

The Future of Net Neutrality and the Federal Communications Commission

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Abstract

In this paper we discuss one of the largest active debates regarding the installment of a regulatory standard over the Internet in the United States. The debate is regarding the concept of applying regulation(s) in order to maintain the existence of an open internet. This concept is also known as net neutrality. Like all debates, there are proponents and critics positioned to argue for or against the issue at hand based on varieties of historical evidence, media coverage, emotional context, current trends and future responsibilities. In January of 2014, two key aspects of the Open Internet Order, established by the Federal Communications Commission (FCC) in 2010 were vacated in a court ruling by the United States government. This ruling has since been viewed as a great loss for the future of net neutrality. Instead of appealing the decision, the FCC decided with a five member panel to establish an open call to the public for commentary on the best way address regulation on the Internet. In its wake, this decision spurred unprecedented public debate regarding a regulatory standard. The FCC panel's decision made the public responsible for providing their opinion on the most effective way to resolve this issue. As this debate is currently active, it makes this an ideal time to produce a technical paper discussing net neutrality and the opposing viewpoints held within.

Introduction

We are fortunate to be part of one of the most significant debates related to an Internet regulation in United States history. The debate is to determine the outcome to events that have the potential to threaten the Internet as we know it. As it stands, there is an open request from the Federal Communications Commission (FCC) seeking public comments in order to help determine how to most appropriately handle the future of “net neutrality”. The intention of this request is to use public opinion to establish fair regulation that would continue to foster net neutrality for future generations to come. The request from the FCC has come about based on a recent ruling by the United States court system that vacated previously established authority of the FCC. In the decision, the FCC was found to be not legally allowed to regulate Internet Service Providers (ISPs) based on its own definitions of regulatory service entities (Verizon v. FCC, 2014).

The debate over net neutrality is centered on deciding the future of how traffic will be handled on the internet and how those who handle it will be regulated. On one side, proponents of net neutrality point out innovation, competition and the prevention of monopolization; on the other side critics see the discrimination of internet traffic as a way of providing the best possible service for the most important functions of the Internet. The following paper will provide a background of net neutrality, examine proceedings that have brought this issue to the forefront, identify proponent and opponent stances on key issues and finally provide examples of emerging technologies as a result of the outcomes.

Background

The concept of net neutrality was introduced by Columbia Law School Professor Tim Wu in his 2003 paper Network Neutrality, Broadband Discrimination. His intention was to introduce a term to examine the idea of imposing formal regulatory controls on those responsible for handling network traffic in order to prevent them from participating in discrimination of the content. This term could lead to regulations requiring ISPs to treat all traffic on a network equally, regardless of its intentions or purposes (Tim Wu, 2003). There are multiple complex issues, as well as parties involved in this relationship, including Internet access providers,

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backbone networks, edge providers and end users (Verizon v. FCC, 2014). The concept of net neutrality has become both economically and politically important for all parties who benefit from the Internet.

The fundamental principle of the Internet is based on the transmission of packets at the “best effort” of the network. This meant that all traffic was treated equally and the network would always do its best to deliver all packets; this did not mean that there would be a guarantee of packet delivery at high volume times. Introduce the Internet of today which has seen an explosion of extremely diverse network traffic thanks to the growth of bandwidth intensive applications and media outlets (Jonathan Bishop, 2014). To combat this rise in usage, the Internet’s major players have introduced the usage of firewalls, increased the use of dynamic IP addresses, enforced the utilization of Network Address Translation (NAT) and implemented enhancements to Quality of Service (QoS). These technologies were created and have thrived because of their ability to provide the necessary services to consumers without compromising the quality of the content (Jonathan Bishop, 2014). Ever increasing needs for bandwidth along with a high expectation of quality has put ISPs in a difficult spot. The ability for ISPs to increase the capacity of the network necessary to accommodate all traffic, regardless of its type or purpose, is becoming more and more of a challenge.

If the ISP were to be able to differentiate between traffic moving through its many network systems, it would have the ability to discriminate in favor of the traffic that was the most important. This concept destroys the fundamental aspects of net neutrality which says that all traffic should be treated equally. The idea behind the concept not new and it can be seen dating as far back as the 1860’s with the telegraph (Robert Thompson, 2005). Western Union had taken advantage of similar discrimination options by signing an exclusive deal with the Associated Press for access to telegraph services. This action alone effectively priced out other competitive companies and granted the Associated Press a monopoly over the telegraph. In hindsight this action of allowing for discrimination of service by Western Union proved to be dangerous for both businesses and democracy in the United States.

Net Neutrality Technology

Since its inception, the Internet was designed to all route traffic equally. This routing occurred at the Internet Protocol (IP) layer and was designed from end-to-end where it did not matter what traffic was being sent across the wire. IP would route each packet equally as it received it across a network to and from destinations regardless of the applications underneath. It was built to be open to any sort of device, so long as it was properly interfaced with Internet standards requiring minimal effort (Jonathan Zittrain, 2006).

At the forefront of the issue are the ISPs who act as the on ramp for all parties to gain access the Internet. The FCC classifies ISPs as information services. This designation distinguishes them from being held under the same regulation as other carriers in the United States known as common carriers (FCC, 2010). A common carrier is defined as something that transports people or goods and can also refer to telecommunications services or public utilities. Without the common carrier classification, the regulations that can be applied to an ISP is not required to be as limiting than if they were classified as a common carrier. This differentiation in distinction has led to multiple issues and questions of the feasibility of net neutrality of Internet services. One of the most challenging decisions facing the FCC is how ISPs will be classified in the future.

To date the focus of the net neutrality debate is aimed squarely on fixed ISPs where there is more availability to enforce rules. On the other side of the coin are the mobile ISPs who are not as easily regulated mainly thanks to the different technologies involved. In mobile networks there is exists the need to block and discriminate traffic in order to provide a similar experience to that of a fixed ISP. It comes down to the fact that it is much easier to apply rules to fixed providers over mobile providers because the transmission of media is more easily controllable. Mobile networks lack the capacities of their faster fixed network counterparts and therefore require a different approach altogether.

Federal Communications Commission Open Internet Order

The FCC is an independent agency of the United States government formed by the Communications Act of 1934. The FCC is responsible for regulating interstate and international communications by radio, television, wire, satellite and cable in the United States. It is overseen

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by Congress and is the primary authority for communications law, regulation and technological innovation. The FCC is focused in the areas of broadband, competition, the spectrum, the media, public safety and homeland security.

On December 23, 2013 the FCC approved the Open Internet Order to establish three specific rules in efforts to maintain the composition of net neutrality. The regulations that were established were related to transparency, blocking content and discrimination of content by ISPs. In regards to transparency, both fixed and mobile broadband providers would need to disclose network management practices, performance statistics and terms and conditions of their services. In addition, fixed broadband providers would not be allowed to block lawful content, applications, services or non-harmful devices from their networks. Finally, fixed broadband providers would not be allowed to discriminate against the transmission of any legal traffic on their networks.

Verizon v. Federal Communications Commission

The regulations established by the FCC in 2010 were challenged in federal court during the Verizon Communications Inc. v. Federal Communications Commission appeal. On January 14, 2014 the United States Court of Appeals for the District of Columbia Circuit ruled against the FCC on their establishment of regulations to prevent fixed ISPs from blocking or discriminating against Internet traffic (Verizon v. FCC, 2014). The findings of the court ruling were not in question of the intentions of the Open Internet Order regulations established in 2010, but rather in relation to the determination that the FCC did not have the authority to impose such regulations. In the wake of the decision, the court vacated the regulations on blocking and discrimination of traffic because network providers were not classified as information services instead of common carriers, and therefore by the FCC's own definition, could not be regulated in this way.

In response to this ruling, the FCC launched a campaign to gather public opinion on how to best protect and promote an open internet while complying with the court ruling. To date, this initiative has received over 1 million comments (Jonathan Ernst, 2014) displaying obvious interest from the public regarding the future of the internet and its content. The FCC will use the

comments it receives to help make a more informed decision on which direction is the most appropriate. Ultimately the FCC's commitment to their goals and principles are simple, ISPs don't get to pick the winners or losers on the Internet (Barbara Schewick, 2014).

Net Neutrality Proponents

Proponents of net neutrality are concerned with the relationship that ISPs would be able to establish with the companies providing services on the Internet. The fear is that providers would use their ability to discriminate between traffic to prevent or degrade access to certain companies in favor of others. ISPs would naturally become more influential in the marketplace with the ability to discriminate or block traffic for monetary or political gains. With this influence established, certain companies would quickly stand out limiting the potential for the innovation that has been the fundamental key to the Internet to date. Net neutrality proponents argue that maintaining an open internet is essential to prevent the Internet from being bought by the highest bidder.

Consider electricity as an example that can be likened to the debate over discrimination of Internet traffic. Electric companies currently send electricity as needed into homes to power a wide range of appliances and devices. This transmission of electricity flows indiscriminately and can provide necessary power for anything that is capable of receiving it. The use of the electricity grid in this way has promoted innovation and competition among companies to create products that can use electricity freely. If on the other hand, power companies were able to discriminately funnel electricity into appliances that paid for priority, the innovation and competition to create products that use electricity would be reduced to the companies that were able to afford the costs associated with having priority (Tim Wu, 2003). This would have inherently limited the amount of devices that have been created through the use of electricity.

In another similar example, consider the mail system in the United States as a substitute for discriminatory Internet traffic. If certain companies were able to pay mail carriers for priority shipping, it would greatly reduce the amount of companies that could compete. Consumers not willing to wait longer periods of time to receive their packages would naturally filter out the companies that were being discriminated against by the package providers. This would stifle

innovation and new companies as they would not be able to compete without a large amount of money up or influence initially.

Finally, the long term risk to net neutrality could be the strengthening of “vectorialism” (Le Crosnier, 2008), or the consolidation of ISPs with the content providers. This trend could create vectors where these joined forces would be too powerful to disturb from sending their particular message across the Internet. Proponents of net neutrality strongly feel that there should not be one particular force in charge of what is important on the Internet; rather it should be whatever is chosen by the participants led by creativity and innovation alike.

Net Neutrality Critics

With the demand for bandwidth intensive applications increasingly entering the Internet markets, net neutrality critics question if the traditional model of treating all network traffic equally will be sufficient in the years to come. The creation of a demand based internet could lead to a more efficient way to deliver specific content to end users depending on what they are looking for (Christopher Yoo, 2005). Critics say that discrimination of traffic could allow for its optimization onto different network channels. End users would be able to pay for and therefore supplied the most important features of the channel dedicated to their specific set of needs. This could include a fast lane channel exclusively dedicated to streaming media and a separate slow lane channel for internet website content and other. There would still be competition among vendors as they would be competing to cater to consumers in a more efficient way thanks to dedicated resources.

An argument can also be made that with the advancement of new Internet technologies, a net neutral internet is obsolete and no longer exists at all. Instead, ISPs are able to bend the rules using terms like QoS and Content Delivery Networks (CDN) where ISPs have the ability to deliver data faster thanks to dedicated networks that sit very close to the end users thus speeding up delivery (Jonathan Bishop, 2014). In addition, modern search engines understand that end users are not willing to wait for pages to load, so the results can be tailored to supply only the items that cater to their unique requirements. Critics of net neutrality frequently ask who should pay for the cost of network expansion and improved bandwidth to end users. Should it be

transferred to the end users solely, or if corporations could help shoulder some of the load would it end up being worthwhile for all parties involved?

As the technology of the Internet changes and advances, there may be the need to differentiate between traffic in order to provide essential services to all users. If some end users or companies could pay for a fast lane only for the services for which they require, it may in turn increase the innovative abilities of these parties. For example, with the increasingly bandwidth intensive applications like virtualization, cloud computing, streaming video, virtual reality coming to the forefront of internet technology, there may come a time when it is not possible to include all of these services on the same network line. There may come a time where a divisional structure is required so end users and companies providing data can efficiently allocate throughput based on what the individual user requires, versus what everyone on the network wants.

Future of Net Neutrality

Ultimately the success of the Internet we know today can be attributed to the principles of net neutrality. The utilization of uniform treatment of packet transmission allows for innovation and competition among all parties, not just those who can afford it. With the advancement in technology, the most influential companies have been able to have the most impact regarding the direction of content on the Internet. Increased consumption of communications through mobile networks will also play a large role in how we address net neutrality. The United States government and the FCC must use this time to take into account the technologies that exist today, emerging technologies that are likely to come in the future in order to address the proper resolution to the net neutrality debate.

On one hand, if the FCC and the United States government can come to an agreement to continue to require ISP's to treat Internet traffic without discrimination, then there is the opportunity to have continued growth and innovation on the Internet. The growth and innovation will be like what we are accustomed to seeing. The competitive nature will introduce new and exciting technologies that have not yet been thought of, thanks to the ability to creatively express oneself without any worry of losing a bandwidth war with a large and established company. On the other hand, if the FCC fails to protect the core concepts of net neutrality and gives way to

Internet fast lanes there is the possibility of an equally exciting and innovative change on the horizon. The outcome of the latter is almost impossible to predict, which in part is why this debate is so relevant for the parties involved. Everyone knows what an open internet is and how it allows the freedom of expression and creativity; it is the fear of the unknown that is fueling much of this debate where people are not easily able to give up control without adequate control.

Despite the looming deadline from the FCC to hear from the public about the future of net neutrality, the debate is far from over. The issue of net neutrality is of global proportions, and while this paper only addressed these issues in the United States, similar discussions are occurring all over the globe. Fortunately for the United States, other countries are beginning to experiment with the discrimination of traffic, acting as a sort of test case to be compared to so it can potentially better understand the outcomes before a full decision is made.

In order to participate in future debates about net neutrality, one must hold inquiries into comparisons between the different ways of addressing the issue. They must follow an international body like the European Union and their ultimate decision on net neutrality. They must take into account the decisions from the United States government and the FCC. Finally they must participate in the evolution in significance of the terms, like net neutrality, that are central to the debate and hold so many preconceived notions that may not be ignored.

Closing

As the Internet continues to advance, those who have the most influence will be the ones who continue to attempt to steer the direction of the Internet in their favor. The debate over net neutrality is currently raging, but there are bigger concepts in play that could have the same impact regardless of how the FCC and government decide on to deal with the issue. While it may not be ideal for the government to regulate the Internet, for the protection of the Internet we have become accustomed to will likely require formal regulations preventing any one company from changing the fundamentals. If things continue without regulation there is an opportunity for large providers to make their own decisions, outside of the best interests of end users. And when profits take preference over the consumer, we will inevitably be stifling the innovative and competitive nature of the Internet that has made it such a success.

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The future of the Internet will rely on some form of government intervention; after all, the Internet was created thanks to the advancements of the government and therefore must be protected from monopolization from multiple vectors, including the proper use of traffic discrimination (Tim Wu, 2003). The United States would benefit from regulations prohibiting the blocking and discrimination of legal Internet traffic in order to encourage innovation that takes advantage of ever changing technologies on the Internet. This is the model we have become accustomed to. At the same time, however, we may need to accept that in our ever changing world, the discrimination of network traffic could allow access providers the ability to more effectively deliver the content that we all want, instead of compromising its quality for content that is not relevant. Emerging technologies may make this debate even more important. The advent of technologies like virtualization, cloud computing and virtual reality could introduce a real need to discriminate traffic to allow end users the ability to effectively operate. The alternative is for all of us to compete for network bandwidth with the services and applications that we do not care anything about.

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