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# REGULATION AND FREE MARKETS REDUX

## ADDITIONAL INSIGHTS ON REGULATING THE TELECOMMUNICATIONS INDUSTRY IN THE NEW ECONOMY

JAMES CROWE\*

I guess it has been about three years since last I addressed this forum.<sup>1</sup> For those of you who were here, you'll either consider me consistent or boring depending on your point of view concerning what I have to say. My views are largely the same as they were three years ago. I'll take a bit of your time to explain those views.

I want to start by reading from something Phil Weiser sent me. He emailed me some thoughts that I might consider in putting together my remarks. He said—I think it's in the agenda for the meeting—that “the transformation of telecommunications from an analog narrowband network optimized for voice to a digital broadband network optimized for data traffic has created a myriad of challenges for businesses, policymakers, and academics alike.” I want to start by elaborating a bit on that statement. While I think the shift in the technical underpinnings of our industry is certainly important and certainly visible, something a lot more fundamental is going on. I think the implications of that fundamental shift are going to affect not just the communications industry but the information technology business, broadly defined. Further, I think that change is not simply a one-time event, but is continuous and accelerating. As Weiser points out, those changes are going to cause some real challenges, and already have for policymakers, regulators, and users. I have some thoughts on the implications of those changes.

To explain my point of view, I am going to talk about history. I know you're all familiar with George Santayana's remark that “those who cannot remember the past are condemned to repeat it.”<sup>2</sup> Well, given

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\* These comments are adapted from a speech given by James Crowe at the Symposium on the Digital Broadband Migration, delivered at the University of Colorado on February 20, 2006. Mr. Crowe currently serves as the CEO of Level 3 Communications. He previously founded and served as the Chairman and CEO of MFS until it merged with WorldCom. Mr. Crowe became the Chairman of WorldCom following the merger with MFS.

1. James Crowe, *Regulation and Free Markets: How to Regulate the Telecommunications Industry in the New Economy*, 2 J. ON TELECOM. & HIGH TECH. L. 420 (2002).

ware and software manufacturers would produce the product. That process has been defended in the name of interoperability. But when compared with market-based processes, it is glacially slow.

However, that is precisely what goes on even today in much of the local loop and in wireless; think of 3G, for instance. It was debated for 10 or 15 years and only now, finally, after much debate, the standards are being implemented. That same kind of central planning is applied to pricing, to capital allocation. In effect, we viewed communications—wrongly, in my view—as a slow-moving utility industry.

The alternative is certainly messy, it is confusing, and it is sometimes hard on consumers who make the wrong choice in technical standard, like my selection of a Beta machine. Think of those who picked Token Ring networking, a standard that IBM pushed, and who watched Ethernet become the choice. If you picked Token Ring, you made the wrong selection of networking standards. However, over any reasonable period of time, market-based processes, when they can work, outperform central planning. It is the central planning process in communications, in my view, that has distorted investment on a massive scale. We process and store information today with incredible new technologies, but we still move information largely the way we did many years ago.

To prove my point, let me pose a question. We have quite a number of industry observers here in the room. What do you think is the cheapest way to move information today? Given this era of optical networks, and the Internet protocol, what's the cheapest way to move information? The answer is to put it on little silver discs, DVDs, and stuff it in a truck or a railroad car and move it across the country. It is an indictment of that central planning process in that it is still cheaper to use transportation networks to move information than modern information technology networks.

And, of course, the result is all around us if we care to look. We process and store information with assets that are located locally. At the home and at the office, we own computing and storage assets not because we choose to do so, but because it costs too much to centralize information, process it centrally, and move it to the point of use. At the office, most of the Chief Information Officers I know would be perfectly happy to outsource processing and storage. They're interested in owning information about their customers and about their transactions. And employing legions of information technology experts, computing experts, and software experts is not generally their core business. They own local area networks, they own servers, and they own computers because it simply historically has cost too much to centralize on a network and move the information to the point of use.

In the home, the same thing occurs. Unfortunately, it's true that most information measured in terms of bits in and out of the home is en-

tainment. We may wish it was education, but it's entertainment. And it is still moved physically over transportation networks. It is still awkward, we still have to spend hours and hours updating software on our computers and updating our machines when all that ought to be done seamlessly over networks. A good example of consumers' desire for that simplicity and centralization is the combination of Apple's iPod and iTunes, where we do access information, in that case music, in a simple and straightforward way over networks.<sup>8</sup>

That differential rate of improvement, between processing and storing information on the one hand, and moving information on the other, led to one of the great arbitrage opportunities in economic history, and the dam finally started to break somewhere in the middle part of the 1990s. It broke with two complimentary developments. The first is the Internet protocol, the technical underpinnings of the Internet. It moved into the marketplace and, today, if you want to develop an alternative or an extension to IP or a new optical technology, if you can get capital and if you can get customer support, the standards tend to follow.

These developments have changed totally the approach that has been taken to the development of technology in our industry. Optical technology today may be the fastest improving technology in industrial history, doubling in price performance every nine to twelve months at the component level. IP technology has simply a special purpose—computing—and improves at about Moore's law rate, doubling in price performance about every 18 months.<sup>9</sup> That means a properly designed communications network ought to enjoy price performance improvement rates that make computing rates look comparatively slow.

The result is a tsunami that is swamping the old order. It means that communications, networking and connectivity, is where the action is going to be for the next few decades and, I might add, regulation of the same is where the action is going to be for policymakers. First of all, the effect is going to be on existing information distribution channels, which will certainly become disintermediated. It means that existing information and distribution channels will move quickly or slowly, in fits and starts, to less expensive optical IP networks. Today, information is distributed in cars, trucks, and airplanes, in books, newspapers, CDs, videotapes, DVDs, and more. Many of these items will move, quickly or slowly, to optical IP networks. It also means more and more outsourcing of processing and storage of information. That's a long-term trend you can bet on. I remember when most corporations owned their own long

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8. See Apple - iPod + iTunes, <http://www.apple.com/> (follow "iPod + iTunes" hyperlink) (last visited Jan. 23, 2007).

9. CNet.com, Moore's Law, <http://www.cnet.com/Resources/Info/Glossary/Terms/mooreslaw.html> (last visited Jan. 23, 2007).

distance companies, so-called "electronic tandem networks." Today, all of that is outsourced because it is cheaper. You can bet that the same is going to happen over time to processing and storing information.

Technologists tend to assume that the needs of society remain constant and that only the technologies change. As a result, we always miss the ways in which technologies are used. For example, when computers were first invented, you remember, they were considered fast adding machines and fast typewriters. Today, they are communications tools or terminals. Generally, writers and artists see the future with a lot more clarity than technologists. If you have not picked up a copy of Thomas Friedman's book, *The World is Flat*, it is worth a read.<sup>10</sup> He does a pretty good job, I think, of explaining some of the implications of the trends I am talking about here. Unfortunately, I am all you have here today, so I will give it my best shot.

I will provide another caveat. Technology development is smooth only in retrospect when viewed over decades. Up close, it's punctuated by rapid development and unexpected change. It can be disruptive; it can be slowed or sped up by regulation and by disruptions in the capital markets. However, maybe the shape of things to come is possible to anticipate, at least in outline.

I think of it this way: we have spent the last 100 years building communications networks that are largely about our ears. Today, we can extend our ears around the world and listen and talk at prices most would consider affordable.

The next 100 years will be about doing the same for visual communications. That's a difference of kind. We are visual animals. Most of the information we gather comes from our eyes. The time will come when it is possible to interact at a distance with the quality of a face-to-face interaction. Today it is not possible to pick up all of the visual cues, all of the unsaid things that go on between humans. That is the reason I am here today, rather than having this conversation from some other locale. But that too is coming.

In fact, when I was trying to raise money for Level 3, I thought it would be kind of interesting to answer the question, "How much communications capacity would be necessary to support interaction at a distance with the quality of physical presence? What would that take?"

You know, the bandwidth of the auditory nerve is about one and a half megabits per second. You can get that on a DSL connection, so you can move information with the quality that approaches what your auditory nerves can handle on today's networks.

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10. THOMAS FREIDMAN, *THE WORLD IS FLAT: A BRIEF HISTORY OF THE TWENTY-FIRST CENTURY* (2005).

Well, what does it take to match the optic nerve? The answer is that no one knows. Something goes on in the brain that we do not understand. There is something in terms of processing and interpolation that scientists have not yet characterized. So I came to the problem from a different angle. I said, "Alright, what would it take to present information to people in such a way that was virtually indistinguishable from reality?" That question is a little easier to answer.

It turns out that if you had half a sphere in front of your eyes, and you painted a picture with enough quality so that it was approaching reality, it would take about 15 terabits per second. You will just have to trust me that our engineers have done the math on that somewhere near the correct answer. It is about 15 terabits a second with high definition frame rates and color depth that approaches reality. In fact, you could actually have a higher bandwidth, but then again you could have compression, so we will just say that 15 terabits is somewhere near the correct number.

What is that? What does that mean to anyone? Well, when we built our network, we decided that we wanted it to be future-proof. So rather than put a single conduit in the ground—a conduit is a piece of plastic, maybe an inch and a half in diameter, through which you place fiber optic cable. Fiber optic cable is about the thickness of your thumb. With today's technology, we actually blow the fiber optic cable through the conduit. Well, fiber is a technology, and we thought that fiber might change over time as well. We do not want to dig up the coast in Santa Barbara or the streets of New York more than once, so we put twelve conduits into the ground. That way, instead of needing \$5 or \$6 billion to build a national network, we will spend a few hundred million to blow the next generation of fiber through this conduit. We thought that was a pretty good idea. We put 144 fibers in the first of those twelve conduits. We actually would use four to eight. The others were for sale, and we made several billion dollars selling them to other companies. As a side note, most went broke. We got the cash up front and then got the fiber back—it turned out it was a pretty good deal for Level 3.

But, let us just say, instead of putting 144 fibers in one conduit, we bought the most fiber count that was commercially available. That's 432 fibers in a single cable. Let's say instead of filling one conduit, we filled all twelve. Again, if my math is correct, that's 5,184 fibers. That's ten times the total number of fibers in the entire industry. On each of those fibers today, we flash a laser on and off ten billion times a second. That is ten gigabits and that is the way we encode information. And, we have 32 different lasers, which use—think of it as a prism—to combine and run data over one fiber. So we use a rainbow of different colors, and each color flashes on and off ten billion times a second. Let's say we do that on all 5,184 fibers. That would be many, many orders of magnitude

more capacity than the entire industry has available today. We could support many, perhaps 30, telepresence sessions. We would have to charge about a half billion dollars a month for each session, and so if there is anyone in the room who would like to buy one, I have my order book in my back pocket.

If we were able to drop the price of communicating by 60% a year—the cost and price—at a rate similar to what we have seen in computing, each and every year, it would take 25 years before telepresence would become affordable. I consider that job security. This is an exciting development. That is why I said earlier, I think communications is where the action is going to be for a long, long time. It certainly means that the world is going to be a smaller place. It already is. Communities of interest are becoming more and more important; geography, less and less important. It certainly means enormous improvements in productivity of the kind the economists are just now starting to point to here in the US, fueled by enormous improvements in information technology. And I believe that the benefits of that kind of market-based process, while at times messy and unpredictable, must be recognized by policymakers.

I said I had a few opinions about the right approach to regulation in this new kind of environment. I am going to start with some observations about the industry. First, I think it is clear that our industry, if it ever was, is today not a utility industry with long asset lives, slow product development, and it is most certainly not a natural monopoly, whatever that means. It is the vital third leg of the information technology tripod, and it is a leg whose development has been stunted and delayed because of central planning, embraced and encouraged by entrenched monopolists, and sometimes supported by wrongheaded regulation.

Second, I think it is clear that innovation comes from competition. It is rarely the companies who are dominant in one economic era that break new ground and have developed the kind of exciting new technologies that we enjoy today. Internet protocol did not come from the traditional telephone industry. Optical technology did not come from the traditional telephone industry. Both came from startups and from innovators. I also think it is true that the faster the pace of change, the more we need the entrepreneur backed by risk capital. The faster the pace of change, the more we need to resist those who defend *de facto* monopolies on whatever grounds, and the more we need to encourage and nurture competition.

But competition and regulation are not mutually exclusive. The answer, as some might say, is not to simply and immediately eliminate all regulation and let the free market work. Competition is not the terminal forest of economic activity. That is, it is not the economic organization that inevitably appears if well enough is left alone. In fact, I think the lessons of history are clear. Market leaders often end up with a monop-

oly, especially in technology industries where a six or twelve month head start can mean an overwhelming advantage. Networking industries like the rail industry and the airline industry are especially susceptible to monopolization because incumbents can simply refuse to interconnect with new entrants. Communications is especially difficult since it is a networking industry and it is an industry moving inexorably from a utility financial model to a technology model wherein asset lives are shorter, investment is going to be higher, and where first to market can mean an effective monopoly. And it is an industry with over 100 years of rather intense regulation, most of it of a single monopoly whose divested parts, even today, maintain bottleneck control of certain facilities.

So what do you do, as a regulator, if too much regulation either leads to irrelevance, as technology moves too quickly to get your arms around it, or to economic distortions of the kind I just described, and too little regulation leads to damaging monopolies? I said I had an opinion. Well I am going to deliver it to you in the form of some guidelines, which is the best I can do. Guidelines mean I reserve the right to change them in three years when Weiser invites me back again, if he does.

First and foremost, regulation is to fast moving technology industries as garlic is to cooking: use it sparingly. Do not interfere unnecessarily with the operations of the free market or the introduction of innovative technologies. The primary goal should be as little regulation and as much free market as is reasonably possible.

I think a new model of regulation is needed, one formed around the notion that the universe of entities in communication can be divided into two groups: users and service providers. The difference between the two is one of privilege and responsibilities and the degree of regulatory oversight. Users are those who are not service providers, by simple definition. I will define service providers in a minute, but first I want to talk a bit about universal service and its funding, a topic of some current interest in DC and elsewhere.

For some time, regulators and policy makers have concluded that all residential users—I am talking about end users—ought to have access to certain basic services.<sup>11</sup> In industry jargon, this is called universal service. Today it's defined as affordable access to local voice telephone calling.<sup>12</sup> Notice that I said local voice calling, not long distance. At the time the policy was developed, society was much more oriented around local community, and long distance was considered something of a luxury. The result is a system that overprices urban local calling and all long distance calls in order to subsidize suburban and rural local calling.

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11. See JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, *DIGITAL CROSSROADS* 333-357 (2004).

12. *Id.*



That system is maintained today by the political muscle of less densely populated states that benefit from the subsidies.<sup>13</sup>

We have the best communications network in the world. It is changing, perhaps somewhat slowly, but that seems appropriate, given the enormity of the industry. So is there actually a problem? We do have a great system, and like students and businesses, thank goodness, governments and regulators are graded on a curve, not on an absolute scale. On that basis, we're not doing too badly. But we can and we should do better. Today, "urban" is no longer synonymous with "rich." Needy residents of our inner cities overpay for local calling because of an inappropriate system.<sup>14</sup> I have an acquaintance who is quite wealthy, who owns a great fishing camp in Wyoming. Qwest is forced to provide heavily subsidized local calling to him because of a system that is no longer appropriate. And I question whether local voice phone calling is the correct definition of universal service today. I think we badly need a clearheaded debate about what services Americans ought to have access to. For my part, I certainly believe it goes beyond local voice calling. I'm deeply concerned about the growing gap between those who have access to the digital world and those who are left behind. Whatever the outcome of the debate over universal service, it should be funded in a fair, open, and competitively neutral way by service providers, as opposed to the users I mentioned earlier.

Earlier, I said that a user is simply someone who is not a service provider. So what is a service provider? I think two interrelated concepts ought to define service providers. First, except for monopolies, service provider status ought to be elective. If you do elect to be a service provider, however, you have to accept the universal service obligations, and you get the benefits of interconnection, which is essential if you want to be a competitive provider in today's world. Those who decide to be service providers would receive the benefits of interconnection with other service providers on a fair nondiscriminatory basis. In return for the benefits of interconnection, without which you cannot provide communications services as a practical matter, service providers would be required to contribute to funding universal service—whatever the definition might be. And those who elect for service provider status should have access to public and private rights-of-way on a fair and nondiscriminatory basis so that they can build their networks.

Over time, the FCC and state regulators should move to allow oversight by industry self-regulation. The SEC's oversight of the financial industry, using self-regulatory bodies, is an example of such an ap-

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13. *Id.* at 337.

14. *Id.* at 334.

proach. Since our industry has no particular history of self-regulation, that step should be carefully taken and cautiously managed, but over time it is certainly a better model for a fast-moving industry.

No distinction should be made among service providers by the type of service or technology employed. It is increasingly obvious that to do so only creates distortions. Communications by circuit, by packet, by radio wave, or by wire, should be treated equally. Limited regulation is required, I believe, to prevent firms from abusing dominant positions or exploiting monopoly control of central bottlenecks. Firms controlling essential facilities should be required to provide access on reasonable, transparent, nondiscriminatory terms. Essential facilities should not be owned or controlled by firms that abuse such bottlenecks. When the record is clear that a firm is abusing a bottleneck, I think the only answer is divestiture, period.

I would like to close by eating my own cooking and attempting to apply the guidelines I just provided to a topic of some current interest. That topic is net neutrality, a term I am sure most, if not all of you, have heard. There is an op-ed piece in today's *New York Times* about the topic.<sup>15</sup> We had our brush with a limited form of net neutrality when we attempted to de-peer a company called Cogent about six months ago. Perhaps you read about it and perhaps not, all I can tell you is that if you mess around with net neutrality you are going to get in trouble. We folded like wet cardboard and turned the connection up twelve seconds after I started getting calls from governors and congressmen who could not access the Internet.<sup>16</sup> So I at least have some experience with what happens when you try to filter information in one form or another.

For those of you who do not look at this on a daily basis, the concept of net neutrality is at the heart of a battle raging between the cable companies and the Bell companies on the one hand and the Internet content providers like Google, Microsoft, and to a certain extent Yahoo, maybe a Vonage, and what I'll call the internet community—the academics and the techies who helped build the Internet—on the other. The argument, which now involves hearings before Congress, asks the following question: what rights, if any, do the cable companies and the Bells companies have to use their control of residential Internet access to discriminate against certain content and to favor other kinds of content?

The Bells and cable companies say that they are building newer, higher-speed access systems for residential users, and that they plan to give preferential access to this better system to those who pay more, and

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15. *Tollbooths on the Internet Highway*, N.Y. TIMES, Feb. 20, 2006, at A14.

16. Press Release, Level 3 and Cogent Reach Agreement on Equitable Peering Terms (Oct. 28, 2005), available at <http://www.level3.com/newsroom/pressreleases/2005/20051028.html>.

perhaps also to their own content. They and their supporters argue that this will speed development of new services, that regulation will only deter investment, that it is their right as owners of the facility to do so, and that content providers should be willing to pay extra for better kinds of access.<sup>17</sup>

Those who oppose what they term, pejoratively, "discrimination," argue that the cables and Bells are leveraging an effective duopoly, that they will inevitably favor their own content and crowd out alternative content, that the Internet has succeeded because of its open, end-to-end connectivity, and that forcing content providers to pay extra for preferential access will slow the kind of innovation that has clearly benefited consumers and our economy today.<sup>18</sup> The only answer, they contend, is immediate and preemptive regulation which mandates equal treatment of all content.

Before we discuss who is right and wrong, I should clarify a few things. The problem, if indeed there is one, is not with Internet infrastructure broadly. I am going to take a moment to define some terms in a bit of an oversimplified way, but directionally it is correct. Consumers are connected to content over the Internet by three fairly distinct segments. First, there is the local connection, generally a fairly big connection from the content provider to the backbone.<sup>19</sup> Those are generally fiber-optic connections, quite large in size.<sup>20</sup> Then there is the Internet backbone itself, which has very large optical IP connections.<sup>21</sup> Then there is the piece that connects the end user to the backbone: local internet access.<sup>22</sup>

The first two sections of the Internet, the piece from the content provider to the backbone and the backbone itself, are hotly competitive and you have lots of choices of providers. The segment that poses the real challenge is the piece connecting our homes to the Internet.

I think the content providers and the internet community are essentially correct when they say the cable companies and telcos have a duopoly. While some point to wireless access and broadband over power line as alternatives, they are not practical alternatives for most Americans today.

So, should we be concerned about that duopoly? You bet. The Bells have a long, colorful and well-documented history of abusing bottleneck facilities.<sup>23</sup> The Bells, as we know them today, are a direct result

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17. See generally, NUCHTERLEIN & WEISER, *supra* note 15, at 168-174.

18. *Id.*

19. *Id.* at 131-147.

20. *Id.*

21. *Id.*

22. *Id.*

23. See JEFFERY E. COHEN, THE POLITICS OF TELECOMMUNICATIONS REGULATION: THE

of the breakup of the old AT&T, caused by anticompetitive behavior. And the cable companies, while possessing a shorter and certainly less colorful legal history, are not the result of a competitive market, but are creatures of what were once exclusive government franchises. So governments and policymakers should be concerned.

However, here is where I refer back to my guidelines. We should make sure that the regulation is no worse than the problem that we are concerned about and that the market itself will not provide a better solution before we try to regulate. So far, the abuses that the content providers and the Internet community are worried about are simply theoretical. I point out that both sides in this conflict are well-armed. Indeed, it is hard to feel too sorry for Google, Microsoft, or Yahoo. They and the other content providers have a great deal of money and can hire people in this room, lawyers by the legion, and complain very loudly if their content is interfered with. Perhaps more importantly, consumers now have a history of using that content, greatly value that content, and, I believe, would make a great deal of noise if access to that content is impaired.

It does well to remember that this debate, while concerned with an issue that is clearly important, is not of the religious significance that some might have you believe, given the doomsday predictions of both sides. It is a debate about a duopoly's potential behavior and about anticompetitive behavior. As Microsoft has discovered, the antitrust laws can have teeth. And if the antitrust laws move too slowly or are too cumbersome, I am sure that many in the room will be happy to write up a petition, and file it with the FCC. So my recommendation would be to leave well enough alone until there is a reason to act. Given the market power of both sides in this face off, I think you will get plenty of notice before any real abuse takes place.

I do want to add, on a broader note, that our country does need alternatives to the duopoly. We should encourage every form of new Internet access. Earlier, I heard a panel comment about radio spectrum. It absolutely is essential that more radio spectrum be made available to entrepreneurs to find alternatives to the duopoly. We ought to encourage every flavor and variant of WiFi and WiMax. It is sad and we all ought to feel terrible about the fact that the U.S., country that invented the Internet, is now 12th in the world in providing high speed Internet access to its citizens.<sup>24</sup> That is an unfortunate fact that is going to affect our long-term competitiveness if we do not correct it.

Now I realize that much of what I said is going to take changes to a century-old construct, a century-old regulatory regime. I also know that

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STATES AND THE DIVESTITURE OF AT&T (1992).

24. ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, OECD BROADBAND STATISTICS TO JUNE 2006 (2006), <http://www.oecd.org/sti/ict/broadband>.

some issues, like tinkering with universal service, are a political third rail. However, the stakes are high. Over the long term, our national economic welfare and our security depend on getting it right. But I look at the progress we have made over the past, and at times it has been halting and convoluted, but it has been real progress, and it gives me optimism about the future. Thank you for the opportunity to speak, and see you in three or four years.