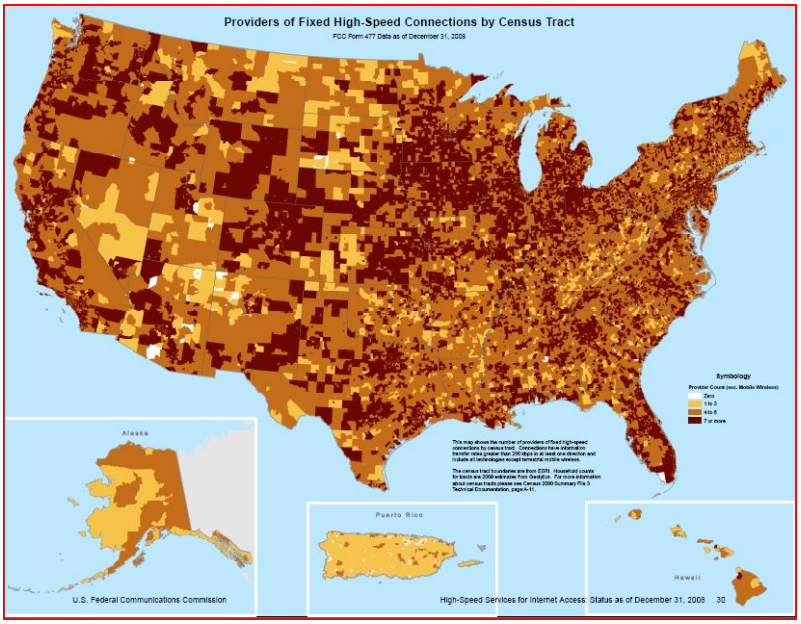


Figure 3. Broadband Providers as of December 2008 (From Broadband Competition 2008, 2009)

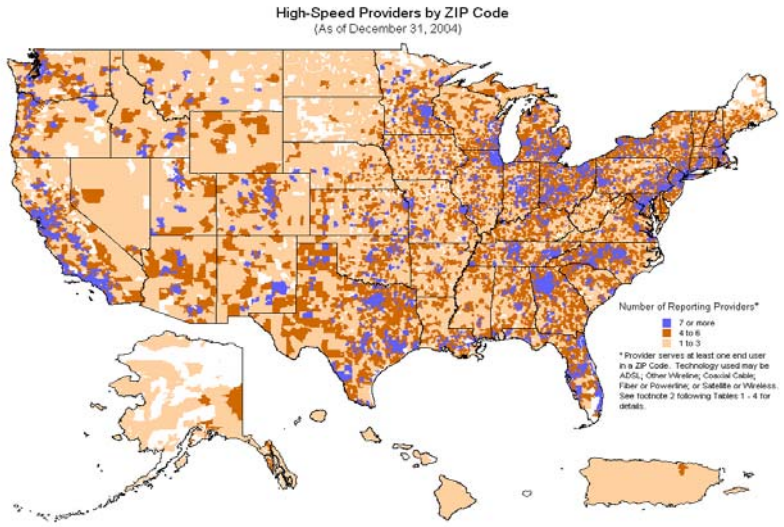


Figure 4. Broadband Providers as of December 2004 (From Broadband Competition 2004, 2005)

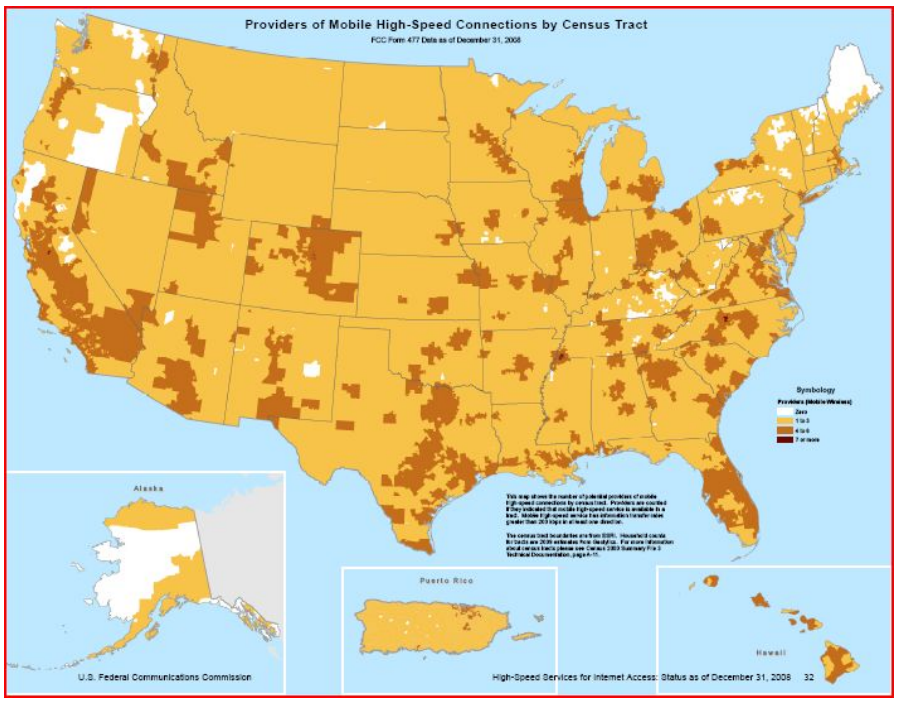


Figure 5. Wireless Providers December 2008 (From Broadband Competition 2008, 2009)

**Residential High-Speed Connections by Technology and Speed as of December 31, 2008**
**(Connections in thousands)**

| *Technology* | *At Most 200 kbps Upstream or less than 768 kbps Downstream* | *Over 200 kbps Upstream and at least 768 kbps Downstream* | *Total* |
|---|---|---|---|
| aDSL | 5,318 | 21,163 | 26,481 |
| sDSL | 37 | 37 | 74 |
| Other Wireline | 4 | 38 | 42 |
| Cable Modem | 1,327 | 38,461 | 39,788 |
| FTTP | 19 | 2,695 | 2,715 |
| Satellite | 560 | 70 | 630 |
| Fixed Wireless | 170 | 244 | 413 |
| Mobile Wireless | 9,465 | 6,353 | 15,818 |
| Power Line and Other | 1 | 3 | 5 |
| Total | 16,901 | 69,066 | 85,966 |

**# – Rounds to Zero.**
**Note: Figures may not sum to totals due to rounding.**
**Source: FCC Form 477, Parts I and VI.**

Table 1. Broadband Options (From Broadband Competition 2010)

While the high upfront costs of building infrastructure in the wired broadband market is one of the factors that keeps options somewhat limited, upfront costs for wireless broadband are less prohibitive. The Obama administration in apparent realization of the potential for increased broadband competition through wireless spectrum, signed a memorandum in June 2010 announcing its intentions, nearly doubling the wireless spectrum available for broadband use. Continued gradual growth in the wired broadband market, the rapid expansion of wireless broadband competition and the variety of choices in other technologies provide those who oppose network neutrality regulation ample evidence that the fears of limited competition are unfounded.

### 3. Access Tiering Benefits Consumers

Christopher Yoo is a Law Professor at the University Of Pennsylvania School Of Law and a prolific writer on the subject of network neutrality, his specific stance is to take a case-by-case approach to violations of network neutrality principles. In a 2009 paper entitled *Network Neutrality After Comcast: Toward a case-by-case Approach to Reasonable Network Management,* Professor Yoo discusses among other things, the potential benefit to consumers of network providers utilizing access tiering. Professor Yoo disputes the claims that only wealthy Internet users and large companies or content providers would gain access to the faster network. He theorizes that those requiring faster access would and should be able to pay more for the enhanced service and that in the absence of this additional revenue providers would raise prices for everyone regardless of their required quality of service. Yoo further points out other aspects of access tiering that suggest its potential benefit and include:

- The 50% per year growth rate of Internet traffic requires network providers to generate revenue in some manner in order to continue expanding their networks. Access tiering is the fairest way for those utilizing the most bandwidth to fund infrastructure growth.

- Content providers primary means of acquiring revenue is through advertising on their websites. The increase in users of a content provider's website using a faster network would initiate a parallel rise in their advertising revenue and more than offset their increased fee to network providers.
- The suggestion that charging content providers a fee would in effect be charging consumers twice is misguided. Assuming sufficient competition among network providers, allowing network providers to generate a portion of their revenue via content providers will allow them to lower costs to users of their networks (Yoo, 2009).

While those opposed to access tiering, conclude that charging content providers for faster access to their users stifles innovation and goes against the basic principles of the Internet. Those in favor simply consider it the fairest way for consumers, network providers and content providers. Consumers will get a choice in the speed of their network connection; businesses will be able to decide if consumers desire the benefits of their applications loading at a normal or increased rate; and network providers will benefit from the increased revenue generated. Subsequently, the increased revenue will allow network providers to continue to expand their networks.

### 4. Regulations Effect on Investment and Employment

As stated earlier, business understands that in some instances regulation is necessary in order to preserve competition and protect the consumer. In these instances, when regulation is necessary, the best outcomes occur when the outcome of regulation is predictable and evident to the regulated market. The regulated market, broadband providers, in this case do understand the outcome of the regulation, however their understanding is that the outcome is contrary to the best interests of themselves, consumers and the Internet itself. In an effort to examine the effects the rules that make up the FCC's NPRM will have on employment and the economics of the Internet, Coleman Bazelon, an economist

from the Brattle Group, published a study examining the anticipated outcomes concerning employment and economic impacts. His findings, should the rules within the NPRM be approved include:

- A slow-down in revenue growth in broadband by one-sixth over the next ten years
- Over 14,000 jobs would be lost in broadband in 2011 and by 2020 over 300,000 jobs would be lost
- Throughout the United States economy over 65000 jobs would be lost in 2011 and by 2020 close to 1.5 million jobs would be lost due to decreased revenue in broadband (Bazelon, 2010).

Bazelot gathers evidence for his conclusions from what he believes is the FCC's most closely related regulatory experience; the deregulation of DSL. Bazelon points out that in 2002 users of unregulated cable modems for Internet access outnumbered regulated DSL subscriptions by two-to-one. Four years after DSL was unregulated and gained even competitive standing with cable, DSL lagged by only 15%. Bazelon translates this into a 15% decline in growth rate and uses it as one of the estimates that would reduce broadband growth by $1/6^{th}$ in the presence of the rules of the NPRM.

## C. CHAPTER SUMMARY

The essence of the debate surrounding whether or not regulation is necessary to perpetuate network neutrality within the network is whether sufficient competition exists in the broadband market to stem motivation for a monopoly or duopoly of providers to take action that violates network neutrality principles. Those seeking regulation suggest sufficient competition does not exist and inevitably, financial motivation will compel network providers to violate the most basic principles of the Internet for their own gain. This group is especially fearful of a system proposed by network providers called access tiering. Under this model, network providers would offer network management

principles whereby content providers could pay to have their applications loaded from a faster network seemingly reaping the benefits of reaching more users. Those who oppose this strategy suggest that charging content providers to reach users most importantly will take the innovation that makes the Internet a success out of the hands of the hands of the users of the Internet as a whole and place it in the hands of major corporations and those with the most capital.

Network providers fear the impact of blanket regulation on an industry that in their opinion has not provided sufficient evidence of a need for it. Providers believe the rules as suggested and imposed on them may also unfairly benefit content providers and search engines such as Google. The network providers also defend their suggestion of a tiered Internet. They claim that the presence of a tiered network system benefits everyone involved including consumers. Their most fervent argument however, supported by the study done by Coleman Bazelon, is that imposing these rules as stated will, even if they succeed in perpetuating network neutrality on the Internet, have a much greater negative impact on growth and employment in the broadband industry.

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# V. PROPOSED SOLUTIONS

Proposals suggesting what should be done in order to maintain the current state of neutrality in the Internet are many. The first decision that needs to be made before accepting any of these proposals is as simple as deciding whether regulation is truly necessary, or if the Internet will remain in its present state without government action. Should it be decided that regulation is necessary subsequent debate exists regarding what agency, within the government, should provide the regulation and what form it will take. Congress, on numerous occasions, has considered but failed to pass laws that would serve to regulate in favor of network neutrality and many would suggest that a law of this type or a rewrite of the Telecommunications act are the only feasible solutions. Currently, the form that network neutrality regulation is taking lies with actions being taken by the FCC. In October 2009, the FCC released its Notice of Proposed Rulemaking, which seeks to codify the 2005 Internet policy statement with the addition of two additional rules that prohibited discrimination and ensured transparency of network management principles. The NPRM relies, however, on ancillary jurisdiction the FCC claims over the Internet as a Title I service under the Telecommunications Act of 1996, the same jurisdiction the FCC utilized in its case against Comcast's blocking of BitTorrent. The validity of this jurisdiction was jeopardized when the U.S. Court of Appeals for the District of Columbia decided against the FCC in the Comcast case in April 2010. This case essentially established precedent putting into question any FCC ruling, which relied upon the rules established in the NPRM.

In light of the Comcast ruling, the FCC has proposed another course of action by which it will regulate access to the Internet. In June 2010, the FCC released a Notice of Inquiry (NOI) which suggested alternative actions the FCC could take in regard to regulating access to the Internet that would overcome it lack of jurisdiction under its ancillary Title I jurisdiction. The FCC, in its Notice of Inquiry, seeks public comment on three proposals it suggested:

- Whether the classification of high speed Internet as an "information service" remains adequate to accomplish its perceived mission
- If not adequate the FCC requests comment on the legal and practical consequences of classifying Internet connectivity service as a Title II "telecommunications service" under the Telecommunications Act
- Comments on a third way to deal with network neutrality under which the Commission would:
    - (i) reaffirm that Internet information services should remain generally unregulated;
    - (ii) identify the Internet connectivity service that is offered as part of wired broadband Internet service (and only this connectivity service) as a telecommunications service; and
    - (iii) forbear under section 10 of the Communications Act

Comments on this Notice of Inquiry were due July 15, 2010, and replies are to be delivered by August 12, 2010. The resolution that follows from public comment on this Notice of Inquiry will likely result in the next government attempt at regulation of access to the Internet (FCC, 10-127, 2010).

Those who oppose government intervention to maintain the Internet in its current state of neutrality express varying degrees of opposition to the different measures that could be applied as the regulatory decision. Broadband providers opposed codification of the NPRM, but felt more than anything that they were simply unnecessary rules that would apply industry wide rules that would conjure unpredictable results. When the FCC announced its intention to reclassify high speed Internet as a Title II regulated common carrier service, broadband providers responded with much more fervent opposition and are totally against actions of this type. Christopher Yoo in *Network Neutrality after Comcast: A Case-by-Case Approach to Reasonable Network Management,* suggests that anti-trust courts should handle cases where network management infractions harm consumers or competition on a case-by-case basis, thus preventing the blanket restrictions and the unknown results these restrictions would create. This

chapter will examine aspects of the different proposals that could be applied and attempt to predict what possible outcomes each of them could provide.

## A. CONGRESSIONAL ACTION

Potential actions that could be taken by Congress to protect the neutrality of the Internet include passing a separate law that mirrors the language the FCC proposed in its NPRM and/or conducting a rewrite of the Telecommunications Act with updated language regarding broadband Internet services regulatory status, specifically modifying its status as simply an information service. Congressional action however has proven difficult to enact. Between 2006 and 2008, seven bills that included language supporting the regulation of the Internet in hopes of maintaining network neutrality were presented to Congress and all seven either failed to pass or were not voted on in time and subsequently died.

History, it seems, would say it is unlikely that Congress will pass a separate law supporting network neutrality. Congress, however, could take a different approach that would also make the FCC's current job of policing broadband providers supplying high speed Internet service easier. A rewrite of the Telecommunications Act that explicitly gives the FCC the authority to regulate access to the Internet would, if done correctly, end a great deal of the debate surrounding network neutrality. In May 2010, subsequent to the decision in the Comcast decision, Congress made statement that suggested that it was beginning to generate proposals for a rewrite of the Telecommunications Act that would include revisions updating the regulatory status of broadband Internet access (McCullagh, 2010). If a rewrite of the Telecommunications Act is completed it would at least solve probably the biggest problem the FCC is having in regard to regulating access to the Internet. Currently, the FCC is attempting to perpetuate network neutrality with no legal framework on which to stand and has to rely on language in the current Telecommunications Act which has already been defeated in court. If done correctly, a rewrite of the Telecommunications Act would provide the FCC the legal authority to ensure network neutrality on the

Internet. The results of what would come, broadband providers would remind, are still unknown but, at the least, the government would be operating from a legally tenable position.

## B. ACTION BY THE FCC

As previously mentioned, the FCC is currently the lead government agency in regard to potential regulation of the Internet. The most recent activity began in October 2009 with the release of the NPRM, which was derailed due its reliance on the same jurisdiction that was proved invalid in the wake of the FCC's loss in the Comcast case. Long before this decision was finalized, however, the legality of what the FCC was trying to do with the NPRM was in question. Barbara Esbin, currently in private with the Cinnamon Mueller law firm, but who previously served as Senior Fellow and Director of the Center for Communications and Competition Policy at the Progress and Freedom Foundation had written extensively and testified to the FCC in regard to the lack of precedent for the NPRM within the Telecommunications Act. The following quote from her testimony to the FCC summarizes her argument, which proposes the lack of legal standing for the NPRM:

> Adoption of the network neutrality rules proposed in the NPRM would be unlawful because Congress did not give the Federal Communications Commission power to protect Internet openness in the Communications Act. The proposed rules regulating the services and network management practices of broadband Internet providers must rest, if at all, on the Commission‘s implied or —ancillary jurisdiction and the NPRM fails to provide a basis upon which the exercise of such jurisdiction can be considered lawful. (Esbin, 2010)

In e-mail correspondence with the author, Esbin has discussed her belief that in regard to network neutrality legislation the FCC has been acting outside its authority, specifically with regard to the NPRM. Her strong belief is that acting in this manner the FCC clouds the effectiveness of our system of government and that if legislation is needed, Congress should act and either pass a separate law

themselves or give the FCC explicit authority in a modification of the telecommunications act to regulate broadband Internet access .

The FCC, shortly after its defeat in the Comcast case, realized the NPRM would not provide sufficient authority for the purposes of regulating access to the Internet and changed strategy. The primary intent of the notice of inquiry is to reclassify broadband Internet access as a Title II regulated common carrier service. This approach, if accepted, clearly gives the FCC's the authority it now lacks, however it would very likely face more legal challenge than the NPRM. The legal debate would consider that for 15 years since the last revision of the Telecommunications Act in 1996 broadband Internet access has been interpreted as a lightly or non-regulated "information service". Simply deciding to now interpret broadband Internet access as a Title II service—because the importance of the Internet has grown since 1996—has no legal basis (Esbin e-mail, 2010). Additionally, compared to the relatively constrained opposition broadband providers provided to the NPRM, opposition to the reclassification of broadband as a Title II service from broadband providers to reclassification was immediate, resolute and collective. Shortly after hearing of the new strategy of reclassification as Title II, a large group of telecommunications providers including Verizon AT&T, Time Warner and quest among others collectively addressed the FCC voicing their strong opposition to action of this type. The following quote summarizes their opposition:

> As discussed below, the proposed regulatory about-face would be untenable as a legal matter and, at a minimum, would plunge the industry into years of litigation and regulatory chaos. And it would threaten to extend common carrier regulation not just to broadband Internet access providers, but to huge swaths of the Internet at large, betraying decades of bipartisan support for keeping the Internet unregulated. This misguided regulatory overreach would thereby suppress the private innovation and investment—at both the core and the edge of the network—that have made the Internet the most powerful engine of economic growth in our time, and that are so vital to achieving your "'100 Squared' initiative—100 million households at 100 megabits per second" by 2020—which you identified as a core objective of the National Broadband Plan. In

> short, the Commission should keep this Pandora's Box of Title II classification nailed shut. (Verizon et al., 2010)

It is clear that the major providers of broadband service are adamantly opposed to reclassification and will not accept it without legal challenge. It does however appear that the FCC is going through with its attempt to do so. Whether this will be through a rewrite of the Telecommunications Act by Congress or simply as a reinterpretation is yet to be seen.

## C. CASE BY CASE

As stated earlier, broadband companies do not condone, nor consider necessary, blanket regulation of the broadband industry as a means to perpetuate network neutrality on the Internet. Their rationale is that implementing regulation could in fact be contrary to the desired end-state of the NPRM and would, instead of perpetuating a free and open Internet; the NPRM would lead to further more restrictive regulation in the future (AT&T.com, 2009). Their misgivings about the potential benefits of regulation and the limited scope the FCC advertises it will remain are supported by the actions that took place following the losses in the Comcast case. The FCC's almost immediate change in tactics where instead of implementing the NPRM, the FCC now seeks to reclassify high speed Internet access as a Title II service seems to support broadband providers claims that any regulation will lead to more regulation.

In the absence of some sort of regulation, however, the question of course would remain; what IS going to be done, because incidents of discrimination that do go beyond what broadband providers should be allowed inevitably will occur? Christopher Yoo proposes his suggestion as case-by-case consideration of cases of discrimination. One would argue that the FCC's loss in the Comcast case make resolution by courts pointless, but in this case the FCC based the precedent for their opposition to Comcast's actions on their own policy statement. Christopher Yoo instead suggests basing their precedent on existing anti-trust law. Yoo supports his suggestion by pointing out the Supreme Courts tradition of

opposition to blanket regulation of an industry that is still developing and where the result of regulation is unclear. Considering the relative rarity of incidents of this type and the variable nature of potential infractions, a case-by-case approach has many attractive features.

## D. TECHNOLOGY OVERCOMES ALL

Proponents of regulation of broadband providers, base their suggestions on a perceived lack of competition that will eventually compel providers to discriminate in favor of the benefit of their business. Their argument further relies, even in the absence of competition, on a shortage of bandwidth that provides broadband companies a reason to discriminate. The trend in both competition and the availability of bandwidth is however toward more competition and more bandwidth. The FCC data presented earlier shows the trend toward the increased availability of providers across the country and the growth of fiber optic networks, the expanding availability of wireless as a viable option for high speed Internet and advances that optimize the use of bandwidth all are factors that detract stimulus from broadband provider's inclination to discriminate.

## E. RECOMMENDATIONS

My recommendations for perpetuating the current state of network neutrality on the Internet are as follows:

1. No industry-wide rules are placed on broadband providers. Individual cases of abuses of network neutrality will be handled by the courts using existing anti-trust laws.
2. While in review of cases of access tiering, courts generally disallow partnerships of this type.

Dealing with anti-competitive behavior by broadband providers in this manner offers resolution to cases without burdening the broadband industry with regulation that has unintended results. In regard to access tiering, even if the

economic results benefit consumers and the Internet; the potential for loss of innovation is too great to risk and tight control over access tiering is required.

In summary, my recommendations are that neither the FCC nor Congress enacts industry wide regulation of the broadband industry. Instead, anti-competitive behavior by broadband providers should be handled by anti-trust law in the court system. Within that statement, however, the courts should take a hard look at access tiering and consider its benefits or drawbacks. I believe when access tiering is considered it should be disallowed and content providers should remain on an equal basis with each other.

# VI. CONCLUSION AND FUTURE WORK

## A. CONCLUSION

The Internet has become a vital tool for education, government, the corporate world and individuals across the globe. Its success and growing importance has created a fear in some individuals that a lack of competition in the broadband market will create a situation where the openness of the Internet, a principle upon which it was founded, is jeopardized. These individuals conclude that regulation, of some sort, is needed in order to perpetuate the Internet as we know it today. Instances of discriminatory behavior by broadband providers, notably Comcast's blocking of BitTorrent, exist that supply enough evidence that perhaps regulation is necessary. In more recent events, as recently as August 2010, it was reported that Verizon and Google, in what were termed as "secret meetings," discussed what amounts to access tiering and had nearly come to an agreement, whereby Google would pay Verizon to have Google content load faster on users of Verizon networks.

The FCC has taken the lead in an attempt to protect the Internet through regulation. The task has fallen to the FCC due to a lack of action by Congress, which would eliminate a great deal of the legal challenges network neutrality is today presenting. In the absence of Congressional action however, the FCC has no legal basis with which to regulate high-speed Internet access and their actions to date are attempts, which have been successfully challenged legally.

Broadband providers oppose industry wide regulation suggesting competition in broadband is sufficient and that regulation would likely stifle investment in expanding their networks. Broadband providers also conclude that adding tiers to their networks would further improve the Internet. These added tiers would be subsidized by payments from content providers in order to have their content load faster on the subsidized provider's networks. Opponents of

access tiering fear the stifling of innovation if access tiering is implemented and fear what could develop if major corporations and broadband providers begin collaborating in this manner.

My research in this area has led me a number of conclusions. Industry wide regulation of broadband providers is not necessary. Those calling for regulation cite the few existing examples of discrimination and these examples provide evidence that broadband providers will continue actions of this sort from time to time, but not enough evidence to prove that these discriminatory acts are the rule rather than the exception. Without sufficient evidence, it is irresponsible to enact regulation, without exact knowledge of the outcome this regulation will present, that changes a system that has succeeded to the extent the Internet has succeeded. It is less clear what may occur if regulation is adopted. Further, the importance of the Internet and my research into the regulatory history of the FCC further led me to conclude that if it is necessary to enact regulation, it should be completed by Congress. The FCC has been left in a weak legal position due to a lack of action by Congress. The result of FCC v. Comcast further highlights the FCC's position. The blocking of BitTorrent by Comcast may have been an act of discrimination, but the FCC lost in this case because it had no legal basis with which to dictate that Comcast could not block BitTorrent users.

In the future, it is very possible that competition and technology will overcome many of the forces that today drive acts of discrimination. Continuing to refine how bandwidth is utilized, and the rapidly growing use of wireless for broadband purposes, will mitigate the need for broadband providers to discriminate. The line that separates wired network providers from those supplying Internet wirelessly will also create increased competition and the trend toward increased competition will continue and expand. In instances where discrimination does occur, judicial action in anti-trust courts is a more dynamic medium through which to decide individual cases where discrimination hurts either consumers, companies or the Internet itself.

## B. RECOMMENDATIONS FOR FUTURE WORK

### 1. Analysis of the Continued Need for the FCC

Some have argued that an analysis of whether the continued existence of the FCC is necessary. My analysis of the FCC's role in network neutrality has not convinced me that the FCC should be abolished, but a thorough examination of this question would be worthwhile and should be given serious consideration.

### 2. Continued Review of the Network Neutrality Debate

While at this time no regulation is required to maintain network neutrality in its current state on the Internet, the Internet and the broadband industry continue to grow rapidly and an analysis of its need should periodically be conducted periodically. I suggest reevaluating this question should occur every five years.

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# LIST OF REFERENCES


Associated Press. (2010). Comcast, FCC take net neutrality dispute to court. Retrieved January 28, 2010, from: http://news.yahoo.com/s/ap20100108/ap_on_hi_te/us_tec_comcast_fcc_Internet_rules

AT&T Statement on Google Voice and Net Neutrality. (2009). Retrieved November 20, 2010, from: http://www.att.com/gen/public-affairs?pid=14048

Bazelon, C. (2010). The Employment and Economic Impacts of Network Neutrality Regulation: An Empirical Analysis. Washington D.C.: The Brattle Group Inc.

Beranek, Leo. Roots of the Internet: A Personal History. *Massachusetts Historical Review 2* (2000). Retrieved March 10, 2010, from: http://www.historycooperative.org/journals/mhr/2/beranek.html

Broadband Competition 2004. (n.d.). Retrieved April 20, 2010 from: http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1204.pdf

Broadband Competition 2008. (n.d.) Retrieved April 25, 2010, from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-292191A1.pdf

Broadband Competition 2010. (n.d.) Retrieved May 12, 2010 from: http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0902/DOC-301294A2.pdf

Cannon, Robert. (2003). The Legacy of the Federal Communications Commission's Computer Inquiries. [Electronic Version] *Federal Communications Law Journal 55* (167).

Cerf, V. G. (2006). Prepared Statement of Vinton G. Cerf Vice President and Chief Internet Evangelist Google Inc. U.S. Senate Committee on Commerce, Science, and Transportation Hearing on "Network Neutrality" Retrieved March 15, 2010, from http://commerce.senate.gov/pdf/cerf-020706.pdf

Chasik, A. (2009). AT&T Asks Employees to Oppose Net Neutrality. *The Consumerist*. Retrieved November 20, 2009, from: http://consumerist.com/2009/10/att-asks-employees-to-oppose-net-neutrality.html

Comcast Corp v. FCC, No. 08-1291. (United States Court of Appeals for the District of Columbia, April 6, 2010.

Electronic Frontier Foundation. (2010). FCC's Net Neutrality Plan Would Permit Blocking of BitTorrent. Retrieved January 28, 2010, from: http://www.eff.org/deeplinks/2010/01/net-neutrality-plan-would-permit-blocking-bittorrent

Esbin, Barbara, (2009). Comments before the Federal Communications Commission in the Matter of Preserving the Open Internet GN Docket No. 09-191 and Broadband Industry Practices WC Docket No. 07-52 Washington D.C.

Esbin, Barbara. (2009). "The Law is Whatever the Nobles Do": Undue Process at the FCC." The Progress & Freedom Foundation, Progress on Point NO. 15. August 12, 2007. Retrieved March 12, 2010, from: http://www.pff.org/issues-pubs/pops/2008/pop15.12undueprocess.pdg

Esguerra, R. (2010). FCC's Net Neutrality Plan Would Permit Blocking of BitTorrent. Retrieved January 28, 2010, from: http://www.eff.org/deeplinks/2010/01/net-neutrality-plan-would-permit-blocking-bittorrent

The FCC Loses-Again. (2010, April 7). *Wall Street Journal*. Retrieved April 10, 2010, from: http://online.wsj.com/article/SB10001424052702303411604575167981034196978.html

Federal Communications Commission. (August 5, 2005). Appropriate Framework for Broadband Access to the Internet over Wireline Facilities GN Docket No. 05-151. Washington D.C. Retrieved December 8, 2010, from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-151A1.doc

Federal Communications Commission. (October 22, 2009). Notice of Proposed Rulemaking In the Matter of Preserving the Open Internet Broadband Industry Practices GN Docket No. 09-191 WC Docket No. 07-52. Washington D.C. Retrieved October 26, 2010, from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-93A1.pdf

Federal Communications Commission. (June 17, 2010). Notice of Inquiry: In the Matter of Framework for Broadband Internet Service GN Docket No. 10-127. Washington D.C. Retrieved July 1, 2010, from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-31A1.pdf.

Furchtgott-Roth, H. (2006). *A Tough Act to Follow the Telecommunications Act of 1996 and the Separation of Power*. Washington, D.C.: The AEI Press.

Gibbs, Colin. (2009). FCC Fires Back at Comcast in Net Neutrality Legal Battle. Retrieved January 28, 2010, from http://gigaom.com/2009/09/21/fcc-fires-back-at-comcast-in-net-neutrality-legal-battle/ http://online.wsj.com/article/SB10001424052702334116045751667828457 12768.html

Huber, P. (1997). *Law and Disorder in Cyberspace, Abolish the FCC and let Common Law rule the Telecoms*. Oxford: Oxford University Press.

Internet Society. (2010). All About the Internet: History of the Internet. Retrieved January 20, 2010, from: http://www.isoc.org/Internet/history/brief/shtml

Internet Society. (2010). User Centric Internet Network Neutrality. Retrieved January 28, 2010, from: http://www.isoc.org/pubpolpillar/usercentricity/network_neutralityshtml

Janjua, K. A, Sahibzada A. N. and Shahzada A. K. (2008). A Critical Evaluation of Telecommunication Act 1996. Scientific Research Publishing, 1, 83–90. Retrieved March 10, 2010, from: www.SRPublishing.org/journal/jssm

Kendall, Brent. (2010, April 6). Court Strikes at 'Net Neutrality.' *Wall Street Journal*. Retrieved April 7, 2010, from: http://online.wsj.com/article/SB10001424052702303411604575167782845712768.html?mod=WSJ_hps_sections_tech

Kleinrock Leonard (2008). History of the Internet and Its Flexible Future. IEEE Wireless Communications, February 2008, 8–18.

Lasar, Matthew. (2010). Netflix to FCC: scary loophole in net neutrality rules. Retrieved January 28, 2010, from: http://arstechnica.com/tech-policy/news/2010/01/netflix-to-fcc-dont-make-managed-services-a-net-neutrality-loophole.ars

Leiner, B., Cerf G., Clark, D. D., Kahn, R. E., Kleinrock, L., Lynch, D.C., Postel, J., et al. (1997) The Past and Future History of the Internet. *Communications of the ACM*, 2(40), 102–108.

Lessig, Lawrence & Robert W. McChesney. "No Tolls on the Internet," *The Washington Post*, June 8, 2006, at A23.

Lundy, B. (2008). *Telegraph, Telephone & Wireless: How Telecom Changed the World*. Monterey, CA: Author.

McCullagh, C. (2010). Congress rebukes FCC on Net neutrality rules. Retrieved from: http://news.cnet.com/8301-13578_3-20005834-38.html

Nuechterlein, J. E., & Weister, P. J. (2007). *Digital Crossroads*. Cambridge, Massachusetts: The MIT Press.

Obama to Nearly Double Available Wireless Spectrum. (2010, June 28). *Wall Street Journal*. Retrieved June 30, 2010, from: http://online.wsj.com/article/BT-CO-20100628-708904.html#articleTabs%3Darticle

O'Connell, P. At SBC, It's All About "Scale and Scope." (2005). Retrieved January 28, 2010, from: http://www.businessweek.com/magazine/content/05_45/b3958092.htm.

Reuters. US court upholds FCC order easing broadband rules. (2007). Retrieved February 2, 2010, from: http://www.reuters.com/article/idUSN1622489820071016

Schatz, A. (2010, April 7). Court Backs Comcast Over FCC. *Wall Street Journal*. Retrieved April 12, 2010, from: http://online.wsj.com/article/SB10001424052702303411604575167782845712768.html

Telecommunications Act of 1996. Retrieved January 15, 2010, from: www.fcc.gov/Reports/tcom1996.pdf

Verizon, AT&T Inc., Time Warner Cable, Qwest National Cable & Telecommunications Association, CTIA- The Wireless Association, United States Telecom Association, Telecommunications Industry Association et al. (2010). Reply to Preserving the Open Internet, GN Docket No. 09-191; Broadband Industry Practices, WC Docket No. 07-52I A national Broadband Plan for our Future, GN Docket No. 09-51. Washington D.C.

Wu T. Network Neutrality, Broadband Discrimination. (2003). *Journal of Telecommunications and High Technology Law* 2141. doi:10.2139/ssrn.388863

Wu, T. and Yoo, C. S., Keeping the Internet Neutral? Tim Wu and Christopher Yoo Debate. *Federal Communications Law Journal* 59, no. 3, 2007; Vanderbilt Public Law Research Paper No. 06-27; Vanderbilt Law and Economics Working Paper No. 06-30; Columbia Law and Economics Working Paper No. 310. Available at SSRN: http://ssrn.com/abstract=953989

Wu, T. Network Neutrality: Competition, Innovation, and Nondiscriminatory Access. Retrieved April 24, 2006, from: http://ssrn.com/abstract=903118

Wu, T. (2006). Network Neutrality: Competition, Innovation, and Nondiscriminatory Access, Hearing before the Task Force on Telecom and Antitrust of the Committee on the Judiciary House of Representatives. Washington D.C.: U.S. Government Printing Office.

Yoo, C. S. "Network Neutrality After Comcast: Toward a Case-by-Case Approach to Reasonable Network Management" (2009). Scholarship at Penn Law. Paper 298. Retrieved February 12, 2010, from: Http://lsr.nellco.org/upenn_wps/298

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