Telecom: A Prison of Our Own Devise

I wrote this for a discussion associated with [Freedom to Connect](#) because I was concerned about the emphasis on the physical aspects of the Internet rather than the idea itself.

When I discovered that Verizon had forgotten to run fiber behind my house (another story) I decided to move one of my distinctive ring numbers over to Vonage. A distinctive ring number is a virtual number that forwards to an existing number but rings with a different pattern. For some reason only numbers that terminate in an actual line can be ported. I realized that if I gave it an "appearance" or a physical line then I could port it. Verizon was very cooperative even though I said I just wanted to port the number and they needn't actually come to my house. Within days there was an installer at my house. Unfortunately the work order was confused and it took a number of visits, AKA truck rolls, to get the problem resolved. Once I had the new line I immediately called Vonage to port the number.

This story captures the essence of much of the discussion of regulatory policy. We have a complex series of regulatory rules and high costs in the time, effort and equipment needed to conform to them. All I wanted to do was change the binding of an identifier, a phone number. If it were a DNS entry I could have done it myself in a few keystrokes.

The question is – how do we move from rolling trucks to simply creating solutions with software and tweaking some settings. How do we align incentives for abundance rather than sustaining the current situation in which the government creates companies which must extract revenue by charging for carrying bits even if there is no relationship between cost, price and value?

We seem to be confusing accidental properties with basic principles and seem more comfortable talking about physical objects rather than abstract concepts. One of the biggest philosophical changes wrought by computing is our ability to work with abstractions instead of physical objects. It took a long time to get used to the idea that a piece of paper represented value and to accept that we can just move entries in a ledger rather than exchange gold bars. With the Inter-

net we can define relationships between two end points using abstract identifiers. Yet when I try to talk about the Internet I keep getting told that the solution is to run a new fiber. I'm then told there's a scarcity of … of something. We presume the pie is finite, AKA, zero sum.

This is the essence of the policy debates – we seem to be unable to think abstractly. We can't accept that the Internet as a concept. Instead see it as wires and fibers. We can't think of spectrum as an arbitrary mathematical construct but instead we treat it as property as if it were an acre of land. Then we start arguing over spectrum policy instead of asking why we've chosen spectrum as a unit of barter! We also talk about bandwidth as if it was a physical thing like copper rather than an interpretation of the copper and we confuse the accidental properties of a payment settlement system with real costs of infrastructure.

The problem is that the math is all correct. To use a simple example, if you want to compress the Encyclopedia Britannica's bits we can determine the limits on compression. But I can compress the Encyclopedia Britannica itself to "1593392923". I can also apply the ISBN number to backhoes or truck rolls. Instead of shipping a book I can pick it up at the local bookstore. It gets trickier if we recognize that the bookstore is broadcasting and that a generic packet transport makes shipping the physical book on demand a better choice. I'm not trying to confuse – just demonstrate that there are many metrics for solutions.

The discussion of the "Smart (Power Grid)" or the "(Smart Power) Grid" is fraught with this confusion. We took the word "grid" from the Power Grid which is really a graph rather than a rectilinear grid and then repurposed the word to mean "resource pool". We then reapply it adding "smart" in the same way we tried to improve the phone network by making it intelligent in the spirit if intelligent design.

If you look at the numbers for the "Smart Grid" they don't add up. You can use newspapers (I hope) to tell people that it's cheaper to run appliances at night and use a dishwasher with a timer. If you want a fancier scheme then it only takes a few bits to negotiate – perhaps a house can be given a discount for a two

hour slot. That said how much money is saved compared to say driving less – though getting people to drive less might actually be the reason for more bits for video content.

We don't seem to be able to apply Darwin's insight. Standards really evolve by building on experience and reinterpreting available ideas and avoiding prejudgment. There isn't just one energy problem with one solution. There are many kinds of problems with a myriad of approaches.

Silos and top-down (or center-out) solutions are preventing abundance by limiting us to a single interpretation (or solution). If we rely on providers or experts to define our solutions we find ourselves stuck in the past because that's the only vocabulary we have. Perhaps I'm being too abstract – I am using vocabulary as a synonym for the slate of choices or services we are provided with.

This is why we need to liberate the physical infrastructure from the telecom value chain. We can then use it as raw materials and explore new ways to use it – AKA, new interpretations. It's also why we need to normalize it to bits so we can build and build on a bit commons. It's why we need to encourage open interfaces which can then give rise to common practices (AKA specifications we can embrace rather than standards that are imposed). This was part of what was behind the question I asked Tom Friedman – he was still talking about the all-or-nothing big bet VC model.

Why do we tolerate the claim that fungible infrastructure is a telecom service. That's no different from a law saying the value of π is 3.0. So why do we spend billions to conform to the lie rather than challenge it? That's like rolling half a dozen trucks to move a phone number from one table to another!

The basic concept is so simple – if you have to fund the transport of bits by selling it as a service then abundance is a threat you need to limit capacity and that's exactly what the telecom industry does openly, explicitly and intentionally. If we have a common infrastructure for fungible bits then we have abundant capacity in the existing infrastructure. We can achieve this by changing the funding model without having to spend billions on incentives – self interest would be aligned with our needs. Is this too simple to be believable?

Once again we have met the enemy and it is us – our willingness to accept limitations that don't exist. We have a simple solution, at least with telecom. But we also have a dynamic which we can apply to energy or, for that matter, cars. Why do we build cars as whole systems despite all the examples of the power of effective decompositions? Imagine the energy saved if we didn't have to manufacture cars and the car was not the only unit of transportation!

Let's remember how much we don't understand and avoid the hubris in assuming it's just a matter of deploying technology. We have a lot to learn so we should create the opportunity to evolve solutions.