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| ENG135-03 Ernst |
| Analysis of Network Neutrality Legislation |
| An Informative Report w/ Recommendations |
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Executive Summary

The purpose of this project has been to research the state of Network (or Net) Neutrality legislation in various countries, and analyze its effects. Network Neutrality is a principle that dictates that all data travelling over a network be treated equally, without priority given to traffic of a specific origin. Most tech-savvy individuals, consumer groups, and internet-based businesses support Net Neutrality. Customers generally support Net Neutrality because it prevents internet service providers (ISPs) from charging customers for access to specific websites or services. Small and internet-based businesses support Network Neutrality because without it large entrenched companies could pay ISPs to block their smaller competitors’ websites or services, and therefore deal a serious blow to new businesses that lack the money or clout to negotiate similar deals.

ISPs such as Comcast and Verizon oppose network neutrality legislation, because it would force them to treat all traffic on their networks equally and prevent them from charging customers for access to specific services. Also, Network Neutrality would prevent ISPs from charging web-based services fees to allow their traffic to traverse the sections of the internet infrastructure that a given ISP owns, or to allow said traffic to traverse their network at full speed. Additionally, some consumer groups oppose giving the Federal Government authority to regulate the internet; for fear that such legislation could become overzealous and damage the openness of the internet.

In 2010, the Latin American nation of Chile became the first country in the world to enact federal network neutrality legislation. Since 2010 Chile’s telecommunications market has grown at a healthy rate, with the level of internet access in the country being a year head of the government’s goals for 2014. (Sub-Secretaria de Telecomunicaciones (Subtel), 2012) Earlier this year the Netherlands joined Chile as the second country in the world to enact legislation enshrining Net Neutrality protections as federal law, the first European country to do so. The United States only has partial Net Neutrality protections, in the form of rules passed by the Federal Communications Commission (FCC) in 2010. The U.S. rules only guarantee neutrality on wired networks, such as cable and DSL internet connections, wireless internet services akin that provided by cellular providers like Verizon, Sprint, and AT&T are exempt from the neutrality rules.

In conclusion, it can be defended that federal Net Neutrality legislation is in the best interests of consumers. Net Neutrality does not stifle innovation or discourage investment in the internet’s infrastructure, as some opponents suggest, the growth of the Chilean telecommunications market since Network Neutrality was enacted there should be more than enough to prove that point. Therefore, I suggest that the U.S. pass universal Net Neutrality rules, similar to those in Chile, to protect customers and small innovative firms from being disadvantaged by large companies that would make themselves gatekeepers of the internet.

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# Introduction

What is Net Neutrality? Network Neutrality, often shortened to Net Neutrality, is the principle whereby all internet traffic is treated equally with no interference with legitimate traffic on a network. The implementation of Net Neutrality as usually advocated allows for prioritization of certain traffic such as Voice over Internet Protocol (VoIP), a protocol that lets you make phone calls over your internet connection, that do not function properly otherwise. Network Neutrality is designed to prevent Internet Service Providers (ISPs) from charging users extra to be able to access sites like Facebook.com or using web-based services such as Netflix or Pandora, as well as to protect small businesses and startups from being disadvantaged by their larger competitors paying to have their own services prioritized.

Net Neutrality laws currently vary by country, with only two (Chile and the Netherlands) having implemented universal Net Neutrality legislation.

This report will cover the following areas of interest concerning Net Neutrality and related legislation:

1.) Analysis of Network Neutrality principles

2.) Arguments in Support of Net Neutrality

3.) Arguments in Opposition to Net Neutrality

4.) Analysis of Net Neutrality legislation currently in effect

5.) Conclusion and recommendations

# Analysis of Network Neutrality Principles

Network Neutrality is a principle designed to protect consumers and small businesses from exploitation by internet service providers and larger more established businesses. Internet service providers such as Comcast and AT&T own and maintain large portions of the internet backbone, and are in a position to abuse the control they have over the primary routes used to transmit data across the internet. These abuses can come in the form of charging customers additional fees to access popular websites like Facebook.com or services such as Netflix.com’s streaming video or Pandora.com’s streaming audio.

Streaming services such as Netflix, YouTube, and Pandora consume large amounts of bandwidth, with Netflix alone accounting for 33% of North American internet traffic according to Sandvine. (Sandvine Inc., 2012) High bandwidth consumption, paired with the widespread popularity such services, make them easy targets for ISPs seeking to levy additional fees to allow customers access to their content. Additionally, because streaming services rely on high bandwidth connections to deliver their content effectively, their services degrade considerably when bandwidth is restricted. Below is a slide leaked from a presentation by Allot Communications and Openet, two cellular industry suppliers, describing piecemeal pricing for access to popular web-based services:

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| C:\Users\Der Meister\Desktop\School\ENG135\Project 4\dpi_integrated-660x494.gif | This slide shows a pricing scheme whereby access to Facebook.com would be charged for on a traffic-volume scheme, access to Skype’s video and Voice over Internet would be billed as a flat monthly rate, and Vodafone (part of Verizon Wireless) would be accessible at no extra charge. |

Leaked Image ©unknown/none (retrieved from Wired.com <- does not own image)

The majority of internet traffic traverses the “internet backbone” at some point in its path from point of origin to destination. The “internet backbone” is comprised of the high capacity, high speed connections that crisscross large geographical areas and is sometimes called the “information superhighway”. This concept is important to note because no single entity owns the entire infrastructure of the internet; most parts of the “backbone” are owned by Internet Service Providers (ISPs) such as Verizon, Comcast, AT&T, and Time Warner Cable, to name a few. Without Network Neutrality, the large companies that own major portions of this infrastructure could charge other companies large fees to allow data to traverse their networks, effectively making Internet Service Providers into the tollbooths and gatekeepers of the internet. Additionally, because there are so many different companies that own sections of the backbone, a company would need to negotiate agreements with each different owner, or risk large regions being unable to access their website or service. Alternately, large companies could pay ISPs, to block or slow their competitors’ traffic to help them eliminate their competition.

The graphics below illustrate two hypothetical scenarios involving the large U.S. cable ISP, Comcast and the web-based streaming video service, Netflix.

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| In this scenario Net Neutrality is not in effect, Comcast is actively slowing Netflix traffic while their own “Xfinity” service goes unrestricted. By seriously degrading the competitor’s service (Netflix), Comcast is able to encourage customers to subscribe to Xfinity instead. | In this scenario Net Neutrality is in effect, Netflix and Xfinity traffic are treated equally and must compete to gain customers. Neither service’s traffic has priority over the other, thus allowing fair competition and encouraging innovation. |
| C:\Users\Der Meister\Desktop\graphic.png | C:\Users\Der Meister\Desktop\graphic2.png |

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# Network Neutrality Arguments

There are many points of view regarding Network Neutrality, some in favor and some strongly opposed. Here I’ll be analyzing a few of the more popular viewpoints.

## Pro-Net Neutrality Arguments

Net Neutrality is generally supported by public interest groups, tech savvy consumers (so called “Geeks”), companies that provide services over the net (eg. Google), small businesses, and free speech activists. Net Neutrality is a fairly simple concept, but has very complex implications for each of these stakeholders, and each has a different reason for supporting Network Neutrality.

Public interest groups such as Free Press and savetheinternet.com, support Net Neutrality because it allows consumers unfettered choice of internet services to meet their needs, and protect them from having to pay additional fees to access the services they desire. Free Press argues that “*Net Neutrality is the reason the Internet has driven online economic innovation, democratic participation and free speech”* because, they continue, *”It protects our right to use any equipment, content, application or service without interference from the network provider . With Net Neutrality, the network's only job is to move data — not choose which data to privilege with higher-quality service.*” (Free Press) Tech savvy consumers, often labeled “Geeks”, usually support Net Neutrality for many of the same reasons that public interest groups do; Geeks are tech enthusiasts and tend to use their technology to its fullest, thus any restriction of their ability to do so is strongly objectionable to them.

Google Inc. started out as a small search engine, but is now one of the largest and most powerful technology companies in the world. Google’s rise would not have been possible without an unrestricted internet, one that did not prefer the traffic of a large or resource rich company over a small startup with innovative ideas but little money. Google strongly supports Net Neutrality; a personal statement of support from one of their founders appears on Google’s official blog: *“Today the Internet is an information highway where anybody – no matter how large or small, how traditional or unconventional – has equal access. But the phone and cable monopolies, who control almost all Internet access, want the power to choose who gets access to high-speed lanes and whose content gets seen first and fastest. They want to build a two-tiered system and block the on-ramps for those who can't pay.”* (Schmidt, 2006) Innovative companies like Google could not grow and succeed if their incumbent competitors could have them and their services slowed or blocked by network providers. Google is not the sole high-profile beneficiary of Network Neutrality, imagine if you will, that the social network Myspace.com had been able to pay ISP’s to block up-and-comer Facebook.com, Facebook would almost certainly not be the company it is today; Network Neutrality is imperative to the evolution of the internet.

Free speech activists support Network Neutrality out of the concern that allowing network providers to alter, block, or otherwise control internet traffic would allow them to censor speech that they, their corporate partners, or the government deems undesirable. The main viewpoint of these organizations is that a free and open internet is the best defense that the population has against governments and large companies that may exercise control over other communication media, such as politically connected news organizations

## Anti-Network Neutrality Arguments

Wireline ISP’s like Comcast and AT&T, and wireless carriers like Verizon come out strongly against Network Neutrality legislation for several reasons. For ISP’s like Comcast, Network Neutrality limits the ways in which they can monetize their infrastructure. For example, Internet service providers would like to be able to charge one monthly rate for access to one set of services and websites, and charge additional fees for access to additional sites and services, breaking internet service down into a package-based system akin to cable TV. This way, they argue, they could offer lower cost service to individuals who don’t use high-bandwidth services, and charge only those who need access to those services additional fees commensurate with the additional load they place on the provider’s network. This type of filtering seems unnecessary though, with ISP’s already offering different pricing tiers for different amounts of bandwidth, thereby effectively allowing people with higher bandwidth needs to pay for the bandwidth they need while allowing people with limited bandwidth needs to purchase a tier that fits their needs as well.

Wireless carriers such as Verizon have similar concerns as wired internet service providers, however, wireless networks tend to have higher operational costs and far lower bandwidth than wired networks, making bandwidth management more important to the proper operation of the network. Another characteristic of wireless networks such as Verizon’s is the impact that heavy network users have on other users. On a wired network like Comcast’s, the network generally has enough unused bandwidth to accommodate heavy users, wireless networks however, don’t have the level of excess bandwidth as wired networks, thus a few heavy users in a populated area can negatively affect the network experience of a large number of fellow users in a noticeable way. This is due in part to the way wireless networks are constructed, with one tower servicing a larger geographical area and user base than a neighborhood line of a company like Comcast or smaller regional cable ISP Wide Open West.

Verizon argues that: *“The delivery of high-quality and safe wireless Internet access services is a highly complex, technical undertaking. The proponents appear to have no concept of the negative technical and operational ramifications of requiring purely “neutral” routing of Internet traffic*.”, and thus any wireless networks should be exempt from Network Neutrality legislation. (Hardawar, 2012) Verizon’s stance, however, is extremely vague and doesn’t provide any reasoning for how or why neutrality would hurt their ability to provide services properly. It should be noted that Network Neutrality would restrain Verizon from taking certain measures that, while negative to consumers, would allow them to increase their revenue by blocking competitor’s services.

Additionally, a number of consumers and public interest groups oppose Net Neutrality legislation, mostly out of concern that the government would use such legislation as a “foot in the door” to wholesale regulation and control of the internet.

# Analysis of current Network Neutrality legislation

Currently two countries in the world have passed universal Net Neutrality legislation, with Chile having passed their Net Neutrality law in August of 2010, and the Netherlands passing their law in March of this year. To analyze the effects of Net Neutrality legislation, it is imperative to examine several technological and economic factors in a country.

**Chile**

Chile is a developing South American country, and while years behind more developed countries such as the U.S., it is ahead of many of the countries in its geographical region. With PwC’s market profile giving many useful insights into the state of the telecommunications market in Chile. The market profile analyzes how Chile, after suffering through the financial crisis of 2008-9 and an earthquake in 2010, still manages to have a healthy and growing telecommunications market. For fiscal year 2010 Chile had a growing and profitable telecommunications sector, with the vibrant mobile market seeing over 115 cellphones for every hundred people in the country. (Ruano & Mahorney, 2011) Additionally, it is worth mentioning that the Chilean telecommunications regulatory agency announced in September that the country is more than a year ahead of schedule regarding percentage of the Chilean population with internet access. (Sub-Secretaria de Telecomunicaciones (Subtel), 2012)

**The Netherlands**

In May of 2012, the Netherlands became the second country in the world to enact federal Net Neutrality legislation. PCWorld explains that one of the major catalysts prompting the Dutch government to pass a Net Neutrality law was that wireless internet providers were blocking or slowing services such as Skype and WhatsApp. The new law prevents ISPs from blocking or slowing any traffic, with one exception: customers may request that certain sites and services be blocked on their connection for religious reasons. (Essers, 2012) The Dutch law, having been passed earlier this year, has not been in effect long enough to discern any economic impact, however it is important to point out that momentum is building around the world to protect Net Neutrality.

**The United States**

The United States has partial Net Neutrality protections, with the Federal Communications Commission having passed rules to that effect in December of 2010. The rules in the U.S., as elucidated by The Washington Post’s coverage of their enactment, prevent providers of wired internet service from blocking or slowing any legal traffic on their networks. The rules however, have a couple of major limitations; first, they do not apply those same rules to wireless or cellular internet providers, and second, they do not prevent ISPs from charging content providers like YouTube.com fees for preferential treatment on their network. (Kang, 2010)

# Conclusions and Recommendations

Throughout the history of the internet, Network Neutrality has been the de facto rule for network operators; in recent years however, operators have been trying to discover new ways to increase profits on their operations. It is clear that without the guiding principle of Net Neutrality, the internet would not be the vibrant and innovative place it is today. The internet today is an amazing development, unmatched in human history in the speed at which new culture, technologies, methods, and companies can appear and spread to the benefit of the majority. Empires such as Myspace.com can rise and fall in a matter of a few short years as people find new and better ways to connect with each other. Without ensuring Network Neutrality on the internet, companies that rise would have a way to ensure that other more innovative companies cannot rise to challenge their supremacy. To fail to protect Network Neutrality would allow large companies to turn what has been the true game-changer and economic and educational equalizer of our lifetimes into something resembling PayPerView cable.

Recommended steps to protect Net Neutrality and ensure the continued game-changing and innovative internet in the U.S.:

* Pass an “Internet Bill of Rights” that guarantees that all internet users and traffic be treated equally
* Pass legislation prohibiting ISPs from charging customers based on access to sites/services
* Additionally prohibit ISPs from enacting anticompetitive deals to block or slow access to competing services at the behest of others

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