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A Tale of Two Platforms

Tim Wu*

[No Footnote Version]

Professor Jonathan Zittrain was a network systems operator before there was an internet. He has watched the network grow up, and has held a ringside seat for most of its collisions with the law over the last decade, including the tussles over internet obscenity, internet domain names, and online file sharing.

Now, amidst new debates over “network neutrality,” and the long-term fate of the network, The Generative Internet, is the effort of a longtime observer to explain how best to manage the greatest tension at the center of today’s Internet policy. Consumers, explains Professor Zittrain, want more security, and service providers want greater centralized control of the network to ensure that security. Yet, as advocates point out, greater centralized control could fundamentally change the generative nature of the Internet as we know it. Faced with that tension, Professor Zittrain, ever the optimist, tries to find a middle way. One has the feeling after reading this article that if we all listened to JZ things would pretty much work out fine. But unfortunately that happy ending isn’t likely in our near future, for reasons I explain here.

Professor Zittrain argues that a hard-line view that resists any compromise from end-to-end or net-neutrality principles is a mistake. He believes that if certain problems, most notably the security of the network, are not dealt with by network operators, then consumer demand will lead to increasingly safe, but “locked-down” computers. As he puts it, “complete fidelity to end-to-end may cause users to embrace the digital equivalent of gated communities.” Hence his call for a more moderate position.

This position merits two initial comments. First, what Professor Zittrain is discussing, in his own way, is the difference between an “absolutist” and more moderate positions in what is now called the network neutrality debate. The direct antecedent to Professor Zittrain’s call for moderation is Professor Eli Noam’s proposal in 1994 to modify common carriage to permit zones of allowed and forbidden discrimination on networks. In addition, the early net neutrality proposals suggested room for public-serving, or positive-externalities, deviations from a pure neutrality principle. Those ideas, and an effort to strike some balance, have found their way into many proposed bills in Congress, and the network neutrality rules that currently bind AT&T. Professor Zittrain joins this group, albeit somewhat late to the game, with the principle “that modifications to the PC/Internet grid be made when they will do the least harm to its generative

possibilities.” While some of Professor Zittrain’s reasons for wanting to deviate from pure neutrality are novel, the basic idea of a moderate neutrality position is a well-debated concept both in academia and in recent public policy debates.

Viewed from this perspective, Professor Zittrain’s focus on security issues is too narrow. It fails to portray other and arguably more important forces that are driving a movement away from the “generative internet.” Professor Zittrain, in his good-faith way, has focused on the problem of security because it is clearly the largest flaw in today’s network. But trying to correct the largest flaw is the wrong approach: What matters is not the changes to the network that would make the most sense, but rather those where the most powerful relevant actors stand to make the most money. That is a different analysis than what Professor Zittrain undertakes.

Today, the greatest force driving deviations from neutrality or the E2E design of the network is not a security concern, but rather the broadband carriers’ interest in expanding their revenue base with new fee and service models. First, the carriers would like to charge differentiated termination fees to application providers -- otherwise known as fees for “priority” or “guaranteed” access to customers. Charging different companies different prices to reach their consumers represents both an obvious carrier interest, and also an obvious threat to a key feature of the generative Internet: the ability to begin offering content without having to pay to reach anyone. Second, carriers want to sell latency and jitter sensitive services, like high quality video, and they want to change at least some aspects of the Internet’s current design to do so. In the AT&T merger agreement, alluded to above, AT&T’s principal interest during negotiations with the FCC over a net neutrality rule was achieving an exception for its planned cable television offerings.

Conversely, what is mostly missing from the carriers’ demands are strident calls for freedom to build the network security enhancement so central to Professor Zittrain’s article. And why should that be a surprise? For carriers, improving the security of the network would be expensive, and difficult to make money from. Consumers expect the prices for Internet access to go down, while improving security would make them go up. In other words, the security issues that Professor Zittrain focuses on, from what I have seen, do not seem to be driving the current challenges to the Internet’s architecture, and for one simple reason: there’s no money there. I do not deny the possibility that the issue is just around the corner. But at least for now, in the policy debates ongoing, network operators have not expressed a strong desire to have more powers to deal with network security beyond

what they already exercise. In short, Professor Zittrain's focus on security issues may miss what is truly driving today's debates over the future of the network.

My second initial comment is that Professor Zittrain is not careful enough in his description of what it means to have an ends-based solution. Take the well-known problem of spam. According to Professor Zittrain, if the network operators do not deal with a problem like spam, users will demand locked-down computers -- "prisons," which will endanger the generative internet. But Professor Zittrain has temporarily forgotten that there are end actors who are not computer users. One of the stronger solutions to the spam problem, if not the only one, has been the spam filters operated by Hotmail, Yahoo, and Gmail, the three leading online email providers. Their efforts to fight spam are an end-based solution. Yet, contrary to Professor Zittrain's thesis, their efforts to fight spam have not locked down the nations' computers. The problem is that Professor Zittrain sees the ends of the network as simply users' computers, when what are more often relevant are the end-point application providers.

This second point can be made clearer with a discussion of the more general economic principle of specialization. The famous "end-to-end principle" can be understood as the suggestion that network operators will do a better job if they specialize in transport, as opposed to trying to handle other network functions (most obviously applications like email, search engines, etc.). To paraphrase Professor Ronald Coase, one firm can only do so much, and moving data from one point to another is hard enough. The question then for Professor Zittrain is which actor is best situated to deal with the security issues he raises. It may be the network operators; but, given what I have just said, it must then be accepted that they will lose some effectiveness as carriers of information, and that they may not do as good a job on security as a more specialized entity. It may be end-users, though as Professor Zittrain points out, most people are not experts in computer security. That is why, it seems to me, when possible, the most efficient solution lies in specialized application intermediaries. Microsoft Hotmail has the means, expertise, and incentive to try and solve spam in a way that AT&T does not. I concede that sometimes no actor but the network operator will have sufficient power to deal with some of the security problems Professor Zittrain is talking about. But the specialization logic suggests that we should hope for a specialized solution as a first resort, and the general, network solution as a last resort.

Back to the big picture. As Professor Zittrain points out, the highly "generative" nature of our PCs and the internet is surprising, and not clearly something that the major players would choose today. Instead, they would be more likely to choose something along the lines of what Professor Zittrain calls an

“information appliance” -- a safe, reliable machine that does a few things well, rather than an open-ended, mechanical brain that runs everything from Lotus 1-2-3 to World of Warcraft. But I think that Professor Zittrain has missed the real crux of this conflict. As he does mention briefly, there is an entire industry that has grown up on the exact opposite set of principles: namely, the wireless- or mobile-phone industry. What I suggest is that the tension between these two platforms may be stronger than Professor Zittrain imagines. And what I want to do in the remainder of this Response is describe the cultural and intellectual gap between the two platforms: the computer and the mobile telephone.

What I mean by this gap can be understood by examining how far apart the intellectual origins of the two network standard-bearers of our day are. The mobile phone and the computer have become the essential tools of our day. But mostly unnoticed is the fact that these two devices, and the networks behind them (the phone network and internet, respectively), are products of radically different intellectual traditions. They are ideological rivals and, as in the Cold War, each side believes that the other side’s philosophy is not just different, but deeply misguided. Both sides want to be the one, dominant information platform of the twenty-first century.

Let us begin by looking at the industries. The cell phone and computer-web industries have very different corporate DNA. One is perfectionist, rationalizing, and centralized; the other is decentralized, unpredictable, and constantly reinventing itself.

Verizon and AT&T are the direct descendents of the great Bell Telephone Company, founded in 1877 (later renamed AT&T). Throughout Bell’s history, rationalized, centralized control was the key to its success. Bell was among the greatest products of the “scientific management” revolution of Fredrick Taylor and Henry Ford during the early 1900s.

The symbol of AT&T’s network was the famous Model 500 “Black Phone,” the rugged, reliable, and nearly perfect phone produced in the millions and leased to virtually every American household. AT&T guaranteed absolute reliability: their advertisements said “wouldn’t it be nice if everything worked this well?” There were no viruses on the Bell system. But the approach necessitated heavy, vaguely totalitarian control. Many Americans can remember that Bell banned all “foreign attachments” -- that is, any phone not made by Bell. As an old Bell advertisement put it, “it takes a totally unified system to make it all work.”

Today, cell phone companies like Verizon Wireless have directly inherited Bell’s philosophy. Verizon allows one category of cell phone on its network -- a

Verizon-branded telephone. It carefully controls how its users use their phones to download ringtones, wallpapers, and places limits on Internet access. Verizon, like Bell, wants a centralized network that works reliably -- and if that means less consumer choice, so be it.

Such centralized, rational control is antithetical to the culture of the cell phone's rivals, the personal computer and the Internet, which arose almost as a protest against AT&T -- and are still at it today. They instead embody the libertarian philosophy of Professor Fredrick Hayek -- sugar-coated with West-Coast idealism. Professor Hayek argued that capitalism's true strength lay not in scientifically-designed, centralized production, but rather in messy and highly decentralized decisionmaking. That has been the key to the growth of the computer and web industries, in which companies like Lotus, WordPerfect, Microsoft, Google, and YouTube come from nowhere and invent or swallow whole markets. It also explains why the Internet is so messy -- littered with spam, viruses, and self-indulgent blogs. Unlike the phone networks, no one is in charge.

If the Black Bell Telephone stands as the ideal for cell phones, the computer industry's own ideal type was the modest Apple II personal computer, perhaps the most important technical embodiments of Hayekian design in history. The man who built the Apple II, Steve Wozniak, was a hippie and tinkerer first and foremost, a prankster who at an early age built devices to cheat AT&T and make long distance calls for free. Today we can see that Wozniak's Apple was a radical device. The Apple II was a cheap, general-purpose tool that left all the decisions with the user, rather than any central authority. By itself, it was useful for almost nothing -- you either had to program it yourself or buy the limited software that was originally available. Yet it nonetheless led to a PC revolution and then a mass Internet. With only some exaggeration, we might say that Wozniak's machine began an attack on the society that Henry Ford built. That is most clear on the web today where nearly anyone can start a blog, remix a tune, or, for the more talented, write a better search engine. But as the contrast with the Bell system makes clear: there is a tradeoff, namely the spam, viruses, bad Internet dates, and the general lack of order that characterizes our information age.

Why does all this matter now? As Professor Zittrain alludes to, for the last decade, computers and cell phones have lived in separate markets. But now, as computers make phone calls, and "smartphones" begin to impersonate computers, suddenly everyone's fighting for the same turf. Cell phone companies want a return to the age of AT&T, and promise simplicity and security. But computers can do more, and usually for much cheaper, at the cost of more chaos. The debate over

“network neutrality” captures many of the tensions between the two sides. And everyone wants to be the über-platform -- the one tool that rules the rest.

The rivalry matters for deeper reasons too. The tools we use daily cannot help but determine who we are. Societies that use pens are different than those that use swords. A Fordist nation is much different from a Wozniak nation. Yes, there are intermediate positions between the cell phone and the computer. Smartphones let you download Google Maps, and Apple’s iPod, in truth, borrows much from AT&T’s ideology. That is where Professor Zittrain perhaps would like us to go. But I suspect that there is too much invested in each side, and too much at stake for either side to give up on the extreme versions of their ideology so easily. In this sense, the implicit question posed by Professor Zittrain’s article is: what will the information culture of the twenty-first century be? Will it a more perfect version of twentieth century rationalism? Or will it be more of the messy, decentralized weirdness of the last twenty years?

Professor Zittrain is right to urge compromise. But like the proponents of a “middle way” between the Soviet Union and the United States, I’d suggest that while the idea of compromise is laudable, it is unlikely to happen in the near future. The companies, firms, and ideologies who are struggling to control the Internet have too much at stake and are too vested in their view of the future to be interested in easy compromise. That’s why Professor Zittrain’s article, as well-intentioned as it is, may simply be the plea for compromise always heard just before the onset of total warfare.