

The Policy Implications of End to End

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Panel 6: Mark Laubach, David Reed, Mark Cooper, James Speta and Peter Huber.

MODERATOR: I was worried this panel would resolve the dispute. But the issue continues. So let's just switch players in the front.

And now we have Mark Laubach, David Reed. Thank you very much. Mark Cooper, James Speta and Peter Huber.

MULTIPLE SPEAKERS: (Unintelligible.)

MODERATOR: Okay. One thing we didn't do in the last panel, completely different from what we did the whole morning, was start off with the technical description of what's happening here that might raise the issue of open access or might raise the issue of whether access should be open.

And I want to start, if I can, with Mark giving a short description of technically what's happened such that there isn't the competition among ISPs that exist in the context, that's been forced to exist in the context of telephones, for example.

MR. LAUBACH: Yeah, I am Mark Laubach of — back in 1994, I actually co-founded a company called Com 21, which put me lock, stock in the whole problem of actually building cable modems that work. And our system actually, from its ground-breaking standpoint, had the notions of open access built into it as well as quality of service and some systems issues.

So when I — I get to talk in two bases here: One is the experience of the system that I deployed that has over half a million modems out there and 16 million homes past, if you want that sort of thing, versus what's happened here in North America as part of the DOCSIS standardization process.

MODERATOR: "DOCSIS"?

MR. LAUBACH: DOCSIS is the Data Over Cable Service's Interface Specification developed by cable television laboratories in Louisville, Colorado, under the direction — at the time TCI John Malone directed, it involved cable operators and also a couple of key vendors. We were not one of the vendors chosen. However, I'd like — I won't begrudge the system.

But what happened is, about a year and a half ago, a little over a year and a half ago, I took a retirement and training break from Com 21, which is useful; everyone should do that. But I dove right into writing a paper at the request of the White House National Economic Council that answered the question of what would be the level of technical pain if the government were to regulate open access in cable systems. So I thought about the problem a bit, and then I realized there is no one definition of open access. That's the first problem. Okay. When any individual says "open access," they all mean it a different way — a different technological space, a different policy space, a different dollar space, it doesn't matter. But I approached it from a technology space, and I actually distributed the paper out; it's available on the Web also.

I took a point of view, okay, there's no model for open access now, let's look at the technology, and I developed my own model which I called the "ideal open access model"; it had 12 requirements in it. And my goal was not to dictate or suggest that these are the, you know, requirements that should be suggested for North America; rather, I needed something where I could develop something that was reasonably sound that I could argue the different approaches for open access. So I put this out there, and the net is is that there are different — I have an ideal model which is pretty strict, but there are less than ideal conditions that do provide some sort of open access.

But the real question is, you know, should the government go tell the cable industry "You got to do open access now"? And you do open access in several layers. One is at layer zero, or the physical layer, layer one, which is the actual medium, and should somebody dictate that the cable operator has to open up their head ends and allow other vendors' equipment to be stuck there on the same arc cable using different and extra channels on the cable system. And for a lot of reasons, including some of the regulations cable operators are under for emissions, that's just an intractable solution. That's not how you go about open access. It just won't work.

So you move up the stack into the data link layer, and there are ways to do open access at layer two in the network. However, DOCSIS, the North American standard, was not designed to do open access at layer two. You'll soon see it wasn't designed to do open access at layer three either. But so it's just not there at layer two, and I discuss, you know, different approaches and ways to do it, and right now it's just not feasible, layer two, 'cause really the DOCSIS doesn't operate at layer two protocol for that purpose.

If you go to layer three, which is the IP layer, things get a lot more flexible. DOCSIS itself was designed under a rather — how do you want to say? — impetus by John Malone back in an edict he made — or a commitment he made back in December of 1995, saying that within one year the cable industry will have a specification for cable modems that would drive multi vendor inoperability and off-the-shelf cable modems. Okay. It means you could buy them off the retail counter for a reasonable price, and that was the edict. So the cable guys scrambled and they went looking at the various vendors to find the easiest track horse they could get there that met their objectives.

Well, at the same time, they had a few big — like cable-oriented ISPs. So what did they do? They came up with the model DOCSIS, which is really a one big IP subnet model of the world, which is fair. It's like a land, but it operates a little differently in some context, but it gets the job done. But the thing is, at layer three, it wasn't designed to do other things we may like to do. There's different layer three — for instance, there's things called tunneling, there's things called label switching, there is source-addressed based routing, which are all very technical aspects or a way to do that. They didn't design to do things that way. So the technology exists in other areas that you can do it, but the cable operators didn't go that way. And that's just a fact of life we're dealing with.

So if you want to go in and regulate it, well, one is you can't do it immediately. It just won't happen, 'cause the equipment, the mentality, the economics were not designed to look for open access at that level. Two is if you really, really wanted it, you had to define what it is and somebody has to own the darn definition for America and say "This is what we mean by 'open access'" technically and maybe economically and policy-wise. And somebody has to do that.

Third is you have to put some goals in place that will happen in three to five years, and then motivate the industry to move in that direction, which is possible.

But the fourth thing is, which is key, a lot of people don't understand is that open access isn't free. There's a lot of people who think, well, you can have multiple ISPs, thousands of ISPs and stuff. But what it really comes down to is an ISP has to work with whoever owns the pipes at — you know, the cable operator in order to get access and is the same way in parallel that you operate in the DSL world; okay? It's not free to drag in bandwidth to the DSL. You got to negotiate some things. You got to realize how you're going to pay one another. You have to think about how you're going to support.

'Cause one of the things — how many people like cable operator support? See, no hands. One of the biggest problems the cable guys have is, you know, just supporting it. And if you start introducing other ISPs right now, even the technical model is that — ISP-A is, let's say, the cable operator, and ISP-B is another ISP. And you call ISP-B and say "How come my cable modem doesn't work," they have to be able to support all the way down to the cable modem — okay? — to figure out whether that's working or not. And that is an issue that takes two, three years to work out from our architecture and protocol point of view.

The good news is is that DOCSIS II, which is the new version that's out, albeit very complicated, hard to test, it does have the underpinnings to do a lot of the quality of service scheduling you actually need in that narrow bandwidth access space called the cable network on the upstream. But things just aren't free there.

So open access, yes, it's possible. You have to plan for it. It's not free. It has to be motivation. The other thing is is this applies, in my mind — I'm actually an e2e open access bigot, because I like it. I think the world is changing where the home is going to open up and you want to be able to get to the home from the outside for various reasons, either control your furnace, nanny cam, you know, all these certain things. And we're seeing it now evolve around personal areas, whereas next it will be family area, and how it works and stuff like that, where you have to have an e2e model support getting to and from the home. It just has to work.

Hi, Steve.

STEVE: (Off mic.)

MR. LAUBACH: I agree with you. And let me say — let me expand on that. What you get from a cableized P today may not give you a very basic, fundamental service, which I think should actually be a right for everybody. And that's what I just call it a simple IP dial tone; okay? Just give me access, provide me a path to the Internet. Don't give me your extra services. Just let me come in and out. Don't filter my packets and don't muck with my content; okay? That actually costs less money 'cause it doesn't run through their servers, it doesn't run through their mail, it doesn't run through anything. It should actually be cheaper.

And, let's see, what else was I going to say. Oh, yes, the open access models, by the way, should apply to every broadband access to the home, not just cable. It's got to be over wireless and it's got to be over DSL.

MODERATOR: Okay, the thing that got us to this position, the critical part of your story was the evolution of DOCSIS as a standard —

MR. LAUBACH: Right.

MODERATOR: — and the decision — or accident? — the DOCSIS didn't facilitate more than one ISP.

MR. LAUBACH: Well, to their merit, you know, you got to understand, cable operators so far have always owned the content and the pipe.

MODERATOR: So they couldn't think any different.

MR. LAUBACH: There was no reason to think any differently. In fact, if you look at some of the ISPs they were putting together, notably "At Home" and "Roadrunner" at the time, that's the way they wanted to think also.

MALE SPEAKER: (Off mic.)

MR. LAUBACH: They owned the content distribution. And Time Warner owns content.

MULTIPLE SPEAKERS: (Unintelligible.)

MR. LAUBACH: Well, sorry. I do admit I spoke a little broad-brush there. But generally they like to provide everything through their mechanisms that supply content, whether it comes from them or someone else, you understand.

MALE SPEAKER: And that's the only channel.

MR. LAUBACH: I'm sorry. Yeah, Joe.

JOE: (Off mic.)

MR. LAUBACH: Well, to solve your MD or multiple dwelling [??] apartment problem, that's actually — it's almost like how do you get DSL to work beyond 20,000 kilo feet. It's within apartment buildings the cable network is kind of poor, and cable operators may not want to upgrade it and the actual building owner may not want to upgrade it either. So you're kind of stuck.

JOE: (Off mic.)

MR. LAUBACH: Well, the way things work these days is in the cable network, the operator has to have at least enabled or upgraded the plan such that you have upstream bandwidth flowing from the subscriber's home or the tap in service's subscriber's home or apartment, all the way back up the network towards the head end. Because two-way cable modems work over the R frequencies downstream channel and an upstream channel. And in order for them to supply a two-way cable modem service to everybody, all the pieces of the upstream network have to be enabled for two-way.

MODERATOR:I want to shift to the world where open access is the rule.

So, Peter, I wonder if you have a reaction to this description of the evolution of closed access system.

MR. HUBER:Well, I mean just first there's some minor legal points that, at least since '84, cable systems, of course, have had at least three open access requirements for their video: One is "must carry" rules. Second is least channels. And the third are PEG channels for the public education government. So they have, you know, anywhere from, I don't know, 24, 30 megahertz on up, which is already not theirs.

Secondly, and it's a technical point — we could engage this at great length — but I really find it very ironic that we have a 750-megahertz pipe, granted it's an old architectural pipe, but 750-megahertz pipe which, "Gee, we just can't technically," you know, "find some way to share this." My clients, guys, who are putting all my kids through college and medical school and everything else — all right? — have a little copper pipe, one megahertz on a good day and much of the time worse than that, and their spectrum has been unbundled into two pieces. They have a voice channel and they have to give Covad and North Point and everybody else in the world, you know, a call location and that, and office and call location in my [??], which is outside my house, and, God knows, everything — roll trucks and take away loading coils.

And, by golly, I told them everything you said. You know, I told the FCC office it was impossible, it was technically infeasible and economically unworkable, and they didn't listen to me. And, you know, my clients are now doing it.

And, frankly, my predecessors, I was too young then, said this about long distance equal access as well, and [??] phoned, and, you know, we would — you know, our guys were told to do it and they did it." We didn't like it and I still don't like it, in fact, but

. . .

MODERATOR:Well, wait. So are you saying it was the decision that they took?

MR. HUBER:No. I mean, you know, we — history is history. I think spectrum — I think spectrum [??] was a very bad decision. And — but I don't — I'm not here to — spectrum [??] for copper wire, I think it's a very bad decision indeed. I think give away the loop, yes, but try and unbundle within a teeny one megahertz is really stupid, and for a lot of reasons. But why debate that now? Let's do cable. But, anyway, they're on to it.

MODERATOR:But tell us — tell us something about what this model is where you get paid only for, you know, in basically a common carriage-

like way.

MR. HUBER: Well, this is a very evolving model. A traditional common carrier principle had no obligations whatsoever to other carriers. Your obligations were to publish tariffs and to — and to provide your service indifferently to what we would know call end users, to clients who had no obligation whatsoever to interconnect with — with other carriers or complimentary providers and so on. That has evolved a lot over the years, and really in the 1996 act has been pushed — at least under Title 2, it's not quite clear if it's common carriage or not, but to a very broad range of obligations to unbundle what are called network elements, right down to the inside of our teensy, little bit of copper that really wasn't built to do this at all, and to provide these elements to a lot of other people.

I can't help but react to some comments made on the previous panel, you know, that we — we and my clients can make money selling this stuff, and so what's the worry. Well, let me tell you something, in case you don't know this, that common carriage or interconnection is an absolutely meaningless concept unless you also have a regulator setting the price. And so [??] elements are all, you know, all this widely unbundled telephone network. I mean this thing has been sliced and diced. It's late night television. They've chopped it into so many pieces and they don't stop. I mean every — every year another one comes along that they — and then it's got to be priced. And I mean the powers in Washington that sit down and say "Well, we figure this is the right price — if not the right price, the right formula." And that is, I think, an economic disaster too, because they sometimes get it right, but sometimes don't. But you have to put a price on that. But believe you me, you know, you unbundle for ISPs, you've done nothing until somebody in Washington [??] then has to set a price for it.

MODERATOR: But now you're sounding a lot like Jerry was —

MR. HUBER: Yeah, because Jerry's right sometimes.

MODERATOR: So — so we should — no requirement of unbundling with cable here? I mean, you know, let's say that they have —

MR. HUBER: I'll tell you, the single worst thing out there — and I mean Jerry said let's assume that there's a monopoly. We don't have to assume there's going to be a monopoly; Washington is making sure that that's what's going to emerge. Because we have two, at least, potentially competing technologies here.

Look, this game is very young. We've got five million people in this; we're going to be at 50 million, we hope, within five years

or ten; all right? So nobody's got the market today. We've got the next 45 million to be decided. We have at least two potentially competitive technologies and a reasonably serious wireless play out there. These guys are not competing in the same market today and they won't be because they are under such totally different regulatory regimes today. I mean I'm not saying a little bit different or in detail; they are so fundamentally differently regulated that they will not compete. They may both emerge, provide service; they will not be providing the same service in the same market.

I won't use clichés here, but just basic regulatory structure envisioned from Washington is so radically different, that the two — I mean this is apartide from a regulatory perspective. And — and that, to me, seems a very bad way to go. I mean if they emerge — evolve into different markets, they will assuredly both be monopolists in their own sphere.

MODERATOR: So still it sounds like what you're saying — I mean you're not saying, are you, then, that we ought to be stepping in and regulating cable just as badly as we're regulating —

MR. HUBER: I think that's the second-best choice. I mean I've — you all — the best choice is actually to — I am quite hopeful that we will not have a monopoly or we should not. I think that we have copper and coaxle in the ground. There's a lot of promise in wireless. There are satellite-based media. And there's a pretty good hope, no guarantee, that they will emerge as robustly competitive from a technical and economic perspective. As of now, there's zero hope that they will emerge competitive from a regulatory perspective. And I think the best — the best option would be to let them go at it. And I think if you did, you would probably emerge with a reasonably open system at the end of it.

I might add that I — you know, it's hardly ever mentioned in this group, but if you want to extract 100 billion dollars from Wall Street, you got to get real. You're not going to extract that kind of money so long as — you know, even the best intention — Bill Kanard (phonetic) or Powell or somebody else is basically trying to decide what works. It just won't happen.

MODERATOR: But there's been a lot — a few extra hands back there.

Carl?

CARL: There's a mental cloud around this that's really been irking me, and that is [??] cable or DSL or whatever is the edge technology that goes to one customer. Why can't it be transit technology? Why can't I put — I can today put router, and in fact I do have a router in my house and it can integrate all kinds of circuits —

circuit. I can get DSL, I can get cable, I can get radio, I can get whatever. And why can't I pass it upstairs? Why can't I, as an apartment builder, take this integrated [??] local ISP to my people in my house? You are blocking me out of that whole area. By violating e2e, you are preventing me from innovating in this direction. And that's this regulatory cloud you're clamping on everything [??] distribution technology.

Think of it as a transit technology. Give to me a pipe, give me a wire and I will innovate far beyond anything you can perceive.

MALE SPEAKER: Hallelujah. But who are you pointing at "you"? You mean him.

MODERATOR: Here's one "you," Jim Speta, who is usually on the other side of Peter, but today seems to be on the same side as Peter. So what is the justification for stopping Carl's innovation?

MR. SPETA: Now I know why I've been invited, other than for Larry to make veiled references about the skeptics. I don't think that the — I think that the debate is at two different levels. I don't think that keeping the customers who buy from AT&T from buying — writing their checks every month to someone other than At Home is the same policy problem as not providing the tunneling or not providing the IP dial tone or not letting you run your own server in your house off of the end of the cable network.

I mean my personal skeptical view is that, taking the proposition that we had before and all of my writings on this topic, because I think it's only interesting if you take this proposition, okay, if they're a monopolist, their monopoly is in the pipe; right? And they want people innovating in their homes because that increases the net economic value of their pipes; okay? They probably can't sell a product today to consumers as a whole if they have people running routers and massive bandwidth demands in their home.

So in order to sell the product that they can sell today, that's what they're selling. But I think they would love it if, to develop the maximum value of their pipe, that's what they're going to do.

Now, I feel it's a completely different argument of e2e, and it's a completely different argument than it is about ISPs. But if the conjecture here about e2e is right, and in my writings I think I endorse it being right in the sense of the thing that maximizes traffic and innovation and the development of [??], the people who own the freaking pipes want to make that happen as soon as possible.

MODERATOR: Okay, but then so —

MR. SPETA: Wait, one more point.

They will make a commitment; right? They won't say "Okay, we'll provide three or four different flavors for you to create the illusion of selling lots of different varieties." But monopolists have a people problem. In other markets they license their technology out to other people so that they create an assurance to consumers that they're not going to screw them down the road. The assurance here will be a commitment, as soon as we can get it, to let that innovation go on 'cause our wires our worth more.

MODERATOR: Okay, but now —

MR. SPETA: Well, they're not my wires, but they're —

MODERATOR: Okay, wait. Would you just — so let's just understand why that was different with AT&T under its monopoly.

MR. SPETA: Well, I have — I have a number of, as you know —

MODERATOR: No, I'm acting like I don't know.

MR. SPETA: For the vast — vast important time frame here, AT&T was price-regulated in the thing that it had a monopoly over. And that vast — vastly alters your incentives. If you are a monopolist and you're price-regulated and you call the [??] out of the thing in which you have a monopoly over, damn if you're not going to find another way to get those rents. And so you're going to prevent other people from providing services that you could provide, which the regulators don't care so much about, and you'll get your rents from there. But if we're not regulating what the cable companies can charge for their pipes upstream and downstream, then we're in a completely different incentive structure.

FEMALE SPEAKER: But if you take it out of the AT&T claim [??] and just take the cable company back to the traditional market of the video, okay, not the [??] Internet access, then the video marketplaces where they had their cool monopoly, they were fat and happy. You didn't see a whole lot of innovations, diversity and welcomed little-bitty programmers [??] —

MODERATOR: [??], are you still not representing the FCC [??]? This is really good.

FEMALE SPEAKER: [??] I need to understand why the fat, happy monopolists in the video world, they got uncomfortable when [??] when BBS came up and said, "I'm going to give you 130 channels of video programming," then all of a sudden it started screwing around and deregulating because there's competition, now you're going to — [??] programmers that are dying to be [??]. Why is [??]? Why is that fat happy cat in the video all of a sudden going to transform itself when it comes to [??] bandwidth, "I'm so happy

to let you create and innovate,” isn’t this — is there a Dr. Jekyll, Hyde personality working with these cable companies?

MR. SPETA: Well, there might be a Dr. Jekyll, Mr. Hyde. We might be, as others have said, in a different competitive space that we understand differently. I mean we understand the returns from variety and from innovation and development of — you know, for God’s sake, you know, let some high school come up with the next [??]. This is that competitive space.

Now, you raised the possibility of — or the issue of broadcast satellites. And in that world the cable operators want to wrap the content providers up as closely as possible. Why? Because the direct broadcast satellite provider is a threat to the place in which they have a monopoly. So it’s monopoly maintenance.

It’s the reason that Microsoft didn’t want you to buy Netscape browsers, it’s not because they wanted to sell you Internet Explorer browsers; it’s because at some point if you bought Netscape browsers, you didn’t have to buy Windows; right? But — so the same — but we don’t have that problem with the cable company with respect to these services.

FEMALE SPEAKER: (Off mic.)

MULTIPLE SPEAKERS: (Unintelligible.)

MALE SPEAKER: One of the things that keeps coming up is this issue of a [??] pipe [??]. Why don’t we just open up the space and let everybody [??]? And the answer is, ‘cause I can’t sell my big dumb pipe for more than your big dumb pipe and make money doing it. How could you not want to be perceived as transporters of [??]? Regardless of whether it’s true or not, they don’t want the perception ‘cause they make their money in the margins of the value-added services.

Why don’t they want you to route it under your house? The answer is ‘cause they don’t want to spend the effort it takes to update their routing [??] cables for a person running [??] in their house. They don’t want to spend the energy doing that. This is all based on perception in the market [??] —

MODERATOR: Did you mean — okay, David, David Reed, what — what are we losing by not making sure that there’s this e2e? What are we losing if we follow the risk, the gamble that Speta is offering us?

MR. REED: Well, I think it really does come down to the question of what we perceive the things as, whether we perceive them as pipes or what. Carl’s point is very close to the one that I was going to make, which is that if you imagine the rationale for the monopoly for the cable pipe between me and the head end, the head end is actually typically in a very convenient place to connect to a lot

of other things; whereas my home is not or my office building is not. So it's — what I value is the pipe.

The rationale that's always been used, to my understanding, as to why I can't just run that pipe has been that it's too costly in terms of, you know, slip trenches or disturbance to the neighbors and trucks hitting people as — you know, pedestrians because there are more trucks on their street and . . . You know, local governments kind of want to keep that down. And the image of all those telephone wires in New York City back around the turn of the century is kind of the image used to sell this natural monopoly in local access.

And what strikes me as interesting is that I see a very interesting alternative, for example in an experiment that I understand in Stockholm, that I heard about only just recently, and similarly other proposed experiments where basically unterminated fiber is being pulled from many points to many other points by the municipal infrastructure and then resold by the — by the municipality to be terminated and operated as desired by anybody who chooses to use it.

Now, it turns out by bundling lots of fibers together and pulling it once, it's a very inexpensive operation. And in particular, it's much more — in terms of the sub-cost in the copper, that's currently being depreciated. Copper wires, which are also depreciating the [??] because they never were separated out, you know, the cost per bit per second is orders and orders of magnitude lower. So there's an opportunity for a build-out of that sort that would change the economics of the industry.

That actually is in some sense what's happening in the cable market. This is my [??]. What's actually happening in the cable market is [??] fiber coaxle systems are being built out from the middle as demand grows to occupy the stuff, and the incremental cost is fairly small of the fiber. But ultimately it gets the fiber really close to your home and it gets whatever capacity you need. You just don't do the Stockholm thing in building it out right now; you can actually hold on for a while and pretend you'll build it when you need it.

So where do you get with that on all of this? Well, the main difference in the Stockholm case is that in Stockholm there are now ISPs who are offering service to apartment buildings, you know, or to small businesses or whatever, of 100 megabyte Ethernet speed at approximately the same cost as our local cable guys are offering services at 350 kilobytes. So that's [??] orders of magnitude, two-and-a-half [??] of magnitude difference, roughly the same cost.

Why is that economic difference? Well, economic difference, as far as I can tell, has nothing to do with the technology or the opportunity cost or even the cost of money on Wall Street. It has to do with the regulation system that is trying to evolve from the past rather than recognizing that we're in a different ballgame in the data space. And I can't reconcile that by a technical difference. Because the equipment that's being deployed in Stockholm is the same equipment that could be deployed here. It's not rocket science. Maybe it requires 48 volts in the United States because that's part of the monopolistic scheme for separating expensive equipment from cheap equipment. But it's not — you know, I don't understand any difference in —

MODERATOR: Well, there's a place just about as weird as Stockholm in the Northwest of the United States. And in the Northwest of the United States, some of the cities are doing exactly this. And they're doing it under this what strikes us as completely bizarre justification until you think about [??]. They're saying these are the highways of the future, and just like we laid the highways when they were real highways, we're laying these highways too, and then let people use them for however they want to use them. But the point is this is a common resource that the communities in general should provide.

And then that raises the question, by avoiding doing something like that, and instead trying to play this very dicey regulatory game to make sure that after laying those pipes we don't become bad players, what are we losing?

MR. REED: Well, let me get back to that. It's very possible — and this is where I think — the key thing about the Stockholm pipe experiment is that it is an e2e solution. The provider, in this case the municipality, doesn't play favorites.

MULTIPLE SPEAKERS: (Unintelligible.)

MR. REED: It's providing fiber. It's not providing a bits per second [??].

MODERATOR: That's the thing for you to see provided here.

MR. REED: Right. And it's truly an e2e game. And I guess what I'm saying is there — if I were trying to guess a philosophical conclusion, the place they're playing the e2e game is at the very bottom level; and, therefore, they're extracting potentially the maximum value out of the real options they create or the uncertainty they create, as opposed to playing at the very top layer, you know, this layer where they've actually built an ISP on top of a cable infrastructure that was never meant to be and tried to operate some of the stuff. And at that level there's not a whole lot of freedom. In fact, there's lots of costs of backing it in.

MODERATOR:Right.

MR. REED: And the more interesting question is can you move that infrastructure into the Stockholm-like infrastructure and what is the path between the two that is an economically sound evolution? And I actually think there the question of open access is possibly interesting. And if open access merely drives the economics, the only sensible thing to do is to not reuse legacy infrastructure because an alternative competitor can come in with really cheap new fiber. Then what it does is it drives out the price support that we keep on the old stuff so that it doesn't get replaced.

MODERATOR:Now, it would appear here we're losing the client, but we have fiber that we're using.

Let me just — Howard?

HOWARD: (Off mic.)

MR. REED: Just because I was listening to Jerry and I totally agree with his philosophy that the goal of economics is to increase that surplus, you're basically saying that regulating something that destroys the potential surplus is not the same policy thing as regulating something that, you know, destroys actual realized surplus.

HOWARD: (Off mic.)

MODERATOR:Embrace and [??].

MR. REED:No, but let me get back to what your argument is. Your argument is that AOL might be "incentived" to do the same innovation that otherwise might happen if they enabled the innovation among a bunch of people who use their facilities. And I think that might have — that's always struck me — and, again, I'm only a naïve economist — that's striking me as saying — as the old game that basically said the only companies that can raise significant capital are the really large ones and that Wall Street and so forth don't exist. Wall Street can fund a whole lot of competitors a lot more efficiently than it can fund AOL to do innovation, I would argue.

MALE SPEAKER: (Off mic.)

MARK: I heard something else, and just in summary of my own observations, that cable operators operate on very thin revenues. They have to do things which are important to their bottom line, so they are economically driven. So I have trouble, when we're asking them to open up to be innovative — and with their line that says "Trust me, I'm your cable operator," that has some issues for me.

Because what we're really talking about here, the innovation that we've witnessed on the Internet, is that the laboratory, the freedom has to move all the way to the side of the home and in the home now. And so just get out of the way. Don't charge or don't get interested in it when it looks like this innovation is going to raise revenue; just stay out of the way entirely until we need that support and there's revenue traffic.

Now —

MALE SPEAKER: (Off mic.)

MR. LAUBACH: Well, they do if they give out private net pin addresses and hide it behind [??], which is happening.

MALE SPEAKER: It might stop people from innovating by foreclosing the market for innovation.

MR. LAUBACH: Exactly.

MR. COOPER: And if you look how — and so if you're looking out as the developer — and we've heard that there's only five million customers now, but those are the best five million customers. Let's remember, those are the biggest budget customers. And before any of those exclusive contracts expire, there will be ten million customers and the ten million best customers.

And so all of the rest of us are innovating to a market that has been bereft of the ten million best customers. And that is a chilling impact on our willingness to innovate, our ability to find resources to innovate.

And so the problem is that the dynamic effect of letting people close markets compounds itself. And Larry has taken residence, he has gone to hide in a bomb shelter, that is the best defense against simple economics, and that is externalities. Because if you — he has repeatedly gone back to the question of externalities because that's the thing economists have trouble with.

And I think it is true that in the last 50 years, the most important area of development is the understanding of how externalities are dynamic sources of growth. And the Internet is, in a certain sense, a pure externality. And so every time you worry about people closing off pieces of it, the answer is that you lose the externality and you lose this incredibly attractive market.

MALE SPEAKER: (Off mic.)

MR. COOPER: Well, but — well, then, now you're making a — well, but now you're making — the question is — the DSL is open for the moment. And Peter seems to have thrown in the towel. He thinks it's going to be open. And so I know I can get there. Now,

wireless is not open necessarily, and the cable guys are going to extract all my rents. AT&T — I don't know if you looked at their description of what they're doing. They in fact have said, "We will speed up and slow down people's [??]." So the answer is that you are forcing people to look at a much narrower market, especially one which has a dominant narrow band ISP, who, unfettered, will flip all those people immediately. So you really won't be able to compete for his customers either.

So in a certain sense, by running an asymmetric regulatory regime — and I agreed almost with everything that Peter Huber said, which is the first time in 20 years.

MR. HUBER: It'll be the last.

MR. COOPER: It may well be the last. By running an asymmetric regulatory regime, you are dramatically distorting the open outcome that you could have and — that you have made a choice. And that's what Peter is complaining about, to handicap one guy and let the other guy who has a closed model, which is the one you really didn't like anyway, you hope, according to Joe, that they will be encouraged to be open with no historical evidence that they will. And so the end result is a much less open market than you should have had.

MODERATOR: But, Howard, let me just ask a clarifying question of you: Does your argument hang upon the assumption that it's a small part of the market that's closed, or does your argument stand even if, let's say, 70 percent of the market remains closed if wireless in the same sense is closed?

HOWARD: No. If 70 percent of it remains closed, that's a terrible outcome. I'm not trying to condemn —

MR. COOPER: And how will you help me fix it? Will AT&T come and say "Hey, I have my monopoly, bus me up."

HOWARD: I'm waiting for there to be a problem.

MR. COOPER: This is a — but there is a problem.

HOWARD: Now wait a minute. How many guys — if you had to [??], how many guys [??]?

MR. COOPER: I need a choice of — 400 would be [??].

HOWARD: You need a choice [??] —

MR. COOPER: I need a choice. I only need one to serve me, but if I don't have 400 who want to serve me, then I have been denied the benefit of the Internet. I need the choice of all 4 — or 25, I'll take 25. If you guarantee me 25, I'll take 25.

MR. LAUBACH: I can give you a dozen if you buy my equipment.

MR. COOPER: No, no, but [??].

MALE SPEAKER: (Off mic.)

MR. COOPER: Five to nothing — at least ten or more is an unconcentrated market. So you now are willing —

MALE SPEAKER: (Off mic.)

MR. COOPER: Absolutely. That's why I — that's right. So in point of fact, five is not enough for me. And this is a debate we had in Boulder because we now — although we were really talking [??]. So now you've said you're going to guarantee me five; right? And by the time you guarantee me five, the one will be dominate and you will not — this is politics now, with the technologists talking to the political people. There is no chance that you will be able to open that marketplace up the longer you wait.

And let me take Mark's paper as a perfect point. He had estimated that it would take between three and five years — two to three years to design and a couple years for implementation to actually give me ideal open access. If we had started that in April of 1998 when the FCC wrote its report, we'd be over the design phase and we'd be almost there, we'd be into the deployment phase for ideal open access. And that's an opportunity that we lost.

MALE SPEAKER: How's it going in Canada?

MALE SPEAKER: (Off mic.)

MR. COOPER: Not so good.

MALE SPEAKER: Several things. First, I wish everyone in this room would just — you know, there's three of us who come from the [??] conference in Montreal [??]. Would it energize people in the sense of this municipal or utility laying [??] and condominium owners [??] a new energy into this very tired discussion of what the matter is with your [??] sick of [??] at the moment understanding what your problem is. You got a legal problem whereby you haven't yet bit the bullet that [??] e2e.

It's going to be solved, I think, in a direction that comes from incredible cheapening not merely of fiber but of the laying of it and the devices that will make it work. And whether utilities get into it or sewers or whatever, I think that as a society you got to face the idea that bandwidth is going to be the highway and infrastructure of your future. You'll get off this — the idea [??] that you get onto this by permission of someone like the railroad.

MALE PANELIST: It fascinates me that two of the three fathers of e2e have offered, one, a vertical divestiture solution, and, two, a socialist

solution. And in fact — but the underlying principle is right, is that this is a highway that ought to be free of the distorting proprietary interest enclosing it. And I would love to go there. I was there for a long time. I'm just trying to get the use of the existing highway open in some non-discriminatory fashion. And that makes it messy, but those are the right answers. And I'm glad, every time I hear these guys speak —

MODERATOR: But wait, wait, wait.

MALE PANELIST: Since I'm not a socialist, I just wanted to point out that what I was really trying to say, in your language, is to say that the socialist system works better than the capitalist one, so we better damn well figure out why the capitalist one can beat it.

MODERATOR: Okay. But, Jim, you have — you've raised a red flag. You put it down. I mean give me a clarification of the Canadian example of [?]; right?

MR. SPETA: The thing I was interested in is the CRTC [?], as Mark said, two-and-a-half years ago, and it doesn't seem to me that open access on the ground is making a whole lot of progress in Canada.

MALE SPEAKER: At the moment now, there is actual real [?] with the CRTC mediating between the cable interests and the [?] who are actually, you know, getting at it now in a real way to [?] discriminatory. This may or may not work. But I think this is well-advanced in terms of the planning out of the specifications and now being treated at least [?].

MALE SPEAKER: What actually has happened with the investment cable network since that decision? Is the argument, for example, that, you know [?]?

MALE SPEAKER: [?] repeated was that if there's a requirement for [?], that investments would dry up for cable infrastructure deployment. And so the Canadian situation is that there was a requirement [?].

MALE SPEAKER: No, no, the question is what's occurred with investment by the cable operators in going — moving towards [?] and/or [?] cable modem service by themselves?

MALE SPEAKER: (Off mic.)

MALE PANELIST: Well — but there's an answer [?]. So if you require open access tomorrow, they're not going to rip the cable out of the ground. You see, one of the cities that we got to order open access was Cambridge. And the reason they can do it in Cambridge was that they'd already deployed, and so you couldn't get blackmailed. But I think the proposal this morning

was that if you require people to do dumb [??], the market [??] would have you — someone's going to build a dumb [??] and given the opportunity.

MALE SPEAKER: The unfortunate aspect of this — other than this thing — is if you don't have [??] AT&T [??], there's always much more money in people talking to other people than there is in central [??] broadcasting. And I think that would have ejected some — this dumb [??] argument that in fact that's a perfectly valid one [??] more money in the phone system [??] more money in people — lots of people talking to each other, lots of people communicating to each other than there has been in broadcasting or movies, despite the cultural importance of movies and broadcasting.

MALE SPEAKER: (Off mic.)

MR. COOPER: I want to go back to the argument that was made about the phone company about the breakup, because I've actually had the honor of testifying in the first post-divestiture [??] case in the state and have done so about 200 times since then. And the answer is quite clear that the wires business is a pretty good business.

And Gerald suggested that when Bell Atlantic wanted to do its intelligent network, the marketplace rejected it. Well, the politics rejected it as well. Let's be clear: They also said then that if we couldn't integrate, we couldn't own content, you wouldn't get built. And, of course, that was before we had the Internet. And I believe I am the first person to ever use the e2e paper in a policy argument, 'cause I wrote an opposition to Bell Atlantic who wanted to integrate in 1989, 1990, when we were having this battle.

And the simple fact of the matter is is that the refusal to allow the convergence of the two, the viability of the wires business demonstrated over and over again, suggests that it is perfectly reasonable to do what Jerry's also suggested, to get a rigorous separation of the economic interests of content and conduit. And that will give you the market you want in content and the facilities you want in conduit.

MODERATOR:David.

DAVID: (Off mic.)

MR. COOPER: The principle of common carrier is 200 years old. It has been applied in every transportation and communications infrastructure that we've had. And so the principle works. And it seems to me that we don't abandon the principle now. We've applied it over and over again and we got railroads built and

they had obligations, and we got telephone networks built, and some were in the private sector and some were in the public sector.

MODERATOR:I think you're getting the computer to disagree with you. This is, uh . . .

MR. HUBER:Well, I mean it's just not so. There are some carriers and there are some non-carriers. I mean there's a huge amount of infrastructure beginning with cable, after all, which expressly by Congress, you know, ever since there's been a cable, was defined as a non-common carrier. It's under Title 6. I mean Congress has gone out of its way in great detail to say this is not a common carrier. And DSB was — when those birds went up, Congress said, "You guys" — or the FCC then said, "You got the option. You got 24 transponders on there. You can make them all carriers, you can make them all broadcast, you can make them all contract carriers." It worked like a charm. Most of our wireless industry has been given that option that you can do carrier, you can do broadcast, if you want. I mean it's, you know, we can invent our histories or we can [??] it.

But the fact is is that people — that people, you know — most markets, given the option on transportation facilities, have actually made a whole range of choices. A limousine service is a — not a common carrier, you know, and buses are.

MR. COOPER: But in each of those industries — but the three examples you gave me are, of course, all very recent. An important fact [??] there is a backbone common carrier.

MR. HUBER:Not in cable there's not. I mean tell me about it.

MR. LAUBACH: Well, also, the non-common carrier status was just for video services. They declined to give that status, but there still is an opportunity.

MR. HUBER:The one thing I'm really good at doing is reading the titles of the Communications Act. And cable is not a common carrier. It might become so. The FCC [??]. The 9th Circuit in Portland and —

MALE SPEAKER: (Off mic.)

MALE SPEAKER: Yeah, I know.

MODERATOR:Okay, we're — we're really trying to wind this down here. And I want to get Jim, and then Mark had one other thing you wanted to say.

MR. SPETA:I guess just two quick points. The first quick point is the debate over common carrier is to some extent the debate over the two different things that are going on in this e2e debate. Common

carrier at base is meant if you give it to me, I give it out to the other side, if I am in the business of taking things and giving it out to the other side. Which, in the cable context, means I don't — I'm not so concerned, as everyone knows by now, about exclusion of other ISPs. I am troubled by cable operators' decisions to do things like deny tunneling, deny shipping of certain kinds of bits from their subscribers to people who are on the other side of their head end.

Now, my fundamental belief is that, as Jerry Faulhaber said, you can either think that there is good technical reason, an anti-competitive economic reason to do that. And my sort of view is, because I think they would generally have an economic incentive to do so, there must be some real technical reason externality to their other subscribers.

But in any event, even if I'm wrong about that, the single best government response to that is not to point at the cable operators and say "You do something differently," but to say "We're going to auction a whole bunch more spectrum to lots of people" or "We're going to put more fiber in the ground on our own."

Now I'm dubious about that, because our tradition in the United States is to have public utility services provided by private companies and not by public companies. But the economists, amateur or otherwise, can show me that the returns from one big piece of PVC with lots of fibers in it are such that doing that thing once is a natural monopoly — right? — the returns from doing it once are so important or so significant, then, okay, I'd be persuaded. But I don't think that's the case, and so I'd like to have the government pointing at things like providing a lot more spectrum in order to — and that will get the cable operators to do it.

MODERATOR: Okay.

MALE SPEAKER: [??] and, I tell you, I mean from the — from the cable side idea on the one hand, we're in a competitive marketplace. There's facilities-based competition, and, therefore, we have no ability to exercise any of this [??].

But I also hear the argument that we need monopoly incentives to build out, and if we don't have the monopoly incentives, we won't build out right now. One of these things, again, is not true. But which one is true? Whether you are — or, as David [??] points out, sort of will be in a market in a world in which there is in fact the [??] of facilities-based competition or not, I don't know, but it's an economic factual question that we need to figure out.

If we are, if there's competition, then we don't need regulation. I mean that's kind of the fundamental place we come down. If there's not — right? — if we think that there's a persistent problem, then we do need regulation. But on the same token, we also need to worry then about the incentives for build-out. And we need — if we're going to have that kind of regulation — to work out some alternative structure or some other sort of incentive for build-out, because, you know, one of these factual [??] the other is true, but not all.

MODERATOR: Okay. [??], is that . . .

MALE SPEAKER: Yeah.

MODERATOR: Okay.

MALE SPEAKER: (Off mic.)

MODERATOR: Okay. Perfect transition and end to this session. Thank you very much. We're going to take 15 minutes.