CFR: Our Copper Fiber and Radios

The idea is very simple. Our connectivity infrastructure is made up of Copper, Fiber, and Radios and is a fixed asset that requires a small amount of maintenance. In the days of telegraphy and telephony, it was deployed as a means of selling services.

Today the Internet and the networks in our homes make it clear that given the CFR we can do our own networking. Yet we fund the CFR by letting the incumbent service providers maintain their privileged ownership.

Funding the infrastructure by selling services makes no more sense that having men with pikes charging for the use of their personal highways.

Issues like network neutrality are symptoms of far deeper problems with this model. These problems are not new -- years ago we connected to the phone network using red and green wires …

It's time to reaffirm the Caterphone decision which gave us the right to connect our devices to the phone network. Today we need to take the next step and get ownership of the CFR – the Copper, Fiber, and Radios – we use to communicate and do our networking.

We use the CFR in our homes to network our computers at gigabit speeds – why do we pay a high fee for one-thousandth the speed when we use the CFR outside our homes.

In the 1950s and 60's my friends and I knew we could install our own phones by simply connecting instruments to the red/green wires. It wasn't until the Caterphone decision in 1968 that the Supreme Court put an end to the phone companies' claim that such connections would harm their network. And it wasn't until the ATT divestiture that we actually had ownership of the wires within our homes.

Ten years ago, the phone and cable companies saw their future in being unified service providers – one connection would do more than just give us television and telephone services. They would host services from others such as the gas and electric utilities and charge for the use of their residential gateway. Our entertainment would revolve around their Set Top Box, and we would pay for their advanced Interactive Television services.

I was at Microsoft at that time and wanted to connect the machines within the home and let them share a single path to connect with the rest of the Internet. The carriers were waking up to the Web and added "Internet" to their mix. Home networking was a good match.

The Internet connection just carries raw bits. We get to decide what the bits mean. The carriers' attempt to provide us with services over-defined and thus limited the solution. The results may seem counter-intuitive – by narrowly defining the allowable solutions the carriers' effort failed. Instead, those Internet packets gave us the opportunity to choose among any solutions including our own.

Today the gas and electric utilities deliver information via their web sites without having to make any special deals with the carriers. I use the term "carrier" but these companies are really in the business of providing services and deploy CFR only as a means of providing the services. The failure of the residential gateway highlights the sharp difference between the service culture and the Internet culture. Yet we still confuse the two.

The telecommunications industry is characterized by precise standards. Strict adherence to standards is necessary if you have rigid solutions and must make them match in the one way that works. Internet specifications are essentially suggestions. You don't have to follow them, but you gain a lot from joining cooperating communities. This community effect is powerful and blurs the distinction between suggestions and commands. It forces you to make mix and match work.

This difference came to the fore when I decided to try FiOS TV. In order to get the new capabilities, I have to use Verizon's router to connect my home network to the rest of the Internet. The router itself is not bad by standards of home routers but it clashes with the way I run my home network, and my Dual WAN allows me to connect to both Comcast and Verizon for reliability and performance.

I can understand Verizon's assumption that a router has a well-defined specification. But it isn't well-defined at all. Today's routers have evolved by trial and error and continue to evolve.

It's as if Verizon is trying to take back control of my home network. They deliver some of their video streams to my house using IP, but they distribute it to the Set Top Boxes using their own cumbersome RG-6 Coaxial cables. I have to pay for them to run new wires around my house. To be cautious I have kept my Comcast service, but Verizon insists on running additional coax! If you look at the MoCA standards site, you can understand why – they believe their bits are special and they claim to know the purpose of the

network. As a privileged broadband service provider, they don't have to worry about competition as they all use their own RG-6 coax. They can spend freely while claiming that there's real competition, but it's an illusion if they are all the same.

This rationale for implementing an expensive private path is mirrored in their rationale for having their own private distribution systems outside our homes. There too video bits are considered special. If video bits were not special the pricing scheme for Internet bits would not make any sense – how can you charge for a megabit and give away gigabits? Yet video bits are not special – we transport them just like any other bits.

We have not learned the lessons of the failure of the residential gateway because the term is now used for today's routers – or at least the carriers' version of the gateway. Like other protocols, such as MMS, it seems to be a standard Internet protocol at first glance. But if you look closely you'll find that the vitality is gone.

The carriers come from a world in which they have total control over every element of their network and believe they must have total control in order to manage their scarce resource. It is bad engineering but justifies high costs and exclusive control over the CFR.

Yet the Internet is a dramatic demonstration of the power of loosely coupled systems. Ceding control gives us the opportunity to choose solutions to existing problems. The real value comes from discovering what else is possible. Email, VoIP and now even video streams build on existing opportunities without incurring new costs beyond the small incremental costs of adding capacity. This additional capacity then creates more opportunity in the kind of virtuous cycle we associate with Moore's law.

At this point, I can hear the traditionalists warning us that we'll have to pay because it can't really be that inexpensive. Yet the costs keep going down as the capacity increases. If you can't control the path you can't charge a premium for better bits.

Thomas Carter succeeded in his suit because the red/green interface was so simple it was difficult to pretend that the network would be damaged. In fact, it would be hard to scale the network if the interfaces were fragile. If you look behind the curtain, you'll see that today's providers don't control their entire infrastructure and their use of the Internet belies they claim that total control is necessary.

The CFR is even simpler than red/green because we now know networking is something we do – it needn't be a service at all. There's no reason to be paying a service charge to communicate with our neighbors be it the house next door or the neighbors across the country.

We use the term "carrier" to describe the incumbent service providers. They happen to own our CFR because of the limitations of last century's analog technology that required a special infrastructure for each kind of bit. This is no longer true but it's hard to give up privileges. The incumbent providers have become dependent upon control and find themselves unable to compete in a real marketplace. They have become so used to a guaranteed return on their investment that they now say they deserve it!

There is nothing special about their ability to provide services other than the privileges that come from owning the CFR and defining the rules for using it. We're used to CableTV companies running their own video cables because that's the way it's already been done. What makes FiOS TV different is that it's supposedly built on current technology and takes extra effort to do things the hard way.

We don't need to ask whether it simply due to a failure to understand or a deliberate attempt to reassert control -- the result is to extend their control to the exclusion of others. It's unnecessary and costly and deprives us of choice. If I want the military channel, I can't just subscribe. I must let Verizon run an RG-6 cable to their Set Top Box! Why can't I just run a video stream over a gigabit network? It can still be restricted to paying subscribers thanks to encryption but without having to pay a carrier for unneeded and unwanted "help".

This is just as true outside our homes as inside. Few of us operate the networks ourselves – we buy equipment to solve the problem. Most communities would hire companies to install and operate the CFR. We'd start with the existing CFR and today's services and then discover what else is possible while saving a lot of money by reducing redundancy and using loosely coupled approaches.

In fact, many communities are already deploying their own CFR. All-to-often they are simply small versions of the carrier systems because that's what people understand and seem willing to pay for. If you higher professionals from the traditional world of telecommunications you shouldn't be surprised to get a traditional telecommunications sytem.

A subscription model fits our own naïve notion of fairness but makes no sense because the CFR is a fixed asset. That's why we can afford to use it for video – the video bits are essentially given away free compared with the cost of the other bits.

The subscription model doubles the cost when we deploy redundant broadband systems and get no additional capaci-

ty. It also deprives us of wireless coverage – we're disconnected almost everywhere.

This is just as true for the CFR between our cities and nations – we seem to have the naïve notion that transporting bits should be profitable in its own right. We should learn from the example of the Interstate Defense Highway System. Some estimates put the value to society in the trillions of dollars. By trying to make the CFR a profit center we have created artificial scarcity and denied the marketplace the benefit of a vital resource.

The gigabit capacity of our home networks only hints at the vast capacity and low costs of the CFR. This is not obvious because of the costs and scarcity resulting from ceding control to a small number of incumbent service providers.

The Internet is an example of what we can do ourselves by taking advantage of opportunities with the entire community contributing. Yet we ascribe the successes to the privileged service providers even though, as we see with the example of the residential gateway that we have succeeded despite them.

In fact, they are doing nothing more than using the protocols and methods of today's Internet. That's why they are able to use a single connection to deliver a raft of services. Even with a small portion of that capacity as raw Internet bits we've done far more than these privileged services providers have been able to do because they've been enfeebled by their privileges.

We have ceded control of our CFR to a small number of providers and are reduced to begging for fair treatment and a little more "Internet". It's shameful and tragic.

Thomas Carter challenged ATT's attempt to tell us how to use red/green. Rather than negotiating for a little neutrality and some more broadband, we have to put a lie to the whole idea of privileged service providers owning our CFR and charging us for services that aren't as good as what we already do ourselves.