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There are certain services in a modern economy that require permanent, expensive infrastructure to deliver essential consumables to your home. Water, gas, and electricity are good examples of this type of consumable. Water and gas delivery requires underground piping networks to be installed for delivery of those consumables. Electricity requires networks of above-ground and underground wiring, poles and transformers to deliver electricity to your home.

However, there is a problem if you have only one vendor delivering water to your house. If your water vendor wants to raise the water price, you the homeowner don't have much choice but to pay up, if you still need water. It is clear that there needs to be way to prevent vendors of essential consumables from taking advantage of the situation and gouging their customers, simply because they have an effective monopoly on the consumable.

One way to deal with this issue is to allow multiple water vendors to run pipes to your house. Theoretically, free market competition for water would then keep water prices at the open market price. Collusion between vendors would be difficult to police, but that isn't the biggest issue. Running multiple water lines to your house is clearly not optimal, since that multiplies the infrastructure cost required to deliver the consumable.

This problem was addressed years ago by state and local governments by classifying vendors of essential consumables such as gas, water, and electricity as regulated monopolies. Prices for the installation of delivery infrastructure, as well as the cost of the various consumables were controlled by government regulatory bodies. The goal of the regulating body was defined to allow the consumable vendors to make a reasonable profit, enough to provide reliable consumable delivery, and sustain operations.

For example, an electric utility company would provide generating plants and the infrastructure to deliver electricity to consumers. The regulating bodies would tell the utility what it could charge for electricity, taking into account the costs of generation, delivery, and maintenance. This allowed utilities to deliver electricity reliably to all consumers.

Recently however, a somewhat different model of service delivery has been introduced for electrical services, specifically intended to increase competition in the electric power market. Nearly 20 states in the US have instigated what they call "retail electricity competition". This process separated the electrical utilities into three separate entities: an electric infrastructure provider (wires, poles, transformers), the power generating entities, and a retail electricity seller. The "retail electricity provider" is allowed to buy electricity from the power plants at wholesale prices, and sell the electricity to consumers for a profit. The retail providers pay the infrastructure providers "rent" for the wires used to deliver the electricity to your home. The infrastructure providers are still regulated, but the power plants and retail sellers can set prices to whatever they want.

Electricity was deregulated in Texas in 2002. If you want electricity in most places in Texas, you can pick from dozens of electricity providers and deals - low cost, green sources, free nights, variable rate, month-to-month, 1 & 2 year lock-in plans, and much more. The key idea is - regulate the delivery infrastructure, and don't regulate the content providers (other than full disclosure of the requirements of the content). When you get an electric bill, you get charged for your content usage (kilowatt hours of electricity), plus a surcharge covering the cost of the regulated delivery service which goes to the transport provider.

This model has had good success in some states and mixed reviews in others, but the basic idea seems to be effective. The key here is to keep that model in mind - regulate the pipe, deregulate the content.

The delivery of cable TV to residences started off much the same way as other utilities. Cable companies that wanted to deliver content to your house had to

install a cable before they could deliver their services, which was an expensive proposition.

In the early days (1940s), cable TV was used mostly to deliver TV signals to areas out of the reach of TV stations. In order to encourage cable companies in locations without over-the-air TV service, cities would grant the cable company a regulated monopoly in an area, if they would agree to install the infrastructure to deliver services to local households. Cable companies were required to deliver content from a set of distant TV stations to a location that that couldn't receive over-the-air signals.

In these early days of cable TV, the cable usually carried signals from a few distant over-the-air stations that were too far away for normal reception. However cable companies realized that they could improve profits by providing additional content. Showing old TV re-runs and movies on additional cable channels became popular way to increase cable revenues. As demand for content other than local TV grew, cable companies added more and more content from other sources, in some cases even creating their own content. Movie channels became more popular, and content providers such as HBO and Showtime bought the rights to films which they resold to the cable companies.

There was one issue that confounded the cable companies. By the mid seventies, HBO, Showtime, and other content aggregators had the rights to thousands of movies that they could show. However, the cable infrastructure only had a few hundred channels that could show movies simultaneously. Worse, only a few cable channels were allocated to HBO or Showtime. So if a cable subscriber wanted to watch a specific movie, he would have to study the channel guide to see if there was any chance that that movie would be shown at a time that was convenient for the subscriber. The cable companies knew that they were missing out on a huge revenue source, simply because they couldn't provide a specific movie when a subscriber wanted to watch it.

Cable dreamed of being able to deliver video-on-demand, as that was the ultimate in user friendliness (and profit potential). The technology for video-on-demand had been available for many years, but there was one big problem. On-demand video is much more bandwidth intensive than cable delivering a movie that is viewed by many subscribers at the same time. When cable delivers the same show to lots of homes simultaneously, the cable company can dedicate just one channel on their backbone network to that movie. That same channel is delivered to all the homes watching that movie simultaneously, using the bandwidth of one channel for all the subscribers. This was how cable TV worked through the 90's.

On the other hand, if everyone watches a different on-demand movie at the same time, the cable provider has to allocate a full-bandwidth channel to each subscriber in their network. If 1000 users watch 1000 on-demand movies on Netflix, the cable provider has to effectively allocate 1000 unique channels on their backbone network, in order to deliver those 1000 different movies simultaneously.

On-demand movies are user friendly, but network unfriendly. On-demand viewing of movies requires that the cable service have orders of magnitude more bandwidth in their backbone networks in order to support lots of users watching different video at the same time. Still, it was clear that cable subscribers wanted the convenience of on-demand movies, so cable companies began upgrading their core networks to handle the wider bandwidth. To be sure, this was NOT a trivial undertaking. The first step was to move from analog transmission on the cable to digital encoded signals. That allowed several digital channels to be encoded in the same bandwidth as one analog TV channel.

While this was going on, cable companies also realized that since they were putting a nice digital pipe into everyone's home, they could provide even more fee-generating services such as internet access, and even phone service. So the era of all-services-in-one-pipe was born.

60001030555.txt

However, after cable companies started providing Internet service, the trouble started. Content providers such as Netflix and Amazon began delivering movies via the internet, which competed with the cable company's own video-on-demand products. So now the cable company was selling a service (internet) that allowed other content providers to compete with their TV and movie services. This irked cable companies, as they were spending billions upgrading their networks to provide video-on-demand, while content providers, who were paying minimal connect fees, were able to steal away the cable company's customers for VOD. By providing internet services to subscribers, cable companies were losing control of the content being delivered over their own wires.

The problem is shown more clearly in this way: When a subscriber buys their internet services from the cable company, the cable company theoretically sells the subscriber a fixed bandwidth pipe to the internet, typically with various optional levels of bandwidth such as 10, 25 or 50 Mbit speeds.

Thus cable companies charged subscribers for their (theoretically guaranteed bandwidth) internet service. This made it hard to justify charging subscribers more for movies from other providers that were provided over the internet. Cable companies weren't happy about the fact that they were essentially subsidizing their competition. Cable companies realized that they COULD charge providers like Netflix more for the bandwidth required in their cable services network to deliver those Netflix movies. This is in spite of the fact that the cable subscriber had theoretically ALREADY paid for that bandwidth.

That issue is what caused the recent dust-up between Netflix and AT&T. AT&T complained that Netflix was using up the majority of AT&T's cable network bandwidth, delivering movies to Netflix customers. Netflix complained that AT&T customers were already paying for that bandwidth. Netflix initially refused to pay more, since they were having no problem delivering VOD movies on AT&T's network. To punish Netflix, AT&T started throttling Netflix's movie delivery, causing hiccups for Netflix's viewers. Netflix was essentially blackmailed into paying up. This was interesting, because again, the cable subscribers were supposedly already paying for that bandwidth.

The problem is that the cable company can't really guarantee that everyone that buys a 50mbit internet connection will get all of that 50mbits, all the time. When every cable subscriber shared the same 500 cable channels, there was no problem. Everyone got 500 channels. The problem arises when every subscriber buys their OWN 50 mbit internet channel. There just isn't enough bandwidth in the cable backbone network to give every cable subscriber 50mbits, all the time. The cable company relies on the fact that the probability of every subscriber needing all 50mbits of data at the same time is pretty small. Before VOD there wasn't much chance of that happening. With VOD, it IS happening.

This network resource limitation issue is not a new phenomena. Telephone companies in the 60s and 70s never designed their neighborhood networks to handle the case when every subscriber in a neighborhood would pick up their phone and make a call at the same time. If that happened, many of the subscribers just wouldn't get a dial tone, and they would have to wait until someone else hung up a call, before they could place one.

So all this finally leads us to the issue of net neutrality. The issue with the current cable providers is that the infrastructure (cable wires and transmission gear) is owned by the same company that provides the cable content. Thus the cable provider essentially has a monopoly on not only the pipe which is a regulated service, but also the content of that pipe, which is essentially unregulated. Though theoretically one can change cable providers if one is unhappy with their service, in many locations today only a single provider is available. And even if more than one provider is available, the costs of switching equipment and services can be expensive. So most subscribers are stuck with one provider.

When the consumable content of a delivery pipe is homogeneous with content like

60001030555.txt

water, gas, or electricity, the advantage for separating the pipe from the content has some advantages, but they are not overwhelming. When the consumable content of the pipe is heterogeneous, and the multiple content elements vary widely in substance and perceived value, like television content and the internet, the case for separating the pipe from the content becomes compelling.

For the consumer, the ideal situation for cable service would be much like the deregulated electricity market. The cable pipe (coax cable or fiber and the transmitting equipment) would be owned by an infrastructure company. The content carried over that cable could be provided by many different content providers, among which the cable subscriber could pick.

The subscriber would pay a fixed fee for the cable delivery infrastructure to their home, which would be provided by a regulated cable service monopoly. The service could come in several levels, with different bandwidths and perhaps guaranteed up-time levels. The infrastructure provider would have to guarantee that bandwidth and service level, much like the old regulated telephone services. Content providers on the other hand, could charge whatever the market would bear for their content, being essentially unregulated. The key issue is that the subscriber pays for the bandwidth that the infrastructure vendor provides.

While the pipe/content separation is the ideal situation for the consumer, it isn't so ideal for the current cable companies. Today they have a virtual monopoly on both the pipe and the content. With that monopoly they can charge whatever they like for the content, though the basic cable service is regulated. Of course, gouging the consumer too much for the services could cause a backlash, but that threshold seems to be fairly high in most places today.

Separating infrastructure from content would turn cable and fiber companies into "dumb bit pipes", where they simply provide the conduit for content providers to deliver their content to subscribers. They would be responsible for providing a fixed bandwidth from content providers to subscribers.

Of course, local governments would have to give infrastructure providers a regulated monopoly, much like the gas, electric, and water utilities, to allow them to recoup the costs of installing and maintaining the infrastructure. However, the infrastructure providers would not be allowed to provide content, as that would be a conflict of interest with the content providers.

Of course the current cable and fiber companies don't like this idea, as the content business is where the big profits lie. However, for a guide as to how this can be done we can look to how states have deregulated electricity. Companies that provided both content (electricity) and infrastructure (wires) were allowed to split into two separate entities, with the infrastructure side becoming a regulated monopoly, and the content side becoming completely unregulated. Rules were set to prevent the transport business from favoring its old content partner, but this scheme has worked successfully with electric deregulation.

If transport and content can be separated, then content will become a truly free market, with open competition among many content providers for subscribers. The demand for bandwidth will challenge the infrastructure providers, and they will have to work to upgrade their networks. Regulators will have to understand the costs of upgrading networks, in order to allow infrastructure providers to charge fees that will cover these upgrades. Infrastructure providers will also have to be more truthful in their claims of delivered bandwidth to subscribers.

Internet service today has become an essential service, much like telephone service became over the last century. It would make the most sense to declare internet service a common carrier service, which should be made available everywhere in the US. Internet infrastructure vendors should be regulated much like the telephone service carriers of the 20th century. However, infrastructure providers should be prohibited from supplying content.