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ISP-3: The Rise of the Internet Service Providers
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Special effects in movies have captivated audiences by growing exponentially in recent years. The same can be said about the rapid growth of the Internet and how it has captivated users. In between the Internet and the user stand the ISPs (Internet Service Providers). This paper will show what the internet was, what has changed, what the trends are now, and future predictions in relation to ISPs and how those changes have been beneficial to society. These changes have affected the original end-to-end structure of the Internet.

Digital life without ISP’s seems archaic. The Internet began with four academic institutions linking together to enhance communication. This architecture system held the idea of basic end-to-end structure (Blumenthal). For over 20 years this system where “the core of the network provides a very general data transfer service, which is used by all the different applications running over it” (Blumenthal 2) helped expand the Internet. Through the end-to-end structure of the Internet, the core of the network expanded rapidly and allowed intellectual society to pass into the information age.

Expansion led to the first ISPs. With the demand for the Internet rising quickly, it was inevitable that at some point users could no longer simply connect through an academic institution. Users were not just academic researchers, and the uses were no longer strictly contained within academia. At this point the first ISP came out, which allowed anyone with access to a computer the opportunity to connect to the Internet. A user was no longer a pure end node in an end-to-end environment. The ISP was a middle man between user and the Internet, selling its services to customers. The route of information travel changed so that it went from end node (starting user) to ISP to core network to ISP to end node (ending user). When the basic ISPs first came out, 28.8k modem connections were fast. Although that connection speed seems slow to current users, an important effect of the first ISPs was the advent of security. Since more and more of society began to take part in Internet usage, the sum of the content on the Web began to change as well. The original design did not plan for ISPs but the end-to-end network had the capability to easily extend for ISPs. What had started out as an academic communication method evolved into a communication method for anyone, anywhere in the world. The range of content was as far as the mind could extend it, and that helped attract even more people. But along with the increased range of content came the increase of malicious users and content. However, with connection speeds and content of the Internet still in its infancy,
security was not the most pressing concern, but it did pave the way for future concerns. The advent of ISPs provided a mechanism of communication for anyone in the world, a process never before seen in human history. The benefits of this new way of communication far outweigh the problems it created.

From when the first ISPs were founded up until today, there have been many changes to the Internet. This paragraph will explain the changes up to the current era, which I will define as the era up to 56k connections. The first and foremost change that the ISPs have brought has been the commercialization of the Internet. ISPs are not a government service; its purpose is to make money by providing a service to customers. ISPs such as AOL and MSN to name a few have capitalized on the opportunity to make money via internet connection. Competition among ISPs has given the term “logging onto the internet” a different meaning than when the internet was first created. The original academic connection changed so that users must log on through an ISP to be able to hit the information highway. With the growing capacity of computers and data transfer technology, new security issues arose. The faster data could transfer, the faster malicious content could spread as well. Spam email became more numerous, and ISPs were caught in the middle. Regulability became a bigger concern. Lessig states “The values that [Internet architectures] embed are different, and one types of difference is regulability… some architectures make behavior more regulable; other architecture make behavior less regulable.” (Lessig 30). This new pressure for regulability quickly changed the reasons people used the Internet. People found the internet as a place to talk, check news, entertain, and much more. Not only was the technology to develop faster connections upgrading rapidly, but places to use it were becoming more widespread. City libraries began to incorporate internet service as one of their educational tools, along with books, newspapers, and magazines. The commercialization of the internet also included many businesses starting to put their services online. These changes brought the internet into widespread use and commercialization of the ISPs and businesses was helping the world. The dot.com boom was beginning.

Current trends since 56k connections indicate an even broader use of the Internet, both literally and figuratively. Broadband connections are becoming increasingly common. The trend towards constant online broadband is prevalent in most academic institutions. The connections are faster, easier, and constant. Commercialization is a growing aspect of the Internet. As Lessig points out, authentication is an important feature in commercialization which is different in real life. “In real space much about your identity is
revealed whether you want it revealed or not,... [but in cyberspace] they look like this: 128.34.35.204” (Lessig 32). Many other methods have evolved to solve the problem of authentication such as cryptography, cookies, keys, and many more. These changes have called for new features and new uses of the Internet. The uses have broadened so that many electronic devices have internet uses. Calculators, digital cameras, and CD’s are some of the many devices with internet capabilities. Everyday items with Internet abilities are allowing society to become accustomed to everyday casual usage of the Internet showing how much the world is being linked by the Internet.

The current trends are not only effecting daily life in a positive way, but also changing the original design of the end-to-end system of the Internet. For example, the increase in sheer volume of the internet has seen an increase in the number of ISPs. Today there are thousands of ISPs, forcing competition between them. With current data streaming technology, in order to maintain the competitive edge ISPs follow the model of larger ISPs where they have the view that “enhanced data transport service [is] something to be provided within the bounds of the ISP as a competitive differentiator… if enhanced service are not provided end to end, then it is not possible to design applications needing these services using an end-point implementation” (Blumenthal 3). This enhances service is provided in the deployment of applications using intermediate servers that can be positioned within each ISP, therefore not using the original end-to-end design. Another recent trend of ISPs that has altered the design of the original Internet has been the rise of third party involvement. These may include officials of organizations such as corporate network, or officials of governments and local law enforcement. Their interests range from organizational policies or other oversight to taxation and public safety. For ISPs, administrators may want oversight on their customers, or want to implement policies. The original end-to-end system did not provide an adequate framework for this behavior. End-points want to communicate, but the ISPs demand to interpose itself into the path without their agreement. Also, ISPs must collect data in order to effectively control pricing and maintain a competitive edge on its business, and the only way to manage its traffic is by having third party intervention. There has to be a way to differentiate between those commercial users who pay a higher fee for their internet access. Since the technology of computing has improved dramatically in recent years other changes to the pure end-to-end architecture are being made. Another example of the change to the end-to-end system is the modified end nodes. Pornography, SPAM, and other unwanted use of the internet is being
controlled at the end node with software or firewalls. Firewalls are erected to protect some part of the network such as a corporate region, from the rest of the internet by checking all passing network traffic and rejecting communications that are suspected of being a security threat. Another location to place a control point would be at an ISP, because it is a single connection from a user to the Internet. The government has already attempted to wiretap users via the ISPs. This way everything that the user does can be checked at one point, because once data has entered the interior of the Internet, it is very hard to control it. Change is a good thing, and these changes of the ISPs and the Internet show the adaptation of an original end-to-end system to fit new demands.

While the current changes are being made, future implications of the Internet have no boundaries. One can imagine a world where everything is continually linked, from instant messaging in cell phones to GPS navigation in cars. This continuous linkage would require broadband service, pushing ISPs further into this territory. Imagine something like the cartoon Jetsons, where a guy in a car clicks a button, which enables the refrigerator to take out food, and cook it, all done with a click of a mouse from a car. It is also possible that the Internet would become a dangerous place, so dangerous that the government imposes strict observation upon all users. This scenario would require the ISPs to help monitor users, and control data at all time. The two previous examples are extreme, however, and what is more likely is that the ISPs would end up catering to business. Profit will decide whether they monitor data being passed around. ISPs however, should have their principles guided by the users. Just as the saying goes government for the people by the people, the Internet should an Internet for the users by the users. If ISPs turn to the demands of government or large corporations, the ones that will suffer are the users. Without users there will be no end nodes, and without end nodes there lies to doom of the internet. However ISPs and the Internet have been able to adapt to the changing environment so far, and it should continue to do so in the future. The predictions for the future have tremendous potential to benefit the world.

From the beginning of the Internet through the current era and into the future, the Internet is bound to change. Whether it is connecting to the Internet or providing a control mechanism, ISPs have to change as well to continually adapt to fit the times. Not only do changes in the Internet affect ISPs, but ISPs can affect the Internet as well. With ISPs, each time period has produced beneficial change for the Internet and society, and hopefully it will ultimately lead to more prosperity for all users.