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Ethics and Politics in Science and Technology

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Ignoring Actors of a Controversy

The cartography of controversies, developed by Bruno Latour, is a method for describing controversies. One of Latour's assistants, Tommaso Venturini, writes in "Diving in Magma" that the cartography method stresses the importance of giving attention to every actor, or participant, in any controversy being described. Interestingly, when describing the scientific work of Louis Pasteur, Latour fails to follow his own method and neglects mentioning the role that other actors played. As first demonstrated in Latour's description of Pasteur, ignoring actors distorts the reader's understanding of the controversy. Failure to pay attention to all actors - especially in ongoing issues - is harmful because it makes readers take certain facts for granted and steers the outcome of the controversy.

In his piece "Give Me a Laboratory and I Will Raise the World," Latour distorts the reader's understanding of Pasteur by failing to properly mention all the actors who made possible his discoveries. During the nineteenth century, Pasteur contributed to the development of germ theory, studied the cause of anthrax, and created a vaccine for it. However, another microbiologist Robert Koch had already determined the cause of anthrax, while Jean-Joseph Toussaint had created an earlier form of the vaccine (Auyang). Pasteur built on the work of these individuals, yet Latour only mentions Koch's contribution briefly in a parenthetical citation: "The spore of the bacillus (shown by Koch) is the translation through which dormant fields can suddenly become infectious" (Latour 145). Latour never mentions Toussaint. Furthermore, Latour often praises Pasteur's ability to grow visible bacteria colonies as a milestone of biology

while only briefly referencing Koch, who had invented the solid media on which Pasteur grew his bacteria. Latour did not follow his prescribed method of examining all the actors. The reason for all these omissions was his desire to showcase the importance of the laboratory. Indeed, the laboratory is one level to examine. However, according to Venturini, there are many levels to study a controversy from, and "a thorough observation is impossible without the superimposition of a variety of layers" (Venturini 15). By treating the lab as the only unit to study, Latour ignores the impact of other actors. Scientific knowledge is communal, but when the contributions of others are unrecognized, readers are left with an idolized view of Pasteur, rather than the correct understanding that Pasteur was the product of circumstances and forces of that era.

In addition to ignoring those who made possible Pasteur's work, Latour ignores actors who worked against Pasteur. Latour describes only Pasteur while making minimal mentions of his competitors. Therefore, in the reader's mind, competitors simply did not exist. However, there were actually challenges to Pasteur at every stage of his work. For instance, germ theory had to displace the theory of miasma, which had been dominant for centuries. Also, Pasteur's methods for investigating the cause of anthrax and for making vaccine were criticized by Koch. Koch's criticism convinced Pasteur to test his anthrax on sheep in another country - Germany; the vaccine failed the first few times due to botched technique (Auyang). Latour ignored all these challenges raised by the other actors. A controversy in science can be defined as the struggle for knowledge to overcome challenges and be accepted. Indeed, social scientists advocate the study of controversy because "translation of private lab work to a public domain is just what happens in controversy" (Schaffer 186). By ignoring the opposing actors, Latour omits all these parts of the controversy. He thus reduces the reader's understanding of the battles that Pasteur had to win. The reader is now more likely to take Pasteur's discoveries for granted. The lack of

challenges by other actors in Latour's account may even convince readers that Pasteur's discoveries were somewhat inevitable, which at the time clearly not the case.

Latour's failure to examine all the actors has two disadvantages. Ignoring the supporting actors distorts knowledge of the situation, specifically through inflating reputations. Ignoring the opposing actors reduces understanding of how scientific knowledge is accepted. Unfortunately, the controversy of Pasteur is one in which the debate has been closed; the debate's relevance to modern society is now minimal. However, the importance of paying attention to all the actors can be seen when applied to controversies with huge implications for the future.

Consider the debate between Thomas Hobbes and Robert Boyle concerning the legitimacy of experimental science, as described in Leviathan and the Air-Pump by Steven Shapin and Simon Schaffer. Boyle believed that scientific knowledge could be produced through experiments involving machines. Hobbes believed that only philosophy, logic, geometry, and direct observation should produce science. Hobbes distrusted the experimental machine as a black box and feared being told what was correct by the machines. He also felt that the few people who knew how to use the machine would become "masters of science" and that science was private and esoteric (Shapin et al.). People today take it for granted that experimental science is valid. To them, the value of performing experiments is self-evident, but it was not so for people in the 1600s. However, by presenting all the actors involved, Shapin and Schaffer make readers ask questions like, "Was science public or private back then? Was it okay to rely on machines for knowledge?" These types of questions lead to ones like "Is science public or private now?" and "Is it still okay to rely on machines for knowledge?" Despite having been decided long ago, this controversy still remains incredibly relevant to the concerns of society because some issues, like how to do science, remain the same. According to Venturini, "quarrels

are so interesting for social sciences, because they open up black boxes, things and ideas that would otherwise be taken for granted" (Venturini 9). If Shapin and Schaffer had hypothetically only presented Boyle's beliefs and ignored the other actors, readers would possess a limited view of what happened then and less insight into what is happening now.

The importance of paying attention to all actors is seen especially in controversies that are ongoing. The goal of research into controversy is to just describe all the views of the different actors with as little bias as possible. Venturini claims that "objectivity can be pursued only by multiplying the points of observation" (Venturini 4). By ignoring certain actors and their effects, the researcher biases his description of the controversy and risks steering it toward closure. However, Venturini states that "the role that research should play in collective disputes is not of steering their closure" (Venturini 19). A controversy should belong to the actors who started it and who have staked their livelihoods in it; it should not be decided by some external observer. Consider issues like global warming or genetically modified organisms (GMOs). If the researcher presents a biased description of those issues, he risks shifting public opinion towards what he believes is important and not what actually is important. The outcome is no longer determined just by the merits of each side, which could be disastrous in cases as critical as global warming or GMOs. The only responsible way for the researcher to avoid artificially changing the outcome is to give attention to every actor. Ironically, social scientists encounter the same age-old problem that scientists of natural phenomena face, namely how to observe something without affecting it.

The cartography of controversies stresses the importance of studying all the actors involved. Latour's failure to adhere to this method in his account of Pasteur significantly distorts the reader's opinion of Pasteur and limits the reader's understanding of the circumstances of the

time. People today often take scientific outcomes for granted if they were produced centuries ago. Only by focusing on all the actors is it possible for readers to see each controversy as it was back then: a crucible of competing theories with no certain outcome. Additionally, paying attention to every actor is the only way for researchers to avoid steering the outcomes of controversies, which is not their role. It is most important to follow these principles when studying controversies with potentially wide-ranging implications. Showing all the actors permits discussion of all aspects of the controversy and ensures that no aspect is ignored. This is the proper way to document and decide controversies.

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Critique of Empirical Methods Used to Analyze the Gene Patent Controversy

In the last three decades, thousands of patents on human genes have been granted in the United States. In general, a patent grants exclusive rights to the inventor of a new, non-obvious, and useful invention. A gene patent is a patent that covers an isolated gene sequence or a method of obtaining or using it. The controversy over gene patents exists because there is debate over whether gene patents are ethical, limit access to genetic testing, hinder research, or drive innovation. Recent advancements in genetics, the rise of genetic tests for diseases, and marquee lawsuits have made the gene patent controversy a pressing issue. Three groups of researchers analyze this controversy empirically. In "Intellectual Property Landscape of the Human Genome," Kyle Jensen and Fiona Murray determine the number of genes patented. In "Trends in Human Gene Patent Litigation," Christopher M. Holman discusses the impact of gene patents by identifying the number of related litigations. In "Gene Patenting and Medical Research: A View from a Pharmaceutical Company," Mike Stott and Jill Valentine provide economic data that support gene patents from industry and innovation standpoints. Though they have their differences, the three papers all use data as their main argument. The data are – for the most part – correct, but its interpretation is incorrect in each paper. Faults in the interpretation of the data are lost when others use the paper's findings.

The first two papers each rely mostly on data to prove a single claim, but both have errors in their use of the data. Jensen and Murray found 4,270 human gene patents by searching a patent database and claimed that "20% of human genes are explicitly claimed as U.S. IP" (Jensen 1). Their paper never explicitly makes an argument for either side of the debate; much of the paper simply describes the data and the method used to obtain it. However, the authors' bias is evident in one of the final paragraphs when they briefly suggest that gene patents raise "the possibility that innovators may incur considerable costs securing access to genes" (Jensen 2). Though there is no explicit argument, there is a subtle and implicit one that the number of patents hinders research. However, Jensen and Murray arrive at this subtle claim incorrectly. According to Christopher M. Holman (in a separate paper from the one mentioned before), an analysis of the patents found by Jensen and Murray shows that 68% of them "claim molecules, not genes per se" and would only be infringed if the genes were isolated and used in the exact molecular form described by the patent (Holman, "Will Gene Patents Impede" 5). However, with so many techniques, including whole genome sequencing, there is no need to isolate genes in order to work with them. Holman states that "a majority of these patents would appear not to be infringed by at least some, perhaps all, forms of genetic testing" (Holman, "Will Gene Patents Impede"). Jensen and Murray rely on the high proportion of genes patented to support their implicit argument that the price of accessing genes will increase. In doing so, they forget that that a gene patent does not prevent all access to a gene. The majority of gene patents prevent use of a gene in a narrowly-defined isolated form. Jensen and Murray take at face value the statement that 20% of the human genome is patented, and thus their interpretation of the data is flawed.

In the second paper by Holman, the argument is much more explicit, but the interpretation of data is also flawed. Holman identified 31 litigations over gene patents, which

seems "a relatively small number" (Holman, "Trends" 1). Relying mostly on that figure, he concludes that there is "little empirical support for a legislative bar to the patenting of genes or DNA" (Holman, "Trends" 2). Holman ignores the possibility that many companies lack the resources to counter a lawsuit, so they must agree to any cease-and-desist demands on research before there is litigation. Holman also neglects the fact that lawsuits set precedents. A few influential cases that rule in favor of gene patents would discourage subsequent litigation, but this hindering effect remains unseen when only examining the number of litigations, which is the focus of much of his paper. Holman also undermines the idea that gene patents are impediments to research by listing easy ways of subverting them, such as taking research offshore or "designing around the patent" (Holman, "Trends" 1-2). However, one could easily counter-argue that patents are indeed impediments if researchers need to resort to such alternatives. Holman uses his main empirical evidence without considering the reality of litigations. Any supporting anecdotal evidence he lists could easily support the other side. His interpretation of the data is one-sided.

The second and third papers both utilize the technique of comparison to prove a point. Holman's paper mentions that "at least 1294 lawsuits have been filed asserting drug patents" (Holman, "Trends" 1). He lists these statistics in an attempt to provide context for the 31 litigations and to show how small that number is. However, Holman provides an incomplete context. It is conceivable that the number of total drug patents dwarfs the number of gene patents, just as everyday experience tells consumers that there are more drugs on the market than genetic tests. 31 litigations could possibly be a large number relative to the number of existing gene patents. In addition, one could easily argue that both drug and gene patents hinder innovation, but drugs have some properties, such as greater potential for imitation or tweaking,

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explain it

that allow individuals to counter intellectual property claims in court far more frequently than against claims to genes. Holman compares gene patents to drug patents to prove a point but does not take that comparison far enough.

In the third paper, Stott and Valentine also utilize a comparison when defending gene patents from a pharmaceutical company's perspective. They cite the "$800 million" cost of developing a medicine and the statistic that "only three out of ten drugs brought to the marketplace generates enough revenue" to recover that cost in order to demonstrate that limited monopoly rights provided by a gene patent are necessary incentives for this high-risk industry (Stott 1-2). Like the second paper, this paper also makes an unjust comparison between drugs and genes. Pharmaceuticals are mainly concerned with using genes to provide diagnostic and screening tests. The average cost of developing a single laboratory-based genetic test is $10,000, which is orders of magnitude less than the cost of developing a drug (Das). Genetic tests also reach the market earlier, and companies view them as sources of "near term revenue" (Wikipedia). The government does not regulate most genetic testing, so those companies can avoid the costly trials required for drugs (Wikipedia). The expenses and marketability of drugs and genes are far too different for the authors to compare them. Perhaps patents are necessary to protect investment on drug R&D, but that should not imply that patents on genes are also needed. The author surreptitiously mixes conversation of drug patents with conversation of gene patents throughout the first part of the paper, even though the comparison is invalid.

Unlike the first two papers, which focus mainly on data, the third paper presents a more comprehensive argument. However, the additional arguments have little merit and ultimately detract from the paper. For example, Stott and Valentine claim that there is evidence that gene patents, which are stronger in the U.S., promote research. They justify this claim because "the

United States continues to be a source of much of the world's scientific research and medical inventions" (Stott 4). This overly broad claim does not show causality. Indeed, one could argue that other factors give the United States its dominant position or that gene patents are impeding the country from further innovation. The third paper also uniquely provides counterarguments, but those suffer from similar problems. In its attempt to prove that patents do not impact research, Stott and Valentine refer to the fact that the number of patents granted is minimal compared to the number of European patent applications. They also claim that the rate of American gene patent grants is decreasing. According to them, "it is difficult see how such small numbers can have the adverse effects on research" (Stott 4). The fact that patent grant rates are low in comparison to application rates or that the grant rate is decreasing has little to do with the effect of patents. It is entirely possible that the few thousand patents already in existence could block out significant research. Stott and Valentine also provide a faulty counterargument to the possibility that Myriad Genetics was stifling research with its gene patents. They claim that "it is not the grant of the patent that is at fault but the way in which the patentee has chosen to exercise that right involving a particular restrictive condition" (Stott 4). Essentially, they claim that the patent is not at fault; what the patentee chooses to do with the patent is at fault. This counterargument is weak; it does not successfully shift blame away from the gene patent. Finally, Stott and Valentine mention one exception to their argument, which is a survey in which clinical laboratory directors replied that gene patents were inhibiting testing. They counter these findings by claiming that "the extent to which the laboratory directors' decisions to cease testing were well founded on legal advice is unclear" (Stott 4). Stott and Valentine cast doubt on the expertise of the lab directors surveyed without any reasons or evidence. The reader becomes

suspicious about the veracity of this claim because it is presented so abruptly without proof. In each of the counterarguments, the third paper provides broad claims with questionable evidence.

Details from the papers are forgotten when the findings are used by others. Jensen and Murray's paper became one of the most widely cited papers, but its acceptance by the public is more interesting to track. The idea that 20% of human genes are patented turned into the idea that access to 20% of genes is totally closed off. This idea then fueled the rhetoric that people were going to die because tests were either unaffordable or alternative tests could not be developed. Some took it further and claimed that parts of one's body were being patented. The 20% statistic is cited everywhere, including in the news and in court cases. What a patent really covers was lost as the paper's findings became rhetoric. The Holman paper is mostly cited to demonstrate that gene patents do not present a severe problem. A Stanford law review illustrates the typical usage of this paper by stating, "a recent study indicates that relatively few DNA patents have been asserted through litigation, suggesting that the problem is less dire than predicted" (Ouellette 4). Any alternative explanations for the low litigation number are neglected whenever the paper is cited by others. Finally, the Stott and Valentine paper is usually cited to showcase the views of the companies. Jensen and Murray give a typical citation: "strong IP protection provides incentives crucial to downstream investment" (Jensen 1). Each brief citation of the third paper exposes the reader to that one side of the argument and does not examine the legitimacy of the argument.

Each of the three papers used empirical methods for support, relying on the notion that claims backed by numerical data are more self-evident. The data presented by the three papers is accurate for the most part, but many feasible alternative interpretations exist. Like in studies of other controversies, the conclusions drawn ultimately depend only on how the individual

scientist chooses to assemble the data into an argument. These conclusions have potentially enormous impacts. Such an impact can be witnessed in the gene patent issue, where the conclusions of the three papers have been accepted by other scientists, cited in court cases, adopted as rhetoric about public health, and used to galvanize either side of the debate. Because of their influence, it is important not to lose sight of how the authors proved their conclusions and not to simply accept what the author's data supposedly shows.

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The Biosafety Lab Controversy: *Different Audiences*

The urban development of biosafety laboratories designed for conducting research on infectious diseases is a controversial issue centered not only on the importance of finding treatments for these diseases but also on the safety of the local population. To understand the costs and benefits of this urban development, we must first analyze the effectiveness of these research laboratories, specifically, the Bio-Safety Level 4 (BSL-4) labs, in discovering treatments for diseases, as well as the possibility and magnitude of the biological damage that can be incurred if an outbreak occurs. This paper focuses on the former, and analyzes two scientific journals in terms of the methods used to persuade the reader of the benefits, or lack thereof, of BSL-4 laboratories. While the article *Research in the Hot Zone* by Robert Steinbrook employs vivid descriptions and examples to indirectly measure the effectiveness of BSL-4 labs, *Global progress in infectious disease control* by Alan Hinman uses hard, numerical facts and tables to provide a more objective perspective on the difficulty of treating infectious diseases.

Through the analysis of the graphics and descriptions used, one can easily tell that the two articles have different target audiences. *Research in the Hot Zone* provides a detailed explanation for the designs of BSL-4 labs as well the protocols for working in theses labs. Steinbrook describes theses labs as "the hot zone...continues to be revered and feared...places to study dangerous and exotic agents that cannot safely be studied anywhere else..." (Steinbrook, 2006, 1) By defining a unique attribute of these labs, Steinbrook is able to imply that they transcend the limitations of a typical research lab, emphasizing their importance. In addition, by portraying an average BSL-4 lab as "a box within a box – a sealed environment within a larger building" (Steinbrook, 1) and providing a basic diagram corresponding to this depiction, Steinbrook effectively gets across to the reader the complexity of BSL-4 lab, further distinguishing it from labs of category BSL-3 and below. Finally, by adding that "in the laboratory, all personnel wear full-body positive-pressure 'space suits' that are connected by tether hoses... [and] research is conducted within specialized areas known as 'biological safety cabinets'," Steinbrook provides concrete examples that imply the intensity and legitimacy of the research conducted, which to most readers should be enough to justify that, to say the least, progress is being made in the lab. Because very few objective data are included in the article, it should be clear that Steinbrook is targeting the general public. In contrast, Hinman includes in his article an abundance of undisputable, experimentally-obtained data and refers to multiple complicated tables ranking causes of death, suggesting that he is targeting the scientific society, individuals who receive information with a critical eye. For instance, the first figure in this paper illustrates the lives saved by immunization of more than a dozen different diseases. (Hinman, 1998, 2) The complex organization of data, as well as the obscure terms used ("EPI plus" and "pertussis", for example) would undoubtedly dissuade the average adult from reading further. However, such precise language is required for a paper to be accepted by the scientific community. By use of this figure and several more, Hinman offers evidence with accuracy that cannot be achieved by mere descriptions or basic diagrams. These evidences, with their corresponding explanations, serve as solid justifications for the difficulty in finding treatment for some diseases. The difference in the approaches that the two authors took to convince the readers of the importance of BSL-4 labs can be attributed to the difference in their target audiences.

The amount of numerical data present in the two articles also aids in contrasting their rhetorical effectiveness. Steinbrook focuses on the indirect data, such as the square footage of a BSL-4 lab or its annual cost (Steinbrook, 2006, 3) as evidence that the lab has the potential to bring about major discoveries of new treatments. Here he introduces an assumption that is not 100% valid: that the huge cost of the lab is a direct measurement of the potential of the lab. One can say that Steinbrook is forced to make this assumption because, as he is targeting the general population of readers, any argument more in-depth would most likely be too complex for the audience to follow, thereby dissuading them from finishing the article. What should be noted in Steinbrook's article, however, is the *lack* of numerical data backing up his claims. On page 2, for example, he simply states, "biosafety level 4 research is slower, more physically demanding, and

more expensive than comparable research that can be conducted at lower biosafety levels" without any reinforcing evidence. This is not to say that this article fails to persuade its readers; in fact, it is safer to conclude that Steinbrook's audience believes his claims more readily, without the necessity of numerical data. In contrast, Hinman's audience will rarely accept a claim without numerical data (sometimes even rejecting claims whose supporting evidence is unsound.) As a result, Hinman must provide strong, objective justifications for each claim that he makes. This explains his prolific use of numbers. Also, one should note again that Hinman's interpretations of his data are significantly more in-depth than those of Steinbrook's. One need only look at a few examples ("researchers use cameras and video monitors when direct observation is difficult, sometimes looking at a computer screen rather than into a microscope" (Steinbrook, 3) as compared to "this is perhaps most visible with HIV and TB, in which each infection is a very potent co-factor for worsening the other" (Hinman, 1998, 4)) to realize this stark contrast in depth. Because the depth of an article is dependent on its audience, it is wrong to conclude that one of the articles is more convincing than the other.

To qualify the validity of each article, it is essential to take into account the citations of the article, the background of the author, and the reputation of the journal in which the article is published. Dr. Steinbrook is an associate professor at Dartmouth Medical School, and does not seem to be affiliated with any organizations taking sides in this controversy. (Dartmouth, 2011, 1) His article, however, cites reference articles, 2 of which are published through the National Institutes of Health and the National Research Council, which are both involved in the controversy. Similarly, Dr. Hinman is a Senior Public Health Scientist at the Public Home Informatics Institute, which is not affiliated with any BSL-4 research lab. (PHII, 2008, 1) Dr. Hinman works with the PARTNERS TB Control Program, but there is no evidence that this program is affiliated with any BSL-4 lab. His article does not cite any reference articles published by an organization involved in this controversy. Steinbrook and Hinman published their articles in *The New England Journal of Medicine* and the *Elsevier Science* journal, respectively, neither of

which has an outstandingly biased reputation, and neither of which is affiliated in any way with any BSL-4 lab. While one should keep in mind that NIH provides funding for many BSL-4 labs and therefore may be biased for the development of these labs, the extent to which its bias has influenced Steinbrook's paper should be negligible, as the author himself seems to be unbiased. Thorough research on the background of the authors as well as the affiliation of the referenced articles suggests that both of the authors are unbiased, experienced, and therefore credible.

Through a detailed analysis of the intended audience, usage of graphics, amount of numerical date, credibility of the author, and affiliations of the article's references, it is reasonable to conclude that Steinbrook's *Research in the Hot Zone* is directed towards the general public, and hence provides basic diagrams, little numerical data, and excess descriptions to persuade the readers that BSL-4 labs bring about accelerated progress, whereas Hinman's *Global progress in infectious disease control* is aimed towards the scientific society, which looks closely at the article's numerical evidence, in-depth interpretations, and complex graphics before accepting the claim that past research on some of the infectious diseases has done little to benefit the world. While the authors took significantly different approaches to make their claims convincing, both approaches are especially effective toward their respective audience. It is only through exposure to such diverse articles can we gain a complete understanding of the controversy around the establishment of a BSL-4 lab on Boston University campus.

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A Façade of Openness

Eighteen years old and a recent high school graduate, I began work at my first research laboratory—Arizona State University's Biodesign Institute, an institute containing ten different "research centers." As I toured the building for the first time, my mentor, Dr. Tran, explained, "Biodesign is different. Here, every laboratory is outlined by clear windows to encourage collaboration and openness between labs." This sense of alliance and a greater collective purpose warmed me until I realized what a façade it was. Only members of the Center for Biosignatures Discovery Automation attended lab meetings for the Center for Biosignatures Discovery Automation. Although we ate lunch in a shared cafeteria, we discussed projects only when members of our own lab surrounded us. We did not ask members of the Center for Bioenergetics what they were working on; they didn't ask us. In some sense, times have not changed. More than three hundred years ago, scientists created a façade of "openness" via *The Republic of Letters*. To this day, that façade remains.

A simple Google search of *The Republic of Letters* pulls up website after website detailing how this network of letters overcame cultural boundaries and distance to establish a web of interactions between intellectuals. But is this truly the case? The extent of openness in *The Republic of Letters* may be embellished. Initially, many of the authors involved in this collection of letters worked for the state. However, the authors maintained a clear divide between their work as statesmen and their work as scholars. It would seem that in this situation, the letters did allow some level of openness. However, this situation

did not last. Consider *The Republic of Letters* during the time of Jeane -Baptiste Colbert, during Louis XIV's reign in France. In the 1650's, when Jeane-Baptiste Colbert gained political power, he immediately decided to use *The Republic of Letters* as a tool to strengthen his hold. Very quickly, he transformed the letters such that only those who agreed with his views wrote. Soon, Colbert established a network of individuals who were state scholars—intellectuals loyal to the French absolutist government.

As is the case in laboratories today, the "openness" in *The Republic of Letters* was at least partially bogus. How could the letters foster "openness" when letters from France were tainted by the country's politics, when the country only allowed academies supported by the state, when only those who agreed with the state were able to write? How could we call *The Men of Letters*, as the letters' authors were sometimes called, "open" when women were excluded from the network? How can it be an open network when flocks would move to Paris to write, only to end up failing because of the surplus of writers?

Even with the start of the first laboratories, there remained a delicate balance between secrecy and openness. As described in Shapin and Shaffer's analysis of Hobbes, a philosopher, and Boyle, an experimentalist, in *The Polity of Science*, laboratories had a duality; they were private in that all work was done within a confined space but public in the sense that ultimately, witnesses were needed to establish findings as "truth." However, Shapin and Shaffer also discuss the three ways to increase the number of witnesses: performing in front of direct witnesses, repeating the experiment multiple times, and using virtual witnesses. The most commonly used was the buildup of virtual witnesses. That is, the public did not actually see the occurrences of the lab. Rather, they read about them in as much detail as the author wished to share and imagined the experiments actually

occurring. The advantage of using virtual witnesses is first and foremost that it allows the number of witnesses to increase far more rapidly than it otherwise would. A second advantage is that it does not require true publicity. A scientist can publish an experiment as he wishes without showing anything or revealing anything he does not wish to reveal. Once again, the laboratory remains a private space. The scientist shares what he needs to in order to achieve success but nothing more.

For an example of such a laboratory, consider Pasteur's laboratory as discussed by Bruno Latour and Simon Shaffer in their pieces "Give me a Laboratory and I Will Raise the World" and "The Eighteenth Brumaire of Bruno Latour" respectively. Although Latour claims that Pasteur built his success by essentially integrating the laboratory into society and dissolving the boundaries between a laboratory and the outside world, Shaffer's arguments seem to be closer to Pasteur's actual strategy. Shaffer discusses the complexities of Pasteur's rise to success. That is, he clarifies that Pasteur's failures are not available to the public. As the public, we don't know of the times that his experiments failed, we don't know how he developed his vaccine, and we don't know what Pasteur's thoughts were through the process. Rather, we only see the successfully tested vaccine. Pasteur's successes arose at least partially because of the lack of discussion about his failures. The public did not acknowledge the fact that Pasteur never disproved his opponent, Pouchet's, work. Pasteur instead used his reputation to his advantage and simply asserted that Pouchet made an experimental error. The public only sees the successes of the laboratory and that too, only because that is what allows the scientist to achieve recognition for his work.

Finally, consider modern day laboratories. Have we moved away from the patterns of secrecy? Today, laboratories sometimes collaborate. With easy access to scientific papers with the Internet, reading about the works of other scientists has become easier than ever. It would seem that we have come to a point where science done in the laboratory is "public." However, this is not the case. Although, there are cases when scientists collaborate, scientists also hide their work from others to prevent being "scooped"—that is, to prevent another scientist from publishing a project first. Today, in the process of publishing a paper, scientists must have their work peer-reviewed. Because another person is reading their work and determining whether it is accurate, it would seem like the details of a scientist's work have become more public than in the past. However, while I was touring a laboratory at the Koch Institute just last week, the post-doc assigned me a paper and explained how she doesn't "believe the research." This is a clear example of how, even today, scientists can leave ambiguities in their experimental method; they can leave details of failures out of their papers; they can make sure that only enough information is given to successfully publish the paper.

Another example of the divide between the laboratory and the public can be seen in the studies done on BPA, an endocrine disruptor found in polycarbonate plastic. After controversies relating to the danger of BPA began to build in 2008, the Food and Drug Administration initially declared BPA to be safe. How did they decide this? The FDA used two studies done by chemical companies; that is, they used two studies with potentially significant bias. The public is removed from this information and the details of the chemical companies' studies. Rather, they simply hear that BPA is safe.

very much

Can the public know?
my delegate theory

Furthermore, more and more research can be completely hidden from the public by deeming it a question of national security. As Peter Galison describes in "Removing Knowledge," the amount of information being deemed classified is increasing far more rapidly than the information being declassified. Soon enough, it may become impossible to understand scientific processes. The government is not hiding specific threats to national security but rather everything and anything that pertains to certain aspects of science, such as nuclear energy details.

Laboratories today have grown and developed significantly since the time of Pasteur. Technologies have advanced, collaboration has increased, and the process of publishing work has become more sophisticated. However, if there is one thing that has not changed since the early laboratories, it is secrecy. To this day, secrecy is maintained when it comes to many aspects of the laboratory. This is established either by the government in anticipation of a threat to national security or by the scientist in fear of his ideas being stolen. Whatever the reason, what happens in the lab, stays in the lab until otherwise deemed by an insider.

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I do Footnotes

good paper
drew nice connection
w/ class

The Policies of the Net Neutrality Debate

By: Thuan Doan

The controversy of net neutrality has the potential to create or eliminate policies that could effectively change the way the internet is structured, the way content is delivered, and the way service is provided. Though the term net neutrality was not introduced until 2003 by Tim Wu's article, "Network Neutrality, Broadband Discrimination," the net neutrality debate has existed since the early 1990s. The basic principle of net neutrality revolves around the idea that networks, in order to maximize the flow of useful public information that has led to the rapidly expanding web-based industries as well as advancements in technology. While this core principle remains at the heart of the controversy, both proponents and opponents are arguing for a consensus in which they feel that the established policies, or lack thereof, will best serve the future of the internet.

While the controversy boundaries are often unclear due to the fact that there are so many different actors, most of the actors can be split into two main groups, opponents and proponents of net neutrality policies. The major proponents include content providers such as Google, Amazon, and Microsoft as well as public interest groups such as the American Civil Liberties Union. The opponents of net neutrality policies, a majority of which assert that regulation of the internet is unnecessary, counterproductive, and burdensome, include internet service providers such as Verizon, AT&T, Comcast, and Time Warner Cable. With the internet being such a rapidly changing environment, there is little precedence in the court decisions and cases regarding net neutrality. As a result, the current controversy is further muddled by the

combination of the languages of law, economics, marketing, and technology as well as the use of both theoretical and simplified real-world analogies to establish arguments.

Most opponents of net neutrality are against any law or policy that restrict or regulate the Internet. These entities argue that the very goals of the Federal Communications Commission and other proponents of net neutrality will be hindered if the Internet was to be regulated. They claim that the natural course of the internet's development should be allowed to continue so that the market of broadband and related services and applications can continue thriving. The laws of economics would prevent companies from taking advantages of consumers and the result would actually be better service, infrastructure, and innovation. The implications of the hands-off-the-internet-policy that is pursued by these advocates would allow for Internet service providers to prioritize and restrict content at their discretion. It would also allow these companies to charge either content providers and/or consumers to access specified content or applications, effectively creating a tiered system of content service. Service providers argue that this system would allow for further development of broadband infrastructure, ultimately benefitting consumers by providing faster and more reliable service.

The proponents of net neutrality, while having differing views as to how neutral the internet should remain, agree that the internet needs some form of regulation in order to maintain the public sharing of ideas and information that makes the internet such a unique resource. Some proponents are advocating for stronger regulations and even legislation in order to ensure that the large telecommunication companies do not use their market power to control the Internet. Other proponents believe that minimal protection is needed and that the existence of systems such as a tiered-service system

Other Paper 3's from Group

in which consumers can pay for faster or prioritized service are acceptable as long as there is a neutral public network option.

In response to growing concerns of network neutrality, in 2004, Federal Communications Commission (FCC) Chairman Michael Powell introduced the idea of the four basic freedoms of the internet during a speech. These freedoms which were adopted by the FCC in their Broadband Policy Statement in 2005, state that consumers are entitled to access lawful Internet content of their choice, run applications and services of their choice, connect any legal devices of their choice, and competition among network providers, service providers, and content providers. The statement also included two additional rules in 2009 regarding nondiscrimination of any content or applications by internet service providers as well as a requirement that internet service providers disclose all policies to its consumers. These policies serve as basic guidelines for Internet service providers and have been the cause of many lawsuits and debates.

Among the major events that have publicized the net neutrality debate and led to the development of the current policies in place has been the case of the FCC vs. Comcast. In this case, Comcast had been reported for blocking peer-to-peer traffic in an attempt to manage and prioritize the content that it was providing in 2007. As a result, the FCC ruled that network operators such as Comcast could not engage in such practices and required Comcast to stop. However, the federal appeals court struck down the regulations placed on Comcast by the FCC in a ruling in 2010, stating a major concern that many opponents of net neutrality had been voicing, that the FCC did not have the authority to regulate network-management practices in such a manner. However, while there is a concern of whether or not the FCC actually has the authority

to regulate the internet, an attempt by certain parties within the Senate to pass a resolution condemning the FCC's Net Neutrality policies was voted down, sending a message that despite the controversy, the Senate views the FCC's policies regarding the freedom of the internet within its authority.

However, there are proponents of net neutrality who are pushing for the FCC to obtain further regulatory authority over the internet. The most notable of the propositions is the push for the reclassification of Internet service providers as a Title II entity under the Telecommunications Act rather than their current Title I status. This would automatically make Internet service providers more regulated by labeling them as, "common carrier," of goods or services. This would place many defaulted regulations on Internet service providers and undoubtedly provide the protection that net neutrality advocates seek. However, many proponents see this as an unrealistic objective especially with the FCC's current limited powers and are instead pressuring Congress to impose legislation to ensure that broadband networks and services remain public and neutral. These proponents fear that with the current state of competition in the market, Internet service providers will use their market power and vast resources to obstruct universal and open nature of the internet. While many opponents are attempting to argue that deregulating the internet would ultimately benefit the consumer, many net neutrality advocates fear that the power held by an unregulated Internet service provider could be used to disadvantage competing content and application providers.

While the current broadband policies regarding the basic Internet freedoms published by the Federal Communications Commission are still in place, a consensus has still not been reached. For the time being, most telecommunication companies have

chosen to abide by the policies despite the ongoing debate and pending lawsuits regarding the legalities of the policies and other regulations instituted by the FCC. While the proponents are hoping to increase the role of the FCC and the opponents are arguing to deregulate the Internet, the outcome of the pending Verizon lawsuit and other complaints against the FCC will have drastic impact on the FCC and its policies regarding net neutrality.

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Roshan Ardhasseril
STS.011 Paper 3
November 22, 2011

A Small Insight: The FCC, the US Senate and Net Neutrality

Net neutrality is the policy or set of rules that state that the Internet should be an open and unrestricted resource to all who wish to use it. The government body that strives to set down the rules for the Internet providers is called the FCC, or Federal Communications Commission. The ultimate usefulness of the FCC would be to allow for regulation enough to ensure competitiveness in the market coinciding with the ability to step back and let the market play out on its own. Recently, however, the FCC has come under fire from lobbyist led political factions that aim to remove this power from them. The issue seems to have, rather than engendered reasonable debate, caused a divide along party lines. This is detrimental not only to an intelligent discussion but also to the safety of Internet freedom.

This paper shall therefore make an attempt to take note of this issue through the eyes of the elected government as well as Internet news sources. I shall speak mostly on behalf of those that support net neutrality as that is the stance of almost all the news articles that were easily accessible online. However, I shall attempt to cover the thoughts of the government, whether they are positive or negative with respect to net neutrality. The opposition to FCC's version of net neutrality will need to be covered in another paper in order to do it justice.

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November 22, 2011

On November 10th, 2011 the Senate held a vote that if passed would have prevented the FCC from imposing the net neutrality rules on ISPs and owners of IP based networks. [Higginbotham] Net neutrality states that ISPs can't discriminate against various information packets flowing across their network. The FCC rules make exceptions for mobile Internet plans unfortunately; therefore, the Internet accessed via the smart phone or through wifi are not protected under net neutrality. this allows ISPs freedom to manage the network however they please. Considering the frequency with which these methods are used by the average person, one must wonder whether the FCC rules were passed more easily due to this fact, something that indicates many repercussions for ISPs, mobile operators, and technology start ups. When the congress became involved with this issue, it soon became obvious that their motives were more along the lines of political grandstanding rather than any intelligently considered opinions.

[Senate Hearing; copyright: C-SPAN]

In the meantime, service providers are are acknowledging these with a metaphorical but respectful nod while at the same time they are fighting against the imposition of these rules. Verizon, for example is currently suing the FCC, claiming that it doesn't have the authority to protect consumers from the company's plans to discriminate online. [Aaron] Yet another source commonly quoted by the naysayer was a statement by the CEO of a cable company claiming "adverse economic impact by chilling the willingness to deploy these new services." [Congressional Record] The opposition truly believes that any regulation is bad and that the regulation by the FCC would result in barriers to investment, including the broad band providers that want to impose their own rules without compunctions onto their customers.

Fortunately, despite the money being poured into opposition against net neutrality, the Senate vote to disable the right of the FCC to enforce net neutrality failed at 46 to 52. What was most telling was the fact that these votes were split along party lines. This brings to mind the question of whether the Senate politicians knew the true nuances of what they were voting for or whether they were simply voting in order to maintain party lines and victory.

In the House, there was yet another dispute. This one was also related to the FCC, though in this instance through the Congressional Review Act which has

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the power to nullify agency rules by enacting a joint resolution of disapproval; this requires a simple majority in each house and cannot be filibustered in the Senate. The resolution was passed in the previous April and it states "Congress disapproves the rule submitted by the Federal Communications Commission relating to the matter of preserving the open Internet and broadband industry practices (Report and Order FCC 10-201, adopted by the Commission on Dec. 21, 2010), and such rule shall have no force or effect." [Jackson] This translates to: if the Congress enacts the resolution, an agency may not impose these or similar rules unless the Congress officially approves a new law specifically authorizing the said rules.

The partisan sides of this political conflict claim to draw their lines in defense of economic necessity. However, which action is indeed best for the government is more difficult to decipher. The Senate republicans claimed that the rules by the FCC constituted a "job killing regulation," describing it as an over reach of the government to fix the Internet when it wasn't broken. The democrats on the other hand, state that companies could decide to ban or show certain data, ultimately resulting in discrimination. [Ryan] While they have the support of the Obama administration in this, for the republicans this only served as further stimulus for polarization and a renewed determination to keep the vote divided along party lines. [Jackson] Unfortunately, the only loser in such grandstanding will be the technological market if their needs are not understood and adequately met.

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Alex Willisson
STS.011 Paper 3

The Internet

From the surface, the internet can appear as a single, unified network. Everything is connected to everything else, and all nodes (or devices connected) are treated equally. In this case, equally means packets are not prioritized. Abstractly, this means the internet does not care if the packet it is handling is from a multi-billion dollar company or is from a cheap dial-up line.

In reality, the internet is a very large amount of routers all connected together and connected to end users through ISPs. Some ISPs use copper wires, some use fiber optics and some use wireless transmissions. While there doesn't appear to be much difference between these different ways to supply internet, physical wires and wireless transmissions are regulated separately.

Two Internets

The protocols used over the wireless and wireline internets are very similar, except for the actual connection to the user. The wireline internet requires ISPs to run physical wires to every user. The wireless internet requires ISPs to own the rights to transmitting over specific wireless bandwidths. Because of this difference, the two are regulated separately.

Neutrality

The primary idea of network neutrality is that all packets are treated equally. Whether it's a cooperate giant's packets or some random kid's game, it gets routed with exactly the same methods. From a technological standpoint, this is very easy to define. Since data is already split up into packets with addresses, it can be completely abstracted away into chunks of data to be sent to the address requested. Unfortunately, because bandwidth is limited, this does not actually create a neutral network.

Fundamentally Not Neutral

In theory, simply treating all packets evenly should create a neutral network. Unfortunately this ignores the issues of bandwidth and latency. These issues are easy to evade while the internet is relatively small by adding more bandwidth, but laying more wires (allocating more frequencies for wireless) costs a lot of money and we will, theoretically, run out of space eventually.

Because bandwidth is limited, we have to pay attention to what will happen when the internet is "full". In other words, what will happen when there is so much traffic that the bandwidth of the internet is exceeded. This commonly happens on a smaller scale. Think of when you're downloading a lot of large files and trying to browse the internet (or watch streaming video). Everything runs slower since it has to wait it's turn to use the channel to the rest of the internet. This is known as latency.

From a user's standpoint, latency itself creates a non-neutral network. If there is significant latency (such as packets being delayed for at least a few seconds), some types of traffic will be almost completely unaffected while others will be devastated. Background downloads (or even streamed and buffered video) would barely see and difference but live streaming packets (such as voice or video chat or online gaming) would be practically unusable.

Technological Workarounds

There are many ways to compensate for the lack of bandwidth. Some of them are to have scaling payment plans based on bandwidth used. Some are to put bandwidth caps on people, much like the minutes on cell phone plans. Others involve prioritizing packets which need lower latency over packets which aren't effected by slightly higher latency. Some concepts even involve caching large files in geographically separate areas of the world as to be able to serve files closer to the users, both lowering the latency and reducing the bandwidth used. If there is a server in Boston and another in LA with identical versions of a site, you only ever have to send the data for the site cross country once. After that, the server which is closer to the user will serve the data, taking up none of the cross country bandwidth.

While much of the dispute surrounding network neutrality is based on business models, policies, and politics, there is still a technological side that has to be covered. While it might be decided that all packets of a specific type (say, VoIP) should be given priority, the question remains as to how to pick out which packets those are. The easiest answer is to have all packets broadcast what type of packet they are. In a world where no one cheats, this would be very efficient and would allow for packets to choose their priority. Packets which depend on low latency (such as live chatting) would be given higher priority, while packets which latency doesn't matter as much for (such as buffered streaming video or downloads) could be slightly delayed to make space. Unfortunately, it is impossible to force everyone to label their packets correctly. The internet has to be designed to still work even if packets cheat.

To deal with packets cheating, it is possible to simply look at the data of each packet and have a program figure out what type of packet it is. This is known as DPI, or Deep Packet Inspection. Computers are fast enough now that this is possible, so it is an option to be considered. However, it brings up privacy issues. Whether every router should be allowed to analyze the contents of every packet, how they should do the analysis, what they should look for and how they should be allowed to act has to be decided on before it can be implemented.

Other methods, such as monthly download limits are also possibilities. By rationing the amount of data used, the hope could be to force users into being more conservative with how they use the internet. Most carriers for smartphones only offer data plans with data caps. Some offer unlimited data, but this is questionably sustainable. With enough users, given the amount of bandwidth used, it is impossible to actually allocate unlimited data to everyone. The cell phone network is a great example, since in any sufficiently large gathering the cell network is very slow or out completely.

Currently, the internet probably cannot sustain itself. With increasing numbers of users, streaming video and other forms of sustained large file transfers, we will most likely hit a point where most of the internet will be full of backlogged nodes, which are nodes waiting to send packets. Downloads and other data transfers which are not very effected by latency will be mostly unaffected, but everything which relies on low latency such as live streaming, fast paced games and video/audio chat will be devastated.

Terminology

Backlogged A backlogged node is a node waiting to send packets.

Cache A cache is a local copy of data from elsewhere stored for faster retrieval. Most web browsers "cache" websites they visit. In other words, they store most or all aspects of sites you visit temporarily so if you visit the same site again, it can use it's locally stored version instead of having to request the data from the server again. Caching is the process of storing the data.

Content Delivery Networks A content delivery network or content distributed network (CDN) is a network of computers spread out over a geographical area with copies of the same data. It allows a user accessing information on the internet to be served it from a server physically closer, as to reduce the latency in the transmission.

Deep Packet Inspection Deep Packet Inspection, or DPI, is a form of packet filtering which the contents of the packet is analyzed to decide how to route a packet. Simply put, it could decide whether to route a packet or not, or if it should give the packet priority over others or give others priority over it. Usually, programs examining packets would only read the destination address.

End user The end user is the user of a system. When you use a computer, you are the end user. In general in this paper, the end user refers to consumers.

Internet Service Provider Internet Service Providers, or ISPs, are the companies which sell internet connections to end users. They own the physical wires or wireless routers which directly connect to the end user's devices.

IP Address IP Address stands for Internet Protocol Address. Every computer on the internet has an IP address, which can be used to address packets to, just like addresses for traditional mail. It is common to simply call the IP address the "address" of a computer.

Latency Latency, when in reference to packets on the internet is the delay packets experience in transit. The greater the latency, the longer packets take to reach their destination

Node A node is a single computer in the internet

Packet A packet is a small chunk of data, packaged up with a destination IP address. All data sent over the internet is broken up into packets before being sent.

Router A router is a computer in the internet which keeps track of paths to get to IP addresses. A router routes packets towards their destination.

Throttle Throttling is generally used to refer to limiting a user's bandwidth.

VoIP Voice over IP (VoIP) is a protocol designed to replicate the traditional phone system over the internet and often connects to the traditional phone network. Skype and Google Chat's voice chatting are both good examples.

Wireless Internet Wireless Internet is the internet when provided over the air through a cell network or satellite, as opposed to over a wire.

Wireline Internet Wireline Internet is the internet when provided over a wire, as opposed to from a cell network or satellite.

STS.011 Lecture

11/28

Presentations shortened to 20 min
- 15 min presentation on your findings
- 5 min discussion

Today Gambling Natasha Dow Schüll
- STS college
- Boundry of human + machines - interactions
- Tech + Society
- addiction

What exactly do we mean by "gambling"?

Gambling online ~~over~~ coming possibly
- Very similar to her research on slots

~~Actors~~ Actors
- as expected
- journalists - 60 min

(2)

→ Interaction humans + machines

Testified 4-5 in City Hall on gambling

Politicans don't make distinction on gambling
- Usually slot machines

40% → 75% from slot machines
1980 2000

Profit from Volume
"CostCo" model of gambling
high roller matters less
instead repeat play - convienence gambling

Some people associate slots as "light" gaming
But its actually the most potent
Some states just did slots - like PA initally

Speed - learned from Skinner
- can immediatly regamble

(3)

In MA scratch tickets - immediatly

Moderate 2-3/week
4-5/hr a time

Find at from people in recovery
Can't research in a casino surveys
People have a fav machine
Want to "zone out"
Most call to help line

Industry trying to segment people at
But look at % of gambling population
- 20% of people
- or 30-60% of revenue
Def of pathological in DSM

(4)

Was controversial to put in DSM

- in impulse control addiction
- but written to be like addiction

In new DSM- addiction can be to things not just substances

Gambling industry trying to show genetics or something personally

More

Elderly, women, poor slot machines

- Zone away
- forget worries

What aspects addicting?

Solitary

Continuous

rapid

Certain type of reward schedule

Unpredictable - amt and time

Not knowing when

(5)

So sit there + gamble

(00 lines makes it more intense

Read book more

Its math driving this

- algorithm of reinforcement

Ergonomics

Visual

Haptics on screen

Ergonomic seats

Machine placement

- Casino asmphere
- Carpet etc

Loyalty

Behavior analytics software

Can't change odds

So send "luck ambassidor" w/ capons or credits

(6)

People zone out - can't see other people

Highly Regulated

But its that machines run (spin) fairly, can't be tampered, pay tax right

Near misses show up only 6 times more often than they would by chance

No testing for harmful effects

Shift from mechanical to digital
- made more potent
- since can fake near misses

Digital has more blanks
Cluster blanks near win symbols

Lick ambassador is not part of gambling
- called marketing
- but are dynamically changing odds

(7)

In history machine more regulated
- JFK
- Laguardia
- machine seen as part of problem
- smashed up + thrown in river

Informational remedys in US
1-800-Gambler

Australia is putting in 50 pages on machines
time of reels spinning
freeze machine after an hour
addiction ambassador who comes over and trys to talk people at instead of talking people more

Nevada min 25% house advantage
- which is huge

Higher odds on bigger bet

(8)

Funding models
- read about
- industry capture

Assumption that people gambling to win
But very quickly mood shifters
You forget your worries
What motivates repeat play

Similar to compulsive email checking

Did this as undergrad - casino architecture
Senior project

How did ~~me~~ you get people to say this stuff?

Anti-Gambling Christian groups ~~already~~ always try to get her to ~~[illegible]~~ talk
- bit more liberal, edgy than a priest

(9)

They were talk to her since it was a college paper.

- People needy - want to take a break - all men

Then 60 min wanted to do story

Intially wanted to do story of her life "going behind the scenes"

Then wanted her vs Howard Shaffer

kinda happy how it turned at

Study for Responsibe Gaming Conference is same time as Gambling Conference

---

Slides on her book + paper at conference

Pre emptive response to her book

Learn from tobacco mistakes

Embrase addiction

But problem in people - not machines

16

60 minutes

850,000 slot machines
- 2x as ATMs

More than other forms of addiction

Natisha studying 15+ year

People steal from cos

People would rather play then win

New machines make people think they are winning

Trance

Howard: If machines ~~becoming~~ are addictive
then people who would do it usually become addicted
- only some
- same w/ crack cocaine

Same response as drugs it looks like it

(11)

Philly largest city to have casino

Rendell: decent way to raise revenue

Downside – people losing pay checks

but were losing it in NJ + Delaware

want upside – more $ for senior citizens

States ~~predict~~ prey on gambling

- States need to balance budget
- regressive
- cannabalistic

~~Not~~ new ~~gambling~~

Rendell: We're not creating new gamblers

PA – calls to addiction lines 3x

See ads in paper

25% of people in MA gamble

(12)

Predatory Gambling name from Predatory lending

Behind the scenes politicking
Senator totally against
Need to get another Senator to do ammendments
Drafted ammendment to get marketing logs
Shocked industry lawes did not notice
First country to do this
Talked to other agencies

Canada – Loto Quibec owned by gov
– much more concerned about their image

After
Asked about architecture – is cheap !

Net Neutrality Grp Meeting 11/28

Prof. Lepinay here w/ all 4

Rewrite: more from papers to web
  Comments on papers
Rewrite another's papers
  – may not useful now: focus on ~~paper~~ web

Our group not so much on sections

Prof: I could have done this w/ 1 day of reading
Its very shallow + superficial
  – but trying to convey technical
Didn't feel like like really got into it

Comments on 2 papers in Word
Structure of paper is good
But wants more food
Navigate from doc to doc in sharper way

(2)

Would expect more in 3 months

Need to simplify things for audience

Show basic audience <u>why</u> they should care about tech details

He didn't learn much on this count

Core qu: What do ya call a network?

Scale up + down on issue

- What's the big issue
- What's the good of a netwk

Sense of Timeline missing

Timeline does not show sense of contention

Why did the FCC still push NN during Bush term?

- Why do they act so weird???

What virtue do they see?

Libertarian: public space

(3)

Or it's a way of protecting consumers, Creating a market place?

Could do web site chronologically if feel that there is a difference
- field not polarized
- when is it not polarized

Trade off simplifying controversy vs repeating yourself

---

* Need to find backbone of controversy
  - may be tech driving it?
  - Deep Packet inspection new?

Need to explain why people are pushing back
- Restrictions stifling
- Matches 1st ammendment

Should summarize into big picture

(4)

Breach of liberties?

Sees telk

Telecom history for Info vs Telecom service

- little nuances that has huge consequences

Rules that guarantee good paper don't always know

preventing bad paper

- no redudancy

For Thur: wireframe

What can we do to help document controversy

- shifting party lines
- what caused it to split
- forces GOP to clarify what their positions are

(5)

Who has something to say?

Prove who can carry weight

Has power to do something?

How pick website – how find central?

Your own spin on NN is important

– Why is it contentious?

– business

– free speech

– civil liberties

If decided wrong

Thur @ 9 next meet

Will send paper comments out tonight

My paper: Good – but slippy slope

– he had longer realtement in mind

NW Site Brainstorming

11/30

Thuan's paper as intro

annotated timeline

(Why should people care)

(What do you call a network)

(Virtues: public space
protecting consumers
creating a marketplace)

(What is backbone)

(Why are people pushing back)

(Summarize into big pic)

Telecom history: telcomm vs info service

(skirting party lines)

(What caused it to split)

(GOP's positions)

Ellen: So do mini papers - but around topics
- like Telecom history ∈ was policy
- Congress's model ∈ was politics

) but more focused

(2)

(Who has Something to say)

(Prove who can carry weight)

(Who has power to do Something)

(What websites are central?)

(Our own spin on NN is important

Arguments against

Tech background

; sections w/ words bad idea

~~What~~ is (Thaun)

- What is (Thaun) existing paper
- Why important / stakes (Nev) (Thaun?
- Tech background (Alex) big improvement need
- Congress' shifting views (Roshan) (neutish
- Telecom history (Plaz) - new
- Why not (Plaz) info vs telecom
- Timeline of points

(3)

This is prob way better way to split up
Can write short-scient things
Self contained
- not tackling whole thing
- Vinets
: list of actors

Michael E Plasmeier

From: alex.willisson@gmail.com on behalf of Alex Willisson <atw@MIT.EDU>
Sent: Monday, November 28, 2011 7:49 PM
To: Thuan D Doan; Michael E Plasmeier; Roshan A Ardhasseril
Subject: [STS.011] Thoughts on network neutrality [WARNING: Long email]

Follow Up Flag: FollowUp
Flag Status: Flagged

Here are some ideas I have about network neutrality, I can post them in some other format if this gets too cumbersome. I'm just going to type up some of my current thoughts about network neutrality, where I think it could be headed and some alternate futures depending on what happens now. I'll probably be repeating a lot of what you already know and/or have written about.

Aspects of network neutrality, for the moment partially abstracting away costs:
Technical (what can the internet support) Political (free speech & related)

From a technical side, what needs to happen, if anything, to support the internet. I'm not talking about tomorrow, I'm talking about 50 years from now. What is a stable point in the future and how can we get there.

The easiest solution is to just keep adding more bandwidth. The question is, while there is a limit, is it low enough that we have to care? That is, is it so high we will NEVER reach it, even if we try to. I choose to believe there is and that we need to act under that assumption. I don't know if it is true, but if nothing else it costs money to increase bandwidth. I can't imagine the internet being around
1,000 years from now with the solution still being to just add more bandwidth. You can do a lot w/ dark fiber and new tech

So, from this point on we assume that we have a bandwidth limit which we will hit, given time. The question is, how can we work in the space of limited bandwidth? There may not be a "best" answer, and the internet will not be as good as it is before we hit the limit. The only way that I know of to avoid hitting the limit and causing problems such as increased latency is to sacrifice in parts of the internet where it won't cost as much. I believe I gave an example in my paper of traffic which latency doesn't matter as much for agreeing to be slowed down to allow traffic which latency matters a great deal for to remain useful.

Now, following my train of thought, that means two things. We accept that the bandwidth is limited and we will hit it without intervention somehow. We also accept that the intervention means applying limitations to the internet in some form. not necessarily...

There are many protocols which can be implemented to regulate internet traffic (as in regulating flow rate or supervising something, not as in legal intervention). Some of them have always been around, such as throttling bandwidth and limiting total data. Throttling always happens to some degree, since a cable does not have infinite throughput. When I talk about throttling, I mean an artificial limit put into place to make sure the channel doesn't get too full. Limiting total data is easy to give an example for, most smartphone plans have a limit as to how many gigabytes you're allowed to download. Some apply a cost per byte.

Some protocols are very new, only possible with the computing power available today. DPI (deep packet inspection), from what I've read, didn't used to be possible. It simply would take too much processing power to examine every single packet to determine what type of packet it was (streaming, downloads, email, etc.) and deal with it in different ways.

Another method could be packets would label themselves what matters to them. One packet could say it really cares about getting to it's destination, but it doesn't care how long it takes beyond a certain point. Another could say it's existence doesn't matter after a certain amount of time, and it should be given priority and thrown away if it takes too

new routing

long. This already exists to a limited degree, it's sort of TCP vs UDP (two protocols for sending packets between peers, TCP is more reliable and UDP is more for fast paced low latency things like live chatting and games)

I'm leaving for a little while in the middle of writing this up so my train of thought might feel a little jarring going from the last paragraph to the next one.

A more economically and politically charged option is to arbitrarily manage traffic. If an ISP decided someone was taking up too much traffic, or it decided it would be better for the internet to limit certain services, it would be free to go for it.

what is it limiting? — for political discrimination?

Now, shifting gears. I'm not sure how much I can say directly about freedom of speech for this, since I'm not sure how different it really is over the internet as opposed to anywhere else. It comes into play (is stopping someone from posting something limiting free speech?) but it's often through other things.

explain more

NO its not

Right now, ISPs treat eachother's packets evenly (I'm pretty sure that's enforced by regulations). That is, a router owned by Comcast doesn't (or, isn't supposed to) care if the packet came from Verizon or another Comcast router. Supposedly, they aren't allowed to limit packets based on source. I actually haven't read much about the whole comcast vs bittorrent stuff, but that's the direct application of limiting packets based on content. Here's also where freedom of speech can come in. If an ISP decides to shut down a site since it's breaking some rules, is that suppressing free speech?

What are they limiting?

SOPA

Finally, to my theorizing as to where the internet could be headed.

These are very grand ideas that I'm pretty sure I've come up with mostly on my own, influenced to various degrees by everything I've read. It's possible some of this is practically quoted from some source I forgot about and just liked what it said. Whenever I'm referring to thinks as good or bad I mean my perspective of wanting a neutral and open internet. I'm pretending the wireline and wireless internets are the same things and get the same (or extremely similar) regulations. If they don't, odds are the wireless internet will manage to avoid regulations. Unfortunately from how it's growing, I think that might wind up being almost as bad as if both the wireless and wireline internets got deregulated.

are deregulated now what does this mean?

Regulations put into place which keep the internet more or less where the internet is now, except with more realistic bandwidth limitations and more intelligent packets (the user would choose classes to put packets in and ISPs would be forced to follow them. There would have to be either a legal backlash to users who disobey the packet classes or some form of monetary incentive. There have been ideas of charging for different classses of the internet. I'm not sure how well that would work or how much of an advantage it would give to large companies over small startups. That would have to be evaluated by people who know a lot more about economics, business and network engineers. In short, the internet stays basically how it is now but with limitations that prevent us from capping out on bandwidth. I believe this is the best solution, although I am certainly hand waving out to get to it a lot.

Or regulated to various degrees

AT+T: how it is right now

The internet is deregulated and ISPs have complete control of it. This is what I feel is the most dangerous outcome. Because the internet is so central to our world now, it would give ISPs immense power. They would effectively own the communication and commerce channels of the world. Because it costs so much to lay new wires everywhere, it would be very difficult for new ISPs to form and offer an alternate channel of communication. ✓

I'm not entirely sure what the middle ground is but I'm betting it's there, and is probably where we'll wind up. I guess because I left the first one so vague it could cover much of the middle ground.

Personally, I like the idea that the internet should become a service, like running water, electricity and heat. Again, I don't know if it's the best idea. But it's interesting and I think it should be looked into.

This turned out pretty long and was partially so I could think through a few ideas. Hopefully we'll have our main ideas planned out on thursday and a site up by the end of the weekend to fill with content.

Michael E Plasmeier

From: Vincent Antonin Lepinay <lepinay@MIT.EDU>
Sent: Thursday, December 01, 2011 9:08 AM
To: Vincent Antonin Lepinay
Subject: [net neutrality] comments

sorry for turning that in late. Comcast let me down and I was at home.

Comments on net neutrality

Plasmeier paper
Overall this paper takes the points of ATT at face value and does not do a good job looking behind ATT' claims. It does not question either where the studies mobilized in the report come from. It is important that you provide us with contextual information: where does the Heritage Foundation stand in the political space?
On p2, the cluster of opponents to net neutrality would deserve to be unpacked. Do they all have the same interests?
On p4, I do not see how splitting content as close to the customer as possible goes against net neutrality. What are the restrictions and constraints for the provider and for the customer?
P4, it seems the move tried by FCC – from information to telecommunication service – is crucial for ISPs. We need some clarification here. What would the old telephone centered regulations add?
P5 ATT cites analysts. Who are they? How are they funded?

Doan's paper
P3 do we know where Powell got his four net neutrality conditions from?
P4 I realize one of the most interesting question of your controversy is the status of the network and the nature of the good "network": what is it that the ISPs provide? Is it "service" or just packets of bits?

Roshan's paper
It is not a bad paper but it needs many more references and also more "showing" instead of raising questions. It is a comment that applies to all the papers. Also to all papers but particularly to Roshan, explain why you study specific individuals and why they are relevant.

Alex's paper
My comments for Roshan apply here too.

NN Grp Meeting

12/1

w Prof. Lepinay

Have him my outline for web

Timeline - FCC moves + industry reactions

- have a section on rise of studies on NN
  Or books - like Tim Wu

- if consistent set of papers - work explaining how they relate

No separate revision req
Just part of website

~3 page

Alex

more details about
why is it important
Whose interested
What's happened so far?
Why are they interested

(2)

Comments sent out on paper

Use Wordpress

Set up domain on my site

Who on list of actors

---

too shallow - dig deeper
- later we do

Within split into sections
- Shallower + deeper

Rosan Home
- para
- sections : these topics
- then click on subsection
  - like Wikipedia

Sources - footnotes / endnotes

(3)

[http://Google.com Google]

Log in for Alex

Generally agree on structure

What important/ states L Thau

~~Things too specific~~

Tech Bg, Congress, Telco history, Why not - link smaller from home

Actors - in what is

- seperate page

Tegh Bg - Alex w/ Plaz's help

Congress shifting views - Roshan

Telco history (Plaz)

Why not direct Plz

└ keep explanitory stuff (or link to)

(4)

Roshan - Actors

└ Who are they
What their stance is

Timeline - Alex

└ track down source

This is the week to get stuff done

Send rough drafts by Sunday night when good to sleep
and good rewrite on old

Start setting up web

Meeting Monday + next Thur

Presentation 13th - Next Tue - week + half

(5)

Presentation

15 min

; talk about monday

2 min on each section

Use site as visual

any graphics

1st draft 12/3/2011

Information or Telecommunications Service (for Website)

Much of the recent debate about net neutrality has centered on whether the Internet falls under Title I or Title II of the Communications Act of 1934. Title I covers "information services" and it gives the FCC "ancillary" jurisdiction over such services.[1] Title II covers "telecommunications services" and it has a long history of regulations enforcing requirements of "common carriage". Although the debate has arisen recently, it actually stretches back decades.

Title II covers "telecommunications services." This is defined as "the offering of telecommunications for a fee directly to the public ... regardless of the facilities used," and telecommunications is defined as "the transmission ... of information of the user's choosing, without change in the form or content of the information as sent and received."[2] Title II was created with the telephone service in mind. The telephone company had to provide common carriage which meant that it (i) holds itself out to serve all customers interested in buying any services the company offers and (ii) allows customers to transmit whatever content they wish by means of its facilities.[3] It means common carriers do "not make individualized decisions, in particular cases, whither and on which terms to deal". Rather common carriers have a fixed price sheet (a tariff) that is available to all buyers. In addition, common carriers interconnect with each other. When you pick up your phone, you can dial any number and you will be connected.

Meanwhile, the idea of an information service stretches back to the very beginning computer networking, before what we would call the Internet. In the very beginning, a computer user would use

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[1] Nuechterlein, Jonathan, and Philip Weiser. Digital Crossroads: American Telecommunications Policy in the Internet Age. MIT Press. 2005.
[2] Ibid. Page 165
[3] Ibid. Page 76.

an acoustic coupler (since direction connection with the phone network was prohibited) to call a specific service located at a specific phone number. For example, if you were a lawyer you could dial the Lexus Nexus legal information service by directly dialing its phone number. If you then wanted use a chat room, you would hang up and dial the provider of the chat service.

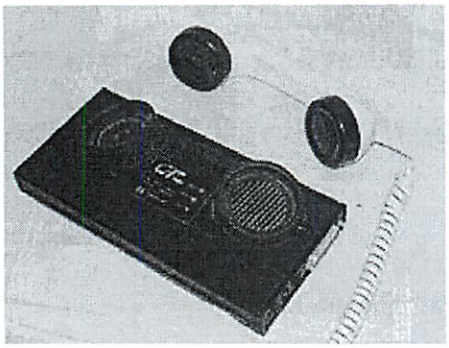

Figure 1 [4] An acoustic coupler

During that time, people were also creating network protocols for computers. Traditional telephone service created a single wire, or circuit, between you and the party you were calling with. Early computer engineers were discovering that with the additional processing capabilities of computers, they could some something smarter than an end-to-end circuit. ARPANET was the world's first packet switched network. Data was separated into envelopes or packets and each packet was placed on the network with the address of its destination. Each packet was then passed from machine to machine, each machine forwarding the packet closer to its destination.

People quickly discovered that they could pass data over these new packet switched networks and avoid the highly regulated (and expensive) public telephone system. In the late 1960s, the FCC first faced the question of convergence and in 1966 it started the first *Computer Inquiry*. [5] The FCC sought to divide the world into *communications* and *processing* not by technology, but by the market the service covered.

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[4] Taken by user Lorax and dedicated to the Public Domain.
http://en.wikipedia.org/wiki/File:Acoustic_coupler_20041015_175456_1.jpg
[5] Cybertelecom project. Computer Inquiry I. http://www.cybertelecom.org/ci/ci.htm

However, it found that it was not able to divide the world cleanly, so it created a third category: *hybrids*. The pure data processing market was viewed as an innovative, competitive market with low barriers to entry and little chance of monopolization. Viewing this market, the FCC concluded that there was no demonstrated need for regulation or safeguards:

> *Applying these standards to the record before us we conclude that the offering of data processing services is essentially competitive and that, except to the limited extent hereinafter set forth, there is no public interest requirement for regulation by government of such activities. Thus, there is ample evidence that data processing services of all kinds are becoming available in larger volume and that there are no natural or economic barriers to free entry into the market for these services. The number of data processing bureaus, time sharing systems, and specialized information services is steadily increasing and there are no indications that any of these markets are threatened with monopolization.*[6]

In 1976, the FCC realized it needed to update its rules to stay up to date with the rapidly changing world.[7] It created a distinction between *basic services* and *enhanced services*. Basic service was defined as the offering of "a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information." Meanwhile enhanced service was defined as:

> *[S]ervices, offered over common carrier transmission facilities used in interstate communications, which employ computer processing applications that act on the format, content, code, protocol or similar aspects of the subscriber's transmitted information; provide the subscriber additional, different, or restructured information; or involve subscriber interaction with stored information.*[8]

The Commission faced difficulties in deciding what was considered processing. The Commission said that "We have tried to draw the line in a manner which distinguishes wholly traditional common carrier activities, regulable under Title II of the Act, from historically and functionally competitive activities not congruent with the Act's traditional forms." [9] The Commission placed the World Wide Web into the category of an enhanced service. Nuechterlein and Weiser believed that the FCC chose to shield long distance data processing applications from the common carriage requirements to allow them

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[6] Reg. and Policy Problems Presented by the Interdependence of Computer and Communications Services, *Tentative Decision*, 28 FCC2d 291, 18 Rad. Reg.2d (P & F) 1713 (1970)
[7] Cybertelecom project. Computer Inquiry II. http://www.cybertelecom.org/ci/cii.htm
[8] 47 C.F.R. § 64.702(a) (2002)
[9] Second Computer Inquiry, *Final Decision*, 77 FCC2d 384.

to grow.[10] However, the FCC required telephone companies to separate out the transmission capabilities from any higher level processing capabilities.

In 1985, the FCC started the *Computer III* preceding.[11] Bell Telephone had just been broken up, and a new regime was put into place to allow competition. The FCC required Bell Operating Companies (BOCs) to break down their networks into the basic building blocks. This was called the Open Network Architecture. In *Computer III* the FCC also decided to maintain federal jurisdiction over Title I *enhanced services*. Nuechterlein and Weiser believe that in the deregulatory environment of Ronald Regan the FCC sought to "preempt state regulation" and "ensure a deregulatory environment for the fledging Internet".[12]

In 1996, Congress overhauled the FCC with the Telecommunications Act of 1996. However, Congress left the *Computer Inquiries* rules almost untouched except for renaming *basic services* as *telecommunication services* and *enhanced services* as *information services*.[13] However, in sections 251 and 252 Congress set up a complex system in which Incumbent Local Exchange Carriers (ILECs) (mostly the BOCs) were required to lease Unbundled Network Elements (UNEs) to the upstart Competitive Local Exchange Carriers (CLECs).[14]

This laid the groundwork for the multi-ISP model of the 1990s dial-up internet days. A consumer would use his regular phone line to call a specific ISP which would connect the user's computer to the Internet. The ISPs built local access points which contained equipment to do this transition. A customer could choose among many ISPs, such as AOL, EarthLink, and NetZero. A user was billed by the phone company for the phone call (although it was often a local call included in an unlimited package) and by

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[10] Nuechterlein and Weiser. P152
[11] http://www.cybertelecom.org/ci/ciii.htm
[12] Ibid 154
[13] Ibid. 154
[14] Ibid 80.

their ISP for the internet access. Switching ISPs was easy; one just had to change the phone number which one's computer dialed.

However, because of the limited bandwidth of the voice line of a phone call, dial-up internet was slow. It was clear that consumers were demanding faster service. The phone company soon set out to see if they could increase speeds. The phone companies invented DSL (Digital Subscriber Line) which allow the phone company to provide data services over the previously unused high frequencies of the existing copper wire. The low frequencies offer traditional phone service as before, while the high frequency data signals are split off at the phone companies' office using devices called DSL access multiplexers (DSLAMs).[15]

When DSL came out, the FCC extended this unbundling requirement to DSL.[16] In 1999, the FCC defined the high frequency part of the phone wire as a separate network element, which under sections 251 and 252 had to be available for lease to a CLEC.[17] However, the CLECs had to provide their own splitter and DSLAM in space they leased at the ILEC's local office.[18] This meant that consumers could choose to purchase DSL Internet service from a separate ISP, who as a CLEC leased the high frequency part of the phone wire and provided its own DSLAM.

However, in March 2002, with a republican-dominated FCC, the FCC, in the *Cable Modem* Order, the Commission declined to extend this requirement to non-telephone line based of bundled high speed Internet access, such as cable companies or Verizon's new FiOS fiber optics to the premises system.[19] The Commission believed that *information services* and *telecommunications services* were mutually exclusive. An end user who purchased an *information service* cannot simultaneously receive a

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[15] Ibid. 140
[16] Ibid. 153
[17] Ibid. 182
[18] Ibid. 183
[19] Ibid. 165

"*transmission* ... without change in the form or content of the information as sent or received."[20] Remember the earlier definition of an enhanced service as a service is "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information with telecommunications."[21] The FCC explained that "for more than twenty years, *Computer II* obligations have been applied exclusively to traditional wireline (telephone) services and facilities."[22]

In making this declaration, the FCC ignored the 9th Circuit Court of Appeals decision in *AT&T v. City of Portland*. Nuechterlein and Weiser believe that the FCC did not participate in the case because of "the perceived enormity of the stakes ... kept the Commission in a state of paralysis for several years."[23]

However, the proclamation of the *Cable Modem Order* was soon appealed and it ended up back in the Ninth Circuit in *Brand X Internet Service v. FCC*. The Supreme Court ruled 6-3 in 2005 that because the distinction between *information services* and *telecommunications services* was vague, the FCC had the authority to make a decision.[24]

In 2007, Comcast started throttling (slowing) traffic over its network using the BitTorrent protocol.[25] In 2008, the FCC ruled that Comcast's blocking of BitTorrent was against the Commissions' Net neutrality Internet Policy Statement.[26] However, in 2010, the D.C. Circuit Court of Appeals found that the FCC's Title I *ancillary jurisdiction* over *information services* does not allow the FCC impose net

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[20] 47. U.S.C. §153(43), (46).
[21] 47. U.S.C. §153(20).
[22] Cable Modem Order. Page 431
[23] Nuechterlein and Weiser. 164.
[24] National Cable & Telecommunications Association et al. v. Brand X Internet Services et al., 545 U.S. 967 (2005). Docket 04-277.
[25] McCullagh, David. "Comcast really does block BitTorrent traffic after all." C-Net. 2007 Oct 19. http://news.cnet.com/8301-13578_3-9800629-38.html
[26] McCullagh, David. "FCC formally rules Comcast's throttling of BitTorrent was illegal." C-Net. 2008 Aug 1. http://news.cnet.com/8301-13578_3-10004508-38.html

neutrality rules on *information services*. The Court found that the regulations were not "reasonably ancillary to the Commission's effective performance of its statutorily mandated responsibilities".[27]

In December 2010, FCC went ahead with its plan to issue net neutrality rules for both *telecommunication services* and *information services*.[28] In January 2011, Verizon sued the FCC to overturn the new rules on grounds that the FCC is once again overstepping its authority to regulate *information services*.[29] That lawsuit was thrown out because it was filed too soon; but Verizon refilled at the proper time.[30] The case is currently pending.

The FCC is currently considering reclassifying the broadband transmission portion from an *information service* to a *telecommunications service*.[31] Title II allows the FCC to only apply some, as opposed to requiring all, provisions of the statue to a regulated entity. Thus, the FCC could choose to only apply certain rules to broadband internet transmission. The industry strongly opposes reclassification because it will impose decades of regulation on the broadband industry.[32] Meanwhile, liberal public-interest groups, such as public knowledge believe that the step is necessary to impose net neutrality rules.[33] However, one group, the Electronic Frontier Foundation (EFF) supports net neutrality,

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[27] Circuit Judge Tatel (Apr. 6, 2010). "Comcast Corp. v. FCC, 600 F.3d 642" (pdf). United States Court of Appeals, District of Columbia Circuit.
http://www.cadc.uscourts.gov/internet/opinions.nsf/EA10373FA9C20DEA85257807005BD63F/$file/08-1291-1238302.pdf

[28] FCC. Report and Order. In the Matter of Preserving the Open Internet (Docket 09-191) and Broadband Industry Practices (Docket 07-52). Adopted 21 Dec 2010. Released 23 Dec 2010.
http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1223/FCC-10-201A1.pdf

[29] Wyatt, Edward. Verizon Sues F.C.C. to Overturn Order on Blocking Web Sites. New York Times. 20 Jan 2011.
http://www.nytimes.com/2011/01/21/business/media/21fcc.html

[30] Anderson, Nate. Verizon sues to halt FCC's net neutrality rules. Ars Technica. Conde Nast Media. 2 Oct 2011.
http://arstechnica.com/tech-policy/news/2011/10/verizon-sues-to-halt-fccs-net-neutrality-rules.ars

[31] Kang, Cecillia. FCC's Copps: net neutrality requires reclassification of broadband. The Washington Post. 3 Dec 2010. http://voices.washingtonpost.com/posttech/2010/12/fccs_copps_net_neutrality_requ.html

[32] AT&T. Comments of AT&T Inc. In the Matter of Preserving the Open Internet (GN Docket 09-191) and Broadband Industry Practices (WC Docket 07-52). 2010 January 14. Filed with the FCC
http://fjallfoss.fcc.gov/ecfs/document/view?id=7020377217 p21

[33] Sridhar, Aparna. The Truth about the Third Way: Separating Fact from Fiction in the FCC Reclassification Debate. Free Press. June 2010. http://www.freepress.net/files/The_Truth_About_the_Third_Way.pdf

but it believes reclassification would open a "Pandora's box" and be a "Trojan horse" of additional regulation of the internet.[34] The FCC has currently taken no action on the question.

Congress has not acted to clarify the question and impose a new statue that clarifies the FCC's authority over net neutrality. However, on November 10, 2011, the Senate voted 52-46 to reject S J Res 6 Disapproval of Federal Communications Commission Rule Regulating the Internet and Broadband Industry Practices.[35]

Even though Net Neutrality survived this resolution in the Senate, the lawsuit by Verizon about the FCC's power to regulate *information services* is still pending. In addition, the FCC has yet to act to reclassify broadband transmission services as a *telecommunications service*.

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[34] Kravets, Davi. FCC Net Neutrality is a Regulatory 'Trojan Horse,' EFF Says. Threat level blog. Wired. Conde Nast Media. 4 Feb 2011. http://www.wired.com/threatlevel/2011/02/fcc-trojan-horse/

[35] Bangeman, Eric. Senate votes down anti-Net Neutrality resolution. Ars Technica. Conde Nast Media. 10 Nov 2011. http://arstechnica.com/tech-policy/news/2011/11/senate-votes-down-anti-net-neutrality-resolution.ars

STS.011
NN Mtg

12/5

Prof. Lepinay + all 4 grp members

Managed services

title of Congress paper

Prof: Anyone do academic papers
- Corp actors w/ reports
- also academic studies
- FCC compiling
- risks of or or not
- people someone affiliated
  - stakes
    - how space organized
- Where is the impulse?
  - Where does it come from?
    - FCC
    - during era when agency not agressive

(2)

Early on 1990s - 1995

- How frame paper
  - Past similar situations
  - Other venues for political expression
  - Make or citizenship assemblies

How relate to past problems

My paper

- go back to people trying to push it
- not just reading a summary
- how does a 1995 paper doesn't use term
  - 2003 paper talk about web;
    - Tim W
      - coined net neutrality
- important to read 03 paper in detail

Is it a commerse clause question

(3)

Diff way to frame problem

L can come up w/ new way of framing

discarding other's people's solutions

Cover in one of the section

- regulating comm interesting
- what comes out of reading Tim Wu's paper
  - just package old qu's

Tim Wu's 2003 paper doesn't mention tech or reg

L outlines framework

mostly an attle of what NN is

- lawyer of it
- writing about road metaphores

Presentation

15 min + 5 questions

like Tue guests

but show more

show website

(9)

- themes
- our findings
- before 2003;
- after 2003;
- agency + Co interact

Not required that all members participate
- don't be shy
- but CI class

Explain what done - make sure people understand

Judged separtly w/ project

Wants to do eval
- How thinking changes
  - no designations MASS-0, CI-H
  - paper more about project
- even if unofficial

(5)

Complaining about humanities requirements

For Tom: it matters for a competition

Explain what others say

└ Not ya say ~~sth~~ something

Judge rethoric of somethhing

Very different style

Show what happening + tear apart

Synsizing peoples arguments together

How do you filter voices?

Whistleblowers go againts the grain

But pratical qu

Public comments

"Depressing"

Expertise - who has it?

(6)

Politics
- Rep more extream
- call it net freedom

Next Mtg Thur 9 AM
4-6 help w/ Tech Bg
- final drafts of papers

Mtg Sat 2-5
Sun evening

Michael E Plasmeier

From: Vincent Antonin Lepinay <lepinay@MIT.EDU>
Sent: Friday, December 02, 2011 6:05 AM
To: Vincent Antonin Lepinay
Subject: [STS.011] Tuesday

Follow Up Flag: Follow up
Flag Status: Flagged

Dear all
We are meeting on Tuesday for our last guest lecture of the term with Brian Gareau from Boston College.
Brian sent us an article he recently published on the Montreal Protocol. Do read it and join him in the conversation.
In the NYT this morning, an article on fracking and the murky business of land leases by gas companies, with a reference to the project Sara Wylie - one of the previous guest presenter - created.

http://www.nytimes.com/2011/12/02/us/drilling-down-fighting-over-oil-and-gas-well-leases.html?_r=1&hpw

See you on Tuesday

Vincent and Tom

STS.011 Lecture 12/6

Brian Gareau - Sociology, BU

move from command & control to free market

(that paper we read about Montreal Protocol)

Montreal Prototocal
- most sucessful
- mostly looked at as black box
- his view: can't use same format again, but some people are trying
- current Dubin talks a disaster

Move
- from precaution to profits
- from social welfare to individuals in marketplace
- from global governance to neoliberalism

Global distrust of science
- since uncertantity

People don't trust gov

Politicans misuse science

(2)

Warming the World book helps Europe, hurts US

- since US has lots of old plants - coal
- would cost Europe less - already did more
- more citizens pushing in Europe

Floods

Deforestation

China now #1

Europe's footprint less than 20 years ago

---

countries saying talks will fail - before they go!

- say won't get agreement < 2016
- won't go in Fore < 2020

(Gov video on it)

Praising Montreal Protocol

Saying up to industry to innovate

"Work together to save problems in a cost efficient way"

Prof: Lots of optimism

(3)

Montreal Protocol

- On substances that deplete the ozone layer
- phase out 95% of CFCs
- foam flame retardants
- Freon in ACs
- Lots of civil society support
  - civil rights
  - pollution
  - Earth Day
- precautionary principle
- Science spoke w/ 1 voice - was respected as such
- command + control regulations

Precautionary Principle

- even if not 100% sure, don't do it
- he doesn't really know the history

(4)

Film Debrief

Industry's alternative was important

- assure that they will manage their way to a solution

Gov sets challenging, yet flexible standards

Markets + industry-led solutions good

Q: 08 Fin collapse

People blaming a few bad apples, not markets

Nothing to move to greater Command + Control

Only ↑ looked to market - w/ austerity to govs

World very different in 80s

People pushed their gov to do stuff

Today: People don't trust their govs

Can track rethoric though international meetings

early ones command + control

later ones useless

- biz community more central

- issues in developing world

Early 1972 conference — need for people to restrain themselves
People needing "checks on appetite"
Soverign is needed to police collective selfishness
tragedy of the commons

(discussion of "taking away freedoms" today
- to prevent terrorism)

Today: entrepreneurial push: if work hard can succeed
(i.e. a version of American Dream)

(Break)

(late 90s +2000 - don't constrain economic growth
Problems more Complex
↳ how are they measuring complexity??
have things become more complex?
↓ or the less we know about problems the less we use

Now see environment as a market opportunity

generated of jobs + poverty reduction

Industry good at alts for aresol buy

And then CFC alts came out quickly

Let them buy at competitors

Methyl Bromide (MeBr)

he wrote a lot about

MeBr industry does not make alternatives

MBTOC - technical options committee

Strawberries uses it

Critical Use Exemptions CUE

Lemphizes private economic interests

MBTOC - election process

If no incentive for change - it won't happen!

(7)

Small # relatively

~600 strawberry growers in CA

Lhave US gov behind

and gov threatened to leave treaty!

is there an incentive to cooperate?

Larger #s of stakeholders

Strawberries

#6 in CA by revenue

farmers say nothing else works

MrBr is a fumigent - it kills everything

UC variet uses a lot MrBr - depends on it

Methyn Iodine - new replacement

but causes birth defects - neurotoxin

Cloro Pikin - WW2 defojate

Iodine - also local neurotoxin

organic strawberries very costly

(8)

VS: alts do not work well enough to constitute an alt

Plastic Tarps laid down to allow MeBr to be
injected underneath
kills everything
Then can plant strawberries

Near wetlands homes

Are some local effects as well w/ MeBr

LFC CUE requires nessary for health + saftery
or critical for functioning for society
No substitutes .. from standpoints of env + heath
MeBr CUE only a significant market disruption
No alts available to individual users
Has to do w/ strawberry makers

In some cases costs have been slightly higher
- way less than they thought it was needed

(9)

MBTOC reviewed ~200 experiments for alts to MeBr
- Said there are plenty of alts
- US Gov said climate + soil different

Then next year approved CUE
- Same data

Q: What can we do?
- have people demonstrate
- Govs + NGOs talk about markets + such
- US citizens in who their gov represents

Q: Why strawberry growers so powerful?
- Lobby had
- export strawberries
- US has long history of supporting econ
- Talk a lot - no one else at the table

Chemical producers not very vocal in meetings

Just not enough public pressure for alts - have local effects but not global ++

(10) Now Methyl Iodide so pressure to use I

STS.011 12/7

Alex - updating paper - grammer + terms

Thavan - asked if someone doing title 1 and 2
will put website up this weekend

Glossary page

Did site design

Ok Each editing our paper

Actors page

Tie Alex's paper to controversy
not related?

Im not sure the timeline of my paper is good
- but I don't think anyone here will notice

Alex Willisson
STS.011 Site page
DRAFT

12/10 Draft

Technological Issues in Network Neutrality

Who! Where is the intro

Constantly expanding the internet's bandwidth while still charging flat rates is not profitable for ISPs. This is one of the primary reasons for the debate surrounding network neutrality. ISPs are pushing to abolish it so they can make more money, and network neutrality advocates are pushing for network neutrality as a way to preserve the internet's function as a tool to conduct business over or as an entertainment device.

Opinion

Replied to test on pc

The Internet

From the surface, the internet can appear as a single, unified network. Everything is connected to everything else, and all nodes (or devices connected) are treated equally. In this case, "equally" means packets are not prioritized. Every packet which arrives at any node enters a first come first served queue before being routed to its destination. Abstractly, this means the internet does not care if the packet it is handling is from a multi-billion dollar company or is from an inexpensive dial-up line.

In reality, the internet is comprised of many routers all connected together and connected to end users through ISPs. Some ISPs use copper wires, some use fiber optics, and some use wireless transmissions. While there doesn't appear to be much difference between these different ways to supply internet, physical wires and wireless transmissions are regulated separately.

ISPs want to change this. One of the issues in net neutrality is whether ISP's should be allowed to prioritize packets differently. Should an ISP be allowed to have two queues, for higher and lower paying customers, where one queue gets priority (its packets get sent first)? Currently, ISPs are legally required to impartially route packets coming from competitor's networks among packets coming from the ISP's own network. Should an

ISP be allowed to charge its competitors for use of its routers? Any of these changes could change the internet as we know it. Imagine if simply visiting a site (say, Facebook) could cost you money, just as sending text messages without a plan currently does.

Neutrality

The primary idea of network neutrality is that all packets are treated equally. Whether it is a corporate giant's packets or a child's game, it gets routed with exactly the same methods. From a technological standpoint, this is very easy to define. Since data is already split up into packets that are marked with their destination addresses, it can be completely abstracted away into chunks of data to be sent to the address requested. Unfortunately, because bandwidth is limited, this does not actually create a neutral network.

Fundamentally Not Neutral

In theory, simply treating all packets evenly should create a neutral network. Unfortunately this ignores the issues of bandwidth and latency. These issues are easy to evade while the internet is relatively small by adding more bandwidth; but laying more wires (or allocating more frequencies for wireless, which are limited and already licensed) costs a lot of money and, theoretically, eventually run out of space.

Because bandwidth is limited, we have to pay attention to what will happen when the internet is "full". In other words, we must consider what will happen when there is so much traffic that the bandwidth of the internet is exceeded. This commonly happens now on a smaller scale. Think of when you're downloading a lot of large files and trying to browse the internet (or watch streaming video). Everything runs slower since it has to wait its turn to use the channel to the rest of the internet. This is known as latency.

From a user's standpoint, latency itself creates a non-neutral network. If there is significant latency (packets being delayed for at least a few seconds), some types of

traffic will be almost completely unaffected while others will be devastated. Background downloads (or even streamed and buffered video) would barely see any difference, but live streaming packets (such as voice or video chat or online gaming) would be practically unusable.

Technological Workarounds

There are many ways to compensate for the lack of bandwidth. Some of them are to have scaling payment plans based on bandwidth used. Some are to put bandwidth caps on people, much like the minutes on cell phone plans. Others involve prioritizing packets needing lower latency over packets unaffected by slightly higher latency. Some concepts even involve caching large files in geographically separate areas to serve files closer to the users, lowering the latency and reducing the bandwidth used. If there is a server in Boston and another in LA with identical versions of a site, the site data only needs sending once. After that, the server closer to the user will serve the data, taking up none of the cross country bandwidth.

While much of the dispute surrounding network neutrality is based on business models, policies, and politics, there is still a technological side that has to be covered. While it might be decided that all packets of a specific type (say, VoIP) should be given priority, the question remains as to how to identify those packets. The easiest answer is to have all packets broadcast their type. In a world where no one cheats, this would be very efficient and would allow for packets to choose their priority. Packets depending on low latency (such as live chatting) would be given higher priority, while packets for which latency doesn't matter as much for (such as buffered streaming video or downloads) could be delayed slightly to make space. Unfortunately, it is impossible to force everyone to label their packets correctly. The internet has to be designed to still work even if packets "cheat".

To deal with packets cheating, a program could view the data of each packet and figure out what type of packet it is. This is known as DPI, or Deep Packet Inspection. Computers are fast enough now to make this a feasible option. However, it brings up privacy issues. Whether every router should be allowed to analyze the contents of every packet, how they should do the analysis, what they should look for, and how they should be allowed to act must be determined before it can be implemented.

Other methods, such as monthly download limits, are also possibilities. By rationing the amount of data used, the system would force users to be more conservative with how they use the internet. Most carriers for smartphones offer data plans with data caps. Some offer unlimited data, but this is only temporarily sustainable: with enough users, given the amount of bandwidth used, the internet's bandwidth limit will stop users from accessing data. The cellular phone network is a great example, since in any sufficiently large gathering the cellular network is very slow or even completely nonfunctional.

In its current form, the internet cannot sustain itself. With increasing numbers of users, streaming video, and other forms of sustained large file transfers, at some point we will hit a point where most of the internet will be full of backlogged nodes waiting to send packets. Downloads and other data transfers which do not rely on real time packets are partially immune to increase latency, but everything which relies on real time and near instantaneous communication live video streaming, fast paced games and video/audio chat will be devastated.

Terminology

Algorithm A mathematical function for performing an operation. A search algorithm would be used to find the shortest path from point A to point B given a map of the world.

Backlogged A backlogged node is a node waiting to send packets.

Cache A cache is a local copy of data from elsewhere stored for faster retrieval. Most web browsers "cache" websites they visit. In other words, they store temporarily most of all aspects of sites you visit so if you visit the same site again, your computer can use it's locally stored version instead of having to request the data from the server again. "Caching" is the process of storing the data.

Content Delivery Networks A content delivery network or content distributed network (CDN) is a network of computers spread out over a geographical area with copies of the same data. It allows a user accessing information on the internet to receive the data from a physically closer server, thereby reducing the latency in the transmission.

Deep Packet Inspection Deep Packet Inspection, or DPI, is a form of packet filtering in which the contents of the packet is analyzed to decide how to route a packet. Simply put, DPI could determine whether to route a packet or not, or whether to give the packet priority over others or give others priority over it. Usually, programs examining packets would only read the destination address.

End user The end user is the user of a system. When you use a computer, you are the end user. In this paper, the end user refers to the consumer.

Internet Service Provider Internet Service Providers, or ISP's, are the companies which sell internet connections to end users. They own the physical wires or wireless routers which directly connect to the end user's devices.

IP Address IP Address stands for Internet Protocol Address. Every computer on the internet has an IP address, which can be used to address packets to, just like addresses for traditional mail. It is common to simply call the IP address the "address" of a computer.

Latency Latency, when used in reference to packets on the internet, is the delay packets experience in transit. The greater the latency, the longer packets take to reach their destination

Node A node is a single computer in the internet

Packet A packet is a small chunk of data, packaged up with a destination IP address. All data sent over the internet is broken up into packets before being sent.

Router A router is a computer in the internet which keeps track of paths to get to IP addresses. A router routes packets towards their destination.

Throttling Throttling is generally used to refer to limiting a user's bandwidth.

VoIP Voice over IP (VoIP) is a protocol designed to replicate the traditional phone system over the internet. It often connects to the traditional phone network. Skype and Google Chat's voice chatting are both good examples.

Wireless Internet Wireless Internet is the internet when provided over the air through a cellular network or satellite, as opposed to over a wire.

Wireline Internet Wireline Internet is the internet when provided over a wire, as opposed to from a cellular network or satellite.

New Stuff

How Routers Work

I'm not entirely sure where this should go, if anywhere. Feedback would be great

Routers have a stream of packets coming in from computers and have to figure out where to send them and which to send first. The simplest method, and the original one, was on an impartial first in first out basis. That is, the router has a list of packets coming in. It looks at the one that has been waiting the longest, reads its address, and routes it towards that address. It's the same type of "first come. first served" queue used at stores and ticket counters: people stand in line and the person at the front gets served, leaves, and then the next person gets served.

ISPs could define whatever algorithm they want to order the packets, not just first in first out. They could always route packets from their network before packets from another company's network. The router would remember where every packet came from and, if it was from the router's ISP, allow it to skip to the front of the queue. This would have the effect of introducing massive latency (if the packets didn't just get lost altogether) into all of the competitor's packets attempting to go through the ISP's routers.

ISPs could also choose more arbitrarily which packets go through first. They could set up payment plans for their customers that allow users who pay more to skip the queue, just like how they could have their own packets skip the queue. The common pricing model for ISPs now is to charge for bandwidth: if the user attempts to use more bandwidth than s/he paid for, the packets could be dropped. If ISPs could allow people to pay more to have his or her packets skip the queue, it would allow higher paying users to out-compete on lower paying users. As long as a higher paying user was dominating the network (say, using a program that constantly streams data), the lower paying user would not be able to use the internet at all. His or her packets would simply have to wait for the higher paying user to close whatever programs are streaming data.

These are all very extreme cases. The algorithms can be much more complicated and nuanced than the all-or-nothing scenarios described above. An ISP could simply slow down a competitor's packets, or could give a higher paying user's packets priority *most of the time* instead of just blocking out a lower paying user. In either case, it would increase the latency of their own packets or the higher paying customer's.

Presentation structure

12/10

What do you think about when you here MVI (1-2min)
- have any of you heard - respond
- Plaz

Tech Bg (3-5 min)
- Alex

~~Economic~~ Free Speech + Stakes (2-3min)
- Thuan

Economic isses (2-3)
- Plaz

Political isses (2-3)
- Roshan

~~What would you do~~ (1-2 min)
- ~~cr~~
- ~~ii~~
- is kinda like qv

Conclusion
- what is our point
- just an intro

NN Presentation Prep

12/10

Baker Conf Room

25 min in - only Alex

Reminds me a lot of Techer 44

All people assumed FCC

(lots of discussions ....)

(Little "work" - but filling people in)

Run through today

; Mon night 1-3 PM state basement

Business Casual - Polo

Conclusion; States Today

Don't talk Title 1 + 2

Current debate

How much can ISPs

To-an

(2)

Ignore wireless

My section:

tiered network - more flexibility

more flexibility good

Roshan wants to includes anecdotes

Q: Whoever can answer

- Plan and to Alex
- Use transition words to Alex

Each of us write up what say

STS Revise: Why Not

12/11

What do we want to add?

What do I already have?

w/ Verizon's arguments

No basis

Talks more about wireless

✓ Discriminate to providers

- as merge (Kindle) (p 14)
- things more tied in App Store

✓ Competitive pressures fine

✓ Rules vague + ambiguous

- out of date

c? focused on

Google has regulatory advantage

Integrated store fronts

✓ Edge + network out of date

✓ prices falling

NN Meeting

12/12

w/ Prof

Other groups mad that not using website
Should show the website
Can go back + forth btw wesite and not

Plug the website more
- show what is on the web

Present website or present controversy
- our work
  - diff groups do diff things
  - have flexibility

website is telling us what the controversy is

Ours is more high level
takes place no where
not a specific farm

Most people will not do what is
- But timeline

(2)

Find a way to articulate website

Bring website more in presentation

Show papers not ~~space~~ PPT

└ work slides into website

keep PPT as backbone

Politics: Big political donations

↑ put more

Will read site

Then they will ask qu Wed or Thur

Or ask for clarification - factual pts

Context tim We

We can respond - would factor in grade

Grades due Next Wed

On website - make changes

└ should be accessible in future

(3)

After Prof

3-4 abstract big idea bullet points

Thuan - will change own papers

Alex - II

Rosean - I will do

Dress up website more !

Thuan + Alex want more colorful

! Add pictures !

We don't function much on a personal level

Corp level

Thuan: I am very minimalist

Digital crossroads pic

Alex needs help on timeline

(4)

Meet tonight

- Roshan can't

4-6 Alex will work

7-9 here in 32-044

Internet capitalized

Roshans - too much policy

Net Neutrality
Mtg

12/12

7PM start
Just Alex + me

1 hr in Thuan here
- doing CSS for lots of stuff

Plaz: Produce website

Alex: do timline

(so brain dead - not focusing!)

Need abstrat format

Thuan: helping out
adding abstracts

(keep getting distracted - not good for concentrating

I'm glad most people updated their website themselves!

Styling

Majorly editing Roshan's paper

(2)

Something for Alex to do

Need more votes

Thuan thinks my paper was really long

Thuan doing citations for me

All 3 days like no color

Roshan wants color pics

1:10 Ready to practice

Alex adding pictures

Thuan finishing abstracts

No one doing Politics MLA - we forgot

1:30 start for real

Alex just reading

10 min total

(3)

1:50 again

Thrain: don't change anything

Reading off

— can we do it

Final Script

12/13

Alex ~3 minutes

First slide ~2 minutes

What actually happens when you visit a small site, such as our net neutrality site?

First, to connect to the Internet you must have a contract with an Internet Service Provider, an ISP, such as Verizon or Comcast. ISPs contract with backbone providers, such as Level 3 and Quest who own connections between ISPs. Our server is hosted by a company that pays an ISP for access to the Internet.

When you open a website, your computer creates a request for the site you're trying to view and sends the request as a packet to your ISP. Your ISP decides the best route to send your packet along and forwards it to a backbone provider it has a paid *transit* agreement with. This backbone provider may not have a connection with the ISP that the site is connected to, but it will have free peering agreements with other backbone providers which will either have a connection to the destination ISP or a connection to a backbone provider closer to that ISP. Once the site receives the request, it sends the page you requested back using the same method.

Under the current model, each party only pays for transit access onto the Internet. Site hosts do not have to pay individual ISPs to allow users on an ISP's network to have access to their site. The site hosts only have to pay for their own connection to the Internet.

Now this is an oversimplified example; but it conveys the major ideas involving transit and peering. In reality, the actual pattern of transit and peering agreements may not be as simple as backbone providers having peering agreements and ISPs having transit agreements.

Second slide ~1 minute

With the consumer base increasing and bandwidth intensive services such as Netflix and Hulu gaining popularity, the Internet is running low on capacity, known as *bandwidth*. As the bandwidth demands increase, the Internet will become congested and data transfers will be slowed down. Simple services such as emails and downloading files won't be much affected by these delays. However, programs that rely on near instantaneous communication, such as voice chatting, will be devastated. Think of having to wait an extra second before an email gets to you - barely noticable. Now think of a second delay in a phone call - that's practically unusuable.

In the past internet providers have simply laid more wires. However, this might not be the best way to solve bandwidth limitations in the future. Opponents of net neutrality regulations are interested in other ideas, such as utilizing the existing wires more efficiently. For instance, voice chatting could be prioritized over email. Your email would arrive a few seconds later than it used to - you probably wouldn't notice a difference - but voice chatting would remain usable. This is only one of the scenarios that Net Neutrality principles would affect.

Thuan

So, why does this debate matter? What's at stake?

For the proponents of net neutrality, the Internet as users currently know it is at stake. Proponents believe that the Internet has developed to become such a vital, powerful tool that we use in our daily lives due to its open and neutral nature. The most common analogy used by proponents is that of roads which are considered, "open and neutral," and have been vital in the growth of the country's economy. The fear is that without regulation, Internet Service Providers, which can be considered as the, "gatekeepers," of the Internet, have too much power. ISPs would have the power to block or degrade access to content at their will.

In addition, rather than simply block traffic, ISPs could also charge users and content providers extra to access certain sites or their customers (remember that currently each end user only pays *their* ISP) or favor their affiliated subsidiaries. So with the status quo, you can choose to use Skype or Youtube or hulu if you wished. However, if ISP's have the power to control the internet, they can either block or slow down your connection to these website and push their own content to users.

The fear is also that in a non-neutral network, small content providers would have a severe disadvantage, resulting in the prevention of growth of the Internet and development of new web-based industries.

Plaz

Broadband companies have spent billions laying pipes. Is it an efficient use of money to lay new pipes? Would it be a better use of money to use the pipes we have more flexibly? The ISPs argue that we can lay new pipes, but the cost would just be passed on to consumers. The ISPs argue that especially as these new applications come online that have different requirements, we should keep ourselves open to being flexible.

Is the Internet neural today? We have the things called CDNs or content delivery networks. Like Akamai or Google for their own sites. **(next slide)** A CDN hosts mirrored copies of your site around the country and around the world. This allows it answer requests faster, because the requests travel less distance. In addition, it keeps the Internet backbone clear of much of the duplicate traffic. Big companies have an advantage here because these networks are expensive! This causes some actors to doubt that the Internet is neutral.

In addition, it is better to put these CDN nodes deep within the ISP's network. A nondiscrimination provision might ban these types of beneficial commercial arrangements. These nodes might the future to doing widespread live streaming video online.

It should also be noted that the Internet has grown as far as it has *without* regulation.

Roshan

The Federal Communications Commission, known as the FCC, was created by Congress to regulate wired and wireless telecommunications: telephone, cable TV, and now the Internet. The FCC sets the rules of the market so that consumers can have access to telecommunications services.

AT&T, Verizon, and Comcast are some of the companies that are opposing greater regulation by FCC. There have been many incidences - from AT&T censoring a song that was against its political agenda to Comcast blocking BitTorrent - that have required the action of the FCC in order to facilitate a fair and open market.

There is also a fear that content providers might be able to pay in order to slow down others or speed up their own services. This would stifle competition and innovation, something that is damaging to the economy and to the rights of free speech. After all, if the ISPs can be paid to promote a certain message, the information that their customers receive and are influenced by will not be unbiased.

Congress has been split; unable to either give the FCC clear authority to regulate net neutrality, nor forestall the rules. Verizon, Comcast, and others have sued the FCC at every step of the way.

The primary debate ultimately lies between the fear that by the government imposing regulation, they shall adversely affect the economy or that they shall adversely influence the information supply based on political inclination, or that without the regulation, the companies shall run savvy monopolies and accept payment for censorship to the detriment of the American public.

Current Status (Plaz)

So where is Net Neutrality now? In 2008, the Courts ruled that the FCC might not have the power to regulate broadband Internet over cable or fiber optics because of a 2002 decision that classified the Internet as an *information service* as opposed to a *telecommunications service*. The details are very confusing, but you can read all about it on our website.

In 2010, the FCC issued rules codifying Net Neutrality. Verizon promptly sued the FCC contesting the new rules. That lawsuit is currently pending. Meanwhile, the FCC is considering reclassifying broadband Internet as a *telecommunications service* which would give it clear authority to impose Net Neutrality rules.

(next slide)

If you are interested in learning more, visit our website: minisites.theplaz.com/netneutrality

STS.011 Presentations

12/13

Website update "optional"
- but helps grade ;)

NEIDL

- the bio labs
(very rehersed script)
5 people
(people went down the row introducing their names)
Zeega video
(we heard all of this before)
EIS + BRA
Blue Ribbon Panel
Nice players page!
Project Bioshield - $ 5 billion anti-terror
Anthrax in attacks came from BSL-4 labs,
- researcher committed suicide

(2)

BSL-3 labs seem to have sucess

BSL-4 labs not many results

BU wanted to ↑ pristigve

Galiston already had BSL-4 - needed more space

Population in Galviston different

L limited opposition

Talked w/ a few of the key players

L recorded

$7,000 difference in income Roxbery + Galveston

Patenting Human Genetic materals

Can't patent nature

L is pating human genes nature?

Or is isolating a gene an invention

(3) Long legal case history

- back to 1800s - isolating a specific wood fiber (?)
- today - Diamond vs Chakrabarty
- etc about exactly what is patentable and what isn't

ALCU trying to invalidated BRCA 1 +2 genes

- like patenting human body
- in front of Supreme Court

Is genetic patenting good for patients?

- keep open
- or encourage research?
- are creating tests expensive or cheap?
- can they recup investment w/o patents
- price + coverage for insurance

Patent only covers gene isolated from the rest

(4)

Gene tests only cost ~$10,000

Looked at public information

Prezi for presentation

- the zoom in + at over large pictures

key actors graph

sts 011 genepatents.wordpress.com

Our Presentation (Ross Alex read off script)

(Roshan went off-script) - into Stakeholder history
- not politics

Feedback - both liked it

- Tom liked minimalist design
  - add callouts + icons?

Nuclear Power

- need to think of specific reactor designs
- Idaho National Lab - tests reactors
  - over 50 built

(5)

Gen 2 reactors - all the ones involved in accidents

Gen 3

AP600 - have natural cooling

- power loss does not matter

Use logic to invoke emotions

But data not always clear

Videos from both sides

Externalities costs

(Very nice website - detailed - well 6 people)

Concerned about non proliferation

Open vs closed fuel cycle

Closed - could lead to proliferation

Power makes it easy to take

(6)

Good headings

Economics
- Some sub topics for each

Environmental impact

Nuclear Cycle

Public Opinion

Primary Actors

Lots of stuff on web

Aquaculture

7 people

focus on Pacific Northwest

free flow system is only system being used now

(timeline: dipity) - includes Google News RSS feed
- view timeline, Flipbook, list, map

Started in 1980s

Canada has tougher regulation than US

(student fainted)

(1)

(presentation resumed ~ 5-10 min later)

Actors

- local vs Global groups
- differences on what each wanted

(Map of actors)

(some of their links not made yet)

(Looked at trends in media)

Activists + industry use videos

Search trends in media

(we should have done!)

Interest falling

More in Canada

Synthetic Biology

Craig Venture

Synthesis of bio systems for functions that don't occur in nature

(8)

TED talk

Created artificial life cell

└ parent is a computer

(Prezi of actors)

Issues — Risks + Benefits

Public perception - most people don't know about it

Think benefits + risks ~roughly =

Worry it will escape and take over biodiversity

└ build slightly differently so can't survive

Groups trying to commercialize

- already 13 patents

Broad patents

- Venter having monopoly on field

Precautionary principle

(9)

Hard to think about ethics – not all that clear

Church has 3 standards

Useful for creating fuel?

Algee

"holy grail" in energy production

So far net energy loss

No actual stats on if could survive outside lab

Suicide gene if some non-naturally occuring nutrient was not present

Use too much biomass, water, or land?

– arguments against each

Partered w/ Novartis for flu vaccines

Class over

Will send feedback