



Is IP Inflationary or Deflationary?

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Introduction

This is a very difficult topic for me. It is not the contents that are not available. It is my presentation skill. I have preparing this for a few months and this is the first attempt.

IP in this article means Internet Protocol. It is the intellectual property invented during the 1970 under a massive number of contracts to universities as part of the APARnet from American's Department of Defense. Right from the beginning, it was tested in a heterogeneous and geographical disperse environment. The technologies required built a wall of hindrance because no appropriate hardware was available. As the result, the IP was developed with hardware emulation by software. The result had a lot of performance concerns. Now all those concerns are gone because the computer is thousand time faster.

Thirty years after that we all take IP for granted which is a sign for a matured technology. In many ways I feel a lot of hype is built around it to equate IP to higher sales and higher profit. This piece explores some of the economic impacts of IP at manufacturer and service provider level.

Understanding IP

Let's begin the discussion by understanding how IP is different from others. One of the big problem for me is that people assigns too many identities and functions for IP which prevents a true understanding and impacts of it.

At the very detailed level, IP is a vast number of ways (about tens of thousands of standards) to do things; some at very low level and some at very high level. Some borrows from other disciplines. In a nut shell, it takes advantage of the high performance of electronics and optical fiber to send and receive data digitally in small chunks. If some source generates 5 chunks of data in 1 second, these 5 chunks can be mixed with another 20 chunks before sending to a specific destination (like the shipping method of containers) either in a single container or multiple containers as long as it arrives at the destination within a specific time and reassemble them to create that one second of data.

The conventional method reserves a container for these 5 blocks of data with a dedicated container truck on a fixed route. IP prescribes the method to use one or more containers to ship out though different container trucks and routes to maximizing the efficiency of the truck payload. The analogy to transportation is best because the saving of fuel can be seen as the improvement in efficiency of transmitting data through equipment such as telephone line or trunks.

Deflation Effect

The first application of IP to save big money is in the telephony industry. Early day telephone company sends our conversation in analog. An electric current represents the sound wave and transmits to the far end through a copper wire. The dedicated line is expensive although patch panel is used to avoid direct connections from one phone to every others. The advancement only changes the representation of the conversation from analog to digital which increases the quality. To support the quality, the connection is designed to carry 64,000 bit per second. We are going to use Kbps to represent thousand bit per second so that I can type less. Newer technology finds that you do not need 64 Kbps to maintain the quality, you can do it in 8 Kbps. So the cost in Kbps has been decreased; a deflation of 56 Kbps.

The phone line from your home to the telephone switch is a single line used by you and no body else. At the telephone switch, the conversation from multiple homes can be merged into the trunk connected between telephone switches within the city and between cities. This means the number of communication cable can be reduced by a factor of 7. The deflation is significant. Of course there is equipment purchased to do this but most of them are done in software. Software is cheap in the telephony industry. It is the copper (Dr. Copper is everywhere) and the switch that cost most of money.

Inflation Effect

Copper cable has high maintenance and has its bandwidth limit. So here comes optical cable. Optical cable is available before it carries IP traffic. It carries the digitized non-IP traffic using SONET protocol. The use of IP over SONET again reduces the cost of deploying optical cable. However, the switch to handle the data in the non-IP way is different from the IP way. Investment has to be made on the new equipment. This pushes up the cost. The infrastructure has to be reorganized and staffs have to be retrained.

IP also opens new market. The DSL service we are using commonly nowadays is to maximize the other capabilities that were not exploited before. It is not using the extra 56 Kbps in conversation. It uses the modern technology of signal processing to create that 256 Kbps to 6 Mbps on your phone line for your Internet surfing. Massive investment has to put on the telephone company and the consumer. The consumer has to rent or buy the modem while the telephone company has to invest on the DSL access switch. This is inflationary.

Inflation or Deflation

Like any technologies, they offer both inflation and deflation at different time and situation. The tradition market will have the deflation effect while new market opportunities open up and create inflation. It is too long to discuss the impact of both in this short piece. I would do more in the future. I would give everyone a prelude on what would be coming.

New technology always has a witty twist on everything. IP standardizes the way to transmit data and provide services. As the result the service can be offered in different

medium. For example, phone service can be offered on cable and TV service can be offered by telephone line. (More academic discussion could be found from my invention: US Patent 6,185,288 *Multimedia call signalling system and method*.) The alternate method for service offering creates the new competition front which is deflationary to consumer but inflationary to service provider.

According to the IP roadmap, consumer should see the deflationary effect in a long run. The roadmap predict that you home will be wired either with LAN or WLAN (i.e. wireless). To connect to the outside world, you only need a single box for phone, TV, gaming and many other things we have not known yet. You *will* able to buy the box rather than renting it. You could have the network set up for the entertainment and communication. Now you are going to ask me why it is deflationary. I would use one example. There will be only one digital cable (which is dirt cheap in comparison to those monster hi-fi cables at hundreds of dollars) to achieve the highest possible quality. If you are an analog fan, it may not benefit you.