

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

FEDERAL TRADE COMMISSION  
  
COMPETITION AND CONSUMER PROTECTION  
  
IN THE 21ST CENTURY

Wednesday, March 20, 2019  
9:30 a.m.

Constitution Center  
400 7th Street, S.W.  
Floor Conference Room  
Washington, D.C.

1	FEDERAL TRADE COMMISSION	
2	I N D E X	
3		PAGE :
4	Welcome and Introductory Remarks	6
5		
6	Technological Developments in Broadband	
7	Networking	11
8		
9	Technological Developments in Broadband Markets	39
10		
11	Panel 1: Speed Advertising Claims,	
12	Substantiation, and Section 5	65
13		
14	Panel 2: Evolving Markets and Technological	
15	Developments: Market Structure	135
16		
17	Panel 3: Evolving Markets and Technological	
18	Developments: Policy Applications	197
19		
20	Panel 4: Identifying Efficiencies and Remedying	
21	Competitive Harm in Broadband Markets	277
22		
23		
24		
25		

## 1 P R O C E E D I N G S

2 MS. YODAIKEN: Good morning, everybody, and  
3 welcome to our hearing on broadband competition and  
4 consumer protection.

5 Before we dive into the substance, I have  
6 ten administrative details to go over with you. If  
7 you leave the building during the conference, you will  
8 have to go back through security, so please allocate  
9 time for that.

10 There is a cafeteria in the building at the  
11 other end of the floor, and the restrooms are outside  
12 the auditorium.

13 If there is an emergency that requires you  
14 to leave the conference center but stay inside the  
15 building, please follow instructions that you will  
16 hear over the P.A. system. If an emergency requires  
17 evacuation of the building, an alarm will sound, and  
18 you should leave the building in an orderly manner  
19 through the main 7th Street exit. You will turn left  
20 and proceed across D street to the FTC's emergency  
21 assembly area, and please remain there until  
22 instructed to return to the building.

23 If you notice any suspicious activity,  
24 please alert building security.

25 This event will be photographed, webcast,

1 and recorded. By participating, you are agreeing that  
2 your image and everything you say or submit may be  
3 posted indefinitely at FTC.gov, regulations.gov, or on  
4 one of the Commission's publicly available social  
5 media sites.

6 The webcast recording, as well as the  
7 transcript of the proceedings, will be available on  
8 the FTC's web page shortly after this event.

9 Please silence your cell phones and other  
10 devices.

11 We want to make sure everyone has the  
12 ability to be heard. Note that actions that interfere  
13 or attempt to interfere with the commencement or  
14 conduct of this event or the audience's ability to  
15 observe the event, including attempts to address the  
16 speakers while the event is in progress, are not  
17 permitted. Any person's engaging in such behavior  
18 will be asked to leave, and anyone who refuses to  
19 leave voluntarily will be escorted from the building.

20 During the panels, the audience is invited  
21 to submit questions through the use of question cards.  
22 FTC staff will be walking through the auditorium to  
23 take those cards.

24 Unfortunately, the Chairman, Commissioners  
25 and FTC staff cannot accept documents during the

1 hearing. Such documents will not become part of the  
2 official record of any Commission proceeding or be  
3 considered by the Commission. We do invite the public  
4 to submit written comments until May 31st through a  
5 link on the hearing website, which is available at  
6 FTC.gov.

7 At the end of the day, please return your  
8 FTC visitor's badges. We reuse them. Thank you very  
9 much.

10 And, now, it's time for our General Counsel,  
11 Alden Abbott, to introduce the hearing. Thank you.

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 WELCOME AND INTRODUCTORY REMARKS

2 MR. ABBOTT: Thank you very much, Ruth.

3 Good morning, everyone.

4 Before I begin, please note that these  
5 remarks reflect my own views, not necessarily the  
6 views of the Commission or any individual  
7 Commissioner.

8 Thank you for joining today's hearing  
9 session addressing competition and consumer protection  
10 issues in U.S. broadband markets. Today's hearing  
11 will examine developments in U.S. broadband markets,  
12 technology, and law since the FTC staff's 2007  
13 Broadband Connectivity Competition Policy Report and  
14 the FTC staff's 1996 Competition Policy and New  
15 High-Tech Global Marketplace Report.

16 In particular, today's session is intended  
17 to help identify for the Commission and Commission  
18 staff those developments in U.S. broadband markets,  
19 technology, and law that may be relevant toward  
20 enforcement of FTC Act Section 5's prohibition on  
21 anticompetitive and deceptive conduct and also on fair  
22 practices in or impacting participants in broadband  
23 markets.

24 We will focus on four key questions. What  
25 is the current state of technology in broadband

1 markets and how is the technology expected to develop  
2 in the near term?

3 Second, how can the FTC best identify market  
4 behavior that may violate the FTC Act?

5 Third, once this behavior is identified, how  
6 can the FTC best use its enforcement tools?

7 And, fourth, what behaviors would the FTC  
8 Section 5 authority not address?

9 We ask these questions today because the FTC  
10 recently regained the authority to protect consumers  
11 of broadband internet access services, also known as  
12 BIAS. We love acronyms here in Washington. In 2015,  
13 the FCC determined that BIAS fell under the category  
14 of common carrier service. As a result, the FCC  
15 temporarily lost the ability to protect consumers in  
16 this space because the FTC does not have authority  
17 over common carrier service. Now that the  
18 reclassification has been reversed, we can bring those  
19 types of cases again.

20 FTC staff have been monitoring and will  
21 continue to monitor the marketing and business  
22 practices of BIAS providers. We integrate this study  
23 into our observation of other actors and larger  
24 broadband market sector. In fact, the Commission's  
25 efforts to identify, prevent, and prohibit

1 anticompetitive and deceptive conduct in broadband  
2 markets go back over two decades to the early days of  
3 the commercial internet. The Commission has, over  
4 those two decades, also undertaken and publicized  
5 substantial research on competition and consumer  
6 protection policy issues in broadband markets.

7 Over a dozen years ago, in August 2006, then  
8 FTC Chairman Debbie Majoras formed an internet task  
9 force to "examine issues raised by converging  
10 technologies and regulatory developments and to  
11 educate and inform the enforcement advocacy and  
12 education initiatives of the Commission."

13 In June 2007, following a two-day public  
14 workshop on broadband connectivity competition and  
15 consumer protection policy, the Commission released a  
16 Broadband Connectivity Competition Policy Report of  
17 the task force. The report covered substantial ground  
18 and considered many of the questions and issues that  
19 continue to be before us today, including the state of  
20 broadband competition, arguments for and against net  
21 neutrality regulation, and principles to guide the  
22 future development of policy in a broadband space. In  
23 analyzing ISP practices under antitrust and consumer  
24 protection laws, the report discussed discrimination,  
25 blocking, vertical integration, and data



1 prioritization practices.

2 We know more now than we knew in 2007, and  
3 we will undoubtedly learn more today. We will begin  
4 today with two lectures exploring technical  
5 developments in broadband networking and broadband  
6 markets. Four panels exploring enforcement and policy  
7 questions will follow.

8 Our first panel will address speed  
9 advertising claims, substantiation, and Section 5.  
10 The second panel will take a closer look at recent  
11 broadband market developments. The third panel will  
12 explore the FTC's role in identifying and addressing  
13 broadband market issues. Finally, the fourth panel  
14 will examine relevant antitrust issues in depth  
15 through a series of hypotheticals. We hope today's  
16 session will help us refine our empirical economics-  
17 based enforcement approach.

18 Before I close, I would like to turn to the  
19 FCC's recent order, or I should say orders. The  
20 principle addressed in the FCC's Open Internet Order  
21 of 2015 and Restoring Internet Freedom Order of 2018  
22 are part of a larger policy discussion that goes  
23 beyond the scope of today's hearing.

24 Today's session is not a debate on a  
25 question of whether Congress, by statute, should adopt

1 the approach taken in the FCC's previous Open Internet  
2 Order or the Restoring Internet Freedom Order.  
3 Whether conduct inconsistent with the agreed-upon  
4 principles of net neutrality should be addressed by a  
5 new statute or rule will be decided by Congress, the  
6 Federal Communications Commission, and in the short  
7 run by the Court's review of the FCC's Restoring  
8 Internet Freedom Order.

9           However, whether the goals or concerns of  
10 net neutrality advocates can be addressed in whole or  
11 in part by a vigorous application of antitrust, then  
12 consumer protection law is relevant to Congress,  
13 regulatory and law enforcement agencies, and the broad  
14 public. As a result, today's discussion will provide  
15 greater bandwidths to inform the broader policy  
16 debate, and I look forward to hearing how our esteemed  
17 panelists will address these issues.

18           With that, let me turn it back to our  
19 gracious host, Ruth Yodaiken, to introduce our first  
20 two speakers, kc claffy and Nick Feamster. Thank you.

21           (Applause.)

22

23

24

25

1       TECHNOLOGICAL DEVELOPMENTS IN BROADBAND NETWORKING

2               MS. YODAIKEN: Thank you. Well, we're  
3 really delighted to welcome our introductory speakers  
4 this morning. First, we will start with kc claffey,  
5 who is going to talk about the development of  
6 technology in the networks.

7               kc is founder and director of the Center  
8 for Applied Internet Data Analysis, known as CAIDA,  
9 at UC San Diego's Supercomputing Center, and an  
10 adjunct professor in the Computer Science and  
11 Engineering Department of the University of  
12 California, San Diego.

13              For almost three decades with 200 papers to  
14 her name, she has been studying internet-related  
15 topics, such as topology, routing, traffic, security,  
16 architecture, economics, and policy. Among her many  
17 accomplishments is her receipt of the 2017 Internet  
18 Society's Jonathan B. Postel Service Award for her  
19 work on internet measurement, open data, and open  
20 science.

21              She will be followed by our second speaker,  
22 Nick Feamster, who will talk about market dynamics and  
23 technology in the networks.

24              Nick Feamster is a professor in the Computer  
25 Science Department at Princeton University and the

1 Deputy Director of Princeton University's Center for  
2 Information Technology Policy. His research focuses  
3 on many aspects of computer networking and network  
4 systems, with an emphasis on network operations,  
5 network security, and censorship-resistant  
6 communication systems. His many accomplishments  
7 include being named 2016 Fellow of the Association for  
8 Computing Machinery which cited his data-driven  
9 studies on internet security and internet censorship.

10 With that, I'll welcome kc claffy. Thank  
11 you.

12 MS. CLAFFY: All right. Good morning,  
13 folks. Thank you for having me, and folks out in the  
14 internet.

15 Today, I'm going to try to give you a bit of  
16 background about internet technology and, in  
17 particular, technology developments over the last 10  
18 years that will hopefully provide some baseline to  
19 inform discussions later in the day. That was my  
20 charge.

21 I'm going to break this talk up into five  
22 sections. First, I'm going to do a bit of terminology  
23 background because Ruth assured me that there is a  
24 varying level of expertise and understanding how the  
25 internet works. So I'm going to talk a bit about

1 traffic, topology, transit, how packets get from one  
2 end to the other of the internet.

3 Then I'm going to use this terminology to  
4 describe evolutionary developments in the last 10, 12  
5 years, in particular, with respect to the emergence of  
6 what we have started to call "platforms," the  
7 interconnection of these platforms and the complexity  
8 that has emerged because of this development.

9 I'm going to talk about the implications of  
10 the changing face of interconnection and the  
11 implications, in particular, for competition issues  
12 and consumer harm.

13 Fourth, I'm going to talk about some  
14 technology attempts, including one notable one that  
15 the FCC took on in the last decade, to try to measure  
16 and mitigate these potential harms.

17 And, finally, I'll wrap it up with hopefully  
18 giving you a summary of really how you should think  
19 about (or how I think about) what's different this  
20 decade at a high level. So five parts.

21 An overarching goal here is, as Ruth said,  
22 to sort of elucidate, and this is a question from the  
23 hearing page, what technological developments, or lack  
24 thereof, are important for understanding the  
25 competitiveness of the industry or impacts on the

1 public interest.

2 Terminology. So I know that if you get two  
3 lawyers in a room you can get at least two definitions  
4 of what the internet is. It's also true for  
5 technologists, however. So for the purposes of this  
6 talk, we're going to describe the internet as  
7 something that carries traffic routed across a  
8 platform that is composed of devices that are  
9 reachable with IP addresses. "IP" stands for  
10 "internet protocol" and, indeed, the internet protocol  
11 is part of a suite of protocols developed as part of a  
12 big government project many years ago, and the  
13 technologists think about these protocols in what they  
14 call an hourglass architecture or an hourglass stack.

15 But the IP protocol is at the center of this  
16 stack. It's called the narrow waist of this stack.  
17 And the reason it is like that is all traffic (no  
18 matter what application it is or what physical type of  
19 medium it's going across) that is on the internet,  
20 will speak this IP protocol at the network layer. So  
21 any content, any eyeballs -- the eyeballs are over  
22 here on the left -- in order to get access to internet  
23 content or to request internet content, they are using  
24 a public IP address in order to do so.

25 Sometimes in homes or enterprises, you may

1 have a private IP address and you are negotiating your  
2 communication with the internet through a public IP  
3 address that's proxying these transactions for you.  
4 So content, services, routers, they all have these IP  
5 addresses.

6 Okay. How do these IP addresses connect?  
7 So many IP addresses can be on a router. Routers then  
8 compose to form networks. These networks on the  
9 global internet are referred to as autonomous systems,  
10 that is all routers owned by a given enterprise.  
11 They're called autonomous systems because they  
12 interact independently on the global internet. They  
13 can decide what their own routing policy is and then  
14 announce that routing policy to the rest of the  
15 internet, and it propagates across the global  
16 internet.

17 There are about 70,000 of these autonomous  
18 systems today. It's growing. It's been growing for  
19 decades. And they all independently connect. There's  
20 no overarching authority, there's no centralized  
21 database of who owns these ASes, where they are.  
22 There are different databases around the world that  
23 hold information for different ASes. There's no map  
24 of these ASes, how they connect, it's all done  
25 independently.

1                   So in this world, how does it work? How  
2   does it work to get content from one place to the  
3   other? So I'm going to introduce a couple of other  
4   terms called transit, which is how -- transportation  
5   of packets because the whole thing is operated by  
6   packets instead of the old telephony model of packet-  
7   switched networking. So packets are the unit of  
8   content that is sent across the network and traffic  
9   flows from the source of content, here on the right in  
10  the blue network, to the person who is requesting the  
11  content, say the residential broadband provider or  
12  sometimes they call it an eyeball network on the left  
13  side, the red bubble, through what they call transit  
14  providers.

15                  And a transit provider is somebody who  
16  provides transit for packets, for traffic. That is,  
17  it's their job to get traffic from one place to  
18  another. That's an independent line of business.

19                  Now, way back when, in the "good old days,"  
20  in the early '90s, you could imagine this connection  
21  of all of these ASes -- and there weren't 70,000 back  
22  then, but there were several thousand -- as a  
23  hierarchy, which was a reflection of how money flowed  
24  in the ecosystem.

25                  So customers, represented at the bottom of



1    this graph, say universities, like UCSD or MIT, will  
2    pay -- this is still true -- will pay a provider,  
3    called a transit provider, for getting traffic to  
4    them. And the way this works is that each of these  
5    independent networks at the edge, meaning at the  
6    bottom of this hierarchy, will announce what IP  
7    addresses they have on their network, and they want  
8    traffic for those IP addresses to be sent over that  
9    link that they're announcing it on.

10           So money flows -- there's little dollar  
11    signs on there -- the money flows up this hierarchy  
12    and traffic flows down the hierarchy. Well, traffic  
13    flows in both directions. But, in general, the way  
14    you think about it is you send money up the hierarchy  
15    in order for your addresses to be announced, and the  
16    person that you're paying will announce your addresses  
17    further up into the -- propagate them across -- the  
18    internet. That's called a customer-provided  
19    relationship. Still a very canonical relationship on  
20    the internet.

21           Another relationship that emerged in the  
22    early days of the internet was one where money wasn't  
23    transferred. Money wasn't transferred if two networks  
24    looked at each other and thought, you look about the  
25    same size as me and we exchange approximately the same

1 size of traffic. So creating a contract to exchange  
2 money and trying to figure out who should pay who  
3 every month or whatever seems like a lot of work and  
4 there wasn't actually technology for doing that.

5           There wasn't accounting built into the  
6 internet -- as Dave Clark likes to say, "money routing  
7 protocols." So they just called themselves "peers,"  
8 and they had what they called settlement-free  
9 interconnection. Sometimes still true today. But  
10 less true today. Today, you can have some hybrids of  
11 these two, like what they called paid peering, we can  
12 talk about that, but I'm going to oversimplify this  
13 for the purpose of explaining the highlights of how  
14 this works.

15           And then entire industries emerged to  
16 facilitate this interconnection between these growing  
17 number of ASes. The industry is called internet  
18 exchange. At one point, it was called internet  
19 exchange points. And, in fact, the decade that the  
20 U.S. Government got out of the business of providing  
21 internet backbone service, back in the mid '90s, they  
22 actually did a little bit of lightweight industrial  
23 policy to make sure that there were exchange points  
24 that some networks had to connect to, some regional  
25 networks, these sort of middle guys in this diagram,

1 in order to prevent partitioning from happening when  
2 the U.S. Government pulled out of operating a  
3 backbone, the NSFNET backbone in '94.

4 Okay. Now, this can get a little wiggy  
5 inside the network, it can get complicated. I'm going  
6 to show one slightly still simplified example of how  
7 complicated this can get because not only is each AS,  
8 each autonomous system, independently making decisions  
9 about who it should connect with, who should be a  
10 provider or customer of and peer with, but each router  
11 inside the AS, at a protocol level, also makes locally  
12 optimal decisions about its choice of the next hop  
13 along the path. And, because of that, you can end up  
14 with (and often end up with) asymmetric routes in a  
15 perfectly rational world because you are trying to  
16 optimize your cost or some performance metric as you  
17 are trying to pick what is your next hop across the  
18 network.

19 So, for example, back to this content, let's  
20 talk about the content network in the blue and the  
21 access network in the red and you've got three  
22 different transit networks in the middle. The red  
23 network, let's call it the access network, which has  
24 eyeballs, so think of it as a residential broadband  
25 network, has two potential upstream, they call it, or

1 transit providers it can choose from.

2           So say it sends a request, you send a  
3 request, and your upstream provider decides to send it  
4 across this upper path, the two green networks at the  
5 top of the diagram, to get to the source of content,  
6 and then the network hosting the content happens to,  
7 in this case, have one option to the global internet.  
8 That's actually the common case. Most of those 70,000  
9 networks only have one link to the rest of the  
10 internet. They call it a default route.

11           And so it's going to send the response  
12 through this to its one upstream provider, and then  
13 that network, the upper green network, actually has  
14 two options to send its content back, the return path,  
15 and one of them you will see has the little red circle  
16 with the line through it, it's a peer, meaning it  
17 doesn't actually pay to send traffic across that link.  
18 So that's the link it's probably going to choose and  
19 that's how you can end up with -- one example of how  
20 you can end up with -- asymmetric routing. Very  
21 common. And, again, multiplied by 70,000 networks and  
22 millions of paths.

23           Now, we're into phase two of the talk now.  
24 Evolution over the last 10 years. What has happened  
25 in the last 10 years? And this was happening a little

1 bit before -- this is an evolution, not a point change  
2 -- is that given the relentless growth and demand for  
3 mostly video, very high-volume content, and the need  
4 for providers, both content and access to optimize  
5 performance, reliability, availability and cost of  
6 getting this content to consumers, you see a trend of  
7 content moving closer to consumers, as close as it can  
8 move.

9           Indeed, any source of content is going to  
10 want to remove transit providers from its path and, if  
11 possible, even, go directly to where the consumers  
12 are, if possible, because it's going to reduce its  
13 cost. It doesn't have to pay transit fees. It may  
14 have to pay interconnection fees to the person that  
15 it's directly interconnecting to. And it's going to  
16 improve performance for consumers. So all a win. And  
17 that has been happening.

18           In addition, what's been happening, also  
19 economic forces, is a consolidation in these sources  
20 of content. Consolidation is normal in an industry.  
21 So while there continue to be small local content  
22 providers, most traffic is now handled by a few very  
23 large content providers. Google handling YouTube,  
24 and, again, much of it is driven by video traffic,  
25 which is very high-bandwidth traffic. Or independent

1 content providers who provide the service of  
2 transiting traffic around to third parties like other  
3 content providers that don't have their own network,  
4 say, like, CNN, for example.

5 And the job of that content distribution  
6 network is to get the traffic from where it enters  
7 your network -- if you are your own CDN, then it's  
8 your network -- to where it is going to exit your  
9 network, hopefully as near to the consumer as you can  
10 get it at the lowest cost they can do it. Straight-  
11 forward.

12 The key driver, again, that's really brought  
13 these two factors, interconnection and content  
14 distribution, to the fore is the internet basically  
15 eating the television industry, which we are seeing  
16 happen very systematically. And the next industry to  
17 be eaten is gaming. So we're watching that happen,  
18 too.

19 Okay. So there's a few different ways that  
20 the content providers can do this, can distribute  
21 content, can get it close to the consumer. As I said  
22 earlier, they can try to connect directly to the  
23 consumer. That's the bottom scenario here. The blue  
24 network is still the content network and the red  
25 network is the access or eyeball network. Think about

1 your home broadband provider.

2           If there is transit in the middle, the green  
3 networks, then you can imagine the content still going  
4 across these transit networks, but you can also use  
5 what's known as caching: keeping a copy of the  
6 traffic at an intermediate point in the network, in  
7 your network if you're the content provider and you're  
8 directly attached to the transit but near the edge of  
9 your network, or actually in the access network. And  
10 so this is an increasingly common mode of distributing  
11 content for large companies. But large companies will  
12 probably combine all three strategies as needed  
13 flexibly to make sure they can get content as  
14 effectively and again cheaply to consumers.

15           You would think some consolidation would  
16 actually reduce the complexity. Turns out not.  
17 Although you do have a meme going around about the  
18 death of the transit industry, meaning there are fewer  
19 transit providers than there were ten years ago,  
20 certainly providers that only do transit as a line of  
21 business. There are certainly providers that have a  
22 transit line of business. But they also have other  
23 lines of business, generally more profitable lines of  
24 business because moving packets around -- just moving  
25 packets around -- doesn't tend to be as profitable as

1 other lines of business that many of what we used to  
2 think of transit providers could get into.

3 But what you do have is a tremendously dense  
4 interconnection between these large transit providers  
5 and the access providers. It's very hard to measure  
6 The internet wasn't designed to be measured very well  
7 and the increasing complexity of this interconnection  
8 makes it harder to measure.

9 But there's something even more fundamental  
10 about the evolution of interconnection in the last 10  
11 years that is important for thinking about competition  
12 and consumers, which is that, instead of -- let me go  
13 back one slide if I can make this thing do it --  
14 instead of the dense mesh of interconnection between  
15 ISPs that are primarily transit providers, (their main  
16 job is moving packets around and they more or less  
17 look like the other in terms of a line of business),  
18 what you're seeing in the last 10 years is -- and,  
19 again, it's a transition -- is providers that don't  
20 look like each other, (they're not in the same lines  
21 of business or maybe one of them might be in multiple  
22 lines of business and another is only in a content  
23 line of business), interconnecting.

24 So this is a fundamentally different type of  
25 interconnection. And, indeed, some of these companies



1 are in multiple layers of this diagram. The way we  
2 think about this is, from a technological perspective,  
3 is these companies operate at different layers of the  
4 internet ecosystem, different technological layers.  
5 Now, this is going to sound like -- this looks a bit  
6 like the diagram I presented earlier about the  
7 protocol architecture and, indeed, some of these will  
8 map to different protocols that are used. The lambdas  
9 and the fibers at the lower layer are also operated by  
10 lower later protocols. And the IP layer in the middle  
11 there is the IP layer in the hourglass architecture.  
12 And the content layers at the top are platforms that  
13 are built on top of the IP platform.

14 You can think of Facebook as a platform  
15 built on top of the IP platform. You can think of  
16 some entire companies built on top of the Facebook  
17 platform, so that Facebook itself is a platform. It's  
18 a single company platform. The IP platform, very  
19 importantly, is a multi-company, multi-industry open  
20 platform, which is the reason that you have so much  
21 vibrancy and investment and competition and lots of  
22 creative innovation happening at the IP layer because  
23 it was completely open. You did not have to license  
24 anything from anybody to connect to the internet. As  
25 long as you had IP addresses and you knew somebody

1     else with IP addresses, you could be on the internet.

2             Now, since I now talked about platforms a  
3     little bit, I'm going to acknowledge that there are  
4     two different definitions of platform that seem to be  
5     dueling. And I hear economists use one definition and  
6     I hear technologists use another definition. And,  
7     now, they've started to use both definitions and it's  
8     not always clear to me if they know which definition  
9     they're using. Since many of the companies operating  
10    in the internet ecosystem now and interconnecting are  
11    both kinds of platforms, I want to make sure we inject  
12    some clarity here.

13            So the two kinds of platforms -- and there's  
14    an OECD report coming out that describes this a lot  
15    better than I do and gives lots more depth -- are  
16    again, what I think of as the economic definition. An  
17    online marketplace, the first definition, that places  
18    one type of consumer, one type of customer in touch  
19    with another type of customer. So we all know this is  
20    a multi-sided market or a two-sided market.

21            Often, in the internet, a platform will be a  
22    multi-sided market: Airbnb, Amazon Marketplace buyers  
23    and sellers, Craigslist, eBay. These are economic  
24    platforms from an economic perspective, multi-sided  
25    platforms. And that's important because when you

1 think about interconnection across platforms that may  
2 involve different markets, you have to think about the  
3 incentives of those different markets.

4 The other kind of definition of platform  
5 that technologists have been using for a long time is  
6 a group of technologies on which you build another  
7 group of technologies. And so the emphasis in this  
8 definition is programmability. There's a service  
9 component. It's general. You can build entire  
10 services on top of underlying platforms. So examples  
11 are IP itself, as I mentioned earlier. Operating  
12 systems are platforms. Amazon Web Service is now a  
13 platform, and I'll talk about that in a couple slides.  
14 Oh, in this slide.

15 The fastest-growing part of the internet  
16 ecosystem right now is what we call cloud service  
17 platforms. So these were, in some cases, internal  
18 platforms to a company, so like think Facebook, but in  
19 the case of Amazon, AWS, a set of services that Amazon  
20 used internally to build its own lines of business,  
21 but it decided that it was going to externalize that  
22 and make it available as a new layer through which to  
23 distribute content and services and allow other people  
24 to use that to build companies.

25 Indeed, many web applications and services

1 and entire companies are now first built upon these  
2 giant cloud service platforms, so Amazon, Microsoft,  
3 Google even has one now. So, for example, Netflix is  
4 built on, last time I checked, all the recommendation  
5 system, all the database that's operating Netflix is  
6 built on Amazon Web Services. Despite that, Amazon  
7 Prime is also the biggest competitor to Netflix at the  
8 video layer, at the content layer, right? So this is  
9 super interesting.

10 Okay. So what you have happening now, and  
11 this was not as true 10, 15 years ago, is  
12 interconnection across platform layers where companies  
13 that used to be what we think of as transit or access  
14 providers are also engaged in that content layer,  
15 right, in the higher layer. Cloud is also now  
16 considered a higher layer of the platform stack.

17 Okay. So in 2007, and as was described in  
18 the report from 2007, a lot of the regulatory  
19 attention was about the access links to the broadband  
20 ISP. They mention interconnection. FCC, even in the  
21 2015 order, mentioned interconnection as an area they  
22 thought they had jurisdiction over, but they weren't  
23 going to do anything about interconnection, including  
24 because they recognized they really didn't understand  
25 the interconnection ecosystem very well.

1               Nowadays, that is a much bigger focus. And,  
2     indeed, from a consumer protection and competition  
3     perspective -- so now I'm in part three of the talk,  
4     implications -- of the interconnection dynamics for  
5     competition are that -- probably the most notable one  
6     -- is that smaller players have less opportunity to  
7     connect with these large content providers.

8               In fact, as submitted to the public comment  
9     for these hearings, American Cable Association's  
10    report talked about that -- and smaller ISPs are  
11    represented by that organization -- most of these  
12    access content providers connect to the big content  
13    guys through exchange points. They don't have direct  
14    connectivity. And, indeed, the smaller content  
15    providers are also, by nature of economics and where  
16    they are, less likely to vertically integrate  
17    themselves.

18              So they cannot leverage the savings you  
19    often get from bundling different services to the same  
20    customer, and that's particularly hard in the regions  
21    where these providers are building out, because it can  
22    be much more expensive to build out in these regions.  
23    So this puts them at sort of a double disadvantage,  
24    let's say.

25              So just to recap, carrier services that are

1 operating on top of this single-firm IP platform, so  
2 every company that offers internet access and some  
3 companies that don't, operate an IP platform  
4 internally and they compete with third-party services  
5 that are running over the common internet platform.  
6 And these interconnection points can enable the  
7 exercise of market power against these competitors due  
8 to technological opportunities for discriminating  
9 against traffic crossing that link, selective  
10 dropping, rate limiting, not upgrading capacity of the  
11 interconnection links which could impair QoE or -- and  
12 I will acknowledge perhaps more likely -- nontechnical  
13 ways of doing discrimination, including pricing or  
14 business terms that are all generally under NDA.

15           These are not new concerns. In fact, this  
16 is a quote from the 2007 report, which really captured  
17 these concerns quite beautifully. They've also been  
18 captured for many, many years because they're really  
19 fundamentally about -- they're really common carriage  
20 concerns. They're really how do you prevent blocking,  
21 degradation, discrimination against consumers. In  
22 this case, discrimination against content and apps.  
23 So a lot of this is about how do you capture the good  
24 things that you had about common carriage without all  
25 of the baggage that it brings.

1                   Okay. Section 4 of the talk. Technology  
2   that has been tried to address some of these  
3   fundamental issues. When AT&T merged with DirecTV  
4   back in -- well, it was a long process, but I think  
5   2015 is a good year to pick -- there was a lot of  
6   consternation in the public comment period by people  
7   who -- by organizations who -- were concerned about  
8   this exact issue, that interconnection would be used  
9   as a locus of discrimination by AT&T against its  
10  interconnecting parties, both transit and content  
11  providers that it directly interconnected with at the  
12  time, in favor of DirecTV and against, say, over-the-  
13  top content like Netflix or YouTube.

14                  So the FCC, in response to these concerns,  
15  attached conditions to the merger -- these weren't the  
16  only conditions, but this was pretty amazing -- it was  
17  internet measurement conditions, the first time ever  
18  -- attached to a merger. And what they said was AT&T  
19  was going to be required to measure the  
20  interconnection points (only the interconnection  
21  points, and that becomes important), the  
22  interconnection points, with some of its larger  
23  interconnecting parties. And it would bring some  
24  source of independent measurement expert to help  
25  refine the methodology, but the high level was

1 actually -- the requirements for what was going to be  
2 measured was actually outlined pretty narrowly in the  
3 merger conditions. They had to measure loss, latency,  
4 and utilization across these interconnecting points.

5 And the FCC also recognized that for certain  
6 kinds of measurements, you were going to get much more  
7 fidelity if you actually had cooperation of the  
8 interconnection. Although, honestly, there's not a  
9 lot of technology developed to measure across an  
10 interconnection between two competing providers  
11 because, as you can imagine, there hasn't been a lot  
12 of demand for that kind of technology.

13 So we were actually the independent -- CAIDA  
14 and MIT -- Dave's in the room -- were the independent  
15 measurement experts selected for this project and,  
16 along the way, we realized that the approach actually  
17 begged many questions, including whether measuring  
18 individual links the way that it was outlined in the  
19 merger condition was the right approach to capture  
20 important dynamics. And how you would measure the  
21 characteristics of those links, because it's tricky --  
22 it's especially tricky to do if you do not have  
23 cooperation of the other interconnecting party.

24 More importantly, it's not at all clear  
25 whether the measurements mapped to consumer harm.



1 Many of the edge providers, content providers have  
2 gotten quite good at adaptive coding, adaptive bit  
3 rates in order to adapt to perceived congestion or low  
4 bandwidth paths from the source of content to the  
5 consumer. And I should note there is no agreed  
6 methods to measure the QoE, quality of experience, for  
7 the user of video.

8 Okay. So this slide is another quote from  
9 the 2007 report: "These are really complex empirical  
10 questions." These were complex empirical questions in  
11 2007. They are more complex now. In 2007, the FTC  
12 report, again, talked about the balance between the  
13 competing incentives -- Nick is going to talk about  
14 the incentives more in a few minutes -- on the part of  
15 broadband providers, and the focus was on broadband  
16 providers back then, to engage and -- the concern was  
17 about potential benefits and harms from discrimination  
18 and differentiation. And there are potential benefits  
19 and that's what makes this complex, one of the things  
20 that makes this complex.

21 So these are complex empirical questions.  
22 The FTC's last set of hearings acknowledged the need  
23 for further evidence of particular conduct in this  
24 area in order to assess harm. This is the open  
25 question, how does one gather evidence of particular

1     conduct?

2                   So it is not clear to us or anyone what the  
3     FCC actually learned from the AT&T reporting exercise.  
4     The reporting that occurred went from AT&T to the FCC  
5     under protective order. So researchers were not  
6     allowed to study any of this. We did not see any of  
7     the data that -- after we approved of the methodology  
8     that was used.

9                   There are several other approaches to  
10    interconnection measurement as well. Some  
11    technologists are undertaking some approaches, some of  
12    the video providers themselves. Google had, at one  
13    point, a Google video quality report. Netflix has its  
14    own, you know, end-to-end measurements. All of these  
15    measure little pieces of the picture with different  
16    ways. All of the methodologies have limitations.  
17    Really, if you were going to try to integrate and  
18    cross-validate, you would need some source of  
19    objective perspective. There is no silver measurement  
20    bullet for understanding these kinds of issues right  
21    now and there's a limited ability for academics to  
22    sustain this kind of work.

23                  Take it from me, it's a lot of money to  
24    sustain this kind of infrastructure that can do these  
25    kinds of measurements, hardware, software,

1 distributing it at places you need. And, indeed, I'm  
2 just doing a little acknowledgment that after nearly a  
3 decade of providing Netalyzr, which is a tool that the  
4 FCC did use to try to increase its understanding of  
5 paths, because it was sort of a network path analyzer,  
6 they took it down for lack of resources to support  
7 this open platform for use. And, yet, much of this is  
8 still research.

9           So what is the FCC measuring? Because many  
10 folks talk about the Measuring Broadband America  
11 system as something that could help in this space. So  
12 the Measuring Broadband America platform was put in  
13 place eight years ago, maybe -- it was last decade --  
14 in order to help measure access bandwidth, just the  
15 link between the consumer and the broadband access  
16 ISP.

17           Why? Because there were consumer complaints  
18 -- the FTC might have even gotten some of these last  
19 decade -- that say, oh, my broadband access provider  
20 is telling me that I'm getting 50 meg and I don't  
21 think I'm getting 50 meg, and when I use some speed  
22 test out there it says I'm not getting 50 meg, so  
23 there's a consumer protection issue and somebody  
24 should do something.

25           So the FCC launched a program to measure

1 access bandwidth. And they did. And I think that  
2 actually did a reasonable job. It actually solved a  
3 problem. It solved one problem. But the FCC is also  
4 clear about the limitations of this platform. It  
5 does not measure anything about interconnection. It  
6 does not capture many things consumers care about,  
7 including performance to, say, the top ten websites.  
8 It doesn't talk about data caps. It doesn't talk  
9 about the privacy of the connection. It doesn't  
10 measure mobile.

11           Actually, there's a separate program to try  
12 to measure mobile. Data was just released last month.  
13 There's no analysis of the data. There's no report.  
14 And Microsoft also recently came out with some data  
15 that shed some doubt on the strength of the sampling  
16 that's happening on FCC side because I think probably  
17 the FCC is not sampling rural areas as well as urban  
18 areas because the way that it deployed the little  
19 nodes, about 10,000 nodes around the country, is sort  
20 of opt-in. You volunteer to take a node. So those  
21 are expected sampling issues.

22           Okay. So in summary, and what to take away  
23 from this, since 2007, the same concerns have expanded  
24 to multiple platform layers, to crossing platform  
25 layers, and gathering and analyzing evidence has

1    become more difficult, validation has become harder.  
2    The complexity of the sector, which was already quite  
3    complex, is increasing at the same time that we're  
4    putting more of society on to this infrastructure.  
5    More is at stake, more is at risk.

6                Why is it so complex? Because these  
7    co-evolving, adaptive systems integrate forces that  
8    are market forces, technology, legal, political,  
9    cultural, social. It is hard to keep up. So all the  
10   topology and traffic shifts I described to you are not  
11   driven by technology; they're driven by economics,  
12   mostly. But if we do not understand the role,  
13   capabilities, and limitations of technology to create  
14   and solve problems, attempted interventions are likely  
15   to fail.

16               So last slide. Evidence-based policy needs  
17   to understand in the internet ecosystem that the  
18   internet operates as layered, multi-sided (sometimes  
19   more than two sides) platforms interconnecting across  
20   layers such as from content to transit. But that's  
21   only one example. This happens in the mobile space,  
22   this happens in the advertising ecosystem, this  
23   happens with the cloud. Which means you need to  
24   understand deeply the platform structure and the  
25   dynamics, including the different sides of the markets

1 and their incentives.

2 This is a challenge to achieving a relevant  
3 transparency and public accountability in operating  
4 these platforms that have become critical  
5 infrastructure to most aspects of society and how they  
6 relate to specific potential harms, and it's been very  
7 tricky, as someone who's been in this space for a  
8 couple of decades now, to find and fund sources of  
9 objective, unbiased expertise.

10 Thank you. I think I'm out of time.

11 (Applause.)

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1           TECHNOLOGICAL DEVELOPMENTS IN BROADBAND MARKETS

2                   MR. FEAMSTER: Thanks for that excellent  
3 introduction, kc. You did a lot of the hard work.  
4 Although I should say I was asked to talk about  
5 developments in broadband markets, that kc is also an  
6 expert in that. So I should have just ceded my time  
7 to her, but I'm going to do my best basically to talk  
8 about what I think are -- what we're seeing in terms  
9 of the developing aspects of the market and how things  
10 have changed over the last 20 to 25 years.

11                   Some of what I talk about at the very  
12 beginning will be a little bit repetitive, but I  
13 think, you know, a little bit of repetition will sort  
14 of drum in the basics of the structure of the internet  
15 and how it's evolved over the last few decades, and  
16 then we'll get to some of the subtleties of market  
17 dynamics.

18                   Okay. So this is actually a slide I used in  
19 my thesis defense about 15 years ago, right, and this  
20 is sort of how we described the internet routing and  
21 interconnection in a nutshell. You're sitting at  
22 home, you're basically trying to stream a video from  
23 Netflix, let's say, or your favorite streaming video  
24 provider. Most of us sort of -- you know, we think we  
25 buy internet service from our ISP and then that's it,

1 right, we basically open the browser, we start  
2 streaming. There's this internet thing and it's just  
3 going to deliver our stream.

4 Well, it's a little more complicated than  
5 that as kc basically nicely articulated. Actually,  
6 there are thousands of independent, autonomous  
7 networks, each operating in their own self-economic  
8 self-interest and, yet, they must cooperate so that  
9 global connectivity exists.

10 So there's this interesting dynamic where  
11 each of these autonomous systems basically needs to  
12 make money and, yet, they depend on the other networks  
13 in the ecosystem, whether that be, you know, an access  
14 network, a transit network, a content delivery network  
15 or some of the other networks that we'll talk about.  
16 They need those other parties, otherwise their own  
17 product has much less value. Imagine how useful your  
18 internet service provider would be if you couldn't  
19 even get to Google or Netflix or Amazon, not a very  
20 interesting product, right.

21 So there's this interesting dynamic of  
22 competition and cooperation that basically plays out  
23 in the marketplace. This picture has changed quite a  
24 bit. I'll sort of talk about that in the coming  
25 slides. But that fundamental dynamic of we've got to



1 cooperate, but we're also competing and, by the way,  
2 it would be nice if the other guy paid, that dynamic  
3 is essentially still pretty fundamental.

4 A few more words on the architecture. It's  
5 basically extremely loose coordination. There is no  
6 central authority that manages the internet, no aspect  
7 of it, really. Names or addresses is about as  
8 centralized as it gets, and even that's fairly  
9 distributed. But as far as interconnection, how these  
10 networks connect to one another, it is completely  
11 decentralized.

12 The ecosystem, the topology, which kc  
13 herself has spent decades studying, arises not from  
14 central coordination, but from many bilateral and  
15 multi-lateral decisions of how these networks connect  
16 to one another and, fundamentally, now, these  
17 decisions are business decisions.

18 Internet economics in a nutshell, okay, this  
19 is one slide, kc covered this as well, but I'll just  
20 sort of reiterate a little bit. Again, this is highly  
21 oversimplified, okay? But we can think about internet  
22 interconnection, as I mentioned, as business decisions  
23 essentially as routing money, okay. So if we take  
24 that unlabeled network there right in the middle on  
25 the left side of the slide, that network who wants to

1 connect to some destination over on the right side of  
2 the picture may have multiple ways to get there. They  
3 could pay a transit provider to get there. They might  
4 peer with other autonomous system to get there.

5 I've labeled that as free. Intentionally,  
6 I've put that in quotes because nothing's ever free.  
7 And we'll talk a little bit about the dynamics of how  
8 that unfolds in the rest of the talk. But as kc also  
9 mentioned, there are situations where one party might  
10 pay another party to basically establish that kind of  
11 relationship.

12 Fundamentally, the dynamics of that link  
13 there that I've labeled "free" peering, sometimes  
14 called settlement-free interconnection, sometimes  
15 called paid peering if money changes hands, the  
16 dynamics there over the last 20 or 30 years have been  
17 highly complicated and contentious and they are  
18 changing a lot in the last just couple of years in  
19 large part to what kc also mentioned, the rise of the  
20 cloud provider and the distributed cloud and content  
21 delivery is really changing the dynamics of how these  
22 disputes and business decisions unfold.

23 Okay. A brief history of the internet in a  
24 couple of slides in terms of interconnection. These  
25 slides actually I lifted from a report on

1 interconnection from the Broadband Internet Tech  
2 Advisory Group, which some of our other speakers  
3 participate in, and David Clark I think maybe even had  
4 drawn some of these. They're good. Thank you.

5 The precommercial internet, I think kc  
6 mentioned, of course, we had the ARPANET, basically  
7 connected a lot of these regional access networks,  
8 other local area networks. No money changing hands,  
9 at least not in the commercial sense. Around 1994,  
10 '95, we basically ended up with this privatization of  
11 the backbone and a breakup into a commercial hierarchy  
12 where at the top of this hierarchy, we had the  
13 so-called tier one backbone providers, okay,  
14 default-free zone is another term you might hear at  
15 some point.

16 We're not hearing this so much anymore, but  
17 maybe in some, you know, outdated corners of  
18 discussions, people still think the internet looks  
19 like this. You might hear about tier one transit  
20 providers if you hear that term. They don't really  
21 exist anymore, but people are probably talking about  
22 this picture and the backbone providers at the top of  
23 the picture.

24 As kc mentioned, you can kind of think of  
25 money as flowing from the bottom of this picture up.

1 The little guys, the access networks, the regionals  
2 pay some other local access provider who in turn pays  
3 regionals who in turn pays the backbone who connects  
4 you to other places.

5 Okay. What happened? Well, content  
6 happened. Content delivery happened. We had the  
7 so-called rise of the hyper giants, right. There's a  
8 great background talk and paper on this that was, I  
9 think, eight or ten years ago now, actually, that  
10 talked about the fact that, as we had providers who  
11 had the capability of delivering lots of interesting  
12 content to consumers, the balance started to shift,  
13 right, because it previously, in that previous  
14 diagram, right, the way that one decided money changed  
15 hands was fairly simple.

16 Fair? I don't know. But, yeah, if you were  
17 the big guy at the top, you got money to connect the  
18 little guys to other little guys. Okay. Well,  
19 typically, the little guys at the bottom were, you  
20 know, people like you and me who wanted to get on the  
21 internet, people who were running their web servers,  
22 universities, small businesses, et cetera. Well, what  
23 happens when the small businesses become big  
24 businesses and have lots and lots of interesting  
25 content? Put another way, as I mentioned before, how

1 interesting is your internet service if you can't  
2 actually see anything interesting?

3 Well, the guys who basically were -- you  
4 know, had content to offer -- realized this and used  
5 this as new leverage to basically form interconnects  
6 at various levels of this hierarchy. One thing, of  
7 course, you immediately realize, and this started to  
8 happen right away, is that at that middle layer with  
9 the regional ISPs, they said, well, we could save  
10 money if we didn't have to pay these backbone internet  
11 providers so why don't we just start interconnecting  
12 with each other, right. And you would go to groups  
13 like the North American Network Operators Group, and  
14 there were sessions dedicated to ISPs essentially  
15 doing speed dating, meet and greet types of activities  
16 where they would say, I'm in these regions, you know,  
17 I'm in these data centers and co-lo facilities and I  
18 have this type of content and here is my peering  
19 policy, here are the people I will interconnect to.

20 So you've started to see a lot denser mesh  
21 at that regional level. And then the content  
22 providers came along and they figured out that they  
23 don't actually maybe need to pay everybody to get to  
24 the access providers, they could connect directly,  
25 right? Or if you are a company like Akamai, you

1 basically realize that, hey, I could actually host the  
2 content myself and start putting servers everywhere  
3 and I could actually help these little guys at the  
4 bottom of the picture save on transit bills by putting  
5 the content closer and closer to users, right. So  
6 everybody wins.

7 The little guys or the smaller guys at the  
8 bottom of the picture start saving money. Performance  
9 gets better, by the way, too, because another thing  
10 that we teach in networking classes is the closer the  
11 content is to the user, the better the performance  
12 typically is. So everybody wins.

13 Okay. So we've basically started to see a  
14 much more extreme version of this particular topology  
15 today. I'll talk a little bit more about that in a  
16 couple of slides. But let me just sort of mention a  
17 couple of things in terms of its implication for  
18 market trends and dynamics.

19 Okay. So up until about five years ago,  
20 when we had, you know, that hierarchal kind of picture  
21 of the internet, one thing to observe is that paths  
22 were longer. So between the so-called eyeballs,  
23 people like you and me who wanted to see stuff and the  
24 content, your traffic might go through a couple of  
25 independently-operated networks or autonomous systems,

1 as they call them. And the performance was  
2 determined, in many cases, a lot by the path.

3 How fast is your ISP? How fast is the  
4 interconnect between your ISP and the transit  
5 provider? How good is the transit provider? Where  
6 does the transit provider interconnect with content,  
7 and so forth?

8 Now, and increasingly now -- I mean, this  
9 probably started about five or six years ago, but  
10 probably the real ramp-up has been in the past couple  
11 of years -- a lot of content, as kc mentioned, is now  
12 hosted on content delivery networks and distributed  
13 cloud services and the distinction between those two  
14 types of service offerings is also becoming a little  
15 bit blurry, more blurry.

16 So now, what does this mean? Well,  
17 performance that you or I experience as a user is  
18 becoming more and more determined by how close that  
19 content is to us, right? It's becoming increasingly  
20 common that most of our content, be that, you know,  
21 some files that we're hosting in a distributed cloud  
22 service or a video that we're streaming or even a  
23 website we visit is hosted on some distributed cloud  
24 service, whether that's Cloudflare or Amazon or Akamai  
25 or what have you. And the performance that we

1 experience is increasingly determined by how far we  
2 have to get to that content.

3 One of the things that kc said in her talk,  
4 which I think is incredibly important here as well  
5 since I'm supposed to talk about markets, is who gets  
6 to put their content close to the eyeballs, right?  
7 That competitive dynamic is not something that we've  
8 talked about a lot, but it's probably something we  
9 should be talking about more.

10 Two really significant ongoing developments  
11 I wanted to highlight and I want you to take away, one  
12 is that traffic volumes are just going up beyond  
13 imagination. This is probably no surprise. I'll give  
14 you a couple of statistics on the next slide. A lot  
15 of this is video traffic, and a lot of the video  
16 resolution, a lot of the resolution of those videos is  
17 increasing.

18 We have been doing a lot of work in video  
19 streaming quality of experience and looking at the  
20 resolution of streaming videos and, increasingly,  
21 we're seeing things like 1080p to smartphones. We  
22 used to think, okay, well, great, a lot of people are  
23 streaming to smaller devices, at least we don't have  
24 to worry about high resolution to those. Well, no,  
25 even that's changing. So more and more video, higher



1 and higher resolution, that means traffic volumes are  
2 going off the charts.

3 And the other thing that I've already  
4 discussed is that the methods of delivering traffic  
5 are evolving. I'll talk a little bit about this in  
6 the coming slides. It used to be you might go all the  
7 way across the internet, right, to get content from  
8 something that's hosted on a web server.

9 Increasingly, that traffic and that content  
10 is being delivered via content delivery networks, also  
11 via distributed cloud services. In some cases, the  
12 interconnects between the access network and the  
13 distributed cloud are private. So some of the things  
14 that kc talked about in terms of oversight of the  
15 interconnect, et cetera, there are interesting  
16 questions there because a lot of what we might have  
17 thought about as publicly observable in the past is  
18 becoming harder and harder to see.

19 Okay. A couple of words on this. I already  
20 mentioned this, right. Here are some statistics.  
21 Something that I will just point out in addition to  
22 the statistics, this is from the Cisco Global IP  
23 Traffic Forecast. You can read the numbers. They're  
24 large.

25 Another thing I think that's worth pointing

1 out is the slide or the graph on the bottom right.  
2 That blue in the stacked bar is smartphone traffic.  
3 So increasingly, a lot, a lot of video traffic to  
4 smartphones. So I know most of what we're talking  
5 about today is fixed line, but let's not also forget  
6 that a lot of this video traffic is going to mobile  
7 devices. It may be over our fixed line ISPs over a  
8 home WiFi network into the home, but there are an  
9 increasing number of ways that that traffic is being  
10 delivered as well.

11 Okay. Methods -- second point, methods are  
12 evolving. I mentioned this already. In the old days,  
13 picture looked a little bit like what we see on the  
14 left. A bunch of machines, you go over this, as we  
15 know now from the beginning of the talk and from kc's  
16 talk, it's not one cartoon cloud, it's actually many.  
17 But you're going somewhere across the internet to get  
18 your content to some server. Now, you are typically  
19 getting that content from a distributive cache of  
20 servers, also known as sometimes a content delivery  
21 network or a CDN.

22 Okay. Here is the picture I showed at the  
23 beginning of the talk. Remember that, right. So here  
24 is the internet. It's this complex interconnection of  
25 independently-operated networks. You go across it to

1 get your video content. Well, now, there are content  
2 delivery networks, Akamai, Cloudflare, Limelight,  
3 Amazon Web Services. The list goes on. They are  
4 delivering a fair amount of this content this. This  
5 picture is simplified because Akamai is actually  
6 everywhere. It's basically -- those boxes are inside  
7 other transit networks. They are interconnecting with  
8 many of the other networks shown in the picture. So  
9 this is simplified.

10 So, one is that we have content delivery  
11 networks. The other significant development is that  
12 these transit networks, these content providers, these  
13 access ISPs, as kc mentioned, they're starting to host  
14 these content caches themselves. So the access ISP is  
15 now also a content platform.

16 Some of the access ISPs not only run large  
17 backbone networks, but they're also running their own  
18 content delivery networks. I should have actually  
19 drawn some boxes in Netflix actually as well because  
20 they have their own content delivery network as well.  
21 The access ISPs in this picture, for example, also  
22 have their own content. So this is getting  
23 increasingly blurry and the discussion that kc brought  
24 up about the cross-layer interactions hopefully is  
25 evident from what's going on in this picture as well.

1           I mentioned this once before, but it's worth  
2     reiterating. As these boxes, these caches of content  
3     go everywhere in this picture, it should become clear  
4     to you that content placement is going to affect  
5     performance a lot more than the path across the  
6     network. Why? Because, increasingly, the content you  
7     get is going to be at those servers in this picture  
8     that are closer and closer to you. So there are  
9     clearly some paths there, but they're not the same  
10    paths that we were talking about 20 years ago.

11           Another thing that is worth mentioning is  
12    that content delivery, right, of which there's a lot  
13    of it, right -- I mentioned the video traffic and the  
14    volumes growing significantly -- that affects the  
15    traffic balance, right, on these interconnects. So if  
16    we basically rewind the clock to that hierarchical  
17    picture I showed you, the economics were a little bit  
18    simple. You just pay the bigger network. Everything  
19    works out, right.

20           Well, then once the small guys started  
21    having lots of content, the economic equation becomes  
22    more complicated, right, because on the one hand,  
23    they've got a lot of content that the eyeballs would  
24    like to see: They have value. At the same time, they  
25    have a lot of content and somebody has to pay to carry

1 the content to the eyeballs. Who is going to pay?

2 Well, the answer is not me, right.

3 Okay. So let me point out that this  
4 landscape is a complicated business ecosystem as well  
5 and everybody wants to win, i.e., nobody wants to pay  
6 the bills.

7 Okay. There is a series of books, actually  
8 it's one book, it's been produced I think many times,  
9 multiple editions, the Internet Peering Playbook,  
10 written by someone by the name of Bill Norton, who is  
11 basically an expert in this area. He, for many, many  
12 years, organized the peering meet-ups that I described  
13 earlier in my talk. You can buy this book, but also  
14 there are drafts of it online which you can sort of  
15 fetch and get the main ideas of what's going on.

16 Let me point out one in particular because  
17 this is subtle. And I don't want you to read what's  
18 on the left part of the slide. I'm going to describe  
19 to you what he talks about. This is an excerpt. As  
20 the name would suggest, the Peering Playbook has lots  
21 of plays. Let's suppose you're a network and you  
22 would like to get other networks to peer with you,  
23 i.e., interconnect. Ideally, you would like to  
24 basically do that without paying lots of money, right.  
25 The idea here is to not pay a lot of money to your

1 transit provider.

2           Okay. The most devious of all tactics,  
3 okay, so there is one play that Norton describes as  
4 traffic manipulation. In this picture, hypothetically  
5 speaking, we have a content provider, we have an  
6 access ISP, and we have a transit network. Netflix,  
7 Comcast and Cogent, respectively. Well, let's suppose  
8 Netflix and Comcast would like to interconnect  
9 directly. Okay. That makes sense actually for both  
10 parties. Both might save some transit costs. Neither  
11 would have to pay Cogent the transit bill.  
12 Performance would probably be better, right, due to  
13 the direct interconnect. Great, all sounds good.

14           Now, for the hard part. Who pays? Okay.  
15 Well, that's an interesting question. It's a business  
16 question. We like normative statements in this town.  
17 I'm not going to make any normative statements. I am  
18 going to make some observations, however. Each of  
19 those parties derives value from interconnecting to  
20 the other. There's a lot of traffic volume to carry.

21           And, finally, Cogent actually plays a  
22 particularly interesting role in the dynamic because  
23 they make money if they're in this game, right. And,  
24 by the way, there's a lever that gets created if they  
25 enter this picture, which is that there is a

1 significant amount of traffic volume that could be  
2 sent from right to left in this picture. Merely by  
3 sending traffic through the transit provider, the  
4 content provider can drive up the bills of the access  
5 network. If traffic basically goes up through Cogent  
6 and down to the access provider, the access provider  
7 ends up paying. And that's basically what Norton  
8 describes.

9 One network targets another by sending  
10 traffic over the transit link to drive up costs. Then  
11 the targeted network, in this case the access ISP or  
12 Comcast would say, hey, wait a minute, I don't want to  
13 pay those transit bills -- okay, I will come to the  
14 table and let's talk peering. Now, the question still  
15 is, who should pay the bills of that horizontal link  
16 in this picture? And, again, the direction of money  
17 flow there depends on who suffers more by the lack of  
18 this link. So there's a little of negotiation and  
19 brinkmanship, if you will, you may even say. And this  
20 is basically the root of many so-called peering  
21 disputes that have happened over the last few decades  
22 on the internet.

23 You have probably heard about this  
24 particular case. That's just a brief sketch of, you  
25 know, what was going on in that particular situation.

1 And it's worth pointing out that that dynamic is not  
2 new. That has basically been going on since the  
3 commercialization of interconnection in the mid '90s.

4 Okay. We don't really know everything that  
5 is going on in that picture, in that story I  
6 described. Okay. We could try to measure it. Okay.  
7 There are better and worse ways to do that. I'm going  
8 to talk about that in just a minute. But it's also  
9 worth noting before I get into the nitty gritty of  
10 the measurement that the core of this is business.  
11 There's a lot of money at stake for all parties  
12 concerned in the picture. Interconnection costs  
13 money. Everybody wants the other guy to pay.

14 Okay. So when that picture basically first  
15 popped up, you know, the internet, in particular,  
16 interconnection wasn't really ready for this. So on  
17 the left, we basically got a picture from my house.  
18 We have been measuring internet performance for the  
19 last 12 to 15 years from hundreds of router-based  
20 measurement devices sitting in access networks around  
21 the world. So this was basically what was going on in  
22 my home. You could basically see roughly every night  
23 latency, in other words, the time it took for packets  
24 to travel from my home to various places across the  
25 internet, just went completely off the charts.



1                   Okay. The Measurement Lab also measured  
2 this in various ways. That's the picture on the  
3 right. They show basically throughput suffering.

4                   Okay. Well, going back to our picture,  
5 whose fault is this, right? Well, you might be  
6 tempted to just say, oh, yeah, well, I buy access  
7 service from this access ISP, clearly it's their  
8 fault, and certainly you could go down the path. But  
9 from a technical perspective, I think we like to  
10 basically figure out what's really going on here?  
11 Where is this problem?

12                  The problem, which is getting worse by the  
13 way, I might add, right, because things are becoming  
14 harder to observe. The problem is it's real tough to  
15 observe this from the edge of the network as a user.  
16 You can come up with theories. You can say maybe it's  
17 at the interconnect between the access ISP and the  
18 transit. Maybe it's inside the transit. Maybe it's  
19 Cogent. Maybe it's both, actually. Maybe it's the  
20 other interconnect that I haven't drawn. Maybe it's  
21 been Netflix and Cogent. We don't really know. All  
22 we can observe is the end-to-end path, right. Unless  
23 somebody inside of this picture tells us what's going  
24 on, we've got no idea. Not everyone has a  
25 particularly good incentive to be transparent about

1     this.

2                   Well, be careful what you read.   Okay?

3     Because everybody in this picture, of course, wants to  
4     make money, right.   It would be nice if everything we  
5     read were plain dealing.   But here is a report that  
6     basically says, oh, yeah, we can pretty much infer  
7     that this performance was interconnection-related.  
8     Well, I'm sorry, what?   Okay.   How did you measure  
9     this?   Well, you measured it from the edge.   Well, how  
10    do you know it's at the interconnect?   Well, we  
11    measured from the edge of the network over to some  
12    server on the other side of the network.

13                  Well, how do you know it's not somewhere  
14    else in the network?   How do you know it's the red  
15    link I'm showing?   Well, oh, because we measured from  
16    Comcast and it was slow and we measured the same path  
17    from Cablevision and it wasn't slow.   So therefore,  
18    it's got to be this interconnect, right?   Well, oops,  
19    Internet 101 would tell you that actually autonomous  
20    systems are pretty big networks, right.   And there  
21    could be other places where that slowdown is  
22    occurring, right.

23                  Okay.   So there are other examples of this  
24    where you can basically take these end-to-end paths  
25    and draw completely the wrong conclusions, like, okay,

1    okay, I see basically slowdowns on these two end-to-  
2    end paths; therefore, it's probably not in the  
3    transit. Well, actually, no, maybe those converged at  
4    some point. You got to realize the internet is not  
5    basically just a bunch of amorphous, you know,  
6    networks. Every one of those independently-operated  
7    networks has thousands of paths inside of it. So  
8    oversimplification can lead to wrong conclusions.

9               There are other ways to do this. kc and  
10   David, sitting right here in the front, have basically  
11   done an excellent job finding out what you can  
12   actually discover from the edge of the network. This  
13   is great. You can do this without special access.  
14   The data is public. There are some drawbacks. It's  
15   hard to measure direct capacity. You can't measure  
16   the capacity of the links. You can only indirectly  
17   figure out basically how utilized those links are. So  
18   you can't figure out relative to how much capacity  
19   there is how full is it. You can make some indirect  
20   inferences.

21              On the other hand, we've been working with  
22   Cable Labs and other folks to basically get the ISPs  
23   to tell us what is on the interconnects. What is the  
24   capacity? What is the utilization? That's good. You  
25   know, you can get direct disclosure. The unfortunate

1 aspect of that is, you know, once you start to talk  
2 about disclosures, you basically end up in data  
3 sharing agreements with lawyers and things start to  
4 get aggregated.

5           There are things you can and cannot tell  
6 from those particular sets of aggregates. What you  
7 really want is a little bit of both of these. Also,  
8 we'd like to basically move towards trends on the  
9 right of this picture where the data is less  
10 aggregated as well. So you could basically put all of  
11 these pieces of the puzzle together.

12           Looking ahead, as I mentioned --  
13 And thanks, kc, I was also drawing attention to this  
14 meme -- the death of transit. Well, let me just say  
15 one more thing about that. Whether or not transit is  
16 dead, I don't know. It sounds like a meme to me. But  
17 it's worth pointing out that somewhere -- depending on  
18 which access ISP you ask, anywhere between 60 or 80  
19 percent of the traffic volume is going to distributed  
20 clouds from the access ISP. That's a lot.

21           So first of all, a lot of those interconnect  
22 decisions are basically to distributed clouds. The  
23 other thing that's quite interesting about that, a  
24 secondary thing, is it used to be when access ISPs and  
25 content providers got into these disputes and said,

1 oh, we can't agree who should pay, we're just going to  
2 like walk away from the table or we'll just disconnect  
3 you. This is basically the classic peering dispute  
4 move is we just cut off the link and force all your  
5 traffic through some expensive traffic.

6 Well, that can't happen anymore, right,  
7 because here's one thing that might happen. The  
8 access ISP, right there, they've also got content over  
9 on Amazon and Cloudflare and, you know, not only the  
10 content that they're serving to their eyeballs, their  
11 subscribers, they've also got like operational stuff  
12 over there. So by de-peering or cutting those really  
13 thick blue lines that I've shown, essentially they're  
14 crippling their own network.

15 So this era of peering disputes -- I will  
16 make a sort of strong claim -- I think it's over, due  
17 to the concentration and consolidation of traffic into  
18 these distributed clouds and CDNs.

19 Last two slides. This is probably going to  
20 change again, right. I think, right now,  
21 consolidation is in a particular part of the  
22 ecosystem. Five years ago, it was on the  
23 interconnects, right. That was where the lever was.  
24 Now, because of where content has shifted and the rise  
25 of the content platforms, as kc mentioned, the lever,

1 the market lever is shifting, right.

2 But it's worth pointing out that in order to  
3 basically deliver content to consumers, there are a  
4 lot of parties who come to the table here. I have  
5 listed as many as I could think of off the top of my  
6 head and David Clark's head, you know, in prepping  
7 this slide, but there are others. And the point  
8 here, which we should think about, is that any one  
9 of these is a potential lever for consolidation or  
10 anticompetitive behavior, and not just potential.  
11 I think we can think of cases in the past where  
12 any one of these has become the choke point in the  
13 market.

14 Last slide, traffic volumes are growing. We  
15 can see basically how that has shifted the market  
16 dynamic. The methods of delivering traffic are very,  
17 very different even than they were five years ago.  
18 These developments are playing out in a dynamic  
19 landscape. It's economic, political. As computer  
20 scientists, we like to measure things and assume that  
21 we can leave it at that. But this particular topic is  
22 highly political and economic. And even something as  
23 simple as our first panel, seemingly simple I should  
24 say, let's measure how fast the internet is, that's  
25 actually hard even as a technical question.

1                   But once you bring all these economic  
2   factors into play where everybody wants to win and  
3   nobody wants to basically be stuck with a large bill,  
4   it's a lot more complicated than just sending a few  
5   bits across the network and measuring how long it  
6   takes for those bits to get there.

7                   So with that, I will close with a challenge,  
8   which is that there are a lot of things that we can  
9   measure, a lot of things that we can measure now. And  
10   it is tempting to say, let's just measure those and  
11   map them up against advertisements and talk about  
12   consumer harm.

13                  But, actually, the types of things that we  
14   can measure right now are still a little different  
15   then the types of things that ultimately relate to  
16   the consumer experience. I think that is where we  
17   need to try to work on closing the gap. So that we  
18   can better answer these questions about are the  
19   products that the access ISPs, the transits, and the  
20   cloud providers delivering to consumers, are those the  
21   products that consumers expect and are paying for.  
22   Thank you.

23                  (Applause.)

24                  MS. YODAIKEN: Thank you again to both  
25   speakers this morning. We now have a 15-minute break

1     until 10:30.   Thank you.

2                   (Brief break.)

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25



1       SPEED ADVERTISING CLAIMS, SUBSTANTIATION AND SECTION

2       5

3               MS. WILLIAMS: Good morning, everyone. If  
4       you could all take a seat. Thank you.

5               Welcome to our first panel of the day, Speed  
6       Advertising Claims, Substantiation, and Section 5.  
7       I'm Kristin Williams. I'm an attorney in our Division  
8       of Advertising Practices in the FTC's Bureau of  
9       Consumer Protection.

10              Joining me on the panel today are David  
11      Clark from MIT; Nick Feamster, who we've just heard  
12      from, from Princeton University; Laura Brett from the  
13      National Advertising Division; Debra Ringold from  
14      Willamette University; and Josh Stager from New  
15      America's Open Technology Institute.

16              I'm going to turn things over to our  
17      panelists in just a moment, but, first, I wanted to  
18      give a brief overview of Section 5 of the FTC Act and  
19      our basic principles of advertising law. Before I  
20      begin, I will say that my comments are my own and do  
21      not reflect the views of the Commission or any  
22      individual Commissioner. Now, onto Section 5.

23              Section 5 of the FTC Act is the basis for  
24      the FTC's consumer protection authority. Section 5  
25      prohibits unfair or deceptive acts or practices in or

1 affecting commerce. Now, when we're talking about  
2 deceptive practices under Section 5, what we mean is  
3 that there's a representation or an omission or  
4 failure to disclose that is likely to mislead  
5 consumers acting reasonably under the circumstances  
6 and that also the representation is material. So what  
7 that means is it's likely to affect a consumer's  
8 purchasing or use decision.

9           When we talk about unfair practices, those  
10 are practices that cause substantial injury that is  
11 not reasonably avoidable and that is not outweighed by  
12 benefits to commerce or consumers. When we take these  
13 principles or these parts of the Act and we consider  
14 them in terms of advertising and what does it mean for  
15 advertising, it comes down to a couple of basic  
16 principles.

17           First, it means that advertising must be  
18 truthful and not misleading. Second, it means that  
19 companies are responsible for all advertising claims,  
20 express and implied, that reasonable consumers take  
21 from their ads. It's also important to note that the  
22 Commission looks at the net impression conveyed by an  
23 advertisement. When you look at fine print  
24 disclosures or disclaimers, those are not going to  
25 change the net impression of the ad. Finally,

1 objective claims must be substantiated before they are  
2 made.

3           So today, as we consider how this framework  
4 applies to our enforcement of advertising of broadband  
5 and internet access providers and speed claims, in  
6 particular, it really raises a couple of questions.  
7 And among those -- let me go back -- we're looking at  
8 questions about what existing measurement tools or  
9 research there are; what are their advantages; what  
10 are their shortcomings; and what additional tools or  
11 research might be needed. We also want to know, are  
12 there standards that exist or should exist to assess  
13 how advertised speeds compare to actual speeds.

14           We're thinking about how companies rely on  
15 research and tools to support or challenge these kinds  
16 of claims in advertising and whether existing methods  
17 of advertising adequately inform consumers about their  
18 choices. Also, we are looking at how consumers or  
19 other stakeholders can determine whether their actual  
20 speeds match advertised speeds.

21           So with that, I will turn things over to our  
22 panelists who will be addressing these questions and  
23 other issues. We will have some time at the end for  
24 questions.

25           David is going to start things off.

1                   MR. CLARK: Good, thank you. So let me  
2 stress we're talking about a really small part of the  
3 overall problem here. If you listened to kc and Nick,  
4 they pointed out that there are issues associated with  
5 interconnection, there are issues associated with  
6 cross-layer interconnection. But when you look  
7 specifically at consumer-facing advertising,  
8 obviously, you don't typically gets ads about the  
9 speed of your interconnection link, and speed has been  
10 the most popular topic to focus on because it's the  
11 easiest to quantify.

12                   In fact, even with respect to access, there  
13 are other measures. The Measuring Broadband America  
14 System measures latency; more recently, it measures  
15 loss. And, of course, there's another question about  
16 the quality of your access link, which is how many  
17 bytes a month can you send. That, too, may be a  
18 matter of a qualitative assertion.

19                   But we're going to talk about speed and what  
20 I said here is more is better up to a point and up to  
21 a point is really important, but let me explain what I  
22 mean by that. I'm going to focus on wireline and one  
23 of the reasons is that if you look at the way wireless  
24 is marketed, cellular is marketed today, at least in  
25 my personal experience, I don't see a lot of ads that

1 say four megabits a second. Basically, I listen to  
2 the Verizon ads and what they say is most reliable.  
3 The place where you get quantitative numbers is in the  
4 wireline space. So I think the emphasis in the  
5 wireless space is going to involve different metrics  
6 and we're going to have to figure out that, but that's  
7 another conversation.

8 What we've been looking at is, in some  
9 sense, the old-fashioned problem, which is the  
10 wireline problem. And I'm going to say three things.  
11 And the first one is cautionary. A lot of the tools  
12 that measure broadband link speed out there don't work  
13 very well.

14 The second thing I'm going to say is as the  
15 access links get faster, measurement gets more  
16 difficult. I think there is a chance, as we go  
17 forward, that speed may not continue to be the  
18 flagship measure of quality. That's debatable. I  
19 explain what the debate looks like.

20 So as I said, since there's a cautionary  
21 story here, let me begin by an experiment we did ten  
22 years ago. When the broadband boxes, otherwise called  
23 the SamKnows boxes, were first used, the FCC asked us  
24 if we would take a quiet look at them and calibrate  
25 them. You don't write a paper about something like

1 this. If you find a problem, you just tell somebody.

2 But we had some early SamKnows boxes and we  
3 took them to a house, and then we tested the SamKnows  
4 box and then we tested four other tools, Ookla, the  
5 Measurement Lab, NDT, Iperf and what's called  
6 Multithreaded. It doesn't really matter what they  
7 are. I'm going to show you the picture of what the  
8 measurement looked like. And it's a interesting  
9 picture because you'll notice that this picture sort  
10 of suggests the link went 20 megabits a second. And  
11 the green test was just absolutely beautiful, but the  
12 red one is all over the map. The red one -- sometimes  
13 it was going 30. Well, if the link is 20 megabits a  
14 second, how could the tool say 30? And then notice  
15 the other half of the time it says 5.

16 Well, we actually figured out what was going  
17 on. The way the tool worked was it sent some data --  
18 or since it's a download test, it received some data.  
19 What it did is start the clock, receive the data, stop  
20 the clock, measure how much data you got, divide by  
21 the time, and the clock precision was wrong. So the  
22 number -- the time in the bucket was wrong. And, of  
23 course, if you averaged across a whole bunch of them,  
24 it came out to 20. But the individual tests were all  
25 over the map.

1           Now, don't assume that this applies to  
2   today. This is a 10-year-old picture. The point is  
3   that sometimes the tools don't work and they have to  
4   be calibrated. And software changes and expectation  
5   changes, they need to be continuously calibrated.

6           Now, what we were doing there was measuring  
7   a 20 megabit link. It's pretty clear in that context  
8   that the 20 megabit link is probably the bottleneck.  
9   And when you do a speed test, you measure the  
10  bottleneck. Where the bottleneck is, that's the thing  
11  that you're going to measure, right?

12          So, a lot of tools would actually -- that we  
13  have today would successfully tell you that that 20  
14  megabit link probably goes about 20 megabits. The  
15  problem we have today is those links don't go 20  
16  megabits. The problem we have today is they're  
17  getting faster and faster and faster. And, now, we're  
18  talking about gigabits.

19          Now, I have to say something. You don't  
20  need a gigabit access speed in the home in order to  
21  have a glorious consumer experience. A hundred  
22  megabits, 200 megabits, 300 megabits -- I don't even  
23  know why you need 300 megabits. Why are they selling  
24  gigabits? Because it is a nice round number and the  
25  marketing departments like it. And I said, but we've

1     gotten into a crazy space where you're selling speeds  
2     that people don't need, and the marketing department  
3     said, yes, but.

4             Okay. So if you've got a gigabit link  
5     there, where is the bottleneck? Well, I can tell you  
6     and Nick will tell you because he knows all about  
7     this, if your speed test tool is in the house and it's  
8     hooked up over WiFi, that's your bottleneck, and  
9     you're going to measure your own WiFi network. And by  
10    the way, most WiFi networks don't work well.

11            But what makes you think that there is a  
12    gigabit of excess capacity between the other side of  
13    your access link and some server? Why would there be  
14    a gigabit of excess speed? That would be wasteful on  
15    the part of the ISP. So maybe measuring a gigabit  
16    link doesn't mean you get a gigabit to any single test  
17    point. Maybe what it means is, well, you can have a  
18    gigabit in aggregate if you're sending it to all kinds  
19    of places at the same time.

20            So does a gigabit mean anywhere in the  
21    internet? That would be nonsense. Afghanistan? No.  
22    If you're saying, I want a gigabit just to cross my  
23    access link, then you need a test point on the other  
24    side of your access link.

25            So what we discover now is that measuring



1     that link has actually become problematical. So we,  
2     again, looked at some test tools. We have SamKnows in  
3     there, mLab, there's something called Internet Health  
4     Test. It almost doesn't matter which one because you  
5     just want to -- this is the take-away picture.

6             Okay. This is, again, a test we do. We run  
7     the tools in a controlled environment. Several of the  
8     tests are up around a gigabit, but the lavender ones  
9     and the green ones are running around 200, 300, 400  
10    megabits a second. Don't ask which one. It doesn't  
11    even matter. Because everybody fixes them all the  
12    time, plays with them all the time. The point is some  
13    of the tools just can't keep up. They can't go fast  
14    enough. It's like I sold you a car and said, this  
15    car will go a thousand miles an hour. And you said,  
16    hmm, you know, my tools don't even go that fast. But  
17    then the car really can't go that fast on the roads  
18    anyway.

19            So there's a lot of concern in the public  
20    space that people are using test tools. They're  
21    downloading a test tool. They're doing something.  
22    They're running it. And they said, oh, my God, I only  
23    got two megabits a second, my ISP must be screwing me.  
24    And then they say, no, the test tool didn't work. And  
25    they can download anything they want.

1           So here is a table and I'm going to -- you  
2   know, you can look at the slides if you want to follow  
3   it. But what I point out here is how the test tools  
4   are set up to try to be effective. One of the things  
5   you need to be able to do is you do a test, you do a  
6   data transfer. We run a protocol called transmission  
7   control protocol, TCP. It's many, many cases that one  
8   connection cannot go at a gigabit. So you run lots of  
9   connections in parallel.

10           So the first column says, is there a single  
11   flow or are there parallel flows? And you'll notice  
12   that NDT in this table has a single flow. And if you  
13   go back to this picture, you'll notice that NDT is the  
14   green dots. The answer is, it just can't go a  
15   gigabit.

16           Another thing we say here is, do you test to  
17   a single destination or multiple destinations? In  
18   other words, do you need to have a gigabit -- a path  
19   with a gigabit of excess capacity to a single  
20   destination or do you measure lots of destinations at  
21   the same time?

22           And the third thing I put in the table is  
23   how is the thing deployed? In most cases, these  
24   things are software, you can download them and you can  
25   run them in your house. The SamKnows box is the

1 distinction. It is hardware and it's put in known  
2 houses and the FCC knows where it is and so forth.

3 Now, in this context, what you want to do is  
4 what is the drawback of various methods? The drawback  
5 of the SamKnows method is it's a piece of hardware.  
6 They have to get you to take it. They have to get it  
7 set up. It's got real issues in deployment. They  
8 have a few thousand of these boxes. Nick talked about  
9 doing measurement with his boxes. He's got a few  
10 hundred. kc does measurements; she's got a few  
11 hundred around.

12 You could say, well, if you just download  
13 the software, you could have thousands and thousands  
14 and thousands of sites. But there are three issues in  
15 that space. The first is selection bias. Random  
16 people do not run speed tests. The people that run  
17 speed tests -- in my experience, there are only two  
18 reasons you run a speed test. The first is you're  
19 cranky. It didn't work. You think you're going slow.  
20 So there is a tendency for people who think they may  
21 be having a bad experience to preferentially test.

22 The other is you bought a gigabit link --  
23 and the only reason to buy a gigabit link is for  
24 bragging rights because you don't need the speed. So  
25 they're going to run a test to see if it goes a

1 gigabit.

2           The second problem is if you bought a  
3 gigabit, because I say you bought it for bragging  
4 rights, you know how fast it is. But most people  
5 don't know how fast their network connection goes.  
6 Comcast regularly sends me a note saying, we made your  
7 link faster, be happy. Okay, fine, I'm happy. But if  
8 you said to me, exactly how fast does my link go  
9 today? I don't know. So how can I tell you whether  
10 I'm getting what's advertised?

11           One of the hardest parts of the FCC project,  
12 which people don't appreciate, is for every SamKnows  
13 box, whenever they do a measurement month, they  
14 actually go to the ISP and the ISP looks up the  
15 contract of every user to figure out what the actual  
16 speed of that home is so they can compare the measured  
17 speed to the actual speed. That's a pain, okay? And,  
18 of course, the other issue with the web or the  
19 application-based measurement is your host can be a  
20 barrier to achieving the speed and, certainly, the  
21 home network can be an impairment and you really can't  
22 tell.

23           So here are questions for consideration.  
24 The first one is, are gigabit speeds important today?  
25 I'm being snarky about it. I'm saying, you don't need

1 a gigabit. Maybe you'll need a gigabit tomorrow.  
2 Maybe we're going to do multiuser immersive,  
3 collective, virtual experience gaming. Blah, blah,  
4 blah, blah, blah. Okay, maybe. But, you know, 100-  
5 megabit today, that's fine.

6 So the difference between 500 megabits and a  
7 gigabit today -- and I'm saying this on the basis of  
8 experimentation -- does not change the user  
9 experience. That I think says, how should the market  
10 and the regulatory expectations evolve as these speeds  
11 evolve towards gigabits? We had a workshop last  
12 summer and we asked a bunch of ISPs, do you think you  
13 should be continuing to market speed as the flagship  
14 measure when you are capable of delivering speeds that  
15 are more than the consumer needs?

16 And the room was absolutely divided. There  
17 were some people who said, we will never get away from  
18 marketing speeds because even though it's irrelevant  
19 to the consumer experience, it's a number they can  
20 understand. If my number is bigger than yours, then  
21 they will buy my product. And I have now heard people  
22 talking about ten gigabits to the home.

23 The other answer is this is nonsense. We've  
24 got to get off that train and get on some other train,  
25 which we've come up with some other measure that more

1 usefully relates to the quality of the user  
2 experience.

3 What changes need to occur in the  
4 measurement platforms? Okay. We've got to get the  
5 measurement tools to run a gigabit. And, now,  
6 somebody is trying to do ten gigabits to the home.

7 And, of course, what should the research  
8 agenda be to address the technical and policy  
9 challenges in this space. And I want to stress, we  
10 are only talking about one little corner of the  
11 problem. We're not talking about interconnect, we're  
12 not talking about cross-layer stuff. We're just  
13 talking about this old-fashioned challenge question  
14 we've had of how fast does the link to my house go.

15 Those graphs came from papers. If you want  
16 to go look at the papers, here are some citations so  
17 you know where the data came from. We have been doing  
18 this stuff, I would stress, since kc brought this  
19 point up. That one of the issues in this space is  
20 that everybody loves the pictures and nobody will pay  
21 us to do the work.

22 MR. FEAMSTER: Thanks, David, for setting up  
23 the topic so well. I am going to spend the next 15  
24 minutes or so talking about some experiences we've had  
25 in trying to measure internet access speed over the

1 past 10 or 15 years and how those lessons might apply  
2 to the problems we're facing today.

3 As David alluded to, the problem is a lot  
4 harder than it would appear. Someone I think before  
5 the panel asked me, how did you get into this area?  
6 Well, actually, someone dropped us a data set and we  
7 thought we would basically just plot some graphs and  
8 write a paper and move on, and it turns out that  
9 when you start getting pictures like the one David  
10 showed, it turns out, well, actually, the data that  
11 you get indicates that this is actually a really hard  
12 problem.

13 Here are a bunch of lessons that we learned.  
14 I'm going to go through each one of them in the next  
15 few minutes. Speed has many facets. Second,  
16 different measurement techniques will measure  
17 different aspects of speed. Third, many factors limit  
18 the performance of a client-based speed test. Fourth,  
19 faster speed doesn't necessarily mean better  
20 performance for the application and it certainly may  
21 not mean better user experience.

22 And, finally, as speeds are getting faster,  
23 just doing the plain old speed test itself is actually  
24 getting harder. So even if we decided that was the  
25 thing we wanted to do, that's not actually that

1 straightforward either. Many of these things David  
2 also touched on as well, so hopefully you're starting  
3 to see some themes.

4 First, speed has many facets. You can open  
5 up Ookla speed test on your phone. That's what I did  
6 here. It's worth pointing out -- and I will come back  
7 to this -- that I'm opening it on my phone as opposed  
8 to in a browser. I will come back to that later.

9 But if you open up the mobile application,  
10 right, the one on your phone, you will see a bunch of  
11 different numbers. Okay? The thing that we talk  
12 about as speed is up there in the upper left.  
13 Downstream throughput or download throughput. You can  
14 measure the -- that's basically just how many bytes  
15 were transferred in a given amount of time. There are  
16 various ways that you can tweak that, measuring  
17 different intervals, the length of the test and so on  
18 and so forth. I'll get into some of those in just a  
19 minute.

20 But even such a simple question as like,  
21 yeah, I'm just going to measure how many bytes are  
22 transferred and divide by the amount of time, well, it  
23 turns out there are about as many ways to do that as  
24 there are people in the room. You can, of course,  
25 measure it in the other direction as well from the



1 client up to the server. That's upload or upstream  
2 throughput. And then there are other things that, by  
3 the way, even speed tests have started to measure.  
4 The numbers are in 8-point font as opposed to 24-point  
5 font, but they're there.

6 Ping? What's that? Well, that's latency.  
7 That's basically how far away is that server you're  
8 measuring? Why does that matter? Well, for certain  
9 applications, like gaming, you might care more about  
10 that. Jitter is basically how steady is that latency  
11 over time. Okay. Well, if it's always ten  
12 milliseconds to get to that server, that's one thing.  
13 But if it's ten milliseconds now and then, you know, a  
14 little bit later, it's half a second, and then it's  
15 ten milliseconds again, you're not going to have a  
16 very smooth video call if my voice is suddenly  
17 stopping and starting all the time.

18 So it doesn't matter how much throughput  
19 there is. It doesn't matter if I can push a gigabit  
20 per second across that link, which, by the way, no  
21 videoconference call runs at that speed. If the  
22 jitter is horrible, your experience is going to be  
23 bad. So this notion of speed, even in something as  
24 simple as a so-called speed test, they're starting to  
25 show us these dimensions.

1           Second, let's just drill into downstream  
2 throughput. Even if you decided that was the thing  
3 you wanted to measure, well, depending on the tool and  
4 depending on the technique you used to measure this,  
5 you're going to get different numbers. So what I'm  
6 showing here is something we did about ten years ago  
7 on a DSL link. Again, this is something we did in my  
8 house. This is similar to the experiment David  
9 described. Take some stuff home, run it against  
10 servers, see what happens.

11           The X axis here, the horizontal, shows  
12 basically fractions between zero and one, where one  
13 would be like, okay, that's my speed tier, which I  
14 happened to know because I paid for and I bothered to  
15 look. In a general case, we don't know what that is.  
16 So further to the right is good. Well, it turns out  
17 if you basically do something called a single-threaded  
18 HTTP test, which is analogous to what NDT does, as  
19 David mentioned, even in the six megabit per second  
20 DSL days, you actually weren't getting very good  
21 numbers. That's not because a single TCP connection  
22 can't push that, by the way. In this particular case,  
23 it related to other things like packet loss on a DSL  
24 link slowing down the single TCP connection.

25           So even like 10 years ago or 15 years ago,

1 we knew that using multiple TCP threads did a better  
2 job at fully exhausting that available capacity on the  
3 access link. Strangely, there are studies that  
4 continue to use NDT as a measure of link capacity,  
5 i.e., what the ISP is supposedly selling you.

6 David actually mentioned a nice word. He  
7 said, the tools are broken, they don't work. Well,  
8 that's certainly one perspective. I would also say  
9 another way of looking at that as well, all of these  
10 tools are measuring something, even that broken plot  
11 that David showed us. Well, it's measuring clock  
12 precision actually, right. You're not measuring the  
13 access link.

14 And the same thing goes for some of these  
15 other so-called speed tests. You're not measuring the  
16 access link. You are measuring something. You are  
17 measuring how fast a single TCP connection can  
18 transfer bytes over that link. And by the way, it's  
19 an old version of TCP. So you're measuring something.  
20 But the important thing, of course, is you want to  
21 match that up to a claim. If you're basically talking  
22 about measuring an access ISP link, that's actually  
23 not what the tool is measuring.

24 Second point -- third point, sorry. Many  
25 factors limit a client-based speed test. David

1 mentioned this a little bit. Let me just enumerate a  
2 couple. Could be the client device, could be the home  
3 network. It could be the path between where you're  
4 measuring and the server that you're measuring  
5 against. For that matter it could be the server  
6 infrastructure. And you can certainly check old FCC  
7 fillings on this. Even the services that were used in  
8 some of their studies, the Measurement Lab servers,  
9 have had some pretty significant issues with  
10 introducing performance bottlenecks on the speed tests  
11 themselves.

12 Then there are questions about how long do  
13 you run the test, how many connections do you run in  
14 parallel, where do you measure to, and so on and so  
15 forth. Let me talk about a few of these that we've  
16 basically discovered in our own studies. One, the  
17 device could be the bottleneck. So this is something  
18 -- this is actually download speeds as measured by an  
19 Ookla speed test during a particular time at the end  
20 of 2015 through the beginning of 2016. If you're  
21 familiar with complaints, you might recognize this  
22 time period as a particular complaint.

23 Each box shows essentially the range of  
24 speed tests that Ookla delivered to people on certain  
25 speed tiers, from 50, 100, 200, 300, and for different

1 versions of the iPhone, 5, 5s, 6, and so forth. The  
2 first thing to note is that the boxes aren't just one  
3 point. So even if you've got a single device, a  
4 single speed tier, you measure a bunch of times,  
5 you're going to get a bunch of different things.  
6 Well, so, great, so there's variability.

7 But the other thing to notice here is that  
8 no matter your speed tier, 50, 100, the iPhone 5s  
9 never measured that top whisker, if you will. You  
10 never see a measurement more than about 100 megabits  
11 per second and change. Well, why? Well, because the  
12 older iPhones actually have older 802.11 radios in  
13 them that don't actually support those higher speeds.  
14 So you can buy a gigabit link at home all you want and  
15 measure from your iPhone 5. You're never going to get  
16 a gigabit per second with that speed test. It has  
17 nothing to do with your ISP; it's the device.

18 Another thing, if it's not the device, maybe  
19 it's the home network. So this is something we did  
20 actually with the FCC's MBA-assisted research studies  
21 projects. We looked at basically, you know, how often  
22 is it that it's the home network that's the  
23 bottleneck? Here, the size of the circle is the  
24 measured access throughput. So bigger means higher.  
25 Then you can see the X and Y axis are showing, okay,

1 further down and to the right, those are access link  
2 bottlenecks, and further up and to the left, those are  
3 home network.

4 This is your home WiFi, right. Yeah, sure  
5 if you've got really small dots and you've got a  
6 really slow access link, yeah, sometimes the access  
7 link is the bottleneck. But, you know, a lot of  
8 times, it's your WiFi. Okay? Especially as those  
9 circles get bigger, as the throughput increases.

10 This was 2015. So we were doing 2015 WiFi  
11 access points 802.11 radios, et cetera. So take this  
12 number with a grain of salt. It's probably not the  
13 right number anymore. But at that time when it was  
14 802.11n homes that basically had access ISP's  
15 throughput higher than 35 megabits per second, the ISP  
16 was never the bottleneck. It was basically the home  
17 network all the time. Well, now, it's probably higher  
18 than that because we've got 802.11n and AC and your  
19 wireless network can push more speed. But the access  
20 link has gotten faster, too. So I don't know what  
21 that number is today. Someone should probably do this  
22 again. But the home wireless network could be the  
23 bottleneck.

24 Another thing that we've looked at is that  
25 the path can be the bottleneck. In this picture, this

1 is something basically where we looked at end-to-end  
2 latency from points -- clients actually near  
3 Johannesburg, South Africa to basically everywhere in  
4 the world. And these -- on the X axis here, we've got  
5 cities ordered in geographic distance from  
6 Johannesburg.

7 So you would expect, you know, speed of  
8 light or a crow's flying or packets flying, that these  
9 bars should get taller and taller as you get further  
10 away from the place you're measuring. So you would  
11 hope these bars would go up and to the right.  
12 Actually, what happens is -- well, actually,  
13 underneath -- you know, underneath the covers, the  
14 internet doesn't route packets by the speed of light.  
15 There's actually paths.

16 What we see is that if you're going from  
17 South Africa to other places in Africa, India, and so  
18 forth, actually even if you're going to a country  
19 that's, relatively speaking, next door, the latencies  
20 are much higher than if you're going through Amsterdam  
21 or London and, in fact, double. Why? Because your  
22 packets between South Africa and Kenya are actually  
23 going through London and Amsterdam first. So this is  
24 an extreme example to point out that the way that  
25 networks interconnect, the things that we talked about

1 the first two talks, can greatly affect where  
2 performance bottlenecks may be.

3 Next point. Faster speed, right, even if  
4 you get it, doesn't necessarily mean better  
5 performance. So this is web page load time. Further  
6 to the bottom of the graph is better. It means  
7 basically less time to load the page. And this is a  
8 log scale, so basically the further down you go, like  
9 the much better it gets. On the X axis, the  
10 horizontal, we have the speeds as we have measured  
11 them with our speed test. So as you go to the right,  
12 you're getting faster.

13 Well, you know, basically you might expect  
14 that these lines would go down and to the right  
15 because, hey, faster is better, right. That means --  
16 faster ISP speed means faster web. All good, right?  
17 Well, no, it actually flattens out.

18 And we saw that for many sites, that  
19 actually the time to load the web page doesn't  
20 actually get any better after about 16 megabits per  
21 second. Again, we did this study about five years  
22 ago. So the specific numbers, of course, may have  
23 changed. You know web pages have gotten actually more  
24 complicated as well. But the point being that -- to  
25 quote David -- "more is better up to a point." That



1 point still holds.

2 Okay. Here is basically what this -- you  
3 know, this is today's version of this. On the X axis,  
4 horizontal, we have our measurements of capacity. How  
5 fast are these access links? And on the Y axis, we  
6 have, you know, how much traffic, you know, how fast  
7 are these applications pushing that access link?  
8 What's the max? Okay. So most of the time they're  
9 not even pushing these rates.

10 But the main thing to take away from this  
11 plot is that these applications are not maxing out the  
12 access link. So this is David's point. You don't  
13 need more than 100 or 200 megabits per second to  
14 stream any of these applications. They're not using  
15 it. So, what do we do? Well, we could focus on user  
16 experience instead. That is going to depend a lot on  
17 what application you're using.

18 But let's talk about video for a second.  
19 Well, how long does it take to start playing? What's  
20 the resolution of the video? Does it change? Does it  
21 suddenly, you know, go from awesome to really grainy  
22 and choppy? Well, the changes may be something we  
23 care about. Does it stop completely, a rebuffering?  
24 We know that's basically frustrating, right. So these  
25 are the things that we may care about as users. I

1 just want the internet to work. I want my video  
2 stream to be good.

3 How does this map to performance? We don't  
4 really know yet. Okay. So that remains an open  
5 question. As speeds get faster, of course, you know,  
6 measuring the speed itself actually gets harder. The  
7 conventional tests, like let's just shove a bunch of  
8 data and measure how much time. Well, okay, the  
9 faster the link means more data. As David pointed out  
10 already, the faster access link means the bottlenecks  
11 are moving elsewhere.

12 It used to be simple, right. The bottleneck  
13 link was the access ISP. Well, the access link ISP  
14 gets bigger, now the bottleneck could be anywhere. It  
15 could be your home WiFi. It could be the device. It  
16 could be the path. It could be the server. And it  
17 is. Not just could be. I've given you some examples  
18 where it is the bottleneck. And the apps don't need  
19 it, right.

20 Okay. So here's basically a thought  
21 experiment and sort of a charge for the future. I  
22 posit that a lot of what we're going to need to do is  
23 actually not just active performance testing, but  
24 actually passive measurement. Let's basically watch  
25 what these applications are doing on the user access

1 link and try to figure out basically how good they  
2 are. That's hard, right, because there are things we  
3 can measure. We can measure packet loss and speeds,  
4 et cetera. But the things that I told -- that I  
5 mentioned that we care about, startup, delay,  
6 rebuffering, resolution -- first of all, you've got to  
7 infer them. That's hard.

8 Second of all, it's different for every  
9 application even if you can infer it. We have built  
10 an application that basically does some of this.  
11 We've basically started monitoring passively and we  
12 can identify like, hey, that's a Netflix stream,  
13 that's a YouTube stream. Here's how fast those are  
14 going. Here are the bit rates. Okay, fine. We can  
15 tell you that someone's streaming YouTube or Facebook  
16 or Hulu or whatever and it's going this fast. But,  
17 well, does that have anything to do with performance?  
18 We don't know because, you know, maybe they're  
19 streaming to a handset, maybe they're streaming to a  
20 4K TV. So there are a lot of unanswered questions  
21 there.

22 Here's my summary of points. Thank you for  
23 your time.

24 (Applause.)

25 MS. BRETT: Good morning. I first want to

1     thank the FTC for inviting us to be here because we  
2     are on the front lines of looking at advertising speed  
3     claims at the NAD. And for those of you who don't  
4     know what the NAD is, we're an advertising law forum  
5     that was founded nearly 50 years ago by the  
6     advertising industry to build support in advertising  
7     claim and truthfulness of advertising claims. And we  
8     look at claims that are brought by competitors and  
9     also in claims that are brought by -- that we open on  
10    our own initiative based on consumer complaints and  
11    evaluate the claims to see whether or not they're  
12    truthful.

13                 We have been heavily used by the  
14    telecommunications industry to resolve claims about  
15    the truthfulness of their advertising. We have looked  
16    at a wide variety of claims, including lots and lots  
17    of speed claims. We've also looked at claims about  
18    coverage and reliability, and try and set industry  
19    standards that the industry follows.

20                 I'm going to talk you through some of our  
21    internet speed claim issues and I hope it will shed  
22    some light on the real complications in evaluating  
23    internet speeds, both in mobile and wired line service  
24    because we've looked at both.

25                 So, first, I do want to give the industry

1     some credit. They have heavily used NAD as a forum  
2     for resolving their advertising disputes. They have  
3     the option to go to court. They have the option to  
4     complain to regulators if they think a competitor's  
5     advertising is not truthful. But they have leaned  
6     heavily on the National Advertising Division, and it  
7     includes nearly all telecommunications providers, both  
8     wired and wireless service providers, AT&T, Verizon  
9     Sprint, T-Mobile, Comcast, Charter, DirecTV, DISH,  
10    Frontier. We have also had challenges by Cablevision  
11    and some of the providers who have been gobbled up  
12    over the years.

13           They have also looked to us for guidance, in  
14    particular, on speed claims. In the last 10 years  
15    alone, we've looked at 34 express and implied speed  
16    claims that one network is the fastest or that another  
17    network is, in fact, slowing down.

18           So, every year, we look at roughly 10 to 15  
19    telecommunications cases and provide guidance on  
20    whether or not their advertising is truthful. You  
21    know just to underscore, participation in an NAD  
22    proceeding is completely voluntarily.

23           So the fact that we've resolved this many  
24    disputes and the companies walk away and make changes  
25    to the advertising is really laudable, particularly

1    when we've seen some very high profile campaigns that  
2    we know cost millions and millions of dollars just to  
3    produce, and they'll walk away from it based on NAD  
4    recommendations that they make changes to their  
5    advertising, not to mention the billions that they  
6    invest in their networks to provide faster speeds and  
7    more reliability. And we will tell them that they  
8    can't make a claim that they feel is supported and  
9    they follow our guidance. So we do appreciate that.

10           And, also, for those of you who are  
11    wondering how we can be so effective within an  
12    industry like telecommunications with a lot of power  
13    both with consumers and in the marketplace generally,  
14    it is really because of the strong support that we get  
15    from the Federal Trade Commission.

16           The Federal Trade Commission supports self-  
17    regulation both by attending our conferences and  
18    inviting us to speak at events like this and singing  
19    the praises of self-regulation. But, also, because  
20    if a company doesn't participate in self-regulation,  
21    we usually refer them to the FTC and the FTC has a  
22    very strong record of following up on our referrals.  
23    In most cases when a company is referred to the FTC  
24    for not participating in good faith and self-  
25    regulation, we see that the company either comes back

1 to NAD and participates or they make meaningful  
2 changes to their advertising after a consultation.

3 So let's talk about speed claims and I'm  
4 going to start with mobile. So speed claims that we  
5 have seen -- and we do see a lot of mobile speed  
6 claims -- in fact, probably more mobile speed claims  
7 than we do for wired line services. We've looked at  
8 disputes that T-Mobile is advertising that they're as  
9 fast as Verizon, AT&T. And we've really struggled  
10 with, over the last few years, how to measure whether  
11 or not a mobile service provider is the fastest.

12 The general debate in mobile is whether or  
13 not -- is how you measure that fastest claim, how  
14 you're supporting that fastest claim. And there are  
15 two primary ways that we see. We see drive testing  
16 and we see crowd source data testing like Ookla as we  
17 have heard talked about before. And I hope as I talk  
18 about this, it will shed light on just the  
19 complications of trying to support a speed claim.

20 When you look at drive testing, it is what  
21 it sounds like. There are a couple of drive testing  
22 companies that hire people to drive around the  
23 country, nationwide, performing tests on networks.  
24 The tests are methodologically designed to make sure  
25 that the networks are evaluated on an even playing

1 field. So they test the same device in the same place  
2 under the same conditions on multiple networks. And  
3 in that way, they're trying to make sure that any  
4 differences that they see are differences that  
5 consumers will experience.

6 However, when you do that drive testing, you  
7 sort of miss some of the consumer experience of using  
8 a mobile network where they may be testing indoors,  
9 they may be using their wireless device indoors, they  
10 may be using it in crowded spaces and in areas where  
11 this drive testing is not necessarily going to pick up  
12 some of the complications and the speeds you're  
13 experiencing.

14 We have also looked at Ookla testing, which  
15 is crowd source data testing. And there are other  
16 crowd source companies, like Open Signal, and those  
17 test in the backgrounds of phones or on user-initiated  
18 tests. And what they pick up is all the complications  
19 of how consumers use their phone. Consumers, when  
20 they use their phone, they have apps open in the  
21 background, they're often in crowded places or  
22 indoors.

23 So this kind of crowd source data testing  
24 really picks up the full consumer experience of using  
25 their phone. However, it may contain bias based on



1 some of the variables of the way consumers use their  
2 phone and whether or not those variables are  
3 consistent across networks.

4 For instance, we know that some devices work  
5 better on some networks than others. And, in fact,  
6 Nick just talked about the iPhone 5 can't achieve  
7 certain speeds. That may not be as compelling for a  
8 wireless network. But we do know that the Samsung  
9 Galaxy S9, at least at one time, worked faster on most  
10 networks than others. So if more T-Mobile users have  
11 Samsung Galaxy S9s, they're going to register faster  
12 speeds because that device is faster.  
13 So we're concerned about using crowd source data to  
14 support a speed claim because of those potential  
15 biases.

16 Also, wireless providers deprioritize users  
17 based on data limits. If you have an unlimited data  
18 plan, you know, the percentage of your users who may  
19 have reached those data thresholds are also a concern  
20 to us, as is coverage in rural areas, which is  
21 generally not as fast as coverage in metropolitan  
22 areas. Rural coverage is often slower because they  
23 haven't installed 4G or 4G LTE service to those rural  
24 neighborhoods.

25 So what have we done given this conflict and

1 the testing? For one thing -- and I'm going to report  
2 on this now, after hearing the experts before me say  
3 that speeds aren't everything. In a recent case,  
4 T-Mobile was claiming to be the best unlimited network  
5 and they were primarily relying on speed test data.  
6 And we did say that speeds aren't everything. So I  
7 feel kind of validated by the remarks before. But we  
8 said speeds aren't everything and you can't support a  
9 best unlimited plan claim -- a best unlimited network  
10 claim on speed testing alone.

11 We've also looked at crowd source data and  
12 found it could support a claim about whether or not  
13 T-Mobile again was less likely to slow down. So they  
14 presented crowd source data demonstrating that they  
15 were delivering 4G LTE speeds to their customers 80  
16 percent of the time. That was a higher percentage  
17 than competing providers. So in that circumstance, we  
18 said, this crowd source data, which picks up really  
19 the variability of the way consumers use their phone  
20 does, in fact, seem like a reasonable basis to support  
21 a claim that you're less likely to slow down.

22 However, a couple years later, just in 2018,  
23 we looked at advertising by Sprint, which claimed that  
24 -- it was denigrating advertising towards Verizon.  
25 They were saying Verizon is now we're offering

1 unlimited and have you noticed how much your phones  
2 are slowing down. Not surprisingly, Verizon  
3 challenged that advertising. Sprint attempted to  
4 support its claim by sharing crowd source data with us  
5 from Ookla and Open Signal which they felt  
6 demonstrated that the Verizon network was, in fact,  
7 slowing down.

8           The problem is that both Sprint and Ookla  
9 sort of acknowledged that deprioritization policies on  
10 Verizon may have impacted those speed test results  
11 because, you know, Verizon offering unlimited meant  
12 that they have users who were potentially experiencing  
13 deprioritization for the very first time.  
14 Deprioritization sort of pushes you to the back of the  
15 line. You know, if multiple people are trying to  
16 access a network at the same time, if you're  
17 deprioritized, you're going to get slower speeds and  
18 the people who aren't deprioritized are going to get  
19 that speed first. So in that case, we recommended  
20 that the claim that Verizon was slowing down be  
21 discontinued.

22           One benefit about self-regulation, though,  
23 is that we know that as technology improves, as  
24 testing methods improve, we use a broad flexible  
25 standard that your advertising must be truthful. So

1 we're going to keep looking at the testing methods and  
2 one decision that this test method is not reliable to  
3 support a claim doesn't bind us in finding that it's  
4 not reliable to support a claim like this in the  
5 future. And, in fact, we've seen some of the crowd  
6 source data companies through other cases and the  
7 context is not important here.

8 But we've seen them try and demonstrate to us  
9 that they're trying to control for variables. They  
10 are trying to make sure that they don't over-sample  
11 from users who tend to test a lot. That there is not  
12 a difference between the background testing that gets  
13 done and user-initiated tests. So we're sort of  
14 mindful that as testing improves, we may be revisiting  
15 some of the issues that we've looked at before.

16 So, now, I've got a few minutes left and I'm  
17 going to turn to wired line service and the claims  
18 that we've seen about speeds. In order to do that,  
19 I'm going to take us back in history back to 2005 and  
20 2006 and 2007, when we saw Verizon first entering the  
21 marketplace with FIOS. Back in those days, cable was  
22 often the fastest internet provider you could get at  
23 your home. Cablevision was making claims that they  
24 were the fastest internet service provider. They were  
25 challenged by Verizon.

1                   What we looked at was what speeds  
2   Cablevision was providing to consumers in their home.  
3   But, also, whether or not Verizon was meaningful  
4   competition to Cablevision for those homeowners.  
5   Because, at that time, Verizon had installed FIOS in  
6   less than 15 percent of homes. So in that case we  
7   said, you know what, if you're not a meaningful  
8   competitor to consumers, you can't prevent them from  
9   making speed claims because, or most consumers in the  
10   market, Cablevision is going to offer the fastest  
11   speeds.

12                  Lo and behold, a year later, Verizon came  
13   back and was making a fastest speed claim,  
14   demonstrated that they were available to most of the  
15   consumers in that region, and they were allowed to  
16   make that claim. But it set up a standard, an  
17   industry standard, that has been followed by the  
18   industry across the board for several years. And that  
19   is, first, that you have to be sufficiently available  
20   in an area to advertise the speeds that you're  
21   providing or make a disclosure that you're less  
22   available than available in the area.

23                  Second, you can advertise that your fastest  
24   speed makes you the fastest in a particular area. So,  
25   we may be part of the reason why we're seeing gigabit

1 speeds being advertised across the board when  
2 consumers don't really need them because what we've  
3 seen over the years is as one provider builds up his  
4 network to a degree where they're able to advertise  
5 that they're the fastest, you know, that gives them a  
6 competitive advantage in the marketplace that they  
7 benefit from.

8           It does provide additional complications,  
9 though, for consumers because now that you can buy  
10 many, many different tiers of service, there are  
11 misleading messages that can creep into your  
12 advertising that we have seen. A lot of guidance that  
13 we've provided to wired line providers is that if  
14 you're going to advertise that you're the fastest, you  
15 can't tie that to some of your pricing claims.

16           So if you're going to, if you're offering a  
17 triple play for 99.99, like we saw Comcast doing for  
18 many years, you can't tie that to the fastest speeds  
19 that you provide. Because even if you're the fastest  
20 -- and at that time, I think they were offering 500  
21 megabit service -- you're not the fastest with the  
22 triple play. You have a different product that you're  
23 advertising at 99.99, so you have to separate those  
24 claims and you have to make it clear that your fastest  
25 service is not for 99.99. We've seen a variety of

1 challenges around that over the years.

2 We've also seen claims about what speeds a  
3 service provider delivers that are based on aggregated  
4 data, which is very -- data which is aggregated across  
5 speed tiers. But you're not delivering a speed across  
6 a speed tier or you're not delivering a speed to  
7 consumers. Let me take a step back for a second.

8 What consumers take away from who is  
9 delivering the fastest speeds is what speed am I going  
10 to get. So what we've tried to make sure that the  
11 internet service providers do is, in fact, share with  
12 consumers that if they're aggregating their speed test  
13 data, that they disclose that to consumers.

14 So my time is just about up. I see my sign.  
15 I just want to thank the FTC again and really give the  
16 telecom community some credit for the work that  
17 they've done to set consistent industry standards by  
18 using self-regulation and make it clear that I'm not  
19 trying to pick on any of them up here. We view all  
20 telecom providers who come to us as good faith  
21 players.

22 Thank you.

23 (Applause.)

24 MS. RINGOLD: Good morning. Thanks very  
25 much for having me. In my experience, when faced with

1 complex regulatory problems, it's often the case that  
2 we become somewhat myopic, losing focus on the  
3 generalities that apply to markets and exchange more  
4 broadly.

5           So when claims are potentially deceptive,  
6 misleading, unfair, it's useful to review what we know  
7 about consumers and advertising. These axioms, if you  
8 will, provide an important context in which to  
9 consider whether an advertisement contains a material  
10 representation that is likely to mislead consumers  
11 acting reasonably in the circumstances.

12           Today, I will present my take on a portion  
13 of the advertising literature most relevant to speed  
14 claims and talk a little bit about speed claims, in  
15 particular. If would you like a copy of the  
16 bibliography I prepared as I put this talk together,  
17 please email me and I will send it to you.

18           My own work and work comprising literature  
19 developed over more than 50 years makes clear that  
20 consumers understand the purpose of advertising. They  
21 are highly skeptical of claims made to differentiate  
22 one product or service from another. They mistrust  
23 generic claims and they distrust advertising as a  
24 activity.

25           Consumers well understand producer



1 incentives. They are quite sophisticated in  
2 recognizing when advertisers have the opportunity to  
3 mislead. Search, experience, and credence claims form  
4 an ease of verification continuum that consumers well  
5 recognize.

6 As verification costs go up, consumers  
7 understand that some advertisers may take advantage of  
8 these higher costs. Typically, consumers trust easily  
9 verified claims and are more skeptical of those claims  
10 that require something of an investment to verify.  
11 They distrust subjective claims more than objective  
12 ones.

13 Posner, in a very early work in 1973,  
14 Regulation of Advertising by the FTC, observed this  
15 and argued that the Federal Trade Commission should  
16 concern itself with situations in which false or  
17 misleading claims are difficult and/or expensive to  
18 detect. But despite this skepticism, consumers report  
19 that advertising is useful in that it communicates  
20 availability, product and service attributes,  
21 alternatives in the marketplace, and provides the  
22 basis for hypothesis formation.

23 With respect to sales impact, advertising is  
24 most effective when it has a new story to tell. Oh,  
25 yes, I have to push the button. Yeah, I'm not a

1 PowerPoint user. I usually just talk with people.  
2 But they said, you know, you have 15 minutes today and  
3 you better damn well stay on it. So that's the reason  
4 I'm sticking to my script.

5 (Laughter.)

6 MS. RINGOLD: With respect to sales impact,  
7 advertising is most effective when it has a new story  
8 to tell, the story is appealing, valuable to  
9 consumers, and is well told. Much, if not most,  
10 advertising fails. And this is simply because it has  
11 nothing new to report and much of what it reports is  
12 of little value to consumers that it seeks to  
13 influence.

14 Advertising has little to no impact on  
15 primary demand; that is, demand for a category, except  
16 at the beginning of the category lifecycle, when one  
17 or two products constitute the entire market. As new  
18 entrants join the fray, advertising works only when  
19 the differentiation story told by competitors is  
20 compelling and responds to consumer preferences.

21 When advertising works it works because it's  
22 communicated information of value to consumers and  
23 sometimes even small numbers of information-sensitive  
24 consumers can affect price, quality, et cetera, of  
25 offerings and even market structure. We see this in

1 the consumer complaint literature and studies that  
2 examine market dynamics when new advertising content  
3 or other information is introduced in markets.

4           Commentators and social scientists  
5 increasingly argue that the internet has shifted the  
6 balance of at least information power from producers  
7 to consumers. In a number of industries, this is  
8 certainly true. Producer-provided information  
9 acquisition, information about product service,  
10 distribution, service delivery, pricing, and producer  
11 communications has never been easier.

12           Third-party evaluations from groups, like  
13 Consumer Reports, WireCutter, U.S. News & World  
14 Report, provide important context in which consumers  
15 can evaluate producer claims. Technical information  
16 and expert opinions populate the internet providing  
17 yet another perspective. Then there are the online  
18 peer review and crowd source reviews, such as Angie's  
19 List. Moreover, consumer protests on the internet,  
20 once trivialized as ineffective, have been  
21 increasingly shown to inflict valuation, reputational,  
22 and sales damage on firms. You now see articles  
23 citing "consumer internet revenge."

24           Thinking now about internet speed claims,  
25 public opinion polls make clear that consumers do not

1 trust and do not like their internet service provider.  
2 Thus, consumers are likely to be highly skeptical of  
3 claims made by ISPs. These same public opinion polls  
4 report 90 percent of people having high speed internet  
5 at home; 95 percent are aware of the type of internet  
6 service they have; and about 55 percent know the  
7 download speed for their home internet service.

8 But what's most interesting to me about this  
9 particular market is that, in addition to copious  
10 third party and expert advice, consumers can evaluate,  
11 do a personal assessment of their own individual  
12 internet speed requirements using any number of free  
13 utility programs. Now, what's important about this is  
14 that these utility programs make abundantly clear that  
15 a whole host of factors affect internet speed. These  
16 include, as you all well know, residential versus  
17 commercial application, number of users in the home,  
18 number of devices in the home, the various uses to  
19 which these devices are put, games, streaming audio,  
20 TVs, movies, conferencing, et cetera, and geographic  
21 area.

22 Several of these programs go to the next  
23 step and illustrate how simultaneous use by members of  
24 a household may slow the home network and/or address  
25 the potential impact of high traffic on the ISP's

1 network.

2 Another very interesting feature of this  
3 market is the availability of the speed tests that  
4 we've heard so much about today that are designed to  
5 evaluate the internet speed associated, in my case,  
6 with a particular computer in my home office in  
7 Corvallis, Oregon. While, clearly, different internet  
8 performance tests measure different things in  
9 different ways, Ookla's speed test results were  
10 remarkably consistent in my home across day, date,  
11 time over a three-week period. Now, I don't have the  
12 beautiful data that you guys do. I just was logging  
13 it in on a daily basis and making sure I rotated the  
14 day part and so forth.

15 But what's interesting is that this  
16 consistent speed was just under -- and it was very  
17 consistent. My consistent speed was just under the  
18 speed that we purchased from our ISP. In fact, a  
19 conversation with our ISP suggested that we would  
20 typically experience a speed about 5 to 10 megabits  
21 slower than the contract number conveyed to us  
22 formally as "up to 150 megabits per second." And I  
23 was very happy to have only bought 150 given the  
24 discussion that we had today. I don't want to buy  
25 stuff that I don't need. It turns out I did

1 experience 150 on occasion, but my download results  
2 were more typically 140 to 149 in line with the sales  
3 talk I experienced from the provider.

4 I offer these ungeneralizable results simply  
5 to illustrate what an interesting example of "up to"  
6 claims internet speed claims are. Unlike many, maybe  
7 most "up to" claims situations, consumers in this  
8 context can come to appreciate the many factors that  
9 do, in fact, affect internet speed, factors that are  
10 not directly under the control of the ISP. And they  
11 can run tests to determine typical versus peak speeds.

12 The net impact of "up to" claims has always  
13 been difficult to evaluate. Joel Winston, one of your  
14 former BCP colleagues, did a great job summarizing  
15 these issues in a piece he wrote in 2012. The Federal  
16 Trade Commission has certainly challenged the notion  
17 that what advertisers are conveying with a phrase such  
18 as "up to" is that individual consumer's results will  
19 vary and the stated figure is a best case scenario not  
20 everyone will obtain.

21 But in the internet speed context, it's  
22 going to be very interesting to determine whether  
23 consumers actually misinterpret this "up to" speed  
24 claim or take them to be what they apparently are,  
25 claims that, at least in my case, accurately set

1 expectations.

2 Thanks very much.

3 (Applause.)

4 MR. STAGER: Well, first, Thanks for the  
5 opportunity to speak and for hosting this important  
6 forum. My name is Joshua Stager. I am a Senior  
7 Counsel at New America's Open Technology Institute, or  
8 OTI. At OTI, we are committed to ensuring that every  
9 community has equitable access to communications  
10 networks.

11 2019 is our ten-year anniversary, and over  
12 the past decade, we have studied broadband markets,  
13 helped lawmakers develop internet policy, and worked  
14 to make broadband service more consumer-friendly.  
15 Through this work we have reached an inescapable  
16 conclusion. The American broadband market is deeply  
17 opaque for consumers, businesses, and regulators  
18 alike.

19 The topic of today's panel, Speed and  
20 Performance Measurement, is a great example of just  
21 how opaque this market can be. Although ISPs often  
22 make speed-related promises, it is very difficult for  
23 consumers to substantiate these claims.

24 My remarks today will first examine why this  
25 market is so opaque and why the relevant actors are so

1   disempowered. Second, I will discuss how broadband  
2   measurement can be a vital tool for regulators seeking  
3   to better understand this market. Lastly, I will  
4   highlight some best practices for measuring internet  
5   performance.

6               So first, the Commission has asked several  
7   questions about how consumers determine if their  
8   speeds match the marketing. This is an important  
9   question, but to adequately answer it, I think we need  
10  to first take a step back and ask how do consumers  
11  identify advertised speeds. Do they know what their  
12  plan is offering and what they're paying for?

13              Unfortunately, too often, the answer is they  
14  don't know. The opaqueness of this market truly  
15  begins at the point of purchase. The terms and  
16  conditions of internet service can be bewildering,  
17  buried in contracts, or they can be vague, claiming to  
18  offer lightning fast speed, whatever that means. It  
19  is totally nonstandardized. This makes it virtually  
20  impossible for consumers to evaluate, let alone  
21  compare service plans.

22              Getting clear data from ISPs has even  
23  stymied the Government. For years, policymakers have  
24  tried to get ISPs to disclose basic information about  
25  the prices of their plans through a mandatory FCC



1 forum. But ISPs have pushed back strongly against  
2 these efforts insisting that they don't have that data  
3 because there's too much variation, too many one-time  
4 promotional rates. Gathering that data would just be  
5 too complex, they say. But if a provider's service  
6 plans are too complex for even the provider to  
7 understand in a generalized way, what possible hope is  
8 there for the average consumer?

9 In response to this situation, OTI has long  
10 advocated for what we call a broadband nutrition  
11 label, similar to the FDA's nutrition label for food  
12 products. This label would standardize in a common  
13 format key information about what an ISP is offering  
14 the customer. This would enable comparison shopping  
15 and give customers a resource they could use to hold  
16 their ISP accountable. The FCC adopted this label in  
17 2016. However, the effort ended in 2017 when new  
18 leadership repealed a series of ISP regulations that  
19 included transparency.

20 So where does all this leave the average  
21 consumer? They don't have a lot of help in navigating  
22 this market. If a consumer wants to ascertain whether  
23 they're actually getting the speed they paid for, they  
24 first have to know what speed they paid for. That  
25 might seem like an easy task, and in any healthy

1 market, it should be, but in the broadband market,  
2 this information can be hard to come by.

3 Consumers have no standardized label that  
4 documents what they were promised. It doesn't have to  
5 be reported in the service contract in any meaningful  
6 way. Maybe the speed pledge was on a billboard or  
7 maybe they got a promotional rate over the phone that  
8 changed the terms of the plan in ways that they didn't  
9 understand. The point here is that consumers are  
10 often left in the dark.

11 So this brings us back to the Commission's  
12 question about where consumers get information about  
13 internet performance. We've already heard a lot of  
14 discussion about many of these sources and I would  
15 just generally group them into three categories.  
16 First are the providers themselves, like Verizon and  
17 AT&T, who host their own speed tests for customers.  
18 Many of these speed tests are also hosted by a company  
19 called Ookla.

20 The second group consists of third-party  
21 tests. A popular network is the network diagnostic  
22 tool, or NDT, that we have heard about which runs on  
23 the Measurement Lab platform, or mLab. mLab is the  
24 largest open source internet measurement effort in the  
25 world. They collect approximately 2 million

1 measurements per day, producing a global data set that  
2 keeps growing. It is run by a consortium of research,  
3 industry, and public interest partners. OTI was a  
4 founding member of this consortium. At a high level,  
5 these tests operate on similar principles and have  
6 similar user experiences, but they can produce  
7 different results due to different methodologies.

8           The final source of information is one that  
9 perhaps only the most informed consumers might turn  
10 to, the FCC, which publishes the Measuring Broadband  
11 America Report on internet performance. However, this  
12 is not necessarily written for consumers and doesn't  
13 offer the kind of individualized results a consumer  
14 might seek.

15           With these general sources of information  
16 established, the question becomes what can the average  
17 person do with this information. If the test  
18 identifies a problem, say their speeds aren't matching  
19 the advertised claim, can the average person determine  
20 the cause of the problem and fix it? This,  
21 unfortunately, is where things truly start to  
22 breakdown for the American broadband consumer.

23           Connecting these dots is no easy task.  
24 Slowdowns can originate at many points across the  
25 internet's architecture, from edge providers and

1 transit networks to last-mile ISPs and their  
2 connections to the backbone to the end-users  
3 themselves. It is difficult to pinpoint the weakest  
4 link in this chain. But even if a consumer can  
5 pinpoint the weakest link, they are often unable to  
6 seek any remedy, particularly if that weakest link is  
7 their ISP.

8           The disempowerment of consumers in this  
9 space has many causes, but I would like to highlight  
10 just three. First, there is the lack of competition.  
11 The overwhelming majority of Americans get their fixed  
12 broadband service from just four providers, Comcast,  
13 AT&T, Verizon, and Charter. Moreover, these companies  
14 have carved up the market to ensure that they don't  
15 compete with each other. As a result, many Americans  
16 have only one ISP to choose from. The lucky ones get  
17 two.

18           This robs the market of the primary way in  
19 which consumers hold companies accountable by voting  
20 with their wallets and taking their business  
21 elsewhere. If an ISP isn't giving a customer what  
22 they paid for, many Americans have nowhere else to  
23 turn. Moreover, those lucky Americans who do have a  
24 choice still might find themselves with problems if  
25 they switch providers.

1           This is because of my second point, that the  
2 broadband market is vulnerable to coordinated effects.  
3 As markets consolidate, it becomes easier for dominant  
4 players to coordinate their efforts to ensure that  
5 they're all essentially offering the same product,  
6 warts and all. As I mentioned earlier, a series of  
7 mergers has left the broadband market dominated by  
8 just four ISPs, a high degree of concentration that  
9 can foster collusion and loss of meaningful choice.

10           Finally, the third reason consumers are  
11 disempowered is mandatory arbitration. These clauses  
12 are commonplace in just about every telecom contract  
13 and they deny consumers their ability to sue their ISP  
14 and have their day in court, instead, shunting them to  
15 an arbitration process that can be slanted in the  
16 ISP's favor. This makes class actions all but  
17 impossible to organize and deprives the market of yet  
18 another way that consumers could hold their ISP  
19 accountable if they have been defrauded. So we have  
20 established that this market is not very transparent.

21           Next, I'd like to discuss how speed testing  
22 can be a vital tool for regulators. With so little  
23 data available on the health of this market, speed  
24 testing can serve as the canary in the coal mine. It  
25 can alert us to when consumers are being deceived. It

1 can also point to larger problems, such as potential  
2 market failures. A key example of this occurred in  
3 2013 and 2014, when many internet users experienced  
4 severely degraded speeds. The degradation was so bad  
5 that, in many cases, the connection was nonfunctional  
6 at peak hours. For consumers, this meant content that  
7 wouldn't load, videoconferences getting disconnected,  
8 and telecommuting services going offline.

9           What's worse, this degradation didn't last  
10 just a matter of minutes or hours. It went on for  
11 months, quietly building into a crisis that affected  
12 millions of Americans. Customer service websites from  
13 this time period are filled with enraged complaints  
14 from people whose connections had become unusable.  
15 OTI published a report about this crisis titled,  
16 Beyond Frustrated, a quote from one of those message  
17 boards by a Comcast customer who was at his wit's end  
18 dealing with months of broken service and no help from  
19 his ISP.

20           It was clear that many consumers and even  
21 enterprise business customers were paying for  
22 broadband speeds that were not delivered, and they had  
23 no recourse or sense of why it was happening.

24           So what was happening? In a nutshell, it  
25 appears that there was a breakdown in interconnection,

1    which we've heard a lot about, but quick refresher for  
2    people who maybe missed the earlier speeches,  
3    interconnection is the point at which last-mile  
4    networks, like AT&T and Comcast, hand off their  
5    traffic to the complex array of other networks that  
6    comprise the backbone of the internet.

7               Average consumers may not have heard of  
8    these backbone networks like Cogent or Level 3, but  
9    their data has almost certainly traveled across them.  
10   If both sides don't agree to routinely upgrade their  
11   side of interconnection, the ports can become  
12   congested and create huge bottlenecks. It appears  
13   this is precisely what happened six years ago.

14              Now, there was a lot of back and forth about  
15   why the ISPs did this. But the blame game is really  
16   beside the point. What is important is that consumers  
17   were the clear losers in this fight? They were left  
18   totally in the dark. They were mere bystanders of  
19   collateral damage in a business dispute that they  
20   didn't even know was happening. Indeed, to this day,  
21   most Americans probably still don't know they were  
22   victims of this.

23              Interconnection operates in a black box  
24   closed off from the public and the regulators by  
25   nondisclosure agreements. Until these conditions,

1 problems can evade detection, and this is where speed  
2 testing comes into play.

3           It took speed testing conducted by mLab to  
4 crack open this black box letting in just enough  
5 sunlight to reveal that there was a problem. mLab  
6 collected data from users throughout the country,  
7 eventually gathering enough data to hone in on the  
8 cause. For the most part, none of the parties fully  
9 informed consumers until the press started sniffing  
10 around. ISPs may have even used the crisis to upsell  
11 their customers on more expensive plans. Phone agents  
12 at one large ISP would reportedly tell complaining  
13 customers that their connections would improve if they  
14 simply subscribed to a higher speed tier, which also  
15 happened to be more expensive.

16           But this would do nothing to fix the  
17 problem. It didn't matter how expensive your plan  
18 was, once the port was congested, all high bandwidth  
19 traffic appeared to be getting blocked. We don't know  
20 how many people upgraded their service in vain.  
21 mLab's data convinced the FCC that they needed to step  
22 in and oversee these disputes. With the threat of  
23 federal oversight in place, the congestion finally  
24 subsided. However, the FCC repealed this oversight  
25 authority last year, so interconnection is once again



1 in a black box.

2 This example vividly demonstrates the power  
3 of broadband measurement and how speed testing cannot  
4 only help determine if consumers are getting what they  
5 paid for, but also if the market is functioning as it  
6 should. It also demonstrates how data like this can  
7 help regulators to direct their investigatory  
8 resources.

9 We've heard a lot of discussion already  
10 about how a lot of this data is unclear and how there  
11 aren't yet a lot of definitive answers on  
12 interconnection. But what is clear is that the  
13 regulators were not looking into this problem until  
14 speed testing data alerted them to what was going on.  
15 This data provided that important canary in the coal  
16 mine that then led DOJ, the FCC, and the New York  
17 Attorney General to do further investigation to marry  
18 these findings with internal documents from ISPs that  
19 illuminated just what was going on at the time.

20 Speed testing can also be used to help  
21 define relevant markets. The broadband market is  
22 notoriously difficult to define in terms of geography.  
23 The FCC has struggled for years to create accurate  
24 maps of just where exactly broadband internet service  
25 is available. The City of Seattle recently tackled

1    this problem by creating a local map that relies on  
2    crowd source speed tests from Seattle residents. The  
3    City then used this data to create a detailed map that  
4    located the City's digital deserts.

5               Finally, I will conclude by offering a few  
6    recommendations for best practices. First, while  
7    there is no one-size-fits-all approach, any good  
8    measurement regime must be transparent. The platform  
9    must make their methodologies open and reviewable to  
10   all. Whatever methodologies is used, it must be  
11   clearly and sufficiently documented so that  
12   researchers can understand the underlying assumptions  
13   and replicate the data.

14              Second, speed tests should be configured to  
15   capture the full path experience of a consumer. This  
16   means the tests should cross an interconnection  
17   boundary. I've explained how interconnection  
18   congestion at these points is a leading contributor to  
19   poor performance. Yet, this congestion won't be  
20   revealed if a test only sends data to a local server  
21   within an ISP's network. mLab calls interconnection  
22   "the life blood of the internet. Nearly all of the  
23   value of the internet comes from the exchange of  
24   traffic."

25              If you're not capturing interconnection,

1     you're not getting the whole picture. Ultimately,  
2     collecting data about performance indicators, such as  
3     speed, is difficult. But that is precisely why it is  
4     so important. The long struggle to get any reliable  
5     data from ISPs, whether it's about speed, price or  
6     availability, underscores just how deeply opaque this  
7     market is.

8             As I have explained, speed testing can bring  
9     much-needed transparency and serve as an early warning  
10    system that alerts us to consumer harms. OTI welcomes  
11    any investigation into these critical issues and we  
12    would be happy to continue working with this agency on  
13    furthering its understanding of broadband performance.

14            Thank you for your time.

15            (Applause.)

16            MS. WILLIAMS: Thank you very much to all of  
17    our speakers. I think this is all incredibly  
18    interesting and really what I'm certainly taking away  
19    is that there are different views. There are some  
20    common views, but it's all incredibly complex.

21            So I think with that note, we'll move into  
22    some of the questions that we have and, you know,  
23    we'll hear from our speakers a little further about  
24    specific questions. We do have people circulating  
25    with cards that you can submit the comments to, the

1 questions to.

2 So the first question that we'll ask is, do  
3 we know what companies are measuring in terms of speed  
4 metrics and how that data corresponds to their  
5 advertising claims and actual user experience? So I  
6 don't know, do any of the speakers have a thought  
7 about that?

8 MS. BRETT: One thing I can say is we  
9 haven't looked at this with regard to speed testing,  
10 but we've certainly seen that networks have  
11 measurement tools available to them to measure the  
12 consistency of the signal they're delivering. So they  
13 may be able to use that to interpolate speed. I'm not  
14 entirely sure. But they do have some tools for  
15 measuring what consumers are getting in their homes.

16 MR. FEAMSTER: I think there are a couple of  
17 things. First of all, I think Laura highlights a  
18 couple of important points. There are other  
19 measurements that ISPs are doing that are, of course,  
20 out there. There was reference to Ookla, for example,  
21 and many of the speed test data points that are  
22 released by the ISPs themselves are actually  
23 contracted through Ookla, being one of the major  
24 providers for that.

25 When you go to Speedtest.net, that's Ookla's

1 speed test. You can also go to Charter or, you know,  
2 your ISP and sometimes you're actually running an  
3 Ookla speed test to servers inside that ISP. Another  
4 thing you might do is actually run Speedtest.net, but  
5 if you're running from that ISP, the ISP might  
6 actually be able to include its own servers in the  
7 public speed test measurement. Your measurements, as  
8 a consumer, may or may not go to those servers.

9 One final point, in addition to the speed  
10 testing, it is worth pointing out that, to some  
11 degree, ISPs have released information about the  
12 capacity of the interconnects in various levels of  
13 aggregation, not on individual links or interconnects,  
14 unfortunately. But from what we can see from the  
15 public data, we can certainly see that capacity is  
16 being added to these interconnects on a very regular  
17 basis in the last six years.

18 So the story that interconnects are widely  
19 congested is a pretty old one. That certainly might  
20 have been the case in 2013, 2014. I'm sure you can  
21 find some congested interconnects out there. There  
22 are some I could certainly tell you about. That is  
23 not the norm these days. And I think one thing we  
24 could certainly do is ask for more fine grain data on  
25 that point. But even the public data on that suggests

1     that capacity to interconnect is certainly being  
2     added.

3                 MR. STAGER: I would just add back to the --  
4     your question about the transparency from the  
5     companies, that they have not been transparent on the  
6     methodologies to the level of granularity that I  
7     discussed. Researchers have not been able to get the  
8     specific metrics that these companies are using or  
9     even determine what they're using them in a manner  
10    that allows them to replicate that data. A lot of the  
11    methodologies they're using are just not out there.

12                And, you know, we've seen this also in the  
13    context of what kind of performance data the companies  
14    are willing to give over to the regulators and,  
15    specifically, the FCC looking at the Measuring  
16    Broadband American Program, for example. There have  
17    been a lot of criticisms of just what methodology was  
18    used there and where the data is coming from and  
19    people just don't know.

20                Also, you know, a lot of what is actually in  
21    the public domain about interconnection and about  
22    these speed claims comes from various regulatory  
23    proceedings where this information really had to be  
24    compelled from the ISPs, in particular, through three  
25    merger reviews in 2015 and 2016 by the FCC and DOJ

1 where there really was a long fight to get some of  
2 this information out even under protective order. So  
3 I think we have a long way to go in terms of getting  
4 the kind of transparency that we need from these  
5 companies.

6 MS. WILLIAMS: Okay, thank you.

7 So we have a question that is directed to  
8 Josh, but, obviously, if others want to weigh in  
9 after, that works well, also.

10 So the question starts by commenting on the  
11 fact that coordinated effects typically occur when the  
12 product offerings are standardized and it's much more  
13 difficult for firms that sell complicated products  
14 with many features to coordinate. So how do you  
15 square the points that you've made about consumers  
16 having trouble comparing offers from the ISPs, because  
17 the offers are not standardized with, on the flip  
18 side, ISPs successfully coordinating on price? I  
19 guess, how do you square that?

20 MR. STAGER: Sure, sure. It's a good  
21 question. So, you know, really the coordinated  
22 effects that I was referencing and that were most  
23 concerning do go back to these interconnection  
24 disputes that I discussed. So what the data was  
25 showing was that this interconnection congestion was

1 really only happening on the four largest ISPs,  
2 suggesting market share might be a factor here. And,  
3 in particular, this congestion started around the same  
4 time on all four of these networks and then, also,  
5 disappeared very quickly after disputes were resolved  
6 through contractual announcements. So this has the  
7 appearance of some kind of coordination. Of course,  
8 we couldn't see that just from the data.

9 The New York Attorney General later  
10 investigated this and got internal documents from  
11 Time-Warner Cable, which is now Charter, and found a  
12 lot of evidence that the companies knew they were  
13 working together and they knew it was a game of  
14 chicken, I believe was the exact quote from some of  
15 the internal emails. But a lot of that context came  
16 from subsequent investigations that just showed just  
17 how vulnerable this market really is to that kind of  
18 effect.

19 MR. FEAMSTER: If I could just follow up on  
20 that. A lot of the comments we're hearing assume that  
21 the axis ISP should be in the crosshairs. While that  
22 may or may not be the case, I think it's worth kind of  
23 going back to some of the earlier discussions we had  
24 where there are other parties in this particular  
25 picture. There is the content provider who has a lot



1 of traffic to deliver. But let's not forget the  
2 transit provider, let's not forget Cogent, who, by the  
3 way, a lot of the paths between those NDT tests and  
4 mLab servers happened to traverse Cogent.

5 Cogent is in the business of selling very  
6 cheap transit. And by the way, they're competing with  
7 other transit providers. So they have a pretty good  
8 incentive to sell rock-bottom transit prices and  
9 accept video traffic at those prices, and they have an  
10 incentive to run those links at pretty high capacity  
11 and they have an incentive to make it appear as though  
12 the problem is somebody else's.

13 So I'm not sure where the problem lies.  
14 Part of the problem is we have a hard time measuring  
15 it from the edge. But if you've got measurements that  
16 don't tell you the whole picture and you see  
17 conclusions that squarely pin them on a particular  
18 party in the ecosystem, it's worth sort of figuring  
19 out exactly where those comments are coming from.

20 MS. WILLIAMS: Okay, thank you.

21 So this might feed into the next question a  
22 little bit. But is it even possible to design one  
23 uniform test and what would that test look like? By  
24 way of analogy, I'll briefly say, so, EPA has a  
25 specific test for measuring miles per gallon that auto

1 manufacturers have to use to support their claims.  
2 But there's some evidence as to how consumers use that  
3 and what they know about -- what that might impact,  
4 you know, all the different things that impact when  
5 they drive their car, the miles per gallon that  
6 they'll actually get. But is there some sort of  
7 analogy there and really is there a test that could  
8 correspond to this industry that would allow us to get  
9 better information to cover the issues we've  
10 discussed?

11 MR. CLARK: It seems to me that the FCC, by  
12 working with SamKnows to do the Measuring Broadband  
13 America, didn't define a uniform test, but in some  
14 sense, because it was the test box that was applied  
15 against all of the participating networks, it was a  
16 system that was giving you a comparison Ookla, I  
17 think, although they changed their method. They keep  
18 evolving their method. It's widely enough used.  
19 And we've worked with Ookla to try to understand what  
20 their test method is.

21 So I think there are a couple things out  
22 there that are widespread, but they are measuring  
23 slightly different things. As you say, you know,  
24 there's city miles per gallon and there's highway  
25 miles per gallon and there's overall miles per gallon.

1     So I don't think there's one test, even if we  
2     completely disclose how it's done, that's going to  
3     tell the consumer enough that they're pretty confident  
4     that they understand how to compare two products. I  
5     think it's a little more complicated than that, but we  
6     could do better than we're doing.

7             This is embedded in this call for a  
8     nutrition label. The nutrition label requires that  
9     underneath it there be a standardized methodology that  
10    produces the data for the nutrition label. And I  
11    think one of the problems we've had with the nutrition  
12    label is not the idea that there could be one, but a  
13    certain amount of contestation about what the  
14    underlying method should be that derives the values  
15    that go into it. Obviously, you have to have a  
16    standardized method in order to do a nutrition label.

17            MS. BRETT: Just to build on that, in a lot  
18    of different industries, in a lot of different  
19    categories, we've looked at industry standard testing  
20    that companies have developed over time to create some  
21    transparency and an even playing field. But, often,  
22    that industry standard testing becomes outdated and,  
23    therefore, not reflective of the way consumers are  
24    using the product today.

25            So, you know, I just think it's worth taking

1 a step back and making sure we know what we're asking  
2 for if we're looking for an industry standardized  
3 testing in this industry where the technology is  
4 constantly changing and what -- if you get an  
5 industry standard speed test, well, that may not  
6 reflect the other things that impact user experience  
7 and provide less information to consumers than they  
8 think it does.

9 MR. FEAMSTER: It's worth pointing out, I  
10 mean, to your point, Laura, that even the very best-  
11 of-breed speed tests out there today are having  
12 trouble measuring these gigabit speeds, even the ones  
13 that we would hold up as good. There are some that I  
14 think we can definitely hold us as not good. But to  
15 give you an example, if you're on a gigabit link and  
16 you go to the Speedtest.net web page, they say, sorry,  
17 please install the native version of this test because  
18 we can't measure the speed from the browser. Point  
19 being, the way that the speed test gets implemented in  
20 the browser, actually, the browser becomes the  
21 bottleneck, the Javascript basically becomes the  
22 bottleneck.

23 So they're like, okay, the way that we did  
24 this before doesn't even work. And they know what  
25 they're doing. Not even to speak of what you said

1 about people just using the network in completely  
2 different ways now, whether that is even the right  
3 thing to be testing, I think, is an open question.

4 MS. RINGOLD: The nutrition facts panel,  
5 too, may not be the --

6 MS. WILLIAMS: I'll note we just have a last  
7 few seconds so --

8 MS. RINGOLD: Oh, this answer is going to  
9 take a little longer than that. Let me say this.  
10 It's based on dietary recommendations that are not  
11 always uniformly accepted by the nutrition community,  
12 and it suggests eating a particular way that isn't  
13 right for everyone. So the nutrition facts panel  
14 would not be the standard that I would offer for  
15 consumers to make meaningful comparisons in this or  
16 other markets simply because its performance over time  
17 is somewhat questionable. Thanks.

18 MR. STAGER: I know we have to -- just very  
19 quickly just to respond to that.

20 MS. WILLIAMS: Very quick.

21 MR. STAGER: Just to clarify that. So the  
22 nutrition label concept, the way it's differentiated  
23 from the FDA is that it would not be designed to  
24 include, for example, what a good diet is and those  
25 kinds of assumptions. It really is just to clearly

1 articulate things like the terms and conditions and  
2 the price of what the consumers are signing up for.  
3 So for example, that they won't get hit with extra  
4 fees later on.

5 MS. WILLIAMS: Okay, thank you very much.  
6 That's time. And we will now break for lunch. I'll  
7 remind everyone that we start again in an hour at  
8 1:00. The cafeteria, if you continue around the  
9 circle, there is a cafeteria here.

10 And I'd just like to say thank you again so  
11 much to our panel. I think this has been a really  
12 great discussion and raised a lot of interesting  
13 points for consideration. Thank you.

14 (Applause.)

15 (Luncheon recess.)

16

17

18

19

20

21

22

23

24

25

1 EVOLVING MARKETS AND TECHNOLOGICAL DEVELOPMENTS:

2 MARKET STRUCTURE

3 MS. YODAIKEN: Hi, everybody, good  
4 afternoon. And welcome back to the Broadband  
5 Competition and Consumer Protection hearing.

6 Before we go forward, just for those in the  
7 audience, we have found a mobile phone, and if  
8 anybody's lost it, please go towards the back of the  
9 room and somebody will find it.

10 Oh, never mind. Okay, there we go.

11 So what we're going to talk about today on  
12 this panel is a mixture of technology and markets.  
13 We're going to try to really dive into some of the  
14 concepts that were raised earlier this morning. I've  
15 got a great group of panelists here to explore those  
16 issues. I'm going to introduce everybody, and then  
17 we'll start out with some presentation, we'll break  
18 for some discussion, and then we'll kind of weave the  
19 discussion into the other presentations.

20 So we have, first up, Matthew Brill of  
21 Latham & Watkins, and he's here representing NCTA, the  
22 Internet and Television Association.

23 Next to him is Tom Whitaker of Shentel, and  
24 he's here on behalf of the American Cable Association.

25 Tithi Chattopadhyay is next in the row and

1 she's here from Princeton University's Center of  
2 Information Technology and Policy.

3 John Bergmayer is here joining us from  
4 Public Knowledge.

5 And kc claffy, who many of you saw give one  
6 of this morning's lectures, is joining us from UC San  
7 Diego's Center of Applied Internet Data Analysis and  
8 the Computer Science and Engineering Department.

9 In between the presentations, there will be  
10 folks here with question cards if you would like to  
11 ask a question. Those will make their way up here.

12 So we'll start with Matt.

13 MR. BRILL: Thank you very much, Ruth.

14 Good afternoon, everyone. I'm going to  
15 provide a brief overview of competitive and  
16 technological developments in the broadband industry  
17 and also just a little bit how networks are managed  
18 and how that intersects with some of the public policy  
19 debates we have around broadband.

20 I thought I'd start with the FTC's 2007  
21 Competition Report and an observation it made about  
22 broadband at that time. The Commission noted that the  
23 broadband internet access industry is moving in the  
24 direction of more, not less, competition. And based  
25 on that observation, the Commission called for a



1    restrained approach for policymakers, rather than the  
2    enactment of broad ex ante restrictions in this, what  
3    it called, unsettled dynamic environment. And I think  
4    that was a very prescient and accurate observation  
5    about the marketplace, and the experience we've had in  
6    the last decade plus has really borne out the wisdom  
7    of that approach.

8                    When we look at the attributes of  
9    competition in the market, particularly a market like  
10   this with significant fixed investment costs and we're  
11   not making widgets here where there are sort of very  
12   limitless numbers of participants. These are very  
13   costly networks. And in light of those attributes and  
14   really in spite of any inherent barriers to entry,  
15   we've seen constantly expanding supply, we've seen  
16   declining prices, and we've seen a lot of other  
17   attributes that define a very healthy and well-  
18   functioning marketplace. So I just thought I'd review  
19   some of those key data points.

20                   In 2007, when this Commission looked at  
21   broadband competition, services were widely available.  
22   They were available to 93 percent of households passed  
23   by cable, 79 percent of households passed by telco  
24   providers often, at that time, providing DSL, so  
25   somewhere in the 80 percent zone for broadband

1 availability. Today, broadband is essentially  
2 available to all consumers. Ninety-four percent of  
3 consumers have access to 25/3 speeds over a  
4 terrestrial wired connection, and essentially all  
5 consumers have access when you add in satellite and  
6 fixed wireless capabilities.

7 And the FCC had observed in 2007 that the  
8 number of high speed broadband lines was 64.6 million.  
9 There's been really a staggering increase in broadband  
10 adoption since that time. Today, there are over 110  
11 fixed broadband connections and over 400 million  
12 wireless broadband connections, so more wireless  
13 connections than there are people in this country.

14 Speeds have also increased fairly  
15 dramatically since that time. The FTC report noted  
16 the typical speeds were only ranging from about 700  
17 kilabits per second to a few megabits per second in  
18 2007. Recode published a report last year saying that  
19 the median download speed as of December 2018 was  
20 96.25 megabits per second. And that speed had  
21 increased some 40 percent over the prior year. So  
22 we're seeing very fast speeds and a very high rate of  
23 acceleration of the growth of speeds.

24 Cable operators, the industry I'm  
25 representing, are introducing gigabit speeds. Today,

1     they are available I think to more than 80 percent of  
2     cable subscribers, and there's an initiative announced  
3     by the cable industry to get to 10 gigabit speeds by  
4     the -- by around 2025. So we're seeing not just  
5     dramatic increases in speeds today, but the future is  
6     going to bring even greater speeds.

7             Price, as I mentioned, had declined. The  
8     cost, when this Commission issued its 2007 report, was  
9     somewhere in the neighborhood of \$6 per megabit per  
10    second. Today, those costs are well under \$1 per  
11    megabits per second. So cost, on a per-unit basis,  
12    has declined substantially, another reflection of a  
13    health marketplace.

14            And alternative providers have grown. The  
15    Commission in the 2007 report noted significant  
16    barriers for satellite broadband or wireless  
17    broadband. In the satellite space, we're seeing much  
18    faster speeds than ever before, lower latency than  
19    ever before, and a lot of entry by providers,  
20    including SpaceX obtaining authority from the FCC to  
21    launch thousands of low-Earth devices, bringing new  
22    competition to the marketplace.

23            All this is a reflection of enormous  
24    investment by private actors in the industry. The  
25    cable industry alone has invested over \$250 billion in

1 the last two decades and, of course, telco providers,  
2 satellite, and others have made substantial  
3 investments as well. We're going to see, I think, a  
4 significant increase in the convergence that's been  
5 underway for many years between wireless mobile  
6 solutions for broadband and fixed solutions with the  
7 advent of 5G. That really is a game changer that will  
8 bring significantly more competition both to fixed  
9 home services and to mobile alternatives.

10 And, today, the data that's been put out by  
11 the FCC shows that choice is abundant when we look at  
12 the 10/1 speeds that are the baseline level the FCC  
13 uses for its broadband subsidies. At the 25-3 level,  
14 70 percent had at least two options and that was a  
15 significant increase over the year before. So things  
16 are certainly moving in the right direction.

17 Touching on technology, the cable industry  
18 has responded to all that increase and demand and has  
19 brought all those increases in speeds in a number of  
20 different ways. Cable companies can expand the  
21 overall pipe by increasing the capacity. Typically, a  
22 system might have 750 megahertz of total capacity  
23 that's being increased often to 1.2 gigahertz of total  
24 capacity, so making the pipe bigger is one way to  
25 bring more capacity.

1           Reducing the number of homes served by a  
2 node in a neighborhood is another technique. Node  
3 splits and segmentation is a common tool where, you  
4 know, consumers are using up available capacity and it  
5 requires decreasing the size of the service groups to  
6 keep delivering increasing speeds. And, also,  
7 delivering data more efficiently. The DOCSIS standard  
8 keeps improving and those techniques allow for more  
9 channel bonding and compression through technologies  
10 like MPEG-4, also improve the consumer experience.

11           When we get into the discussion, I'll talk  
12 about interconnection as well. Interconnection  
13 capacity continues to increase. There are many routes  
14 into ISPs' networks and many of these routes are  
15 settlement-free. The economics continue to evolve,  
16 but it's worked well on a market-based approach. And  
17 the cost of transit for internet connectivity  
18 continues to plummet, another sign of a healthy  
19 marketplace.

20           Finally, ISPs manage their networks to  
21 prevent malware, to honor choices we make like  
22 parental controls, and to ease congestion. And in  
23 doing so, all major broadband providers have made  
24 commitments that are binding and enforceable by the  
25 FTC to adhere to consensus net neutrality positions.

1 ISPs don't block, don't throttle, don't engage in  
2 unfair discrimination and, again, through the  
3 transparency rule, have made binding commitments to  
4 live by those principles.

5 Those principles are not just important from  
6 a public policy standpoint, but really are critical  
7 from a business perspective of keeping the customer  
8 happy and meeting the customer expectations.

9 So I'm happy to talk about all these issues  
10 once we get into the broader discussion. Thanks.

11 MS. YODAIKEN: Great. Tom?

12 MR. WHITAKER: My name is Tom Whitaker. I  
13 work for Shentel, which is a rural incumbent telephone  
14 company based in the Shenandoah Valley of Virginia,  
15 and we are a cable operator throughout Virginia, West  
16 Virginia, and Maryland.

17 And what Shentel brings to the table today  
18 for conversation is the fact that in rural broadband  
19 markets, there is effective competition, investment  
20 and value today in spite of the fact that delivering  
21 services in these small markets continues to be a  
22 burden for small providers. But in spite of that,  
23 these networks continue to grow, investment continues  
24 to come into these networks, and prices for consumers  
25 continue to decline.

1           There's new providers in all of these  
2   markets coming from areas like fixed wireless, 4G  
3   wireless, electric co-ops, new satellite options, and  
4   other disruptors in the marketplace.

5           And in addition to that, more and more homes  
6   are being built through programs at the state and  
7   federal levels. In Virginia, things like the tobacco  
8   settlement helps to fund fiber networks in Southside,  
9   Virginia and in other parts of the state, and CAF and  
10   CAF II have both been leveraged by service providers.  
11   Not necessarily by Shentel, but by the incumbent  
12   telcos. Companies like CenturyLink have been very  
13   successful leveraging CAF funding and shortening their  
14   DSL loops to provide better service in the markets  
15   that they serve.

16           A little more about Shentel. We're a small  
17   cable operator. We're considered a small cable  
18   operator. We serve about 8 million broadband subs and  
19   pass about -- no, I'm sorry. Smaller cable operators  
20   pass about 800 broadband subs in 17 million housing  
21   units. Shentel, we have about 75,000 broadband subs  
22   in Virginia, West Virginia, and rural Maryland.

23           Scale is different for small providers. You  
24   know, we have some markets where a technician can only  
25   do two appointments a day because they've got four

1 hours of windshield time. When you're working in  
2 really small markets where a market, a town that we  
3 serve, a place like Clarksville, Virginia or  
4 Farmville, Virginia or Lebanon, Virginia, you may only  
5 have 2- or 3,000 homes pass in the entire market. For  
6 us to be able to scale that business and maintain that  
7 business, technicians have to cover a very wide area  
8 and serve our customers in that area over a very long  
9 day. So scale was tough.

10 And in these markets, we're also seeing some  
11 competition from overbuilders, but the overbuild  
12 business is very difficult. The cost to overbuild in  
13 a market with new technology is extremely expensive.  
14 A 5,000 home pass market was going to cost you \$3 and  
15 a half million to build, another \$1 million to serve,  
16 and your negative cash flow on an investment like that  
17 is probably four years. So although there is  
18 competition in some of these smaller markets, they are  
19 not going to see additional service from a new  
20 competitor just because of the scale issues and the  
21 competitive circumstances.

22 And we continue to see competition from the  
23 incumbent telco. CenturyLink is a very difficult  
24 competitor for us in markets where we serve. They  
25 took CAF money and they improved their loop quality.



1 They offer 25 megs for \$45 per life, which is a pretty  
2 compelling offer. That's something that we had to  
3 adjust to as the cable competitor in the markets that  
4 they serve.

5 Electric co-ops are becoming an effective  
6 competitor, building fiber-to-the-home networks in the  
7 markets where they provide rural electric service.  
8 Consequently, for us, in those markets, it is very  
9 difficult for us to get on those poles and colocate  
10 those poles -- on those poles because electric co-ops  
11 operate under different rules than the big power  
12 companies like Dominion and American Electric Power.

13 So in those markets, it's very difficult for  
14 us to go head-to-head with them because the cost of  
15 colocation on those poles could be as much as \$20 per  
16 year per pole, and in a small market, you might have  
17 to attach to 5,000 poles.

18 You've got fixed wireless providers in these  
19 markets, which are true disruptors, and it's not  
20 uncommon for one or two wireless -- WISPs -- service  
21 providers to compete against us in a small market.  
22 Satellite is still out there and 4G mobile, unlimited  
23 data, is a real competitor to terrestrial systems no  
24 matter where we do business. A hundred dollars a  
25 month for four \$800 mobile phones is a pretty

1 compelling offer, and it's difficult for us to compete  
2 in that type of environment.

3 We continue to invest in all of our markets  
4 by investing. We've invested over \$150 million in our  
5 markets. We've invested \$125 million in recent years  
6 and another \$25 million this year primarily enabling  
7 our systems for DOCSIS 3.1, which will allow us to  
8 deliver gigabit service to all of our cable customers  
9 throughout our 185,000 home pass footprint.

10 We're seeing the price of broadband come  
11 down. Where we buy broadband in our peering  
12 locations, that price continues to drop as competition  
13 in exchange points continues to be very robust,  
14 driving down the cost of access to internet access for  
15 us. And we think that small providers provide great  
16 customer service. In 2018, Shentel was the  
17 Independent Operator of the Year, primarily because we  
18 really do offer a great network experience. Less than  
19 1 percent of our customers experience trouble on a  
20 monthly basis and we provide great local customer  
21 service.

22 Cable operators continue to experience  
23 challenges when it comes to the upstream broadband  
24 market. Getting to the access exchange is a real  
25 challenge for a small operator. Not so much for us.

1 We're only about 90 miles from D.C., and many years  
2 ago we had an opportunity to build fiber into Ashburn  
3 out by Dulles Airport where there's a huge access  
4 exchange out there.

5 But a smaller operator who is far from a  
6 city where there are access opportunities is not only  
7 going to have to pay transport to get from their  
8 aggregation point in their home network to a point  
9 somewhere in a distant city just that transit from  
10 point A to point B is going to be particularly  
11 expensive and the competition in that access exchange  
12 is not going to be as robust as the competition is out  
13 at Dulles Airport. So they're not going to be buying  
14 at the same cost per megabit as I can buy and that is  
15 a real barrier to entry in growth for small operators  
16 and small markets.

17 So rural broadband, in my opinion, it's the  
18 business I've been in my whole career, is a good news  
19 story and we believe that we're moving barriers to  
20 access, and particularly when it comes to colocation  
21 on rural power co and municipal poles. And continuing  
22 to award subsidies in unserved markets for the  
23 deployment of robust broadband markets would be the  
24 best tactic and opportunity for increased competition  
25 in these rural markets.

1                   That's it. Thank you.

2                   MS. YODAIKEN: Thank you very much. So  
3 we're going to spend a little time on questions here.  
4 Matthew and Tom, you've both described slightly  
5 different perspectives and you work with different  
6 size internet access providers. Let's call them that.  
7 We've had a lot of discussion this morning about  
8 internet access providers in a generalized way with  
9 some folks talking about the differences.

10                  I wondered if you can both talk a little bit  
11 about the differences between -- a little bit more  
12 about the differences between the different size cable  
13 operators who are offering internet service. Then we  
14 can maybe explore some of those other internet service  
15 providers that you've talked about.

16                  So, Tom, you gave some examples about the  
17 cost of building out and having fiber. Can you talk a  
18 little bit about the incentives, the economics of  
19 building out closer to the consumer and a little bit  
20 about the power in terms of the market that you were  
21 talking about.

22                  MR. WHITAKER: In small rural markets where  
23 you might have 5,000 homes pass, which is is a -- I  
24 live in Lexington, Virginia. Lexington is about a  
25 5,000 home pass market. CenturyLink is the incumbent

1 telco; Comcast is the incumbent cable co. They are  
2 the only two options. There are a couple WISPs in  
3 town, but that's kind of the typical small town  
4 internet access scenario.

5 The reason there's not a third provider  
6 there is because a third provider is going to have to  
7 come in and split the market. CenturyLink is a good  
8 provider, but Comcast is the dominant service provider  
9 in a market like that. And Comcast is definitely the  
10 dominant service provider in Lexington. So a new  
11 entrant is really going to split the market with  
12 Comcast.

13 MS. YODAIKEN: So it's about the number of  
14 consumers, is that what you're talking about?

15 MR. WHITAKER: Sure. It's just there's not  
16 the investment opportunity. If you're going to spend  
17 \$4 and a half million building the market to get to 30  
18 percent of the subs and have negative cash flow for  
19 four years, there's not a lot of companies that are  
20 going to be willing and able to do that. So it's  
21 unappealing, you know, repetitively in every market  
22 that looks like that. There's just not a lot of  
23 companies who are willing to step into that type of  
24 aggressive competitive environment.

25 MR. BRILL: I would note that while the

1 challenges for smaller providers and larger providers  
2 is different, the one constant for all ISPs is this is  
3 an incredibly capital-intensive business and there is  
4 a baseline of competition from telco providers, WISPs,  
5 as we've heard about, satellite providers. And the  
6 coming growth in competition with 5G wireless is  
7 really going to be incredibly intense. That points to  
8 an imperative to keep improving the network plant and  
9 to offer greater capabilities to consumers to keep up  
10 with the competition and the demand.

11 So what we see is an industry that is  
12 constantly investing heavily to bring these  
13 capabilities, to keep up with higher bandwidth  
14 applications. You know, applications like Netflix  
15 that we all use so heavily, you know, drive a lot of  
16 growth in the network. So that investment is  
17 occurring and it is driving increased capabilities on  
18 the access side.

19 And I think there are important changes that  
20 maybe got talked about on one of the other panels this  
21 morning in the interconnection side of the business.  
22 It's important to understand that, you know, a small  
23 number of very large entities, including Amazon cloud  
24 services, Netflix and others, really control how much  
25 of the traffic that we experience on the internet gets

1 to the ISPs. These entities that dictate the routes  
2 have enormous economic leverage over ISPs of all  
3 sizes, and particularly smaller ISPs, because they can  
4 impose significant transit costs on ISPs and use  
5 peering playbooks to exploit that leverage.

6 So while often there's a lot of public  
7 policy debate about ISPs and what leverage they can  
8 employ, it's often misunderstood that edge providers  
9 that control a lot of traffic have enormous leverage.  
10 And what we see is, I think, today a balance and fair  
11 amount of stability. There haven't been high-profile  
12 peering disputes notwithstanding the absence of heavy-  
13 handed regulation in this area. So that part of the  
14 market has reflected a lot of very big players on the  
15 edge side that are exerting a lot of pressure.

16 MS. YODAIKEN: Is that balance and market  
17 power with the edge providers and the ISPs, is that  
18 something that is different between different types of  
19 ISPs? So one example I'm thinking of is the  
20 discussion about trying to get edge providers to bring  
21 the content -- we heard a lot about this earlier today  
22 -- to bring the content closer to where the consumers  
23 are. Can you talk about that?

24 MR. BRILL: Sure. I mean, I think all ISPs,  
25 again, face, to some degree, these same issues. But

1 if you're a large ISP that has a national backbone, as  
2 AT&T and Verizon do, as Comcast and Charter do, you  
3 know, you can control some more of your own costs by  
4 carrying the traffic on your own network.  
5 Typically, there are set peering policies where if  
6 there's a rough balance of traffic and a balance of  
7 value on both sides, ISPs can enter into peering  
8 arrangements on a settlement-free basis with transit  
9 providers and others. Typically, where there's  
10 payment in one direction or another, that reflects an  
11 asymmetry in the value that's provided in the traffic  
12 flows.

13 The problems are more pronounced for smaller  
14 ISPs because essentially they can get pushed around by  
15 large edge providers. If an entity like Netflix wants  
16 to colocate equipment in a certain location and have  
17 the ISP house that equipment, they have enormous  
18 economic leverage to insist on terms of their  
19 choosing. So it's a more balanced negotiation with  
20 larger ISPs. I think smaller ISPs really are often at  
21 the mercy of entities that deliver large amounts of  
22 traffic.

23 MR. WHITAKER: There's about 800 small cable  
24 cos in this country. Shentell is like the 25th or  
25 30th largest. So there are a lot of really small



1 cable companies. We only pass 185,000 homes.

2 Now, we're able to get Netflix and Google  
3 and Facebook to bring their casting equipment into our  
4 peering point. So when somebody goes to Facebook,  
5 they don't go all the way out through the public  
6 internet and back to get to that content, which saves  
7 us money because we don't have to pay for those  
8 megabits to pass over into the public internet  
9 network. But think of all the hundreds of companies  
10 that will never be able to talk to Netflix or Google  
11 or Facebook with that type of arrangement. It's the  
12 vast majority. So most small cable cos have zero  
13 leverage to enter into some of these preferred peering  
14 relationships.

15 MS. YODAIKEN: And I want to just grab the  
16 clicker for a second so we can view the very, very  
17 simplified diagram. But how does this translate for  
18 consumers? There was a lot of discussion this morning  
19 about quality of video. Is that the main thing in  
20 terms of having content that's going to be closer to  
21 where the actual consumers are in their homes if we're  
22 talking about home networks?

23 MR. BRILL: Yeah, I think a lot of it is  
24 about quality of service. Caching and localizing  
25 content means fewer hops, it means better

1 performances, it means lower latency for people who  
2 enjoy real-time applications like gaming. Latency is  
3 really important. And for video, when we experience  
4 buffering, it's noticeable.

5 For a lot of accessing web content that  
6 isn't as latency-sensitive, there's probably not a  
7 major impact. But certainly with the prevalence of  
8 video streaming, gaming and real-time applications,  
9 these things can make significant differences in  
10 performance. It may not be a big cost issue from the  
11 consumer standpoint. It's really about the quality of  
12 experience, but certainly the economics of these  
13 things matter as well.

14 If a low-income user of broadband is being,  
15 in essence, asked to subsidize the cost of upgrading  
16 infrastructure to carry services like Netflix, but she  
17 doesn't subscribe to Netflix, you know, there are  
18 economic and policy questions about where those costs  
19 should be placed, whether they should be placed solely  
20 on the ISP customer or whether the cost causer  
21 responsible for that traffic ought to bear a portion.  
22 Those debates are imbedded in the interconnection  
23 debate and, fortunately, I think we have a market-  
24 based system that has resolved those issues very  
25 effectively in most cases. But, you know, the quality

1 of service certainly is impacted by all of these  
2 arrangements.

3 MS. YODAIKEN: So I'm just going to do this  
4 oversimplified diagram for a second. I think the one  
5 thing we haven't talked about is -- we've been  
6 focusing on this ISP concept. You talked a bit about  
7 node splitting, Matt, and I know, Tom, you've also  
8 talked about this idea of getting those lines out to  
9 where the consumers are. Can you talk about how  
10 that's changing if new developments in technology are  
11 changing that?

12 MR. WHITAKER: From an operator's  
13 perspective, we are trying to get the node closer to  
14 the subscriber. So --

15 MS. YODAIKEN: And could you just say what  
16 -- explain a node a little bit?

17 MR. WHITAKER: So a node for us is a point  
18 in the network where the energy converts from optical  
19 energy to RF energy and goes over to coaxial and then  
20 goes to the home. So beyond any node, you can serve a  
21 couple of hundred homes reasonably. But in rural  
22 networks, the distance from those nodes is a bigger  
23 issue than the number of people that serve the node  
24 and the ability to be able to amplify the signal  
25 beyond the node.

1           So to offer a quality server experience,  
2   you've got to shorten the distance beyond the node and  
3   remove the number of amplifiers beyond the node. So  
4   that's kind of the -- that's the service operator  
5   side. That's where performance is a big issue. Just  
6   managing and operating a good network and making sure  
7   that there's no local saturation at that node is  
8   really a day-to-day management issue. And it's not  
9   something that really involves the upstream provider  
10   so much.

11           MR. BRILL: One of the biggest developments  
12   in recent years is we talk about HFC network, or  
13   hybrid fiber co-ax, fiber traditionally connected on  
14   that chart the ISP data center and the node and  
15   coaxial cable ran from the node to the customer's  
16   home. One of the biggest developments is pushing  
17   fiber deeper and deeper into the network, as Tom  
18   talked about moving nodes closer to homes. That means  
19   increasing the portion of the network that runs over  
20   fiber, which means big increases in capacity. So  
21   that's the high cost and certainly one of the most  
22   important developments in networks.

23           MS. YODAIKEN: Okay, great, thank you.  
24   We'll move on.

25           MS. CHATTOPADHYAY: What I thought I would

1 do today is talk a little bit about these  
2 technological developments and how they impact market  
3 structure itself, how they impact economic  
4 relationships, how they impact investments and,  
5 finally, how they impact competition. That's going to  
6 be the first part of what I talk about. Then I'll go  
7 on to talk about what's happening in state  
8 governments, what are they doing with respect to  
9 broadband.

10 Okay. So let's talk about the market, the  
11 network itself. I know a lot of this has been covered  
12 earlier in the day, so I want to focus on each one of  
13 them in detail. But you have your broadband  
14 providers, which are essentially your access providers  
15 and the backbone providers. You have your edge  
16 providers that sort of are your content providers.  
17 You have your consumers, and I think it's important to  
18 sort of talk about the different kinds of consumers.  
19 You have your residential consumers, which is a focus  
20 of today's discussion, but you also have business  
21 consumers and community anchor institutions that are  
22 sort of separate from some of what we're talking about  
23 today.

24 The one thing that I haven't mentioned here  
25 is what you call the content distribution networks,

1 simply because it was harder to put them in this  
2 bucket. But content distribution networks are  
3 increasingly changing how commerce happens in this  
4 space. Content distribution networks are moving  
5 content closer to the consumers and they are  
6 interesting because they sort of locate themselves  
7 based on two things. One is cost minimization and the  
8 other is performance maximization.

9 The other thing that makes them unique is  
10 the fact that you can be a content distributed -- you  
11 can sort of be in this business as a commercial  
12 service, you can host other people's content, you can  
13 be a private CDN and host just your own content or you  
14 can be a telco CDN or an ISP CDN and sort of offer up  
15 your services to others to host their content closer  
16 to the consumer.

17 Now, that means the last mile is becoming  
18 more and more important than competition and the last  
19 mile really matters. Here I would, again, bring into  
20 fact that competition sort of needs to be looked at  
21 with a technological lens because wireline and  
22 wireless and fixed wireless, while they sort of could  
23 be complementary, they also bring different things to  
24 the table. Wireless brings mobility, which wireline  
25 probably doesn't. So they do bring different things

1 on the table.

2 The other thing is they all have different  
3 starting points, regulatory starting points. Telcos  
4 have had a different regulatory starting point as  
5 compared to the cable company. So they've had  
6 different historical starting points.

7 And the final point that I want to make is  
8 the geography matters in this area. There's a huge  
9 difference between rural and urban markets in terms of  
10 the cost structure. So geography and the density of  
11 subscribers really do matter.

12 So I wanted to simplify this a little bit  
13 and talk about pricing, consumer pricing, and the  
14 reason I've simplified this is to basically make the  
15 most important point. A lot happens within the  
16 platform itself. By "platform," I mean your access  
17 provider or your -- the platform that's actually  
18 transporting the content between the client and the  
19 content server.

20 But the point that I want to make here is  
21 when you're looking at consumer pricing, it's  
22 important to keep different things in mind. Consumer  
23 pricing does not just depend on consumer demand or a  
24 consumer's price sensitivity or elasticity. But  
25 consumer pricing also depends on the content provider,

1    how concentrated that market is, are there dominant  
2    players in that market. And the type of fee that's  
3    levied, whether it's a flat fee or whether it's a  
4    usage-based fee or whether it's a combination of the  
5    two really depends on both these factors. One can't  
6    just look at consumer prices only with a lens of  
7    consumer demand or price elasticity.

8               Now, moving on to the provider side of  
9    things, what tools do providers have when it comes to  
10   sort of owning their revenue. Providers can sort of  
11   use quality, quantity, and market segments to  
12   discriminate. The quality aspect is a little bit more  
13   complicated, but quantity and market segments are sort  
14   of -- you see them use that pretty openly. You see  
15   usage-based pricing. You see bundles being served.  
16   You see family lines with wireless providers. Market  
17   segments, in the same way, are also used quite a bit,  
18   some of it in the form of specialized services.

19              But then there is this other thing that's a  
20   tool for providers to use, which is product  
21   differentiation. And this is where it gets  
22   complicated because it's hard to do this without going  
23   into content delivery. What you see here is the  
24   complicated relationship that ISPs have with content  
25   providers, because content providers have actually



1    gone over the top and have built a direct relationship  
2    with their consumers and have provided services that  
3    otherwise some of these ISPs are -- say, for instance,  
4    telcos have provided. Telcos have had texting and  
5    international wire services and roaming and those  
6    kinds of services that are now also being provided by  
7    these over-the-top players.

8                    This is sort of cutting into some of their  
9    revenue streams and the over-the-top players do sort  
10   of cross-subsidize in the sense that they can provide  
11   these services at below cost because they have another  
12   revenue stream coming from advertising. So that's  
13   another thing that needs to be sort of kept in mind  
14   when it comes to the relationship between ISPs and  
15   content providers.

16                   Now, moving back to just ISPs, they also  
17   face other hurdles. For instance, I've talked about  
18   the density of subscribers, but they also face  
19   regulatory hurdles sometimes, right-of-way issues,  
20   where to locate their poles, attachment issues,  
21   competitive hurdles. So I just want to bring those.  
22   You need to look at investments with all these things  
23   within the parameters that you're studying.

24                   Now, moving on to competition, now what does  
25   this mean for competition? One is competition between

1 ISPs. Of course, you want to make sure there's  
2 competition between ISPs and there's no  
3 anticompetitive behavior. But the more complicated  
4 part of those particular relationships with over-the-  
5 top players going into sort of providing services that  
6 ISPs have provided or telcos have provided or cable  
7 companies have provided, this is not to say that  
8 access providers should sort of go into adjacent  
9 markets and cross-subsidize, but one does really need  
10 to look at what their value proposition is anymore.  
11 Is it sufficient for them to stick to their core  
12 business when they do face competition from over-the-  
13 top players?

14 All this is well and good. But what does  
15 this mean to a consumer? So the bottom line still is  
16 that consumers need to focus both -- consumers need  
17 choice, consumers need sort of access to low switching  
18 costs. But consumers don't quite understand their  
19 commercial terms. We've talked about this a little  
20 earlier. Consumers don't sort of understand speed.

21 So when I worked at the State of Wisconsin's  
22 broadband office, we did a demand survey which  
23 basically said that consumers don't really -- they  
24 know what they want in terms of applications, but they  
25 don't really quite understand what that means and how

1     that correlates to commercial terms. So maybe moving  
2     away from speed testing and things like that and  
3     talking about commercial terms in terms of  
4     applications might make more sense.

5             The final thing that I wanted to sort of  
6     quickly go into is what are state governments doing.  
7     Historically, state governments out of the  
8     Telecommunications Act of 1996, under Section 706,  
9     they were only supposed to sort of encourage and  
10    incentivize deployment of broadband technology, and  
11    they did this using subsidies that collect -- mapping  
12    data collection, providing tax credits, loan programs,  
13    and so on. They used basically nonregulatory tools.

14            Things sort of changed after the 2017 FCC  
15    ruling where they sort of deployed four different  
16    strategies. One is they did nothing. The other is  
17    just they sued the FCC. Some states sort of decided  
18    that the FCC -- sort of sued the FCC because they  
19    thought the FCC had violated the notice and rule  
20    comment requirement of the rulemaking process.

21            The third thing that they did is tied these  
22    things to state contracts and local grants. And,  
23    finally, they had direct state-level laws. Now, the  
24    FCC did preempt states from doing this and I know a  
25    lot of broadband providers also think states going

1    into sort of their own state-level laws can be  
2    burdensome on the basis -- and the primary premise is  
3    that they think internet is interstate, but with CDNs  
4    moving closer to consumers and a lot of traffic in a  
5    lot of areas not actually leaving the state or even  
6    local areas, it might, there is sort of reason to  
7    reexamine this. I don't know what kind of  
8    jurisdictions states should have, but there is need to  
9    reexamine this a little bit.

10               But the one thing that states should  
11    continue doing is sort of look into data collection  
12    and transparency. Passive testing and deployments are  
13    much easier to do at a state level and rule  
14    deployments are also sort of easier to facilitate at  
15    the state and local level.

16               MS. YODAIKEN: Great, thank you.

17               So just a couple things of what you said  
18    maybe everybody would like to chime in on. One of the  
19    things you talked about was ISPs and their core  
20    businesses changing. And I know Tom and Matt have  
21    experience in that, but I think everybody may have  
22    something to add in terms of what is it that you see  
23    and have seen in the last 10 years or so as the  
24    business is changing in terms of providing video or  
25    getting involved in other things to make the business

1 model work?

2 MR. WHITAKER: Well, the cost of content is  
3 pressing it out of the video business. It's become a  
4 loss leader for us, traditional linear video. And I  
5 think the consumer kind of sees linear video and over-  
6 the-top video as two kind of separate ecosystems.  
7 Nobody has really collapsed the user experience,  
8 search and discovery into one really great ecosystem I  
9 guess might argue that.

10 MS. YODAIKEN: I was going to just say, can  
11 you just kind of spell out what you mean by over-the  
12 top video versus --

13 MR. WHITAKER: So the app-driven, Hulu,  
14 Netflix, you know. So at any rate, we are losing 6  
15 percent of our video subs per year. That is pretty  
16 typical across independent telcos. So our business  
17 model is changing. And at the same time, you know,  
18 our broadband business continues to grow at about the  
19 same rate or a little bit slower. And, of course, the  
20 margins on broadband are much better than margins on  
21 video. So the whole business model has flipped in  
22 what is relatively a short period of time.

23 There's still a lot of small cable cos out  
24 there that are very, very dependent on video and were  
25 late to the game on broadband. But that's our story.

1           We're also a local telephone company. You  
2    want to talk about a business that's tanked, you know,  
3    the good old dial tone, the good old institution of  
4    the kitchen wall phone. We are not renting telephones  
5    anymore.

6           MS. YODAIKEN: Anybody else? Go ahead,  
7    John.

8           MR. BERGMAYER: Yeah, I was planning on  
9    mentioning this in my presentation. However, the  
10   increasing vertical integration between ISPs and  
11   content, ISPs and edge services, obviously, simply  
12   creates, you know, more of the potential incentives to  
13   favor or discriminate in favor of your own services.  
14   I think AT&T is a pretty clear example now that in  
15   addition to being a wireless and wireline ISP. It's  
16   also a major video streaming provider with its DirecTV  
17   Now platform. And, in addition, it owns all the Time  
18   Warner content, which it has renamed, I think, Warner  
19   Media, including HBO.

20           So I think you do have, you know, more of  
21   this integration up at different layers of the stack,  
22   and at each turn, there's a fear that there's going to  
23   be the incentive to discriminate in favor of your own  
24   content, discriminate in favor of your own programming  
25   on DirecTV Now. You know, for example, AT&T just

1 dropped Viacom programming and Discovery and added HBO  
2 to its bundle, but then also discrimination in favor  
3 of DirecTV Now over other video services on your AT&T  
4 broadband connection.

5           You might, we might say, well, if they're  
6 now a nationwide video provider maybe they want access  
7 to other ISP customers, too, which could balance it  
8 out. It just simply makes it -- I think the analysis  
9 of the motives of these companies that are highly  
10 integrated, it's simply much more complex, to say the  
11 least.

12           MS. YODAIKEN: Anybody else? No?

13           Okay. And one more thing I guess related to  
14 that, when we're looking at competition and we're  
15 talking about let's say if we -- if it is possible to  
16 break it down to internet access providers, first of  
17 all, a question, can we break it down that way or why  
18 shouldn't we? And if we do, can you talk a little bit  
19 about the other players that you mentioned? You  
20 mentioned things that local government is doing to  
21 create alternatives for internet access.

22           MS. CHATTOPADHYAY: So some models -- so  
23 there is, of course, some local governments that go  
24 into municipal networks, but there is also the CAN  
25 model, or the community area network model, where the

1 public sector would get into partnership often with  
2 the private sector to pool their resources and their  
3 infrastructure or to sort of come up -- and this  
4 generally happens in high-cost areas or rural areas  
5 where it's harder to get service, but they will sort  
6 of pool their resources to find a solution to build  
7 out an infrastructure there.

8 Now, it becomes problematic when they use  
9 sort of public resources to maybe compete with  
10 someone. But this is sort of a model that a lot of  
11 rural areas have been sort of using to come up with a  
12 solution in those areas.

13 MS. YODAIKEN: And for everybody, Matt, you  
14 mentioned mobile being a good competitor for fixed  
15 internet access. Does everybody agree that they're on  
16 the same level or do people have thoughts about that?

17 MR. BERGMEYER: Yeah. I mean, my thoughts  
18 are basically, in very idealized circumstances, you  
19 can get pretty high performance off of a mobile  
20 connection if it's not congested, if you've got a  
21 clear line of sight and so on and so forth. And all  
22 that's great and sort of I welcome more competitive  
23 choices for people. But it's really hard to say that  
24 ounce for ounce mobile will be better than fiber for  
25 connections to the home.



1           I think if you have the choice of having  
2    fiber to the home, you know, that's always going to be  
3    better. In terms of market definition, you know,  
4    instead of thinking in terms of abstract details of  
5    like, oh, you know, they both provide internet access  
6    and, look, they kind of perform the same. I think a  
7    better way to do it is just to say, look, do people  
8    who can afford both buy both? And if they do, then  
9    it's really hard to say that they are directly  
10   substitutes for each other. They seem to play  
11   complementary roles. And I think we know from our  
12   experiences that most people who can afford home  
13   broadband and mobile broadband do choose to buy both  
14   because they do perform different roles, they are  
15   priced differently.

16           If that changes sometime in the future with  
17   some amazing new technology, wonderful, you know, but  
18   I'm just looking at the reality today instead of  
19   looking at the potential far-out, sci-fi future of  
20   competition. And, right now, I would not say that  
21   they are directly competitive.

22           MR. BRILL: Just a couple points. I think  
23   it's important to realize it's not all or nothing. So  
24   competition is different for different consumer  
25   segments. For many people, particularly value-

1 conscious consumers, mobile can be a complete or  
2 partial substitute. And that's especially true  
3 because there is multi-homing. And so even if I do  
4 have both a fixed broadband connection and a mobile  
5 phone, I can use them differently to access different  
6 services. And that is a form of competition even if I  
7 haven't given up my home connection.

8 So that degree of partial substitution is  
9 important economically. It has pricing effects. And  
10 I think as we look forward, you know, while I agree  
11 with John that today for me at home, I have three  
12 children, I don't want just a mobile phone connection  
13 providing all my broadband needs at home. 5G, in the  
14 future, is going to create a very different  
15 competitive dynamic. The speeds that are being  
16 projected as, you know, dramatically higher than we  
17 receive today on our typical cell phone plans. So the  
18 competitive implications of 5G are quite profound on  
19 top of what is already a lot of substitution for some  
20 consumer segments in the marketplace.

21 MS. YODAIKEN: So one last question before  
22 we go to John's presentation. I know, kc, you and  
23 Tithi have worked at trying to capture the internet  
24 ecosystem in terms of who the players are and so  
25 forth. Can you talk a little bit about the challenges

1 of that? Why there's not one set way of looking at  
2 all this?

3 MS. CLAFFY: It's just an incredibly  
4 heterogeneous ecosystem. And one of the things that  
5 came up at -- we have a workshop review on internet  
6 economics where we try to bring together technologists  
7 and people who think about this higher layer stuff.  
8 We have a report on that; you can go read it. But one  
9 of the outcomes from this year's workshop was the  
10 primary development in markets, may be called  
11 technological market development, is the increase in  
12 private network.

13 Nick talked about this in his talk, too,  
14 meaning networks you wouldn't probably -- links you  
15 probably wouldn't consider on the public internet,  
16 like an enterprise, a company connecting to the cloud,  
17 Amazon Web Services. They are more likely to want  
18 some private connection to that cloud to have very  
19 high reliability and availability.

20 This is probably the fastest-growing market  
21 segment, although we don't have visibility into that  
22 market segment. So we don't know how fast it's  
23 growing. But it's an increasing part -- and this is  
24 also true for international. So it used to be that  
25 telecom consortiums would lay cable under sea, across

1 oceans to other continents. I don't think that's  
2 happening anymore. My understanding is that who is  
3 laying cable now is consortiums of content providers.  
4 Google and Facebook are laying those cables.

5 So that's -- and remember the platform  
6 diagram I mentioned earlier. They're at the content  
7 layer up at the top, but this takes them all the way  
8 down to the physical layer, integration of their  
9 services. So I think that's just an example of what  
10 is making this harder and harder.

11 And mobile is characteristically more  
12 difficult to measure. It's a more opaque ecosystem  
13 than even the wired internet. So you can't easily do  
14 a trace route, for example, across a mobile path.

15 MS. YODAIKEN: Thank you.

16 John, do you want to give your presentation?

17 MR. BERGMAYER: I would love to.

18 Okay. So in my short time, I want to  
19 highlight, first, one important difference between  
20 sector-specific regulators and general-purpose  
21 agencies like the FTC before moving on the net  
22 neutrality issue as they relate to market structure  
23 and, finally, mention a few issues where consumers by  
24 themselves are not equipped to figure out why their  
25 internet experience is not satisfactory.

1           So now, the first one is this is sort of a  
2 boilerplate citation that the FTC has in merger  
3 reviews. In order to find that a merger is in the  
4 public interest, the Commission must be convinced that  
5 it will enhance competition. And I want to focus on  
6 the word "enhance" because that is the important  
7 distinction that I want to draw between a regulator  
8 like the FCC or the Department of Transportation and  
9 the FTC, which is more around preserving competition.

10           The DOT is a good example to take us out of  
11 broadband land for a instant -- for a second so we can  
12 see how similar it is. So the Department of  
13 Transportation enforces pure competition principles  
14 and is directed by Congress to avoid unreasonable  
15 industry concentration, excessive market dominance,  
16 monopoly powers and other conditions that would tend  
17 to allow at least one air carrier unreasonably to  
18 increase prices, reduce service or exclude competition  
19 in air transportation. And it has a mandate to foster  
20 and encourage legitimate competition and to encourage  
21 entry into air transportation markets by new and  
22 existing air carriers and the continued strengthening  
23 of small air carriers to ensure a more effective and  
24 competitive airline industry.

25           So that goes well beyond simply enforcing

1 antitrust law, I think. This is effectively sort of a  
2 form of like industrial policy. That is how a lot of  
3 sector-specific regulators look at industries.  
4 They're not just saying, okay, I'm going to stop this  
5 or that anticompetitive action, but I'm actually going  
6 to set rules of the road that increase competition  
7 beyond what it would be naturally.

8           So my question, what the role is of the FTC  
9 with that framework because, in general, it seems that  
10 if the FTC simply enforces competition and consumer  
11 protection law, ensures that broadband providers live  
12 up to their promises to respect the open internet, I  
13 think there would be competition-enhancing effects and  
14 all of these sort of secondary effects. But while  
15 sector-specific regulatory agencies can direct  
16 companies to behave in certain ways, I think the FTC's  
17 powers are a lot more constrained. With that, I  
18 certainly support the FTC using the full extent of its  
19 powers as they are. I'm just pointing out that it is  
20 simply not the same as sector-specific regulation.

21           Now, as to net neutrality issues  
22 specifically, our basic worry is that broadband  
23 providers stand as gatekeepers between customers and  
24 online services and content. What are the sources of  
25 this gatekeeper power? So, first, I think it's

1 important to distinguish between gatekeeper power and  
2 the typical problems associated with monopolies.  
3 Those are, you know, namely monopolies are just low  
4 competition, which are reduced output, lower quality,  
5 higher prices.

6 Those are important issues, too, of course.  
7 In broadband, they are maybe a lack of build-out or  
8 slow speeds, bad customer service, slow data caps, but  
9 I think they can be analytically distinguished from  
10 the open internet issues, per se.

11 So the main sources of gatekeeper power are,  
12 first, customers typically do lack choice in home  
13 broadband. According to the FCC's 2018 Internet  
14 Access Service Report, 13 percent of developed census  
15 blocks do not have access to broadband at 20 megabits  
16 down; 56 percent of census blocks, according to that  
17 report, can get those speeds from two ISPs; but only  
18 44 percent can only get them from just one. So it's  
19 not like everyone is in the worst case scenario, but  
20 it's hardly a competitive utopia.

21 Even where they do have choice, like in  
22 mobile, switching costs are often pretty high. And in  
23 any event, carriers often act in similar ways due to  
24 concentration. For an edge service, there is no way  
25 to reach a customer but through their ISP. That's a

1 really obvious point, but it bears just sort of  
2 emphasizing. It doesn't matter how many routes there  
3 are to an ISP's network, there is only one way to  
4 reach its customers.

5 Vertical integration, we mentioned that. I  
6 think that's an increasing threat and it creates  
7 incentives for discrimination. Due to consolidation,  
8 many ISPs have so many millions of customers that this  
9 provides them with significant leverage over edge  
10 services. I understand that doesn't apply to the  
11 small ISPs. I'm, you know, singly out them here.

12 In short, the largest ISPs have significant  
13 monopsony market power, and this issue is explored  
14 most in-depth in the various recent cable merger  
15 proceedings. And it's also why once upon a time we  
16 had caps on how big any one cable provider was allowed  
17 to get (the video programming side) for similar  
18 reasons.

19 The kinds of issues we're concerned with  
20 are, broadly speaking, anything that an ISP does that  
21 interferes with the job customers hire ISPs to do,  
22 which is to provide them access to whatever internet  
23 services they want to access. That means, of course,  
24 blocking content, throttling content, paid  
25 prioritization, which we think is inherently



1 discriminatory, and all of those services become more  
2 oppressing in the face of vertical integration.

3           It is important to note that throttling and  
4 prioritization are basically two sides of the same  
5 coin. Even building new capacity with the intention  
6 just to sell access to this new capacity, it's still  
7 basically throttling all the services which are not in  
8 that new fast lane, you know, relative to the  
9 baseline.

10           At the same time, network management and  
11 nonpaid prioritization are still allowed. I think  
12 there's always going to be a lot of complicated edge  
13 cases. I think this discussion gets wrapped up in,  
14 oh, you know, what about this scenario, what happens  
15 when there's some form of network management which is  
16 technically throttling, but it's imperceptible to the  
17 user? You know, those are the kinds of issues that  
18 we'll resolve if we ever get and keep a legal regime  
19 in place long enough for an enforcer to build up a  
20 body of precedent, which unfortunately we simply have  
21 not had. I think those edge cases require a lot of  
22 thought. But, right now, we're still working on the  
23 basics.

24           Net neutrality does not mean that ISPs are  
25 required to spend unlimited money arranging

1 interconnection with just any old edge service that  
2 comes along. Who actually pays for interconnection?  
3 I don't really care. I just don't want ISPs charging  
4 for access to their customers. There is a difference,  
5 and I just want to be very clear that I think that the  
6 so-called eyeball network should operate according to  
7 different standards than other players in the  
8 internet. And just because they have economic  
9 leverage doesn't mean I want them to be able to use it  
10 in every instance.

11 The edge providers that are delivering large  
12 amounts of traffic to ISPs are simply delivering the  
13 traffic that customers have asked for. That is the  
14 job of the access networks is to provide access. It  
15 does not mean that CDNs or peering arrangements aren't  
16 allowed and, obviously, customers should continue to  
17 have control over their own internet connections.

18 In an earlier panel, Josh mentioned the  
19 Verizon thing -- I'm pointing to Josh now -- and that  
20 was where, during an interconnection dispute,  
21 customers called up and they said, hey, Verizon what's  
22 going on, I can't -- you know, Netflix isn't working.  
23 And the customer service representative told them,  
24 well, you need to buy a faster connection, you need a  
25 faster plan that will make Netflix work. I think

1 everyone here knows that that isn't true, and that is  
2 an instance where how are customers supposed to know  
3 exactly what to do.

4 And the other instance, which I'll briefly  
5 mention, is the New York Attorney General in its  
6 lawsuit against Charter over actions that happened in  
7 Time Warner days about internet speed. One of the  
8 claims is just about like the WiFi routers were not  
9 able to meet the same speed level that the broadband  
10 connection itself had, and they knowingly sold those  
11 routers to customers without really informing them.  
12 And that's just another issue. You might think, well,  
13 that has nothing to do with the network. That's just  
14 consumer premises equipment, you know. That has  
15 nothing to do with the quality of broadband.

16 But I think it shows where it's like, yeah,  
17 but from the perspective of the customer, who cares.  
18 You've sold me a speed and with the equipment that you  
19 provided, I can't get that speed. The State of New  
20 York was able to take action against that, and it  
21 really shows. It's like how are ordinary nontechnical  
22 consumers supposed to navigate this. It's as if they  
23 need some kind of expert agency to investigate these  
24 claims. Thanks.

25 MS. YODAIKEN: Great, thank you.

1 Well, there's a lot to explore there. I  
2 don't know if anybody wants to take any one thing at  
3 first. Go ahead.

4 MR. BRILL: Sure. I think one high-level  
5 reaction is John's presentation identifies a lot of  
6 potential harms and a lot of conduct that could occur.  
7 An important consideration from my perspective and the  
8 industry I've represented is that the FTC had it right  
9 in the 2007 report, when it said, in a dynamic  
10 environment, we have to be really careful about  
11 regulating in a heavy-handed way based on potential  
12 harms that don't actually come to fruition because  
13 regulations have significant costs and they can  
14 distort the marketplace, they can deter investment,  
15 and they can chill innovation.

16 So we have to be mindful that regulation is  
17 not a neutral action. It affects the marketplace  
18 profoundly. And it's important in this dynamic  
19 marketplace to continue to apply a light touch. So,  
20 sure, I think if blocking occurs, if throttling  
21 occurred, if anticompetitive prioritization occurred,  
22 those will be significant harms. But, importantly, we  
23 have an industry in the broadband industry that's  
24 publicly pledged not to engage in those behaviors,  
25 behaviors that support legislation that would codify

1    bright-line rules.

2                   Where the industry's been in dispute over  
3    any of these rules is really just open-ended rules  
4    known as the -- something know as the internet conduct  
5    standard and the part of the Communications Act known  
6    as Title II, because where there's an open-ended  
7    regime that could mean just about anything that a  
8    regulator dreams up, without real notice of what's  
9    prohibited and what's not, you know, that's where you  
10   get the chilling effects, where regulation has its  
11   heaviest cost.

12                  So I think a light touch regime that  
13   codifies protections against the types of harms that  
14   John was alluding to, that I don't think will happen  
15   anyway, but the industry is happy to sign on to, and  
16   those are the right kind of protections for consumers  
17   in a balanced way that allows the industry to continue  
18   investing and innovating.

19                  MR. BERGMAYER:  Yeah, I mean, it's just  
20   always interesting that rules which tell an ISP that  
21   they're not allowed to do something that the ISP also  
22   says they don't want to do -- I mean, look, if we're  
23   talking about rules that create reporting requirements  
24   or something, it's like, sure, you know, we can talk  
25   about the costs there.  But if there's a rule which

1 says, no paid prioritization, no blocking, you know,  
2 and it's pretty clear and also the ISP says they don't  
3 want to do that anyway, it's really hard to see what  
4 costs there are. You know, I see, well, people are  
5 going to make complaints and say that we really are  
6 blocking or we really are throttling, but then it's  
7 like, well, what if you are? I mean, that's -- you  
8 know.

9 So I think basically I'm not going to say  
10 that there are zero costs to regulation. But I think  
11 in this case, you know, they're worth it essentially.

12 MS. YODAIKEN: Okay. Well, let's dive into  
13 some of these concepts that you talked about. First  
14 of all, blocking, and then maybe throttling or  
15 degradation. There's a certain amount of that that  
16 has to be done to manage a network. I mean, you're  
17 keeping out malicious content. Can you talk about is  
18 there consensus on what counts as blocking in this  
19 space?

20 MR. WHITAKER: From a network management  
21 perspective, I guess the easiest thing to identify  
22 when it comes to just basic network management  
23 practices for blocking is any type of malicious  
24 attack, DNS attacks, things like that, they're  
25 typically going to come from a source. But that's a

1 responsive type of network reaction on day-to-day  
2 network performance and most operators can buy a piece  
3 of equipment that sits in your network that constantly  
4 monitors for that type of malicious activity.

5           There's a big difference between that and  
6 targeting a source and putting rules around that  
7 source content that would degrade the performance of  
8 that sort. I think that's what Jonathan's talking  
9 about, operators taking that type of practice. We  
10 just have a lot more to do to run our networks than to  
11 worry about doing something like that. It just  
12 doesn't cross our minds. But I'm not foolish enough  
13 to think that some operators and some businesses  
14 wouldn't think that way. It's not the type of  
15 business that we run, and I certainly wouldn't support  
16 anybody that does run their business that way, but I  
17 can see the circumstances that might exist or that  
18 would cross somebody's mind.

19           MR. BRILL: And I think we've had consensus  
20 for a number of years around this concept of a no-  
21 blocking rule. And I think, as Tom says, there needs  
22 to be room for network management, we need to be able  
23 to block malware and such, and I think just about  
24 every stakeholder in this debate recognizes that. And  
25 at the same time, I think all ISPs recognize that

1 blocking for anticompetitive reasons is prohibited and  
2 should be prohibited.

3 If an ISP wanted to do a deal and somebody  
4 wanted to get to Hulu and they wanted to steer them to  
5 a different service provider for anticompetitive  
6 reasons that absolutely shouldn't be permitted  
7 conduct. But it's not something that occurs in the  
8 marketplace, it's not something that consumers would  
9 tolerate, it's not something that any set of  
10 policymakers would tolerate, and that's why there's a  
11 consensus against it.

12 I think we have one example in the history  
13 of ISPs, a tiny little company called Madison River  
14 blocked ports that were used for VOIP, that it could  
15 preserve its incumbent telephone service. And I  
16 think, you know, for decades now we've had a policy  
17 consensus, that kind of anticompetitive conduct should  
18 never been allowed.

19 MR. BERGMAYER: So, I mean, ISP blocking,  
20 you know, it's being legally mandated in a lot of  
21 nations around the world for various reasons against  
22 sites. So I think on a global perspective, blocking  
23 is something that happens. I would just  
24 sort of caution I don't say no blocking for  
25 anticompetitive reasons; I'm just saying no blocking



1 because I also don't think there should be blocking  
2 for editorial reasons or aesthetic reasons or for  
3 really any reason.

4 And I also don't want to open up arguments  
5 about whether or not a particular instance of blocking  
6 is or is not anticompetitive. I believe that  
7 sometimes we just have certain categories of behavior  
8 that we just say, you know, you just don't get to do  
9 this and you also don't get to argue that you're in  
10 like the 10 percent of cases where it's actually okay.  
11 It's much simpler and cleaner and much more  
12 enforceable to have a bright-line rule that says  
13 simply no blocking.

14 MS. YODAIKEN: So let me ask, you know,  
15 there's debate about when something counts as  
16 throttling. There may be many reasons that traffic is  
17 congested and whether a consumer is going to recognize  
18 that there is some sort of slowdown happening or that  
19 they're having some sort of interference going on is a  
20 complicated question. So how are we supposed to  
21 figure this out?

22 MR. BERGMAYER: Well, I would just say  
23 something which is like on the side of the ISPs here.  
24 It's like a lot of times when people are encountering  
25 slowdowns they might just think, ah, I hate my cable

1 company, I hate paying that bill, it must be their  
2 fault and actually it's not. It could be that the  
3 edge service itself is having an outage or slowdown or  
4 just something somewhere in the network that the ISP  
5 simply has no control over.

6 My point is not that, you know, ISPs are  
7 always the ones who need to just sort of bear the  
8 brunt of the responsibility to somehow magically fix  
9 things. It's that customers are simply not in the  
10 position to know either, which is why, in general,  
11 we've supported the notion of having expert public  
12 agencies that can investigate these issues and find  
13 out what's going on because at the end of the day what  
14 matters is making things better for consumers, not  
15 necessarily whose fault it is.

16 MS. YODAIKEN: Right. So let's just jump  
17 into that for a second and maybe, kc or Tithi, you  
18 have a thought on this, also. But let's say there is  
19 some -- we've talked this morning about problems  
20 measuring speed. Let's say there is some problem that  
21 consumers are having. They call up Tom and they say,  
22 I'm not getting a certain content. Are there  
23 particular steps that the consumer would take or that  
24 an outside expert would take to figure this out?

25 MR. WHITAKER: Most consumers, as everybody

1 knows, are on some type of WiFi network in their home,  
2 and when it comes to cable cos, cable cos usually  
3 provide that wireless equipment for them. And  
4 everyone probably recognizes that over time, this  
5 equipment that cable cos are putting into consumer's  
6 homes just continues to get better and better and  
7 better.

8 So today's WiFi routers, the ones that we  
9 deploy, have multiple in and multiple out transmit and  
10 receive radios embedded in the hardware so multiple  
11 devices within the home can connect simultaneously and  
12 experience the same type of performance. But there  
13 are always going to be circumstances inside the home  
14 where the RF is going to be disrupted for some reason  
15 whether it's somebody making a bag of microwave  
16 popcorn or if somebody took their laptop to the other  
17 side of the refrigerator and performance is affected.

18 The vast majority of the customers just  
19 don't understand that. I mean, that same person that  
20 took their MacBook to the other side of the  
21 refrigerator will call from that spot and complain  
22 about their speed. I don't know that they're on the  
23 other side of the refrigerator. So these types of  
24 internal WiFi network performance is a growing  
25 challenge for all ISPs. But the good news is that CPE

1 wireless equipment is becoming increasingly better-  
2 performing equipment over time.

3 We're coming up to this kind of speed  
4 threshold that's a real issue for service providers  
5 because gigabit is becoming a vitally deployed speed.  
6 It's a value speed and there's a lot of providers that  
7 are selling a gigabit for way under a \$100, but there  
8 are very few pieces of hardware inside the home that  
9 can even operate at that speed. That's the limit on  
10 their card.

11 So we are starting to get phone calls  
12 saying, you know what, I'm only getting 910 mega --  
13 you know, .91. That's because your machine can't  
14 process anything faster than a gigabit. So we're  
15 starting to reach some thresholds where the speed is  
16 outperforming the equipment in the home and that's  
17 creating perceived performance problems with the  
18 customer.

19 MR. BRILL: There are a number of things  
20 that can help the consumer. I mean, as a starting  
21 point, the FCC's transparency rule speaks to this.  
22 ISPs are required to post public descriptions of the  
23 performance of their network. ISPs describe the  
24 limitations of WiFi and the factors that could affect  
25 WiFi performance. It's helpful to understand that an

1 old PC can affect the performance of your internet  
2 service or an older browser, by the same token. It  
3 may have nothing to do with the physical last-mile  
4 connection.

5 I appreciate John's recognizing problems can  
6 occur on lots of networks, and kc mentioned the  
7 heterogenous nature of the internet where you have  
8 transit providers and CDNs and edge providers with  
9 their own server forums. There are a lot of points of  
10 failure where an issue can intermittently arise. If  
11 there's a sustained problem and somebody suspects some  
12 sort of throttling or blocking or problematic conduct  
13 going on, there are more sophisticated tools out there  
14 that can trace packets and diagnose problems. Those  
15 are obviously not for the individual consumers.

16 But it probably bears mentioning that the  
17 ISP industry is maybe the most scrutinized industry in  
18 the country. There are plenty of observers outside of  
19 government, interest groups, consumer advocacy groups,  
20 that watch everything, that monitor every disclosure.  
21 So I think if there really were a problem occurring  
22 and it was of the ISP's making, there are a lot of  
23 interested players and academics and others who would  
24 certainly use the available diagnostic tools to  
25 identify any such problem.

1 MR. WHITAKER: Instagram had outages last  
2 week in certain parts of the country, it affected us  
3 and we got hammered with phone calls. I don't think  
4 Instagram took a single call.

5 MS. YODAIKEN: Okay. Well, we don't have  
6 that much time left. If we can just -- if everybody  
7 wants to give a minute or so of what they think that  
8 the FTC should take out of this discussion when we're  
9 looking at these markets that are very complex, that  
10 would be really helpful. Do you want to start?

11 MR. BRILL: I think the most important thing  
12 and one that's consistent with the Section 5 framework  
13 is to intervene only when necessary based on  
14 demonstrable harm to consumers. The Section 5  
15 standard builds into the definition of unfairness,  
16 conduct that has a significant impact, an adverse  
17 impact on consumers. I think that's an appropriate  
18 standard for the internet economy because we've got a  
19 lot of players, we've got a very diverse and dynamic  
20 ecosystem.

21 The mere fact that one can hypothesize  
22 harmful conduct doesn't mean it will ever come to  
23 fruition. And, again, intervening prematurely or in  
24 an overly heavy-handed way imposes real costs. So a  
25 flexible Section 5 approach that intervenes when

1 necessary to protect consumers from demonstrable harm  
2 is an optimal approach for this marketplace.

3 MR. WHITAKER; As a rural provider, I think  
4 one of the things that I would push for is continued  
5 removal of barriers to the growth of broadband,  
6 terrestrial broadband in rural markets, especially  
7 when it comes to colocation on poles. Sounds like a  
8 really small issue, but it's not. Cooperatives and  
9 munis have different rules than the big power  
10 companies do and we are paying a fraction to colocate  
11 on a Dominion Company pole or an American Electric  
12 pole than we are paying to colocate on a rural  
13 cooperative pole. That is a true barrier to entry  
14 because it's a real cost.

15 And at the same time, these munis and  
16 cooperatives are now competing with us with a fiber-  
17 to-the home product that they are attaching on these  
18 same poles. So there's some issues there that  
19 probably need to be addressed and resolved to help  
20 with competition and growth in rural broadband.

21 MS. CHATTOPADHYAY: So I would say pay  
22 attention to the fact that CDNs and content providers  
23 are changing commerce in this landscape as well.  
24 Having worked in a public agency that often could go  
25 to an ISP when there was a complaint, a lot of public

1 -- the FTC is probably a little different, but a lot  
2 of public utilities commissions and others don't have  
3 that relationship with the content providers. So the  
4 FTC might be a little different and could.

5 MR. BERGMAYER: Yeah, my one recommendation  
6 I usually have is, you know, don't focus so much on  
7 the specific methods by which discrimination might  
8 happen because those can change over time. They could  
9 happen on the network, at interconnection, or even  
10 just through billing practices. I think the focus  
11 should always just be on the effects on the consumer  
12 and not on the specific technical mechanism by which  
13 it's happening.

14 And I think in terms of some of the -- I  
15 think some of the statutory tools that the FTC has to  
16 work with are a little bit more narrow. So, for  
17 example, unfair acts or practices, I think it's  
18 focused more on economic harm, has to be legally  
19 cognizable, unavoidable, no countervailing benefit.  
20 And I think things like that are really not really  
21 necessarily the appropriate way to think of some of  
22 the things that traditional communication regulation  
23 looks at, like freedom of expression and diversity of  
24 content and things like that. You know, trying to  
25 frame all of that in an economic lens, I think can be



1 extremely difficult.

2 But maybe taking that into account when you  
3 are trying to enforce ISP promises about protecting  
4 the open internet, recognizing that those promises  
5 include those noneconomic benefits, at least could be  
6 potentially a way to get closer to what I think would  
7 be the ideal.

8 MS. CLAFFY: I think I'm the token  
9 technologist on this panel, so I should probably say  
10 something about technology here. So I talked a lot  
11 about platforms this morning and I want to bring us  
12 back to the notion of platforms a little bit.

13 It's not the first time that we've talked  
14 about platforms even in the space of consumer  
15 protection. I think the last time the FTC had an  
16 antitrust issue in the IT space, it was a platform.  
17 It was like Microsoft and the browser or something.  
18 So that was really a software platform and a software  
19 platform.

20 So these are not new issues. I don't mean  
21 to claim they are. But I think what's new here -- and  
22 I need to credit Chris Reilly from Mozilla who  
23 submitted a fantastic comment to this whole hearing --  
24 so go look up that comment if you only look up one  
25 today -- who really identified the unique feature of

1 the current ecosystem is the fact that you're talking  
2 about layers of software services, platforms that are  
3 basically software services.

4 And so businesses can make decisions that  
5 they then implement in technology to tie together, to  
6 interconnect their software services in ways that may  
7 make it easier or harder for competition to flourish.  
8 And for the first two decades, there was a normative  
9 approach in the internet community, in the standards  
10 development community that interoperability was key.  
11 In fact, you couldn't become an internet standard  
12 until you had two interoperable implementations. So  
13 that was really a primary sort of cultural force in  
14 the ecosystem.

15 That's not so much true today. And so we  
16 have huge, huge companies that offer platform-layered  
17 software services all the way up and down the stack,  
18 which isn't necessarily bad if they can promote  
19 vertical and horizontal competition, but that's going  
20 to require interfaces that allow interoperability.  
21 Right now, that's not a requirement and that's not  
22 something I think the FTC is thinking about and that  
23 really needs people who understand the software and  
24 the technology.

25 So I think that's a big challenge, and,

1    again, Chris said this better than I could. But if  
2    FTC is going to focus on one thing that has technology  
3    in it, I think that would be it. And it's not easy.  
4    Because you can talk about -- people talk about data  
5    interoperability all the time now. Oh, I want to take  
6    my Facebook profile to some other network. But what  
7    does it actually mean?

8                So I think really doing this properly -- and  
9    it goes into the nutrition label space, too, because  
10   really for a nutrition label to work -- and I'm not  
11   opposed to it. I think it's a good idea that somebody  
12   should invest some resources in that. But I think  
13   you're going to need technology underneath. That  
14   thing cannot just be a piece of paper and negotiated  
15   in like, you know, ASCII. That thing has to be -- the  
16   network can transmit something to me in technology  
17   about how their network is configured right now.  
18   Because networks change all the time. They have to  
19   change to stay alive.

20                So I think you need a channel between the  
21   network operator and the consumer. That channel could  
22   be useful to the network operator if done right, if we  
23   standardize on what source of things can go across  
24   such a channel. And, again, technologists have been  
25   talking about this for some time. One of Dave's

1 colleagues that coauthored the papers with him has  
2 been talking about this for a while.

3 But you need companies to come together to  
4 talk about it. You need government probably to help  
5 nudge a little bit and say, here are the things we  
6 think are important for consumers, and I think  
7 everybody could win. But, again, it's software, it's  
8 software that's embedded in layered platforms, and it  
9 requires technologists' understanding.

10 MS. YODAIKEN: Thank you. Thanks to all the  
11 members of this panel, and I think we're going right  
12 into the next one. No, we have a break, 15-minute  
13 break. Thank you.

14 (Applause.)

15 (Brief break.)

16

17

18

19

20

21

22

23

24

25

1           EVOLVING MARKETS AND TECHNOLOGICAL DEVELOPMENTS:

2                           POLICY APPLICATIONS

3                   MS. MUNCK: Wonderful. Well, thank you very  
4 much for joining our third panel of the day, looking  
5 at evolving markets and technological developments,  
6 specifically focused on policy applications. We will  
7 begin the panel with presentations from our esteemed  
8 panelists. All of their bios are in your papers. And  
9 this panel is a bit of a bridge between the panel that  
10 Ruth just conducted and the more antitrust-focused  
11 panel that we will have following this one.

12                   We are going to be looking at how the FTC  
13 can best identify market behavior, what we should be  
14 thinking about in terms of technological expertise,  
15 how we can use our statutory authority, our advocacy  
16 tools, and what considerations the FTC should be  
17 thinking about when we look at promoting innovation in  
18 this space because obviously two of our main goals as  
19 an agency are promoting innovation and protecting  
20 consumers.

21                   So with that, we will go in order,  
22 Christopher Yoo, Gigi Sohn, Berin Szoka, Mitch Stoltz,  
23 Tom Struble, and Tejas Narechania. I'm very pleased  
24 that you're all here to join us, and I am looking  
25 forward to the discussion today, so thank you.

1 MR. YOO: Well, thank you very much. I'm  
2 delighted to be here. It occurred to me when I was  
3 looking that one of our mandates is to update the  
4 Commission on what's happened since 2007. And having  
5 looked at the number of people talking today, I  
6 realized that the only two people who testified both  
7 in 2007 and today are Gigi and me.

8 MS. SOHN: We're old.

9 MR. YOO: Yeah, we're old, and it puts us in  
10 a uniquely good position, and I'm actually going to  
11 brag because in addition, Gigi is a graduate of my law  
12 school, an alumna of whom we are very proud.

13 So the other thing I really appreciated was  
14 Alden's opening talk about evidence-based,  
15 enforcement-oriented perspectives, because really what  
16 we think about evidence-based is that I think the  
17 takeaway from the talks that were given earlier by kc  
18 and by Nick is that much of these practices are  
19 ambiguous. There are parts for them which can be  
20 harmful to consumers; there are part that can be  
21 beneficial to consumers. And when we stay at the  
22 theoretical level, you just are positing harms.

23 And what we really need to do is to actually  
24 get to the next level the way the Commission has done  
25 in other areas of the law, and I will talk about that.

1 But I think that we are -- need to be getting that  
2 kind of evidence-based to make better decisions than  
3 we have.

4 So I would actually like to organize my  
5 remarks quickly around five changes since 2007 and  
6 then try to analyze them a little bit through the lens  
7 of one specific example which is Comcast-Netflix. The  
8 good news is thanks to both Nick and kc, the first of  
9 these will go very, very quickly. First, a big change  
10 since 2007 is the growth of video. As Nick pointed  
11 out very nicely, according to Sandvine Global Internet  
12 Phenomena, which they're no longer publishing, so we  
13 stop at 2016, realtime entertainment went from 29  
14 percent of prime-time -- of peak traffic to 65 percent  
15 from 2009 to 2016. This isn't a big surprise to any  
16 of us. That's been a big change.

17 The second is the growing importance of  
18 wireless broadband really triggered by the smartphone  
19 revolution, launched by the iPhone in 2007, explosive  
20 growth in an area where you can't just add more  
21 capacity automatically because of the constraints of  
22 spectrum, and we're getting better at using it, but  
23 the other thing is that we've known since the 2010  
24 Order where we made an explicit exception for wireless  
25 broadband and even the 2015 Open Internet Order by the

1 FCC, where they brought the wireless characteristics  
2 into the reasonable network management calculus, that  
3 wireless is quite different.

4 And one of the most striking things to me is  
5 if you go to the engineering literature on wireless,  
6 they talk about cross-layer design, which is there's  
7 something about wireless that makes us break up the  
8 usual architecture that we've had and how we've  
9 modularized things before in ways that are putting  
10 enormous pressure on the entire -- on the way we  
11 organize the industry.

12 The other couple -- the other three things  
13 that I think are very striking, one is an obvious one  
14 to anyone who's watching, is the increase in vertical  
15 integration. We've seen, obviously, the Comcast-NBC  
16 Universal merger, the AT&T-Time Warner merger, but we  
17 see things like Google Fiber, where we see Google  
18 actually building last-mile networks, but something  
19 that's flying under the radar is that Google,  
20 Facebook, and Microsoft, are the largest constructors  
21 of undersea cables in the world right now. They're  
22 actually creating long-haul networks and bypassing the  
23 public backbone and actually selling service on their  
24 excess capacity, which is a pretty radical change.

25 And what I really find quite striking about



1 the framing vertical integration is it actually frames  
2 up these issues in a way that I think is helpful that  
3 the Commission really understands, which is the last  
4 50 years of vertical integration theory, we've gone  
5 from per se illegality for almost -- many vertical  
6 restraints to one of the rule of reason.

7 The reason for that is quite simple, is that  
8 we see an ambiguous practice that can go either way  
9 and that, in fact, we need to understand that there  
10 are benefits to this. And we have two great studies  
11 authored by FTC-then-staff or future staff, one by  
12 James Cooper and Luke Froeb on vertical restraints and  
13 two excellent articles written by Francine Lafontaine,  
14 who became later Chief Economist during the Obama  
15 Administration, which found -- which assessed the  
16 empirical literature and were very surprised to find  
17 that in the overwhelming number of cases vertical  
18 integration was either neutral or benefitted  
19 consumers, really putting the underscore in the peer-  
20 reviewed literature, which are still our best test for  
21 understanding that you have practices that have  
22 potentially both effects, and the hard challenges  
23 untangling which of those effects dominates in an  
24 enforcement case.

25 And what we're seeing now is we see

1 technological aspects which are combined with the  
2 vertical economic aspects, and I'm always reminded of  
3 the technological tying cases where courts just punt.  
4 Once you have a plausible technical claim, they don't  
5 assess it. It reminds me of the way economics was 30  
6 years ago, and now we see that expertise being  
7 internalized by enforcement officials, by judges, and  
8 that, in fact, we need to bring the same sort of  
9 expertise we've brought now to economic analysis to  
10 the technical analysis so we don't just punt and let  
11 that go.

12 The two other big changes are actually --  
13 are going to go much faster, too, because they were  
14 highlighted nicely by kc and Nick. One is really the  
15 growing diversity of the network structure, you know,  
16 the change of the topology so it's no longer Tier 1,  
17 Tier 2, Tier 3 backbones, last inter-regionalized  
18 piece, and last-mile providers, but really they're  
19 talking when the advent of content distribution  
20 networks, about third-party data centers, first-party  
21 proprietary CDNs and data centers, and, you know, also  
22 the alternative peering and transit relationships.

23 And what it really underscores is when you  
24 think about an economic actor, they often look at it  
25 at the last minute where the dispute arises. What you

1 really need to do is back it up to the full range of  
2 options available to them to begin with. And we'll  
3 talk about that briefly in the Comcast-Netflix  
4 example.

5 And then, lastly, the really striking thing  
6 that they mention briefly but I really want to  
7 highlight is the nature of a network's ability -- how  
8 we need to analyze them as systems, is that if you  
9 have a choke point in one part of the network it is  
10 not a given that that's going to create a problem  
11 because networks have the ability to route around  
12 things, and you can't really understand it until you  
13 analyze the entire system as a whole and how they work  
14 their way through it.

15 And so just because you squeeze the balloon  
16 doesn't mean it gets smaller. It will pop out on the  
17 other end. And what we see is that being a very  
18 difficult problem. So to talk about this, you know,  
19 concretely in the Comcast-Netflix situation, what we  
20 see is, in fact, that Comcast, there were 50  
21 additional -- 80 peering partners between that link  
22 and 8,000 transit network relationships.

23 So the market power that serves as a limit  
24 price, and this we've known for about 10, 20 years, it  
25 doesn't mean that they can absolutely exercise it, but

1 in addition Netflix is deploying an open-connect CDN  
2 itself on a proprietary basis, which it has the right  
3 to self-provision and avoid some of these problems.  
4 And then we see the final solution that they ended up  
5 with is they connected through a third-party data  
6 center through Equinix. And they originally had a  
7 different transit provider before, which they switched  
8 it, and if we really want to understand what the  
9 position is between the two, you have to take and  
10 count the full range of options available to each.

11 And then Nick pointed out very nicely is  
12 that part of the play book is that, in fact, and that  
13 David Clark and his team had found this because they  
14 were studying the links, Netflix was actually able to  
15 act strategic as well to move around traffic to make  
16 links look congested. And so when we think about  
17 this, it's not simply that there's one strategic  
18 actor. In fact, there are multiple strategic actors  
19 and opportunities, and we really need to think about  
20 this in a very holistic way if we're going to  
21 understand the way it works, and understanding that,  
22 in fact, disputes are normal -- there's normal  
23 bargaining, deadlocks, and to try to interpret this  
24 through a more sophisticated lens.

25 MS. MUNCK: Terrific. Thank you very much,

1 Christopher.

2 Gigi.

3 MS. SOHN: Good afternoon, everybody, and  
4 thank you, Suzanne, for inviting me to speak today. I  
5 really welcome this exploration of how the FTC can  
6 protect consumers and competition in the broadband  
7 market, specifically as it pertains to discriminatory  
8 network management practices.

9 First, I want to associate myself with  
10 pretty much everything my former colleague, John  
11 Bergmayer, said. And this is not going to surprise  
12 anybody that I'm going to say this, but I'm going to  
13 say it anyway. I want to make absolutely clear that I  
14 believe that the Federal Communications Commission  
15 should have the primary, although not the exclusive,  
16 role overseeing the broadband market.

17 So the FCC for 85 years was tasked by  
18 Congress with ensuring access to the country's  
19 networks. And it really defies belief that it now no  
20 longer has that role. And that oversight includes,  
21 among other things, ensuring that all Americans have  
22 access to communications networks, and it also  
23 includes protecting consumers and promoting  
24 competition.

25 Taking ex ante action to promote competition

1 is something that the FTC doesn't have the power to do  
2 under statutory authority, and despite Matt Brill's  
3 excellent presentation to put a very good spin on very  
4 poor numbers, that kind of ex ante action is sorely  
5 needed today.

6 So let me put my spin on those numbers. So  
7 according to the most recent data from the FCC's 2018  
8 Communications Market Report, which I have a lot of  
9 disagreements with, but I'll still quote from those  
10 numbers, 42 percent of Americans have a choice of only  
11 two fixed broadband providers, while 24 percent have a  
12 choice of one, and 6 percent have no access to fixed  
13 broadband at all.

14 Now, you have to understand that this  
15 grossly overstates the number of people that have  
16 access to broadband because for the FCC's purposes if  
17 one customer in a census block has access, then all  
18 have access, so it grossly overstates it. You know,  
19 if we had the kind of competitive market in broadband  
20 like we had in the dial-up era where the average  
21 American had 13 ISPs per consumer, we might be having  
22 a very different conversation today.

23 I also want to mention two other things --  
24 one other thing actually -- that wasn't mentioned in  
25 the last panel, and that is there was some discussion

1 about how communities build their own broadband  
2 systems, but 19 states in the United States have laws  
3 that prohibit communities from either building their  
4 own broadband networks or expanding the networks they  
5 already have. So that's a significant anticompetitive  
6 situation there.

7 All that being said, I think the FTC should  
8 play a role in protecting consumers and competition in  
9 the broadband market. You know, when an industry is  
10 as vital to our economy and to our society as the  
11 broadband industry, it's prudent to have more than one  
12 regulator. And, in fact, if legislative action was  
13 needed to provide that authority, I'd be all for it, I  
14 would support that.

15 But let me go back to the three questions  
16 that the staff have asked us to address. The first is  
17 how can the FTC identify discriminatory network  
18 management practices; second, how can the FTC use its  
19 current statutory authority to protect consumers and  
20 competition in the broadband market; and, third, what  
21 should the FTC be thinking about in terms of market  
22 development and innovation.

23 So let me first discuss how the FTC can  
24 identify discriminatory network management practices,  
25 and I'm going to guess -- unfortunately, I couldn't

1     come here until after lunch -- that I'll be repeating  
2     some of the things that were said earlier today.

3             There are existing organizations that  
4     measure network performance, Measurement Lab is the  
5     most prominent among them. It's a consortium of  
6     researchers, public interest groups, and industry  
7     players that collect data and analyze data on network  
8     performance. And they make that data available to  
9     consumer groups, policymakers, and researchers. As  
10    I'm sure you've probably heard, the Open Technology  
11    Institute used Measurement Lab data to determine the  
12    cause of Netflix throttling in 2014, and we can argue  
13    later about, you know, what the actual cause was, but  
14    Measurement Lab played a huge role in that.

15            The second thing the FTC can do is accept  
16    and investigate complaints from consumers and public  
17    interest organizations with regard to discriminatory  
18    network practices. But the problem is it needs its  
19    own cadre of technologists who are experts on how  
20    networks work so that they can determine whether those  
21    complaints have merit.

22            I noticed just by looking at the internet  
23    the other day that the Office of the Chief  
24    Technologist is currently vacant. And I was told by a  
25    former chief technologist that when he was there that



1 office had no more than between 5 and 10  
2 technologists. And, I mean, look, the FTC needs  
3 technologists for more than just determining network  
4 management practices. It's involved, needless to say,  
5 in a number of other highly technical issues,  
6 enforcement matters. So getting up to speed, 5 to 10  
7 technologists is not going to cut it for an agency  
8 that has the kind of breadth that the FTC has.

9           There's a renewed interest -- and this is an  
10 issue that I've been working with some folks in Tom's  
11 group and other groups on -- there's an interest in  
12 reviving the Office of Technology Assessment, which  
13 was an office that -- a small but hearty office --  
14 which advised Congress on technological issues. And  
15 in 1995, in the rush to make government smaller,  
16 Speaker Gingrich got rid of that office, which was  
17 only a \$40 million office. And I think every agency  
18 that has to deal with any kind of issues that affect  
19 technology -- either policy affecting technology or  
20 technology affecting policy -- needs to have its own  
21 office of technology assessment.

22           Finally, I'd like to see the revivification  
23 of something called the Broadband Internet Technology  
24 Advisory Group. I'm stealing this idea from Berin,  
25 although I was on the board of BITAG. It played a

1 really important role in examining network management  
2 practices and advised the FCC, and it's pretty much  
3 been dormant for the last two years, and I think it  
4 needs to get up to speed again.

5 All right, I only have one more minute and  
6 I've got a lot more than a minute, so let me just very  
7 quickly summarize the rest of what I wanted to say and  
8 then I'll take questions. On the FTC's authority to  
9 address discriminatory network management practices,  
10 I'll agree again with John Bergmayer that I think the  
11 FTC does have some tools, you know, unfair and  
12 deceptive practices, unfair methods of competition,  
13 but they're both limited.

14 Let me just focus on the second one in  
15 particular, unfair methods of competition, to say that  
16 current FTC Commissioner Chopra has said that the FTC  
17 has largely neglected this tool. And that's something  
18 that I heard Former Republican Commissioner Bill  
19 Kovacic say similarly in Silicon Flatirons two years  
20 ago. So it's a tool, and it may be good for dealing  
21 with blocking and throttling, but perhaps not so good  
22 when it comes to paid prioritization and zero rating.

23 And I would -- if this has not already been  
24 submitted for the record of these hearings, I would  
25 point the FTC to my friend, Hal Singer's, article,

1 Paid Prioritization and Zero Rating: Why Antitrust  
2 Cannot Reach the Part of Net Neutrality Everyone is  
3 Concerned About. I think that's a really, really  
4 important analysis of why antitrust laws fall short  
5 when it comes to pretty much the two issues that are  
6 most debated when it comes to net neutrality.

7 So on the last question, what should the FTC  
8 be thinking about in terms of market development and  
9 innovation, very quickly, you've heard on various  
10 panels and even my friend, Chris Yoo, agrees, the  
11 increase in vertical integration gives increased  
12 incentive and ability for broadband providers to  
13 discriminate, so that needs to be looked at. And it  
14 doesn't necessarily have to mean an AT&T buying a Time  
15 Warner; it could be a Google or an Amazon buying an  
16 infrastructure provider, so it goes both ways.

17 Second, new practices that don't obviously  
18 violate the bright-line rules, I think the ISPs have  
19 done a brilliant job of using zero rating to get  
20 around paid prioritization prohibitions. I think it's  
21 the same darn thing, but you got to look out for those  
22 practices. And that's why even if it's not the  
23 general conduct standard we adopted in 2015, there  
24 needs to be some sort of nondiscrimination standard --  
25 general nondiscrimination standard that gets at

1 activities that don't fall within the bright-line  
2 rules.

3 And, finally, the FTC should be wary of  
4 claims that new network technologies like 5G or the  
5 diversity of network structures are incompatible with  
6 net neutrality. Thank you.

7 MS. MUNCK: Thank you, Gigi.

8 And next Berin.

9 MR. SZOKA: Thanks to the Commissioners and  
10 the staff for having me today. For all the debate  
11 about antitrust law and competition, I believe it's  
12 actually the FTC's consumer protection authority that  
13 will be the agency's primary tool in policing net  
14 neutrality concerns and, indeed, it already has been.  
15 The agency has already settled two cases for  
16 deceptively throttling access against AT&T and  
17 Tracfone. And I want to remind everyone as I start  
18 here that deception claims don't depend on competition  
19 levels and they don't require a showing of harm. It's  
20 enough to show the consumers didn't get what they were  
21 promised.

22 So let's start with the 2007 broadband  
23 report, which I quote, "Some have argued that if a  
24 broadband provider intends to prohibit its customers  
25 from using their broadband connections to access

1 specific content or applications such as VOIP calls or  
2 streaming video, the provider should disclose those  
3 limitations clearly and conspicuously before a  
4 transaction is completed." Wow. Allow blocking so  
5 long as it's disclosed? Which rightwing hater of the  
6 internet said that in 2007? Was it Christopher? Was  
7 it me? Oh, no, it was my friend, Gigi. And the FTC  
8 also cited none other than Tim Yoo.

9 Now, perhaps that was the bare minimum of  
10 what Gigi was willing to accept, but it's since turned  
11 out that that was also the maximum of what the Federal  
12 Communications Commission could require all along.  
13 After Alamo Broadband challenged the 2015 Open  
14 Internet Order, the three-judge panel dismissed  
15 Alamo's First Amendment arguments. Then Judge  
16 Kavanaugh invoked those arguments in arguing for en  
17 banc rehearing.

18 The two judges who ruled against the FCC on  
19 the panel -- Srinivasan and Tatel -- explained that  
20 the First Amendment was not triggered by the FCC's  
21 rules because "as the Order explains, broadband ISPs  
22 that are subject to the rule 'sell retail customers  
23 the ability to go anywhere (lawful) on the Internet'  
24 -- they represent that they will transport and deliver  
25 traffic to and from all or substantially all Internet

1 endpoints," without alteration, blocking, or editorial  
2 intervention.

3 And, thus, for a broadband ISP that holds  
4 itself out to consumers as a neutral, indiscriminate  
5 conduct, the rule requires them to abide by its  
6 representations and honor its customers' ensuing  
7 expectations.

8 Well, that, of course, is precisely what the  
9 FTC does with its deception authority. And just as  
10 Gigi and Tim Yoo proposed to let broadband providers  
11 opt out of the net neutrality requirements so long as  
12 they clearly and conspicuously disclosed nonneutral  
13 practices, Judges Srinivasan and Tatel recognized that  
14 the Open Internet Order "does not apply to an ISP  
15 holding itself out as providing something other than a  
16 neutral, indiscriminate pathway, i.e., to an ISP  
17 making sufficiently clear to potential customers that  
18 it provides a filtered service involving the ISP's  
19 exercise of editorial discretion."

20 So given all of this, would consumers really  
21 be better protected under the FCC's rules? I think  
22 the answer is pretty clearly no. Most importantly,  
23 the D.C. Circuit made clear that whether an ISP's  
24 service fell under the Open Internet Order was purely  
25 binary. Only those ISPs that held themselves out as

1 offering a neutral, indiscriminate conduit across the  
2 board were subject to the rule. But if an ISP opted  
3 out in one respect, it opted out completely.

4 And if you think about it, it's obvious why  
5 that had to be the case. The FCC's order rested on  
6 classifying broadband providers as common carriers, a  
7 status reserved for truly neutral providers. The FCC  
8 avoided First Amendment problems by declining to force  
9 common carrier status upon an ISP that did not in the  
10 way that it held itself out to consumers qualify as a  
11 common carrier. The FCC, therefore, never explained  
12 what it would do about broadband providers that opted  
13 out of the rules and also therefore out of Title II  
14 status. And that's probably because the answer was it  
15 couldn't use Title II, it couldn't do anything with  
16 that source of authority.

17 By contrast, the FTC's deception authority  
18 isn't binary. The FTC polices individual claims,  
19 providers of kosher, child-safe, or MAGA-free internet  
20 service, could opt out of the no-blocking rule and  
21 therefore effectively offer and lawfully offer  
22 network-level content filtering, but they would still  
23 be subject to exactly the same analysis of throttling,  
24 paid prioritization, and any other practice by the  
25 FTC.

1           This effectively parallels the debate over  
2   how to interpret the FTC's common carrier exception.  
3   Why the panel in the AT&T litigation held that the  
4   FTC's authority depended on overall status, the Ninth  
5   Circuit agreed with the FTC and reversed that panel  
6   and excluded only common carrier activities. And  
7   that's how the FTC works generally. But the FCC's  
8   authority really did depend clearly on status and,  
9   therefore, would be a huge problem policing net  
10   neutrality. The second reason I think the FTC is a  
11   better regulator here is the FTC has a century of  
12   experience in policing marketing claims, exactly the  
13   issue that I think will be the front line of net  
14   neutrality enforcement, and that's experience the FCC  
15   simply lacks.

16           Third, the basic structure of the FCC's  
17   enforcement power is the right one. It's ultimately  
18   more important to make consumers whole if they're  
19   cheated than to impose fines, which ultimately get  
20   paid to the U.S. Treasury. A single episode of the  
21   John Oliver show, triggered by an enforcement action,  
22   will do much more to deter bad behavior than any fine  
23   the FCC might conceivably impose.

24           So let me close by highlighting a few  
25   aspects of FTC enforcement that I hope we'll have time



1 to discuss today. Number one, contrary to the  
2 deceptive claim you heard this morning, the FCC's 2015  
3 transparency rule remains in effect and will be  
4 enforced by the Federal Trade Commission. Second, it  
5 will also be easy for the FTC to enforce the specific  
6 commitments to net neutrality made by major broadband  
7 providers.

8 Third, changing those commitments, while  
9 possible under either agency, will not be easy under  
10 the FTC's case law on unilateral changes of  
11 contractual terms. The ISP would have to disclose  
12 that change, and subscribers would likely have to opt  
13 in.

14 Fourth, even absent the FCC's transparency  
15 rule or current industry commitments to net  
16 neutrality, the FTC would still be able to police  
17 implied claims about the nature of broadband service,  
18 no less than the FCC would have been able to do. And  
19 that's essentially the similarity I want to talk about  
20 on our panel. For example, if a company makes a claim  
21 about broadband service being appropriate for  
22 streaming video and fails to deliver that level of  
23 service, that's actionable deception in my view.

24 But at a bare minimum, even where companies  
25 made no such claims, the FTC would still be able to

1 police material omissions and thus vindicate "ordinary  
2 consumer expectations as to the irreducible minimum  
3 performance standards for a particular class of  
4 goods." That's in addition to policing the claims  
5 they actually make.

6 What the standard exactly means was  
7 precisely the source of disagreement between  
8 Commissioners Ohlhausen and McSweeney in the recent  
9 Lenovo case. I hope we can talk about what standards  
10 of proof and what theories of evidence would actually  
11 be adequate under each of those claims, but I'll just  
12 close by noting the path not taken here.

13 In 2008, the FTC had the perfect opportunity  
14 to assert itself and this form of deception authority  
15 when it became clear that Comcast, contrary to public  
16 claims, was throttling BitTorrent traffic. This would  
17 have been a relatively straightforward case for the  
18 FTC to bring. And from what I understand happened,  
19 the Republican Chairman and the senior Democratic  
20 Commissioner were ready to bring suit. And, instead,  
21 the Chairman of the FCC insisted that his agency would  
22 handle the case.

23 That decision ended in a D.C. Circuit  
24 decision scolding the agency for a legal theory that  
25 "if accepted would virtually free the Commission from

1 its Congressional tether." And then for the next  
2 decade, instead of the FTC handling this issue, we  
3 wound up with the FCC fighting over its legal  
4 authority, and that's where we've been ever since.

5 So I hope as we focus on this issue that  
6 we'll now accept that the FTC, for the time being, is  
7 the cop on the beat, and we need to think carefully  
8 about how it should use its authority to protect  
9 consumers and make sure they get the service that  
10 they're being offered.

11 MS. MUNCK: Thank you, Berin.

12 Next Mitch.

13 MR. STOLTZ: Thank you. Thank you, Suzanne  
14 and the Commission and my fellow panelists. I'm going  
15 to talk about a few things that may be a bit  
16 disjointed but I imagine they will come together by  
17 the end of this hour. What's at stake, I think, in  
18 the questions that are being raised here is consumers'  
19 basic expectations about what internet access means.  
20 And those go -- those include what is said in ISP  
21 marketing materials, but it goes deeper than that.

22 It's an understanding that consumers have  
23 reached over really the past 20 years as we've gone  
24 from sort of the dial-up services in walled gardens to  
25 a more open notion of what the internet is as

1 something -- really, the D.C. Circuit panel opinion  
2 that Berin just read really sums that up pretty well.  
3 It's giving access to the entire internet, as well as  
4 possible.

5 The practices that are the subject of this  
6 panel are things that threaten to change that  
7 understanding, perhaps slowly, perhaps even more  
8 quickly, to something that may be more like a walled  
9 gardens service of old or maybe a hybrid, but still  
10 pretty far from what consumers understand the internet  
11 of internet access to mean.

12 I'd like to acknowledge and to agree with  
13 Gigi and John that there is a -- and Berin -- that  
14 there was a very active debate about agency  
15 jurisdiction in this area and that objectively this is  
16 an open question right now. There are several active  
17 court cases and several pieces of legislation that  
18 will in fairly short order determine whether broadband  
19 service is a common carrier service that has direct  
20 implications for whether the FTC has jurisdiction over  
21 those activities. So that's the elephant in the room  
22 here.

23 In the meantime, I agree with a number of  
24 the previous panelists that there is an important role  
25 for the FTC regardless. Now, it doesn't reach ex ante

1 rules. And ex ante rules are very important in these  
2 circumstances because they are what help maintain  
3 those norms that I mentioned -- the notion of internet  
4 access as access to the entire internet as best we can  
5 without the editorial judgment or sort of judgment  
6 based on commercial or ideological interest of the  
7 last-mile ISP.

8 And the FTC, again, you know, has very  
9 limited authority to create ex ante rules, so that's  
10 always going to be a limitation, regardless of the  
11 outcome of the current legal cases. There is perhaps,  
12 you know, an avenue to proceed under the various  
13 Section 5 standards, based on this really sort of deep  
14 understanding of the consumer expectations. And  
15 these, again, they have to go beyond marketing and  
16 thus beyond the deception standard because lawyers  
17 like Matt, you know, are well capable of writing  
18 marketing materials and disclosures that really don't  
19 bind major ISPs in any significant way but that  
20 satisfy the standard and will not trigger enforcement  
21 action in the future.

22 I wanted to mention some of the ISP conduct  
23 that we have observed over the years and that we're  
24 particularly concerned about, and these touch on  
25 privacy. I know there's been some -- already some

1   hearings on privacy but they haven't focused  
2   specifically on ISPs. I want to make sure that ISPs  
3   are thrown into the mix because many of the privacy  
4   issues that we've heard about and identified with  
5   social networks and search companies and application  
6   layer companies on the internet apply in similar  
7   fashion to ISPs.

8               Some of the things we've seen is, you know,  
9   ISPs preinstalling spyware on mobile devices that  
10  track browsing history and so on, you know, selling  
11  location history, browsing history, demographic  
12  information. And then there's not a bright line  
13  really between privacy issues and what we might think  
14  of as net neutrality issues because some of the other  
15  things that we've seen and observed over the years are  
16  blocking of certain applications surreptitiously.

17              This was, you know, with Comcast inserting  
18  reset packets to block BitTorrent and several other  
19  peer-to-peer protocols without disclosing that,  
20  redirecting particular search queries to commercial  
21  partners rather than the search engine that the user  
22  thought they were going to, actually modifying web  
23  pages in transit, inserting code into them to serve  
24  ads. This is something at least three ISPs have been  
25  observed doing.

1           These are all equally powerful and equally  
2     concerning as some of the examples that we've seen on  
3     the application layer side. And, you know, they can  
4     be treated and should be treated equivalently to  
5     those, you know, by the FTC as, you know, a matter of  
6     sort of the privacy beat and the upholding consumer  
7     expectations beat.

8           Then I want to shift gears a little bit and  
9     talk -- in my remaining time and just mention sort of  
10    the technological progress. This was touched on by  
11    John and some other folks this morning, but if we head  
12    for -- if we're going towards a world of robust fiber  
13    deployment as far out in the network as possible,  
14    fiber has orders of magnitude more capacity than  
15    copper or even cable. It has potential to leapfrog  
16    it.

17           And I'd agree with John that fiber  
18    deployment and other wireline buildouts are  
19    complementary to wireless because wireless,  
20    particularly at the speeds that have been promised for  
21    5G, is dependent on robust, high-speed fiber networks  
22    going as far out as possible because the newer  
23    wireless technologies have limited range and limited  
24    ability to penetrate buildings and obstacles.

25           But the FTC has to keep those developments

1 in mind and really see where they end up because we  
2 have the potential to make some of the concerns about  
3 prioritization fall by the wayside. If capacity can  
4 really be expanded, which it can through certain use  
5 of avenues of technological progress there, so  
6 encouraging fiber deployment, you know, might be sort  
7 of a long-term but more robust way at getting at some  
8 of these problems.

9 MS. MUNCK: Great. Thanks, Mitch.  
10 Tom, please go ahead.

11 MR. STRUBLE: Cool. Thanks, Suzanne, and to  
12 the FTC for inviting me here to speak today and for  
13 hosting this hearing on this important topic, which  
14 seems to happen about, I guess, once every decade here  
15 at the FTC. So obviously we are mostly to talk about  
16 what has changed since 2007 and how that impacts  
17 public policy and specifically how the FTC's authority  
18 should be applied to these issues as they have  
19 changed, but I first want to look back at the 1996  
20 Advanced Services Report, which touched on broadband,  
21 and obviously the 2007 Broadband Competition Policy  
22 Report because a lot of things have actually not  
23 changed that much in terms of the overall economics of  
24 the system. You know, physics and everything haven't  
25 changed at all, but economically, broadband networks



1 still benefit from economies of scale on the demand  
2 side and supply side, as well as economies of scope,  
3 because they are general-purpose technologies that can  
4 support a lot of different applications up and down  
5 the stack.

6 So bearing that in mind, the sort of recent  
7 developments we have seen shouldn't be all that  
8 surprising. If they have economies of scale, we have  
9 seen more concentration in sort of horizontal mergers  
10 in the broadband space, fewer economics of scope.  
11 We've also seen lots of vertical integration up and  
12 down the stack with network operators, buying -- or  
13 content providers, content providers building  
14 networks, device owners all in there as well.  
15 Everyone wants advertising money, so lots of  
16 competition up and down the stack, which I think  
17 ultimately is what we want. In terms of overall  
18 policy, we want robust competition at every layer in  
19 the stack, among network providers, application,  
20 content, everywhere.

21 The question is how do we, I guess, best  
22 achieve that policy. And through lots of different  
23 debates, I'm sure we'll get deeper into the weeds of  
24 FCC versus FTC, but first focusing on the FTC and what  
25 I think that this Commission could do for so long as

1 broadband in its entirety is under its jurisdiction.  
2 Obviously, it will be up to Congress for how long that  
3 eventually lasts. But to focus on the here and now,  
4 what the Commission can do, I would first look, I  
5 guess, to two recent trends since 2007 and I guess  
6 point out some policy inferences from there.

7           So those two would be virtualization and  
8 convergence. On the virtualization part, generally  
9 it's referring from going, you know, to analog to  
10 digital, basically everything moving over the top from  
11 these legacy services, the old silos we have at the  
12 FCC and the Comm. Act, you can do all of that  
13 basically over broadband these days. You know,  
14 telephony is a boring one. You can do VOIP over the  
15 top. Video, much more exciting and interesting,  
16 relevant for policy because of all the bandwidth that  
17 it takes up.

18           One of the earlier panelists touched upon  
19 this. I think it was the rep from Shentel, talked  
20 about over-the-top video, which is a super exciting  
21 development, was not really around in 2007. I think  
22 it was in 2007 when Netflix started streaming video.  
23 I think that was around the same time that iTunes  
24 started offering videos through the -- or that Apple  
25 started offering videos through the iTunes

1 marketplace, that would be, you know, video on demand,  
2 either subscription or non, you know, a la carte video  
3 on demand.

4 That, I think, we pretty much all agree is  
5 mostly complementary to live, you know, linear video,  
6 traditional MVPD -- I'm also sorry for all the  
7 acronyms -- but VMVPDs, virtual MVPDs, much more  
8 recent development. Companies like Sling TV, YouTube  
9 TV, DirecTV Now, these are all virtual MVPDs that are  
10 offered over the top of a user's existing broadband  
11 connection. They look exactly like traditional MVPD  
12 cable TV service.

13 Now, you can argue about the quality. The  
14 quality is probably not as good because it's not a  
15 managed service, although if you buffer enough up  
16 front you can get the same resolution and pretty much  
17 experience as you would on traditional video service,  
18 but that impacts the net neutrality debates and the  
19 broadband ecosystem immensely because cable is such a  
20 big part of it. It's still, you know, described as a  
21 loss leader for many ISPs.

22 They have to provide a video service, even  
23 though it is not profitable for them, because of the  
24 rising programming costs and decreasing cable  
25 subscriptions, but they still have to offer it because

1 people demand it, but we have seen increasingly mostly  
2 some small new entrants give up on their traditional  
3 MVPD service and go all over the top and partner with  
4 one, you know, virtual MVPD or multiple MVPDs and say,  
5 you know, customers, we're going to give you  
6 broadband, but we don't want to be buying programming  
7 from all these content providers, so we're just going  
8 to partner and you can get any of these other apps to  
9 get you your video content.

10 From a consumer standpoint, I think that's  
11 great. That is going to be providing challenges for  
12 the public policy because there's a lot of things,  
13 mostly in the Communications Act, around video, you  
14 know, public interest obligations for local PEG  
15 channels, nondiscrimination, good-faith bargaining  
16 requirements, none of that applies in over-the-top  
17 space.

18 It is fully, you know, a wild west, free  
19 market right now, which is cool but also probably  
20 going to be, you know, some friction there as these  
21 business models change because as we have sort of long  
22 heard in the net neutrality space ISPs have the  
23 incentive and ability to block or discriminate against  
24 online services.

25 I personally don't think that is true as a

1    general matter, but if it is ever going to be true, it  
2    is probably most likely true when those over-the-top  
3    services are competing with services that they offer  
4    themselves. So vMVPDs compete directly with ISPs'  
5    MVPD offerings. There are no rules right now in place  
6    prohibiting ISPs from blocking or throttling those  
7    virtual MVPD services to protect their, you know, MVPD  
8    services and get subs to go back to their own video  
9    products. And yet we still see cable subscriptions  
10   going down and down. I think 2018 was the largest  
11   ever drop in cable subscriptions, and virtual MVPDs  
12   continue to rise.

13               And I think that is -- I guess, one, you  
14   could say that's the sign that ex ante net neutrality  
15   rules, at least some of the particular rules from  
16   2015, are not necessary yet. But you could also say  
17   that this might be changing the whole broadband  
18   ecosystem at large in terms of the economics of  
19   network buildout and how these companies finance all  
20   the capital needed to deploy and operate these  
21   networks.

22               So that's my first point about  
23   virtualization. That bleeds into my second point  
24   about convergence because if you have virtualized  
25   services running over the top of any broadband

1 connection you have convergence, and you can basically  
2 use any broadband connection like any other so long as  
3 you have adequate speeds and then there's a lot of  
4 talk about what speeds are, in fact, adequate. But  
5 looking particularly at the wireless, wireline  
6 convergence and competition there because that's come  
7 up a couple times, whether or not these are true  
8 complements, true substitutes, partial substitutes, I  
9 think probably Matt's point earlier that they are  
10 partial substitutes right now is, you know, fair.

11 I think John made the same point, but I  
12 think that, you know, at least with the promise of 5G  
13 they could be full substitutes in the future, provided  
14 that they have the same sort of business flexibility  
15 as we have traditionally allowed for wireline  
16 incumbents, which is to say if they want to offer a  
17 wireless cable service, you know, a zero-rated video  
18 product because most of your data consumption comes  
19 from video, and if you have an all-you-can-eat video  
20 product that, you know, consumers tend to like that.

21 So, you know, if we have specific rules  
22 prohibiting wireless companies or restricting their  
23 wireless companies' abilities to offer a zero-rated  
24 video product that is going to necessarily, I think,  
25 hurt their ability to compete with wireline

1 incumbents, which ultimately is, I guess, what we  
2 want. We want more competition at every layer in the  
3 stack.

4 That's one thing I think the FTC is uniquely  
5 situated to do, having broad jurisdiction, and also  
6 with its unfairness mandate, it is required to balance  
7 harms against benefits. And even if you can find  
8 harms in one market, that doesn't mean that you have a  
9 case because they may be balanced or even more, you  
10 know, offset by benefits to consumers or competition  
11 in another market. We can get into that more now, but  
12 I see I'm out of time.

13 MS. MUNCK: Perfect. Thank you, Tom.

14 And now Tejas.

15 MR. NARECHANIA: So let me add to the course  
16 of thank-yous. Thank you to the Commission and to  
17 Suzanne in particular inviting me and to all of my  
18 copanelists for their thoughtful comments. So my  
19 opening comments, they focus on the statutory language  
20 and the statutory authority of the FTC in particular,  
21 and I think they reflect the position of our panel in  
22 today's agenda.

23 So as almost everyone here knows, as we've  
24 already talked about today, the FTC's authority  
25 includes the ability to sanction unfair or deceptive

1 practices. The FTC also has wide authority to enforce  
2 antitrust laws. So all together, these fonts of  
3 authority will set out three sorts of unlawful conduct  
4 that fall within the agency's ambit. You have  
5 deceptive conduct, anticompetitive conduct, and unfair  
6 conduct.

7           So this morning's panels encompassed a  
8 significant portion of the potentially deceptive  
9 conduct that the Commission might fold into its  
10 enforcement priorities, right, the sorts of questions  
11 that arise when a broadband carrier fails to deliver  
12 service of a particular quality, right? Whether it's  
13 a speed, throughput, service uptime, or what have you,  
14 how do you hold them to the promises to ensure that  
15 the marketing materials aren't deceptive?

16           This afternoon's panels are -- right,  
17 they're aimed at, quote, remedying competitive harms.  
18 So the afternoon's panels, stacked with antitrust  
19 experts and economists, are, I think, aimed to help  
20 the FTC understand how broadband carriers might act  
21 anticompetitively. So that leaves us with the  
22 question of fairness. What does it mean for conduct  
23 to be neither deceptive nor anticompetitive but still  
24 somehow unfair. What does that mean?

25           So this is a difficult and complicated



1 question. The language is capacious; it can mean  
2 almost anything. So how do we define what's fair and  
3 what's unfair? A few factors that folks have alluded  
4 to already today, I want to ask a couple and then  
5 focus in on a few examples. So I think one question  
6 we have to answer is unfair to whom? Unfair to  
7 consumers or unfair to competitors? Right? Is this a  
8 standard that looks more like deceptiveness, or is it  
9 a standard that looks more like anticompetitiveness?

10 Second, what does it mean, then, for  
11 substantively something to be unfair? We refer often  
12 to conduct to be substantively unfair where it refers  
13 to -- where there are striking asymmetries of  
14 bargaining power, for example, right? Not market  
15 power, bargaining power. So where might we find these  
16 sorts of examples?

17 So I actually found one in the public  
18 comments that were submitted for the hearing. So one  
19 anonymous commentator suggested that the FTC  
20 investigate exclusive contracts between broadband  
21 providers and multidwelling units, MDUs. This was a  
22 good idea. Almost a decade ago the FCC, the  
23 communications commission, issues a rule prescribing  
24 any cable operator or MVPD from "enforcing or  
25 executing any provision in a contract that grants it

1 the exclusive right to provide any video programming  
2 service to an MDU."

3 And then a year later, the FCC issues a  
4 similar rule for telecommunications services. Now, of  
5 course, broadband service is neither today a  
6 telecommunications service nor is it a video service,  
7 a cable service. So the FCC's jurisdiction over these  
8 contracts is questionable at best. Right, but the  
9 policy basis for the FCC's rules are exactly the same.  
10 The policy basis for the FCC rules cites national  
11 policies favoring broadband deployment. That's still  
12 true.

13 And get this, Section 628 of the  
14 Communications Act, right, the statutory authority for  
15 the rules, refers expressly to unfair or deceptive  
16 acts or practices. So the FCC itself defines this as  
17 a substantively unfair practice. This is similar. So  
18 the FTC might consider investigating exclusive  
19 broadband service contracts, too, as well as similar  
20 practices, practices like bulk billing for example.

21 All right, these practices are substantively  
22 unfair because they insulate the broadband provider  
23 from real competition, they limit the consumer's  
24 choice among providers, and they introduce a sort of  
25 principal-agent dilemma, where the apartment complex

1 acts as a principal, they're freed from any fiduciary  
2 obligation to the tenants. Moreover, it's not even  
3 clear what the duty would look like because tenants  
4 probably have widely distributed preferences. So  
5 exclusive service contracts are one such example of  
6 unfair conduct.

7 Another example of conduct, this will be  
8 slightly more controversial, I think, regards  
9 preferences for affiliated services. So the same  
10 statute that gave the FCC the authority to ban  
11 exclusive contracts also gives the FCC the authority  
12 to regulate preferences based on affiliation. I'm  
13 talking about the program access rules and the program  
14 carriage rules and the authority to do so without  
15 regard to whether those practices were strictly  
16 anticompetitive in the antitrust sense.

17 So the FTC might similarly consider whether  
18 preferences for affiliated services in the broadband  
19 market and the adjacent markets are fair. One example  
20 is zero-rating. Again, I'll turn to the FCC for  
21 precedent. In the now-rescinded report, the agency  
22 notes that by zero-rating DirecTV services, AT&T was  
23 inflicting significant unreasonable disadvantages on  
24 competing edge provider services, because DirecTV pays  
25 no real cost for its participation in the program

1 while competitors had to pay hefty charges.

2 This is might be conduct that while not  
3 strictly anticompetitive, nor deceptive because it's  
4 disclosed, is still unfair. You could also see this  
5 in the interconnection market. So one thing, right,  
6 as we've talked about vertical integration, right, one  
7 -- so Google, Amazon, Facebook have certainly bought  
8 into the transit stack and Comcast-AT&T, right, have  
9 bought into the content stack. It is also true that  
10 ISPs, eyeball networks have also bought into the  
11 transit stack.

12 Comcast offers its own CDN, and as these  
13 ISPs -- as they exercise power on both sides of the  
14 point of interconnection, I think it's really  
15 important to consider whether or not there will be  
16 affiliate preferences at that point of  
17 interconnection, whether Comcast CDM, for example,  
18 will get a leg up.

19 So those are two examples of conduct drawing  
20 from the FCC's own power to regulate unfair conduct  
21 that I think might inform the way the FTC approaches  
22 its own authority and power to regulate unfair conduct  
23 in the broadband market.

24 I'll stop there. Thanks very much.

25 MS. MUNCK: Thank you.

1           Thank you, everyone, for your opening  
2   statements. You've raised a number of very  
3   interesting points with respect to FTC's market  
4   definition questions, our unfairness authority, and  
5   potential cases we might bring. And so I'd like to  
6   really turn now to a broad hypothetical of the FTC is  
7   facing a complaint, right, or we're out there trying  
8   to figure out how we can best enforce in this space.  
9   And I'd like to ask us a few questions circulating  
10  around that hypothetical because that is how we  
11  operate.

12           As you may know, people come to us and say,  
13  we think that this behavior is anticompetitive or it  
14  violates consumer protection laws and we'd like you to  
15  investigate. And then our staff need to take a look  
16  at that, ask the right questions, drill down.

17           So I'd like to start by talking about  
18  identification of broadband market behavior that the  
19  FTC might investigate. And as you know, in 2007, we  
20  held a broadband workshop. And when we announced it,  
21  we said we were looking at, among other things, the  
22  capabilities and incentives of broadband internet  
23  service providers to discriminate against, degrade,  
24  block, or charge fees for prioritized delivery of  
25  unaffiliated content and applications.

1           And I'd like to ask a few questions sort of  
2   circulated around this issue, maybe spend about 7 to  
3   10 minutes on this point, but really, my questions are  
4   how does the FTC best identify market behavior that  
5   may violate the FTC Act, should we still focus on  
6   discrimination, degradation, blocking, and paid  
7   prioritization? Within that, how do we think about  
8   the transparency and nondiscrimination rules that we  
9   have today? And should we only be looking at ISPs?

10           So I'm throwing a lot of questions at you at  
11   once but it's essentially I'd like to get everyone's  
12   thoughts on how the FTC can identify behavior and  
13   where you would be focusing if you were in our shoes.  
14   So I think just for fairness, we'll go down the line  
15   this way, but if people want to jump in on other  
16   people's points, please feel to do so.

17           So Christopher.

18           MR. YOO: So I think that actually this is a  
19   fairly conventional analysis in many ways that the  
20   Commission is very well suited to. So what's striking  
21   to me is we've heard a lot of statements about whether  
22   something is feasible, which is usually in this space  
23   determined by market structure, whether they're in a  
24   position to do it. As everyone knows in a standard  
25   antitrust analysis, that is not enough. You have a

1     given market structure that makes it feasible, you  
2     have to then decide whether there is an incentive. In  
3     fact, many things that are feasible are not  
4     profitable.

5             Third, even when an incentive exists, it's  
6     sometimes they are actually welfare-enhancing or  
7     beneficial to consumers because many of these  
8     behaviors are. And, then, lastly is the second-best  
9     problem, which we've all learned, which is it has to  
10    be enforceable. It's just because you have a problem  
11    doesn't mean that the remedy you can fashion will  
12    suffice.

13            And so what strikes me, and this all has to  
14    be disciplined by a clear theory and empirical  
15    evidence designed to back up that theory. And so this  
16    should be a very familiar framework to an enforcer.  
17    And what I find people -- is I'm concerned that people  
18    will take only part of that framework and go forward  
19    with it.

20            So the second point is to amplify what I  
21    said earlier, to take into account the full range of  
22    alternatives. There are many things in market  
23    definition here that don't look like regular markets,  
24    so CDNs are now competing with network capability,  
25    something that technologists have known. You can

1     substitute storage for networking by moving it to off-  
2     peak, and there's other things we can do.

3                 And so what we have to really look at is not  
4     on the technologies or the traditional definitions of  
5     businesses but rather on the services provided to  
6     consumers and what the real impact is going to be  
7     there.

8                 And then the second notion that's constant  
9     in the essential facilities cases, in the line-sharing  
10    cases under the regulatory world, we have to take into  
11    account alternatives of self-help, self-provisioning,  
12    alternatives in the market, again in that broader  
13    market definition. And what really strikes me is  
14    something that kc claffy said, which is we actually  
15    don't know the relationship between many of these  
16    practices on consumer welfare.

17                And missing that essential link, you know,  
18    this is a big part of what we've done. A lot of  
19    practices that once upon a time we thought were bad  
20    for consumers we actually decided were either  
21    ambiguous or even potentially good for consumers. And  
22    so without that missing link, it's really unclear how  
23    we can do that. And so what I would say is really go  
24    back to the traditional tools of welfare analysis.

25                I keep thinking of Carl Shapiro's work,



1 saying exclusivities can be welfare-enhancing, it's  
2 not always a bad thing, product differentiation is not  
3 always a bad thing. Two-sided markets has told us  
4 that side payments are not always a bad thing. And in  
5 fact, what we -- but they can be. And so what we need  
6 is a really good empirical base, evidence base to  
7 decide enforcement actions.

8 MS. MUNCK: So if I can just quickly  
9 summarize, you're saying essentially that when folks  
10 come to us with an area in this space now that the  
11 authority is ours, post-RIFO, we should use our  
12 traditional tools. Is that right?

13 MR. YOO: I think that will take you a long  
14 way, with a traditional suspicion of competitive  
15 complaints and other things that we know that -- Matt,  
16 you also bear in mind that the source of information  
17 you get are very self-interested.

18 MS. MUNCK: Thank you.

19 And, Gigi, I know you spent a lot of time at  
20 PK and you have experienced -- and you mentioned this  
21 a little bit in your opening, talking about the  
22 technological expertise that we would need. How do  
23 you think we should be looking for cases in this  
24 space? How can we work with third parties? What  
25 should we be doing?

1 MS. SOHN: Yeah, let me just say first  
2 something about the missing link. I mean, we've been  
3 debating net neutrality for, what, 15, 17 years now?  
4 The missing link is not missing, okay? We've now --  
5 we've had, what, three FCC proceedings, three court  
6 cases, about to be a fourth, that have, you know,  
7 demonstrated that particularly vertically integrated  
8 ISPs have the incentive and ability to discriminate,  
9 to engage in paid participation. Verizon's attorneys  
10 admitted it in open court. So I'm not sure how much  
11 more empirical data we need to see that the incentive  
12 and ability is there.

13 And the other thing I just need to say is I  
14 don't remember what I said in 2007, but there's a lot  
15 of water under the bridge, including three court cases  
16 since then. I think I also said in 2007 is Neil  
17 Chilson, who used to work at the FTC, said let's not  
18 go to Title II, let's not go to Title I, we can stay  
19 with Title I, but that was before the court said you  
20 basically have no other option if you want to have  
21 strong net neutrality rules. So please stop quoting  
22 me from 2007. It's a little bit tiresome, and it's  
23 kind of irrelevant at this point, but let me answer  
24 your question.

25 So, look, the FCC has a huge raft of

1     technologists, economists, and people that study  
2     market structure, right? They are completely  
3     dedicated to studying how networks work, okay? And if  
4     the FTC is going to seriously take on this role of  
5     figuring out how to work in this space -- and, again,  
6     I invite it -- I think you need to have that same  
7     level of expert -- well, maybe not the same level of  
8     expertise, but you certainly need to have more than  
9     what you have now.

10           And, you know, sometimes things bubble up  
11     from the agency itself, but a lot of times they come  
12     from outside parties. You know, the FCC is very  
13     different, and in a way sometimes not better, you  
14     know, to the extent that it does focus basically very  
15     narrowly on one segment of the economy as opposed to  
16     the FTC, but there are people that basically make it  
17     their business to tell the Commission what is going on  
18     in these networks. They have both in-house and they  
19     have stakeholders outside. And perhaps one thing the  
20     FTC could do is invite outside stakeholders who care  
21     about this stuff and who do look at network management  
22     and how networks work to come in for a workshop and  
23     educate on, you know, on how they look at how networks  
24     work and how they look at network discrimination.

25           So, you know, I think you have to have in-

1 house the expertise. Again, not only the technology  
2 but also on the market structure and the economics,  
3 and you need to bring outside stakeholders in to  
4 discuss this as well.

5 Let me talk a little bit about what  
6 practices I think the FTC ought to be looking at. I  
7 think everything covered under the 2015 Open Internet  
8 Order -- blocking, throttling, paid prioritization,  
9 unfair interconnection practices, and as I said  
10 before, other discriminatory conduct not covered by  
11 the bright-line rules. You know, zero rating is the  
12 example we talk about now but there will be other  
13 things in the future.

14 And you also asked should we just look at  
15 ISPs. You know, this is always a good way to kind of  
16 muddy the water on the net -- and I'm not accusing you  
17 of doing that. You know --

18 MS. MUNCK: No, and I can clarify. What I  
19 meant was the presentations this morning covered the  
20 entire broadband marketplace, and my point was  
21 following RIFO, we now have jurisdiction over that  
22 entire marketplace. So how would you factor that  
23 broad authority into our investigation authority?

24 MS. SOHN: Yeah, I think I'm going to -- I  
25 guess what I was thinking of is, you know, are you

1   also including the edge companies as well as something  
2   that you think -- you know, look, I think the FTC  
3   should have oversight over those companies as well. I  
4   don't think it's the same set of problems. There are  
5   discrimination problems but they don't -- they're  
6   different.

7                   And I obviously welcome what the FTC is  
8   doing with its, you know, Technology Advisory Council  
9   and looking at, you know, the ability of edge  
10   providers to discriminate, you know, against certain  
11   parties as well. But I'm not -- it's a different  
12   issue, and I'm not saying you shouldn't address it,  
13   but I don't want to conflate one with the other,  
14   because there is something singular about having the  
15   power to allow others to access the network.

16                   And there are a certain set of problems that  
17   come with broadband internet access that don't  
18   necessarily go to edge providers as well. I think  
19   it's a different set of problems. It is a set of  
20   problems. I will not say there is no problem there,  
21   but I wouldn't want to mix the two up. I think  
22   they're two separate problems.

23                   MS. MUNCK: And, actually, if I could  
24   just -- following up on the technological question,  
25   one thing that I think about is how the FCC uses its

1     technologists as a sector regulator and how the FTC,  
2     you know, we have experience, obviously, using  
3     technical experts in a number of very complicated  
4     cases. What are your thoughts on how to sort of work  
5     between those two models?

6             Having a technological capacity as a sector  
7     regulator versus having experience -- it's not really  
8     a direct comparison, but having experience bringing  
9     folks in, right, if we have a complicated  
10    pharmaceutical -- I worked on Cephalon, right, so we  
11    had to bring in a pharmaceutical licensing expert into  
12    the agency. How do you think a model like that could  
13    work in this space? Do you think it could work?

14            MS. SOHN: Yeah, I absolutely think it could  
15    work. I mean, it's obviously more complicated. It's  
16    broader, and I have to say, I will profess some  
17    ignorance on, you know, how the bureaus work here, but  
18    most of the bureaus at the FCC had their own  
19    technological expert, not enough, I will say. And it  
20    was shocking some of the bureaus like the wireless  
21    bureau did not have a chief technologist, which I  
22    found to be pretty incredible. But I think each  
23    bureau needs to have a variety of technologists, in  
24    addition to, you know, a general technology office and  
25    a chief technologist.

1 MS. MUNCK: And I also -- I heard your point  
2 earlier on BITAG and bringing BITAG back.

3 MR. SZOKA: Can I make one -- so the funny  
4 thing about the engineers -- and I love them in the  
5 FCC -- their strength is actually in radio  
6 engineering, and they have historically relied on  
7 originally AT&T through the breakup for a lot of  
8 networking expertise. And they brought the chief  
9 technologist in usually as a one-person, short-term  
10 basis. I think there's a dearth of networking  
11 expertise in the FCC. I wish that, you know, it were  
12 stronger.

13 MS. SOHN: I agree.

14 MR. SZOKA: But just -- I think that's a  
15 bout of history, it's just what they needed to do and  
16 that they have not solved -- entirely solved the  
17 problem of getting that expertise inside.

18 MS. SOHN: Yeah, don't take my comments to  
19 say that the FCC has adequate technology expertise  
20 because they don't. I think I measured it for another  
21 speaking gig I had a couple of weeks ago, and it's  
22 something like, you know, 5 percent of their employees  
23 actually have technology backgrounds, which is crazy.

24 MS. MUNCK: No, no, I appreciate that.

25 So moving on to Berin.

1                   MR. SZOKA: Look, I'm in favor of  
2     legislation in this area. The Internet Society will  
3     be shortly putting out a statement of principles that  
4     reflect a consensus among many groups, not only Tech  
5     Freedom but a wide array of groups that have tried to  
6     inform what legislation should look like, and I think  
7     that could be passed, but that's a separate  
8     conversation. We're here to talk today about what the  
9     Federal Trade Commission can do and should do with its  
10    authority. And I think that in having that  
11    discussion, yes, we need to think completely about the  
12    agency's authority but we also need to not kid  
13    ourselves about what the FCC could have done.

14                  And that's why I really -- I encourage  
15    everyone in this room to go back and read the  
16    Srinivasan and Tatel opinion in denying en banc  
17    rehearing, which makes very clear just how limited the  
18    FCC's enforcement was going to be. I've said this  
19    before, I will say it again. The FCC was effectively  
20    going to be policing deception, and that was it. And  
21    if a provider opted out of the rules, they were not  
22    subject to that regime, period, end of story.

23                  The FCC has a much -- had a much less  
24    flexible approach in that sense. The FTC will be able  
25    to police marketing claims across the board. And in



1     doing so, I want to make clear, the discussion you  
2     heard this morning about speed claims, that is only  
3     the easiest category of claims for the FTC to police,  
4     but it's only one category of express claims. There  
5     are other express claims that companies make.

6             And if you go back and you read the  
7     Srinivasan and Tatel opinion, they -- in one  
8     paragraph, they essentially offered their analysis as  
9     to why they think that marketing a broadband service  
10    implies claims to provide a neutral conduit that is  
11    not filtered or throttled or in any other way  
12    modified. And if that analysis was true for the FCC,  
13    it's true for FTC, too, but it needs to be supported.

14            And so what I would say to you is if you are  
15    really concerned about either agency's ability to  
16    enforce net neutrality principles in the future, what  
17    you really need to do is substantiate that paragraph.  
18    You need to do consumer studies or find some other  
19    competent evidence to show that consumers expected to  
20    get that kind of service. And the Lenovo case is a  
21    really instructive example.

22            I'll take just a moment just to walk you  
23    through that case. Anyone here familiar with it,  
24    apart from the agency staff? So the agency brought a  
25    claim against Lenovo, which had preinstalled software

1 on laptops that did a bunch of shady things. They  
2 collected information as your web traffic passed  
3 through your computer, and that was the data security  
4 aspect of the claim, but they also slowed down the  
5 downloads and uploads ever internet traffic.

6 And the question that Commissioner McSweeney  
7 and Commissioner Ohlhausen disagreed upon, and  
8 therefore was not part of the ultimate settlement with  
9 Lenovo, was whether the company's failure to say  
10 anything there, that material omission, denied  
11 consumers that minimum irreducible level of service  
12 quality that they expected.

13 Now, that is not a doctrinal question. It's  
14 a factual question. And I don't know who's right.  
15 Commissioner McSweeney may well have been right. What  
16 you would need is more competent evidence to show that  
17 when consumers subscribe to broadband service that  
18 they're expecting, you know, by analogy to get  
19 something where the broadband provider doesn't reduce  
20 the speed in some respect, right? This is just about  
21 claim analysis. It's fundamental to what the agency  
22 does, and I'll stand by that in 10 years.

23 I'll say that the agency has been doing this  
24 for a century. They police these claims, and the  
25 right answer always depends on the facts. And what's

1 great about that approach is it applies to everyone.  
2 It's not dependent on status. It's not dependent on  
3 technology. The agency will be able to apply exactly  
4 the same toolkit across the board.

5 Now, finally about unfairness, I want to be  
6 clear here, I think unfairness can be an important  
7 tool. The most obvious use of unfairness is policing  
8 unilateral changes in contractual terms. That's the  
9 most clearly unfair practice of all. There may be  
10 other things that the agency can classify as unfair,  
11 but, again, it will be a factual question as to  
12 whether to do so. What the agency can't do because of  
13 Section 5(n) is the codification of the unfairness  
14 policy statement, 1994, is point to some other  
15 agency's decision that a practice is unfair and then  
16 say their job is done.

17 That cannot be the primary basis for a  
18 determination of unfairness by the agency. They have  
19 to do their own analysis and show that the harm to  
20 consumers outweighs benefit, and the consumers can't  
21 reasonably avoid that claim, and they might be able to  
22 do that. I don't have a strong opinion in advance  
23 because I don't know what the facts are.

24 MS. MUNCK: So thanks, Berin.

25 And, actually, Mitch, before we jump on to

1     you, one of the points that you raised, Berin,  
2     regarding transparency and nondiscrimination touches  
3     on a question that we have from the audience, which is  
4     should new rules about transparency and  
5     nondiscrimination apply to edge providers as well as  
6     to ISPs. And I'm interested in what the panel thinks  
7     about that.

8                 MR. SZOKA: Can I just say quickly, if what  
9     you mean is standards, the FTC's standards for  
10    transparency and disclosure already apply to everyone.  
11    Exactly the same standards for having to disclose what  
12    terms your services provided are already in effect.  
13    You don't need specific ex ante rules in place to do  
14    so.

15                MS. MUNCK: Well, Mitch, I'm sorry, I didn't  
16    mean to --

17                MR. STOLTZ: I thought the FCC's 2010 order  
18    answered this very nicely, which was there was a  
19    proposal to say everything -- the upper layers of the  
20    stack, which is essentially the edge providers would  
21    be immune. And the FCC said no, now it's outside  
22    their jurisdiction because it's not network services.  
23    But they said the idea that market power can't exist  
24    in other places they just said is not a blanket  
25    proposition you can accept.

1           The source of market power may be different,  
2   and as you talked about, the transparency requirements  
3   you may need may be different, but the idea that we  
4   would immunize an area from any economic -- or any  
5   consumer harm concern -- significance of harm, I don't  
6   think is plausible.

7           MR. STOLTZ: I wanted to take a stab at both  
8   parts of Suzanne's original question and also respond  
9   to a couple of points. But, yes, the FTC should be  
10   investigating and enforcing issues of blocking,  
11   throttling, pay prioritization, zero rating with --  
12   the anticompetitive zero rating, for a couple of  
13   reasons. One is because those are in a sense a  
14   codification of the customer's reasonable expectations  
15   that have been in place for, you know, at least 15,  
16   probably 20 years.

17           I would welcome that empirical study that  
18   Berin was calling for because I think it will show  
19   that. I think that's kind of the basic understanding  
20   underlying, you know, everything that we've heard from  
21   internet users of all sorts about this is that's what  
22   the internet is. That's what differentiates internet  
23   service from cable TV. Or from the sort of walled  
24   garden services of old like AOL and Compuserve. It is  
25   those principles.

1           It's also, by the way, the principles under  
2   which ISPs received franchises, collectively thousands  
3   from localities to use conduits and streets and poles  
4   and spectrum and access to buildings and rights of  
5   way, whether it was -- that was sort of part of that  
6   understanding was that what they were providing was  
7   access to all or nearly all endpoints on the internet,  
8   again to use the D.C. Circuit's language.

9           Then as to the second part of Suzanne's  
10   question, how should the FTC identify these sorts of  
11   practices. And I'll be honest with you, it's hard.  
12   All of the difficulties involved in measuring and  
13   verifying claims about speed that were discussed this  
14   morning are simpler than questions of identifying and  
15   verifying claims of discrimination because that would  
16   be a variation in speed or access based on potentially  
17   very subtle criteria or differences. That would be --  
18   that would be very hard for a sort of researcher to  
19   detect.

20           Now, that's if we have -- you know, we have  
21   seen them. EFF helped to uncover Comcast's recent  
22   packet injection that was targeting particular  
23   internet applications. I believe the Associated Press  
24   was involved. Other groups have identified practices  
25   like this, sometimes maybe sort of acting on just

1 maybe a hunch from consumers that are verified  
2 empirically. These are hard questions.

3 One of the ways forward is to try to avoid  
4 us being the blind man and the elephant, and that's to  
5 combine the sort of -- the broad base of consumer  
6 information and consumer complaints that the FTC and  
7 state authorities receive with the investigative  
8 prowess of groups like Measurement Lab, like my  
9 organization, the Electronic Frontier Foundation, and  
10 like there are a number of others out of there, is to  
11 combine the source of the hunches with the source of  
12 the empirical verification, you know, and then to have  
13 some expectation or confidence that those are going to  
14 be acted on, that if there is an enforcement action  
15 that there is at least acknowledgment that it becomes  
16 part of the policy process that it isn't being emailed  
17 into the ether.

18 MR. SZOKA: Can I just jump in here for a  
19 second?

20 MS. MUNCK: Yeah. Well, actually, I just  
21 have a -- just one quick followup question if that's  
22 all right, which is just, Mitch, how did you decide  
23 that you were going to go after the Comcast example  
24 and how do you think government and public interest  
25 groups can partner to identify behavior in that space,

1 because as one of our public interest sort of  
2 representatives on the panel, I'm really curious about  
3 that because it's something that people mention, you  
4 know, that we can sort of leverage the work of others  
5 in this space. And I'm wondering how we can maximize  
6 that.

7 MR. STOLTZ: You know, I think you -- you  
8 know, I think you use the -- what we're all calling  
9 the net neutrality principles as a guide. So you look  
10 for conduct that seems to be attempts to shape  
11 people's experience of the internet by directing their  
12 attention to particular sites, particular  
13 applications, particular points of view even  
14 sometimes. You know, and you look -- and that's sort  
15 of your threat list.

16 And you also look for things based on the  
17 incentives that the ISPs have. A few of these were  
18 mentioned before, but, you know, there are incentives  
19 to block particular content, potentially commercial  
20 incentives. And there are -- or to encode a  
21 preference for some sites or services over others.

22 Looking to those may sort of guide the  
23 initial investigation and guide the identification of  
24 complaints that come into the FTC and complaints that  
25 come into organizations like mine and say those are



1 ones we'd like to follow up on.

2 MS. MUNCK: Terrific, thanks.

3 MR. SZOKA: If I may.

4 MS. MUNCK: Yeah, quickly. I have to make  
5 sure I get to Tom.

6 MR. SZOKA: I think there is some agreement  
7 here amongst Mitch, Gigi, and myself. There needs to  
8 be a clearinghouse outside the agency. The agency is  
9 a law enforcement agency. It can't move quickly, and  
10 it can't comment on all of the details, especially of  
11 cases that it decided not to bring. And meanwhile, we  
12 will have a series of public frenzies about each  
13 allegation of alleged misconduct.

14 And sometimes it might turn out that it is  
15 the broadband company. Other times, it might turn out  
16 that it's Netflix or whoever else, and I think it  
17 would be very helpful if a group like the BITAG were  
18 asked to make not just a conclusory charge of this  
19 violates our principles, but rather a neutral,  
20 thoughtful, technical analysis of what happened, with  
21 multiple people from different points of view who are  
22 able to offer their perspective.

23 And that will happen much more quickly than  
24 the FTC can do anything because it won't have direct  
25 legal effect, but it will play necessarily a critical

1     role enforcing the agency to prioritize those cases  
2     where there are -- where there is an agreement on the  
3     technical details. And I think one of the things that  
4     should come out of this report is a call for some  
5     group like the BITAG or the BITAG itself to play that  
6     kind of role and to be focused again on technical  
7     vetting to make sure that the agency is really  
8     focusing on the right cases.

9             MS. MUNCK: Terrific. Thanks, Berin.

10            And, Tom and Tejas, I want to make sure we  
11     have time to get to you.

12            MR. STRUBLE: Sure. So jumping in and  
13     taking all of these points in the order they come to  
14     me. So on the last point about technical, you know,  
15     expertise and input in the process, I agree that is  
16     absolutely important and there is not enough of it  
17     currently. There are lots of ways to get more, such  
18     as better interfacing with outside expert groups like  
19     BITAG, also, you know, potential meta sort of process  
20     reforms the FTC could look at, like elevating OTEC out  
21     of CPB and to a standalone office bureau, like, you  
22     know, akin to the Bureau of Economics. That might  
23     help, but to Gigi's earlier point, maybe having, you  
24     know, a standalone bureau of technologists is not as  
25     helpful as having a bunch of them embedded into each

1 bureau, so I leave that to you.

2 But to your question about transparency, I  
3 think transparency is great as my, like, go-to default  
4 regulation that I'm always in support of as a  
5 conservative because transparency does impose costs on  
6 industry, compliance, but it also makes the market  
7 work better because consumers with more information  
8 can make more informed choices, better express  
9 themselves. So in favor of that.

10 To the question about applying Section 5 or,  
11 you know, these sort of broadband regulations to, you  
12 know, beyond the last mile to middle mile, backbone  
13 providers, or up the stack to other actors in the  
14 internet ecosystem, I think that is a good idea. I  
15 think given all of the integration we have up and down  
16 the stack, you know, this ecosystem should be governed  
17 more or less by a consistent framework, but that does  
18 not mean that the regulatory outcomes will be the same  
19 for each layer in the stack because we have more  
20 competition in some areas than others.

21 So saying that I think the same rule should  
22 apply to everyone does not mean everyone's going to be  
23 treated the same way, but I think to the extent  
24 possible, we should have a level playing field and  
25 not, you know, favor unduly one layer of the stack

1 over others.

2 There may be more points there but, I don't  
3 know, Tejas, you jump in.

4 MR. NARECHANIA: Okay. So on your first  
5 question, should the FTC still focus on  
6 discrimination, degradation, blocking, and paid  
7 prioritization, so, yeah, I think the answer is, yes,  
8 the Commission should still pay attention to these  
9 fundamental tenets, but I think the thing that I'd say  
10 is that these are foundational, right, that these have  
11 been a part of the question since the beginning, it  
12 doesn't mean that it's all that the FTC should focus  
13 on.

14 So prioritization and degradation are -- I  
15 think someone said the previous panel, these are flip  
16 sides of the same coin. They're both forms of  
17 discrimination. And if discrimination is the  
18 category, then there's all sorts of discrimination,  
19 and it's not just traffic discrimination. It's not  
20 just -- you know, to use the pithy but inaccurate fast  
21 lane, slow lane analogy, it's not just that.

22 Zero rating is a form of discrimination,  
23 right? Certain interconnection agreements might look  
24 like forms of discrimination. Different types of  
25 interconnection agreements with different types of

1 providers could be discrimination, too. So I think  
2 it's important to look at all sorts of discrimination,  
3 some of which will just -- I think will seem more  
4 obvious than others.

5           So this relates to the next question, which  
6 is how do you do this? So I think zero-rating-based  
7 business plans are a great example of discrimination.  
8 Some might be good, some might be bad. Some might be  
9 fair, some might be unfair. I tend to think that  
10 affiliate-based -- affiliation-based preferences fall  
11 on the unfair side of the line, but that might be  
12 something to think about, something to look at in  
13 particular.

14           But for the more difficult ones or for the  
15 ones that aren't obvious because they're part of the  
16 terms of service, the ones that look more like traffic  
17 discrimination, I agree with everyone else that I  
18 think a body like BITAG would be extraordinarily  
19 helpful. BITAG was extraordinarily helpful. It was  
20 really great, I think, to have an outside body  
21 comprised of technical stakeholders from a wide array  
22 of technology companies that could get in a room and  
23 hash it out. And I think that worked really, really  
24 well.

25           I think your last question was about how

1    this looks up and down the stack. So I think one  
2    thing that we've done -- and I'm guilty of this,  
3    too -- I think one thing that we've done in this space  
4    is to talk about companies rather than services. And  
5    I think we need to get a little bit more precise about  
6    that. So it's not Facebook, right? It's Facebook,  
7    the social media provider, versus Facebook, the  
8    traffic provider. Netflix is a CDN company as much as  
9    it is a content studio. And they're acting in very  
10   different markets when they are doing those different  
11   things.

12                   And so if we're specific about the services,  
13   then I think we can be a little bit better about how  
14   we do this up and down the stack. And I think the  
15   answer is yes, right, the FTC should be looking at  
16   practices at the eyeball network, at the point of  
17   interconnection, in transit, on the edge. All of  
18   these are things that merit the FTC's attention, but  
19   the markets are different. The companies are  
20   different, and the dynamics are different.

21                   MS. MUNCK: Can I ask one followup question,  
22   please? Tejas, thank you. When you mentioned zero  
23   rating, and this has come up elsewhere on the panel,  
24   what is the -- what would be your theory of consumer  
25   harm with respect to zero rating? What component of

1 zero rating would the FTC want to explore? How would  
2 you think about that?

3 MR. NARECHANIA: Yeah, so, like I said, I'm  
4 most concerned about zero rating that gives  
5 preferences to affiliates at the expense of  
6 unaffiliated providers. That is because the affiliate  
7 doesn't bear the real costs of the zero rating,  
8 doesn't bear the cost of paying for the zero rating,  
9 whereas the competitors do, right?

10 And, then, that has implications, I think,  
11 for the sorts of things that the FCC has traditionally  
12 cared about -- diversity in the content market, for  
13 example. So that maybe is not consonant with the way  
14 FTC has traditionally thought about fairness.

15 MS. MUNCK: That's why I'm asking about it.  
16 It's a little different for us.

17 MR. NARECHANIA: Yeah, but I think it is  
18 constant with the way the FCC has thought about it  
19 because it historically has had a statutory mandate to  
20 think about concerns related to diversity and localism  
21 when it comes to the sort of content that travels over  
22 these communications platforms.

23 MS. MUNCK: And, Gigi, if you could just  
24 jump in because I want to also reserve time for  
25 closing statements.

1 MS. SOHN: So very quickly. I do think that  
2 the FTC's authority is not well suited to handle a  
3 zero rating, particularly if you look at, you know,  
4 what unfair practices -- again, it has to be  
5 substantial, not outweighed by countervailing benefits  
6 to consumers. The consumers themselves could not  
7 reasonably have avoided it. You're going to get the  
8 argument, well, they're getting this for free, right?  
9 So, I mean, you have to overcome that, and we don't  
10 have time to have a longer conversation about that,  
11 but I think that's a very high hurdle to overcome.

12 The other point I want to make was time,  
13 okay, and the importance -- you know, Berin himself, I  
14 think, made the argument for why you need rules, but  
15 if the FTC's processes are as he says very, very slow,  
16 and you're an innovator who's being discriminated  
17 against in a paid prioritization deal or a zero-rating  
18 deal, your business could be toast unless the agency  
19 can come to a conclusion very, very quickly. And I  
20 know that's not usually the way the FTC handles  
21 things.

22 MS. MUNCK: No, I think we do try and  
23 move -- we work in a lot of fast-moving industries.  
24 I hear your point absolutely --

25 MS. SOHN: Yeah.



1 MS. MUNCK: -- so I'm not pushing back  
2 exactly, but I just want to say that there are a  
3 number of fast-moving industries where we operate, and  
4 so that's always a consideration for us because you  
5 want to make sure that what you're doing is helpful  
6 within the larger sort of economic environment.

7 I think what we should do now -- we started  
8 a little early. I had a feeling that you guys would  
9 really have a lot to talk about, and I'm so happy for  
10 that, but I'd like now for everybody to give, you  
11 know, a two-minute closing statement. I think that  
12 will take us roughly to the end of our time.

13 And as you do that, one question that we  
14 didn't touch on in the discussion was we have our  
15 enforcement authority, but we also have advocacy  
16 authority. And if you have thoughts on how we can use  
17 our advocacy authority, I'd like to hear that in your  
18 closing statements, and then other considerations we  
19 should be thinking about with respect to promoting  
20 innovation. So this has worked well for us. Maybe  
21 can just start with Christopher and go down the line.  
22 Thank you.

23 MR. YOO: I hate to be a bit of a stinker,  
24 but we've heard a lot of praise of the BITAG. And I  
25 think as far as it went, the work it did, I think, was

1 very well regarded. I do know in some circles there  
2 is some sense of disappointment in it that it maybe  
3 didn't work as quickly as people would like, and I  
4 know some people in this room were attached to it, and  
5 I don't mean to be really suggesting that they weren't  
6 devoting efforts, but it's a question structurally  
7 about how to get that kind of expertise and before you  
8 -- before the FTC decides to go down that road, I  
9 would solicit a broad range of opinion of what people  
10 thought worked and didn't because it was perhaps less  
11 bold or less fast, or I don't know exactly what, but  
12 there was maybe something, learnings about ways to do  
13 it slightly better, just as an aside.

14           You know, it's interesting. We talked about  
15 zero rating, and I really note that Tom talked about  
16 anticompetitive zero rating, we talked about  
17 discrimination, and, you know, what an economist will  
18 tell you out of antitrust perspective is that  
19 discrimination is not always bad.

20           And, you know, I always think about the  
21 first zero rating complaint was brought against Metro  
22 PCS. They're a company with 3 percent national market  
23 share that was trying to deploy LTE on 1G spectrum of  
24 1.4 megahertz instead of 40 megahertz. And to do  
25 that, they couldn't do all the things other people

1     could do. And at 3 percent market share, anything  
2     that makes them a more effective competitor to the  
3     larger players I think is a filter that we were  
4     missing.

5             And one of the things that the FTC rejected  
6     was an anticompetitive discrimination filter. And I  
7     think that, you know, there are times that we -- as I  
8     do think the -- we all agree the FTC should look at  
9     discrimination, but using the tools that they normally  
10    do to put the consumers first.

11            Discrimination is not a value in and of  
12    itself to protect. It is a value in service of  
13    protecting consumers. And I always tell my students,  
14    you get student discounts, and there's other senior  
15    citizen discounts, there's other things we do that are  
16    clearly discriminatory which are welfare-enhancing,  
17    and which isn't to say they can't be, but that's where  
18    we go back to our normal analysis.

19            The other comment I would make sort of in  
20    closing is Tejas advocated fairness. And I understand  
21    the virtues of that. I do have to think about  
22    fairness is very hot in the EU right now in  
23    competition law. It's hot in Korea, in Japan, and  
24    other places. And there is a real concern that  
25    without the discipline of a clear guiding principle of

1     what constitutes it, it becomes a subterfuge for  
2     protectionism, and that's a lingering concern.

3                 MS. MUNCK: Thank you. So much to unpack,  
4     as I'm sure there will be in all of your closing  
5     statements.

6                 Gigi.

7                 MS. SOHN: So, look, again, I don't want to  
8     turn the FTC into the FCC. I mean, one of the things  
9     I did at the FCC was sort of bring stakeholders in.  
10    And, you know, I've worked with the FTC over the  
11    course of my career, and it's not the same, right?  
12    There isn't as much a solicitation from the agency, to  
13    bring outside folks in to talk to them about  
14    differently levels of expertise. And I think -- or at  
15    least not that I've seen.

16                I mean, maybe -- again, I don't profess to  
17    be an expert on the FTC, but, you know, I know when I  
18    was outside of the FCC, I was often brought in by  
19    commissioners' offices and bureaus to talk about, you  
20    know, various and sundry technological economic policy  
21    issues. And maybe that's just a place where the FTC  
22    has to up its game, particularly as it tries to  
23    identify, you know, bad behavior in this space. So I  
24    wanted to mention that.

25                I also wanted to just address something

1 Christopher just said about discrimination and it's  
2 not always bad. The standard is not discrimination;  
3 it's usually unreasonable discrimination, unfair.  
4 It's not discrimination across the board that's  
5 prohibited, just like, you know, blocking across the  
6 board isn't prohibited. Obviously, you can block  
7 spam. It's unreasonable. That's the standard, that's  
8 the standard the FCC uses, and that's kind of the same  
9 standard, you know, as Tejas mentions that the FTC  
10 uses as well.

11 And I don't think we can really conflate  
12 student discounts or placements on grocery shelves  
13 with the discrimination that takes place that affects  
14 speech, that affects people's access to information.  
15 And that, you know, unfortunately as my colleague,  
16 John Bergmayer mentioned before, is one of the values  
17 that the FTC's authority doesn't really get at. You  
18 know, blocking because speech is controversial, or you  
19 know, blocking because like happened in 2005 in  
20 Canada, you don't like the position a union takes.

21 So these are some of the concerns that, you  
22 know, while I encourage the FTC in this day and age to  
23 use all the tools it can and use it and be -- take  
24 risks in that regard, you know, there's some bad case  
25 law here and there, but to take some risks in that

1     regard, there are just some things that Section 5  
2     authority won't reach, and that gives me concern.

3             MS. MUNCK: No, that's helpful, and that was  
4     one of Alden's framing questions to start.

5             Berin.

6             MR. SZOKA: I just want to remind everyone  
7     that we can say that the FCC should have been in the  
8     business of protecting speech, but, in fact, the only  
9     reason the FCC's rules would have been protected from  
10    First Amendment scrutiny was that they didn't apply to  
11    companies that said they were going to actively filter  
12    or block someone. So we just have to take as a  
13    reality the version of the FCC's rules that the FCC  
14    itself always said it was proposing, it was always  
15    inherent --

16            MS. MUNCK: Berin, actually, can we bring  
17    this back to the FTC for the closing?

18            MR. SZOKA: -- in the definition for  
19    internet access service. The FTC itself, also,  
20    doesn't have that -- the ability to protect speech  
21    online. Its fundamental ability is to ensure the  
22    consumers get the benefit of the bargain. And if you  
23    want to inform what the FTC's report looks like and  
24    guide how the FTC is going to apply its authority, the  
25    most useful thing you can do, to what Mitch was

1 saying, is to substantiate the kind of statements that  
2 people make about what consumers expect with real  
3 empirical evidence. That will make the biggest  
4 difference in what the FTC does going forward.

5 The FTC has many virtues, one of them is  
6 that it doesn't go out of its way to talk to people on  
7 the outside. That could be a problem. It can mean  
8 that the FTC lacks a vehicle to access outside  
9 expertise, but it also means the agency is less likely  
10 to be captured by particular interests. That is a  
11 great advantage of an agency that has general purpose  
12 authority.

13 Then, finally, on the question of  
14 competition advocacy, I think the agency should be out  
15 there defending anything that will make broadband  
16 deployment happen more excessively. 5G offers the  
17 potential for a new round of competitors to deploy  
18 service to homes to compete with wireline providers.  
19 That's exactly the kind of thing that will make net  
20 neutrality violations less likely to happen and that  
21 the agency would be well-served to use its competition  
22 authority to address.

23 MS. MUNCK: Thank you, Berin.  
24 Mitch.

25 MR. STOLTZ: I think we are at a crossroads

1 right now in two important ways. One is there is a  
2 lot of really great energy among consumers, among  
3 civil society, and even in Congress for a new, fresh  
4 look at antitrust law that brings in notions of  
5 privacy and of the way that people use technology  
6 today. And the FTC has a very important role to play  
7 in those, to the limits of its statutory authority,  
8 you know, and also, frankly, with the other things  
9 that Suzanne mentioned through amicus filings, that I  
10 think could really draw on a solid history of looking  
11 into privacy and to the sort of -- and also other  
12 things besides privacy.

13 The other way that we are at a crossroads is  
14 with the way that internet technology is going to be  
15 deployed, and the choices are really fiber to as far  
16 out in the network as we can get it, ideally, licensed  
17 wholesale to retail providers that will provide the  
18 last-mile service. That's one.

19 The other is basically wireless deployment  
20 with backhauls controlled entirely by the retail  
21 providers, that while they will be an improvement on  
22 today's technologies, they will be a bit of a dead  
23 end, and they will keep out future competition at the  
24 retail level. And while we didn't really have a  
25 chance to get into those here, you know, I would



1 encourage the Commission to keep that in mind in the  
2 future because, again, it has profound implications  
3 for the consumer questions that we've been talking  
4 about here.

5 MS. MUNCK: Thank you, Mitch.

6 Tom.

7 MR. STRUBLE: Sure. There's lots of things  
8 the FTC can't do in terms of, you know, procompetitive  
9 regulations. They can't address poll attachment rates  
10 or impose shot clocks on local franchising  
11 authorities. They could say that's a good idea,  
12 competition advocacy. You know, you should try and  
13 convince states or cities to adopt -- you know, try  
14 and lower barriers to entry to get more competitions,  
15 something that we've tried to do at R Street, and, you  
16 know, from the FTC's perspective, that would certainly  
17 be helpful.

18 But the FTC, I think, with their expertise  
19 and authority, should try and look at these sort of --  
20 the same competition issues through their own lens  
21 that the FCC addressed through their lens, which,  
22 again, is, I think, based on a rigid, sort of outdated  
23 set of silos. The FTC doesn't have that -- you know,  
24 those priors, so in terms of market definition, I  
25 would love to see just a general, you know, run

1 through the sniff test, can a broadband provider  
2 profitably affect a significant nontransitory increase  
3 in price.

4 Look at demand elasticity and  
5 substitutability between wireless and wireline  
6 networks. I would love to see an FTC, you know,  
7 analysis of whether these are different markets, where  
8 they are competitive substitutes in some respect or  
9 another. So I would like to see that, and  
10 particularly if we're talking about zero rating, you  
11 know, look back at tying. Obviously that, you know,  
12 includes a market power analysis, but these are  
13 vertical restraints. We have sort of a long, you  
14 know, history of FTC and competition law to look at  
15 that could be applied to these same issues. So that's  
16 what I would like to see.

17 MS. MUNCK: Terrific, thank you.

18 And, Tejas.

19 MR. NARECHANIA: So Tom actually said what I  
20 was going to say about the advocacy authority. I  
21 think the FTC could --

22 MS. MUNCK: I want to hear all about -- I'm  
23 really interested in the advocacy point, so you can --

24 MR. NARECHANIA: Well, so I think the FTC  
25 can play an important role in participating in actions

1 that might otherwise have been part of the FTC's  
2 interests. So I think that includes advocacy before  
3 public utility commissions, right, advocacy before --  
4 advocacy in state courts in state cases, on matters  
5 related to broadband deployment, in particular. So I  
6 think, you know, where a state or local policy seems  
7 like it might inhibit competition, I think that's a  
8 great place for the FTC to intervene. I also -- so  
9 that's what I have to say about the FTC and advocacy.

10 On the question of fairness, so I think -- I  
11 guess -- I understand the concern about a sort of  
12 free-floating, untethered, what does fairness mean?  
13 It means anything. And so I think it's important to  
14 recognize that, nevertheless, fairness is in the  
15 statute, right? It is a font of authority that the  
16 FTC has the charge and the responsibility to execute  
17 on.

18 So then I think it means that we have to  
19 give some content to what fairness means. I think  
20 that means figuring out unfair to whom. I think it  
21 means figuring out exactly what it means for something  
22 to be substantively unfair. Yeah, I think  
23 unconscionable contract terms is certainly part of  
24 that, but I don't think that's the limit of that.  
25 There's other conduct that I think strikes me as

1     unfair that other agencies have found to be unfair.  
2     And, sure, the FTC can't just incorporate by reference  
3     that analogy, but it provides a useful starting point  
4     for the FTC to begin its enforcement proceedings.

5             MS. MUNCK: Wonderful. Well, thank you.  
6     Well, we will come back at 4:15 for a discussion of  
7     antitrust, but before then, please join me in thanking  
8     the panelists for a vibrant discussion. Thank you  
9     very much.

10            (Applause.)

11            (Brief break.)

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1 IDENTIFYING EFFICIENCIES AND REMEDYING COMPETITIVE

2 HARMS IN BROADBAND MARKETS

3 MS. MUNCK: Well, welcome back to our fourth  
4 and final panel of the day, Identifying Efficiencies  
5 and Remedying Competitive Harms in Broadband Markets.  
6 Before we dive into this panel, I just wanted to say  
7 that I talked to Nick Feamster at the break, and he  
8 mentioned that BITAG is actually working on a report  
9 that should be coming out shortly. So I wanted to let  
10 you guys know that and we can all keep our eyes open.  
11 So thank you.

12 MS. AMBROGI: Thanks, Suzanne, and we're  
13 really excited to have this fabulous panel to round  
14 out today's discussion. So I'm going to go down and  
15 just introduce folks briefly. There's fuller bios in  
16 a longer packet that you can find at the front desk.  
17 And everyone's going to give brief opening remarks of  
18 about five to seven minutes, and then we will kind of  
19 kick it back to law school and go into some hypos  
20 about efficiencies and competitive harm and trying to  
21 put a finer point on some of the conduct that we've  
22 talked about at varying points throughout the day.

23 So, first, we have Howard Shelanski, who is  
24 a Professor at Georgetown University Law Center and a  
25 Partner at Davis Polk. Next to him is Michelle

1 Connolly, who is a Professor in the Economics  
2 Department at Duke University. Then we have Bill  
3 Blumenthal, who is a Partner at Sidley Austin. Next  
4 to him is Jonathan Sallet, who is a Senior Fellow at  
5 the Benton Foundation. And last but not least, we  
6 have Michael Katz, who is a Professor in the Economics  
7 Department and the Haas School of Business at  
8 University of California, Berkeley, also a Senior  
9 Consultant with Compass Lexecon.

10 So without further ado, I'll let Howard kick  
11 off the opening remarks.

12 MR. SHELANSKI: Great, thanks very much,  
13 Katy. It's a real pleasure to be here. I'm very  
14 grateful to the FTC for this invitation to participate  
15 again in this series of hearings. One way to open up  
16 my remarks is to say this. My friend, Gigi Sohn, said  
17 on the last panel that she was tired of being quoted  
18 from 2007 and asked that people please stop. Well,  
19 2007 is about the last time I actually published an  
20 article about network neutrality. And unlike Gigi,  
21 I'd be happy to continue to be quoted from that 2007  
22 article, the main reason being that the point of that  
23 article was to talk about why there were so many open  
24 questions surrounding the need for network neutrality  
25 regulation.

1           Now, this panel, obviously, is not talking  
2 necessarily about regulation but ways to identify  
3 efficiencies in anticompetitive conduct in network  
4 neutrality, but that necessarily brings in the  
5 question of whether ex post tools of the type that the  
6 FTC more typically applies are up to that job, and  
7 that brings regulation into the purview of the  
8 discussion.

9           So in thinking about this and preparing for  
10 the panel, I thought back to 2007 when I really wasn't  
11 sure of the empirical case for saying we shouldn't  
12 have ex post enforcement and for moving towards a  
13 regulatory model. And I guess I find myself 10 years  
14 or a dozen years later thinking that there are still a  
15 lot of open empirical questions.

16           Although, to the extent that I see the  
17 evidence having accumulated in those dozen years, it  
18 would seem possibly to be in the favor of sticking  
19 with an ex post model now that we are where we are  
20 after the court decisions on the FCC's regulations,  
21 and driving us towards thinking about how the FTC can  
22 use its tools, its tools short of regulation, for the  
23 purpose of making sure that the broadband market  
24 remains competitive and serves consumers well.

25           So let me just step back for a minute and

1 talk about what the debate really was, at least as I  
2 saw it, back in 2007 and what has and hasn't changed.  
3 A lot of our discussion in 2007 was about a sort of  
4 competition between investment in the core of the  
5 network as we called it, infrastructure investment,  
6 and innovation at the edge of the network, people who  
7 were thinking about applications and content that  
8 would run from the edge of the network over the core  
9 infrastructure to consumers, obviously, a very highly  
10 stylized picture.

11 But a lot of the debate during that period a  
12 dozen years ago was over how much of a tradeoff there  
13 really was between edge innovation and core  
14 investment. A lot of folks said that if we regulated  
15 in a heavy-handed way we'd lose core investment. A  
16 lot of folks said if we don't regulate in a heavy-  
17 handed way, we will lose edge innovation. And looking  
18 broadly at what the experience has been, we now have  
19 had mostly a period of light-handed regulation, very  
20 limited time and experience with a more clear ex ante  
21 regulatory model.

22 And over those dozens years, we've seen an  
23 enormous amount of investment in the core of the  
24 network. Network speeds have increased dramatically.  
25 Network coverage across the United States has



1     increased substantially. And the number of available  
2     networks to consumers -- not to all consumers, not  
3     everywhere -- but to many consumers many places has  
4     increased.

5             We've also seen mobile wireless coming into  
6     the picture as a legitimate transmitter of high-band  
7     width content and, indeed, becoming a means by which  
8     people use to access very high bandwidth content and  
9     applications. So I think we've seen the marketplace  
10    at the infrastructure level receive a lot of  
11    investment and become somewhat more competitive than  
12    it was largely in the absence of heavy-handed  
13    regulation during that period.

14            And, by the way, it is interesting to look  
15    at some of the data on the investment levels when  
16    there was and wasn't FCC regulation in place. There's  
17    at least some indication that that investment in the  
18    core did go down during those periods.

19            Well, what about edge innovation?  
20    Innovation throughout what one might call the internet  
21    ecosystem has moved very quickly, and at least is not  
22    in my mind clear and compelling evidence that there  
23    has been discrimination of a kind that has deterred  
24    innovation that is beneficial to consumers. That  
25    doesn't mean there can't be such episodes of

1 anticompetitive, anticonsumer discrimination, but  
2 there does not seem to have been a consistent set of  
3 behaviors or of examples where we have seen something  
4 that would lead to us, say, ex post enforcement is  
5 simply not worth it. There's too much of an incentive  
6 and ability to engage in bad behavior. Let's move on  
7 to ex ante regulations.

8           So it seems to me that since 2007, we've  
9 come back to a point where I think the empirical case  
10 for ex ante regulation remains ambiguous, that there's  
11 a strong case for keeping regulation in the purview of  
12 an agency like the FTC that is primarily an ex post  
13 enforcement regime. And even though the FTC does  
14 have, of course, rulemaking authority, rulemaking  
15 authority that some have said the agency has been too  
16 hesitant to use, if the question we're going to ask  
17 here is whether the agency should move in the  
18 direction of using that rulemaking authority more  
19 aggressively in the broadband area, I think the  
20 evidence is probably no and that the focus should be  
21 on how to sharpen and best use the ex post tools, both  
22 consumer protection and competition tools that the  
23 Commission possesses. Thank you.

24           MS. AMBROGI: Thanks.

25           Michelle.

1 MS. CONNOLLY: Thank you for having me. I  
2 always enjoy listening to Howard. I understand things  
3 much more clearly afterwards.

4 I kind of have two points that I want to  
5 make, and I apologize if these are points that someone  
6 has heard me make before, and many times I feel like I  
7 keep repeating the same things, but every time -- I've  
8 been here all morning, and I keep hearing different  
9 people use different statistics, all claiming they're  
10 telling you the current state of the market. So I  
11 thought if nothing else, I could perhaps clarify how  
12 two different people can be quoting the same site and  
13 giving too completely different statistics. And so  
14 that's going to be my first point.

15 And the second one is about how economists  
16 see certain words and how I've been hearing them  
17 used consistently today in ways that I think are  
18 very systematically biased in terms of their  
19 interpretation. So those are the two points I want to  
20 make.

21 The first one, on terms of when we're  
22 talking about what is the necessity, perhaps, for net  
23 neutrality or the likelihood that ex post we may have  
24 to enforce certain issues has everything to do with  
25 the amount of competition as the SEC said, the

1 competition in the last mile, or last-mile monopoly  
2 power, or someone else earlier was talking about the  
3 potential of gatekeeping.

4 One thing that's very interesting is how  
5 broadband was defined by the FCC over time. Until  
6 2010, anything over .2 megabits per second was defined  
7 as broadband. In 2010, that moved to four megabits  
8 per second download, one megabits per second upload.  
9 In 2015, it went from 4 to 25 megabits per second  
10 upload and 3 download. And I heard a lot about the  
11 fact that measuring speed is a difficult thing. But I  
12 think that this is an important point because this is  
13 why people can quote the same report and have  
14 completely different implications in terms of what  
15 we're saying is available in terms of broadband in the  
16 United States.

17 So, for example, if we use the current  
18 definition of 25 megabits per second download and 3  
19 megabits per second upload, then 2013, almost none of  
20 us officially had broadband connection. I'm pretty  
21 sure I used it in 2013, but it would be difficult,  
22 according to this definition. So by simply redefining  
23 the speed of broadband technology, then we very  
24 clearly -- immediately get very different results in  
25 terms of coverage and availability.

1           If we stick at, say, 10 megabits per second,  
2    which is already double what we had before in terms of  
3    the official level, then in terms of competition,  
4    what's very interesting is only using fixed  
5    terrestrial, only counting fixed terrestrial, looking  
6    at every single census block in the United States,  
7    including census blocks with no population or housing  
8    units, 83 percent have two or more operators, fixed  
9    terrestrial that have over 10 megabits; 43 percent of  
10   these census blocks have three or more operators.

11   That's very different from what people are stating  
12   when you're using the 25 megabits-per-second criteria.

13           Now, even that looks pretty good in terms  
14   of the level of competition, but that's not even  
15   including anything else. That's not including  
16   satellite. That's not including the fact that mobile  
17   broadband is being used by 20 percent of U.S.  
18   households as their only means for getting --  
19   connecting to the internet. So once you start adding  
20   these things, then the numbers look even more  
21   supportive of the idea that this is a very competitive  
22   market.

23           If you just add satellite, we now go to 98  
24   percent of the U.S. population would have two or more  
25   service providers, and 82 percent would have three or

1 more service providers.

2 In a similar notion, this market is changing  
3 tremendously. The traditional lines between  
4 communication services, information services, video  
5 market, all those things are disappearing. A clear  
6 example is we're talking about 5G, the deployment of  
7 5G, enabling mobile broadband to become a more  
8 complete substitute potentially for fixed broadband.

9 We also see things moving in the opposite  
10 side. We have cable entry into wireless services by  
11 using a combination of their own fixed broadband  
12 networks, WiFi hotspots, and MVNO agreements with  
13 MNOs. We see increased interdependence between what  
14 previously would just be wireless and what would be  
15 fixed in terms of the backhaul agreements as well as  
16 MVNO agreements, and 5G deployment would only increase  
17 the need for a backhaul between the two and, again,  
18 reinforce these links.

19 We see increasing deployment of content  
20 delivery network. We see increased edge providers.  
21 We're seeing all of these things go up. All of these  
22 things are indicators of greater overall competition.  
23 So the notion that these harms need to be regulated ex  
24 ante, because of a lack of last-mile competition, seem  
25 very farfetched and make me think that ex post the

1 case has to be pretty strong -- would have to be  
2 pretty strong to prove such problems.

3 Now, in terms of language -- and maybe I  
4 became an economist because I'm not always really good  
5 with words -- but when people keep saying,  
6 "competitive harms" and "unfairness," and, Chris, you  
7 made the point earlier that discrimination is not  
8 necessarily a bad thing. Price discrimination exists.

9 Or let's think about something else. People  
10 keep saying "paid prioritization" as if inherently  
11 it's like saying "the devil." Pay prioritization,  
12 think about -- let me just rename it. Let me call it  
13 differentiated services or differentiated products.  
14 Is it bad that consumers have differentiated products?  
15 Is it bad to offer differentiated services?

16 When we send things by mail, sometimes we  
17 pay for overnight delivery or two-day delivery. If  
18 you have an application that must absolutely be  
19 guaranteed that none of their packets get dropped, it  
20 can be incredibly valuable for them to have the option  
21 to pay for a guarantee. And it's not necessarily  
22 prioritization in terms of speed, but simply a higher  
23 likelihood that nothing will get dropped. That's a  
24 useful mechanism to have in the market, and not having  
25 it can prevent the innovations in other services.

1           So this is just to point out that the  
2    language we use and the way with which people are  
3    discussing a lot of these things are implicitly  
4    assuming that any activity that we could call unfair,  
5    being competitive isn't -- is a good thing. And  
6    simply saying it is discrimination or it is pay  
7    prioritization does not necessarily mean that a case  
8    needs to be brought up.

9           MS. AMBROGI: Thanks.

10          Bill.

11          MR. BLUMENTHAL: Well, thank you, and good  
12    afternoon, everyone. I'm going quickly to go through  
13    the first four questions that were teed up for today's  
14    discussion, to just give some quick comments on each  
15    of them, those being what do we think about the 2007  
16    report and how many legs does it have? What do we  
17    think about market definition? What do we have to say  
18    about exclusion, degradation, pay prioritization, and  
19    other things that people identify as potentially  
20    anticompetitive? And what do we have to say about  
21    state and local regulation and how we ought to factor  
22    that in?

23          For purposes of all of this, I'm just going  
24    to take it as a given that the jurisdictional debates  
25    are settled, that we're in an ex post world, that the



1     FTC is the agency that is going to be dealing with  
2     these issues for a while, and I'm just going to be  
3     talking about things in traditional antitrust terms.  
4     I mean, I'm comfortable with that based on the general  
5     principle that as a default matter in our economy,  
6     antitrust is the mechanism that we use to regulate  
7     markets. And if we deviate from that, it has to be  
8     for a particular purpose. And I'm not going to get  
9     drawn into the broader debate about whether that  
10    purpose of something deviating from traditional  
11    antitrust has been shown. For purposes of today,  
12    we'll just take FTC as the agency.

13                 So, point one, the 2007 broadband report. I  
14    was at the agency in 2007. How well does it hold up?  
15    Well, think of it in these terms. That report came  
16    out on June 27, 2007. It was two days later, June 29,  
17    2007, that Apple released the first iPhone. Now, that  
18    iPhone had been rumored. People knew it was coming,  
19    just as people knew the broadband report was coming.  
20    But, you know, we didn't quite know it at the time on  
21    June 29, 2007, but the world was about to change, and  
22    it was about to change as a result of the mass  
23    proliferation of wireless broadband.

24                 So, you know, people have talked about that  
25    all day long. That's the first big change I would

1 identify since 2007. The second big change is that  
2 there has been a fundamental change in the  
3 architecture of distribution and interconnection, and  
4 kc and some others spoke about this, you know, with  
5 the rise of CDNs, more generally with the rise of  
6 networks of widely distributed proxy servers and data  
7 centers with private transmission, widely distributed  
8 that connect into the internet, into the public  
9 internet at many, many different spots. Again, a  
10 fundamental change, and we're going to, I think,  
11 probably be getting back into the implications of that  
12 when we talk about exclusion and the feasibility of  
13 exclusion and degradation. So that's point one,  
14 question one.

15 Second, market definition. How should we  
16 think about relevant markets in this industry? Well,  
17 Tom spoke about it briefly, that there is a  
18 methodology. It's the same methodology we use in  
19 every other industry. The hypothetical monopolist  
20 test was developed in the 1970s. It was adopted in  
21 the 1982 Merger Guidelines. It has been widely  
22 adopted by the courts in the U.S. It has been widely  
23 adopted by agencies now around the world. That's how  
24 we do it.

25 We continue to debate the details of how it

1 ought to be specified, but that stuff is really in the  
2 weeds. I'm not going to get into that today. But I  
3 do want to focus on one key definition -- and this,  
4 again, is right out of the Guidelines -- but it can be  
5 kind of head-bending for people who are not antitrust  
6 regulars. And that is it's like relativity in  
7 physics. Industries do not have a specific, well-  
8 defined set of relevant markets. Companies do not  
9 compete in a specific set of well-defined relevant  
10 markets.

11 Under the Merger Guidelines, and generally  
12 under the case law, the market that is relevant in a  
13 given case will depend on the identity of the  
14 particular counterparty. If you change the  
15 counterparty, you change the markets. Think about  
16 Whole Foods and the Whole Foods-Wild Oats case, the  
17 relative market was premium, natural, and organic  
18 supermarkets. I mean, the FTC has not identified what  
19 the relevant market was that it used for Whole Foods  
20 and Amazon. But almost certainly, it was not premium,  
21 natural, and organic supermarkets.

22 I mean, the way you think about it depends  
23 on who the counterparty is. And that's in a Section 7  
24 case, likewise, in Section 1. You would think about  
25 the particulars of the restraint. In Section 2, you

1 would think about the particulars of the conduct at  
2 issue. You cannot define the market without  
3 examining, in detail, the facts, and not just the  
4 facts of the industry but the facts of the particular  
5 activity at issue.

6 So for purposes of today, I'm not even going  
7 to try. And, actually, I would say that to the extent  
8 people did try, they probably got it highly  
9 generalized in a way that almost certainly is going to  
10 be wrong in the context of the particular case. Over  
11 time, there will develop what's essentially a common  
12 law of relevant markets in the industry. But that's  
13 going to take a while to develop. So that's question  
14 two.

15 Question 3, how should we think about  
16 exclusion and the way the question reads other  
17 anticompetitive conduct, such as preferential pricing.  
18 And, yes, there is a bias in there that I'm going to  
19 talk about. Exclusion and anticompetitive practices,  
20 you know, those largely remain, I think, a theoretical  
21 concern that are not materially present in the context  
22 of the markets that we're discussing today.

23 You know, antitrust generally does not deal  
24 with inchoate fears. It doesn't deal with bogeymen.  
25 If there is a credible claim that is presented, it can

1 be addressed by the FTC or DOJ or private litigation  
2 through traditional techniques. I'm familiar with  
3 sort of the one-offs. I mean, people mention  
4 BitTorrent and people mention Madison River like  
5 they're epithets.

6 And on that, I guess, all I would say is  
7 the most dangerous phrases I'm familiar with in  
8 legislation and rulemaking are "we need to make sure  
9 this never happens again," right, because once you  
10 start doing that, people lose sight of the tradeoffs  
11 and the balances and, you know, in general, if it's --  
12 if it's exclusion that we're worried about, if it  
13 becomes a problem, people can deal with it at the  
14 time.

15 I deal with exclusion in a way that I think  
16 is fundamentally different from preferential pricing,  
17 pay prioritization. Those concerns, I think, are  
18 fundamentally ill-placed, for the reasons that  
19 Michelle started to get into, but I'm going to  
20 elaborate on that for a second. I don't mean to say  
21 that they can never be problematic, but we know the  
22 price discrimination is often efficiency-enhancing. I  
23 mean, Chris Yoo said that it's sometimes efficiency-  
24 enhancing. I would go stronger than that. I'd say it  
25 is generally efficiency-enhancing.

1           And we have known for at least a century  
2   that it is necessary, necessary for efficiency in  
3   high-fixed-cost, low-marginal-cost industries, right?  
4   I mean, that's Ramsey pricing. And, you know, as a  
5   general matter, pay prioritization of various types is  
6   pervasive in service industries.

7           You know, Michelle mentioned one. Let's  
8   think about airlines. You know, if we're talking  
9   about moving people, you know, you have Y fares and  
10   anytime fares. You also -- you know, those will put  
11   you on the next plane, and that is going to be a  
12   preference that is not available to somebody who wants  
13   to pay for a cheaper fare, right? I mean, that is --  
14   that is generally viewed not as something that is  
15   adverse but efficiency-enhancing.

16           And, finally, I'm just going to speak very  
17   briefly about state and local regulation. The  
18   question is do they affect market participants in a  
19   way that limits competition and innovation? And at  
20   the risk of yet overrunning my time a little bit  
21   further, I will say undoubtedly. Undoubtedly they  
22   have that effect. They always do in every industry.  
23   But you need to look at the specifics case by case to  
24   see what the effects are.

25           And I think in general, what I would say is

1     that this agency, for at least five decades, has had a  
2     competition advocacy program that people referred to  
3     on the prior panel. You know, the agency has made a  
4     habit of going to state and local governments and  
5     other federal agencies and saying, "Look, guys, be  
6     careful about what you're doing. We know you think  
7     those regulations are well-intended. We know you  
8     think they're designed to protect some constituency.  
9     But they're having adverse collateral effects. Have  
10    you thought about this?"

11                 And that's going to be true, you know, any  
12    time that state and local regulators start meddling in  
13    broadband or anything else. Those are my comments.  
14    Thanks.

15                 MS. AMBROGI: Thank you.

16                 Jon.

17                 MR. SALLET: Yeah, thanks very much. So if  
18    I could change the law, I would reinstate the 2015 net  
19    neutrality rules and repeal the common carrier  
20    exemption that keeps the FTC from regulating common  
21    carriers. Assuming just for the moment I don't have  
22    the power to do that, let's talk about current law.  
23    And I'm honored to be with this distinguished panel to  
24    do so.

25                 So I want to make four points. First of

1 all, according to the FCC data, competition in fixed  
2 broadband is dominated by zero providers, monopoly  
3 providers, duopoly markets. Secondly, we have a  
4 record from the world of mergers of competitive harms  
5 that can arise, and I think that record is important  
6 for the FTC to consider as it thinks about enforcement  
7 actions.

8 Thirdly, the FTC has a toolkit that it can  
9 use. Section 5, the boundaries of which can be  
10 discussed, and Commissioner Chopra's recent suggestion  
11 to use rulemaking I think is the sector that is  
12 particularly fit to meet the criteria he outlined.  
13 And, then, fourthly, as a competition advocate, the  
14 FTC has told states when they were out of line. For  
15 example, on the licensing of professions. Municipal  
16 broadband should be the next -- the next step that the  
17 FTC takes advocating for the repeal of laws that  
18 prevent municipalities from deciding whether they want  
19 to engage in broadband activities, either directly or  
20 through private-public partnerships.

21 So let me just do those briefly. On the  
22 most recent FCC data we have -- well, no, I'm sorry.  
23 The Ookla data from last year suggests that the  
24 average download speed in the second and third  
25 quarters of 2018 was 96.25 megabits and the upload



1 speed was about 33. That's consistent with statistics  
2 we heard earlier.

3 But so take 96. The way the FCC cuts the  
4 data, at 100 megs download, 11 percent of U.S. Census  
5 blocks have no access to broadband; a third have one;  
6 37 percent have access to only two -- zero, monopoly,  
7 duopoly. Even at lower speeds, it's relatively rare  
8 for census blocks to have as many as three choices,  
9 which we could normally think in antitrust as a  
10 rationally competitive market, maybe, four to three  
11 mergers not being always approved. But census blocks,  
12 for the reasons Gigi Sohn say, overstate the level of  
13 competition anyway.

14 And there's an important language question  
15 here. There's a tendency to talk about new entrants  
16 in this space as overbuilders. That may be relevant  
17 to engineers, but the FTC has a much simpler term to  
18 use. It's competition, more competition. And the  
19 research we have suggests that more competition makes  
20 a difference. There's a report by the Analysis Group  
21 that found material price declines associated with a  
22 third provider and increased quality; a paper by  
23 Mohler and Savage also finding quality increases.

24 When the FCC, the Federal Communications  
25 Commission, looked at municipal broadband in an order

1     that was struck down by the Sixth Circuit on legal  
2     grounds, but whose factual foundation I think is  
3     strong, it found that in both Chattanooga and Wilson,  
4     North Carolina, the emergency of municipal broadband  
5     had the expected effect that competition brings. The  
6     incumbent responded by lowering prices or keeping  
7     prices flat instead of raising them and increasing  
8     quality.

9             So none of this is surprising. This is what  
10    we think from antitrust -- more competition will  
11    deliver more benefits to consumers. But, secondly, we  
12    do have reasons to believe that harm can arise under  
13    antitrust standards of harm to competition. So think  
14    about the merger cases that have been reviewed since  
15    Comcast-NBC about a decade ago. The threats that have  
16    been found include higher interconnection fees. This  
17    is what the staff of the DOJ thought was happening --  
18    would have happened in the Comcast-Time Warner merger  
19    when it found that interconnection fees increased  
20    based on the size of a broadband provider, and such  
21    fees could disable competition.

22            Data caps, the subject of a condition in the  
23    AT&T-DirectTV merger review, conducted by the FCC,  
24    contract terms that can harm downstream rivals, the  
25    DOJ's consent decree in the Charter-Time Warner cable

1 merger that talked about MFNs, most-favored nation  
2 clauses specifically, and those that allow the cherry-  
3 picking of terms. And, of course, input foreclosure.  
4 Now, we've just had a litigation in which Michael  
5 participated on this

6 MR. KATZ: Actually, I did all four of  
7 those.

8 MR. SALLET: I only picked them for that  
9 purpose. But this isn't a new theory, right. It goes  
10 back to Comcast-NBCU, where the DOJ and the FCC both  
11 looked at the possibility of input foreclosure and,  
12 indeed, the FCC had some conditions on this. So,  
13 look, this is not novel that harm in a competitive  
14 sense can arise.

15 This brings us both to the application of --  
16 in the conduct sphere, the Sherman Act, of course, but  
17 also Section 5, right? Unfair methods of competition  
18 was enacted as an incipency statute. It was enacted  
19 in light of the Sherman Act's prohibitions but with  
20 the desire that the FTC have additional room to  
21 maneuver to stop competition, invitations to collude  
22 being a relatively well-established use of Section 5.

23 Now, I think the toolkit exists for the FTC  
24 to act here, and in particular, I think it's useful to  
25 note Commissioner Chopra's suggestion that rulemaking

1 authority could be used to define unfair methods of  
2 competition. And I think in this sector, the key  
3 criteria are met that Commissioner Chopra established.  
4 We have an extensive enforcement record from both  
5 merger and regulatory proceedings involving the  
6 Federal Trade Commission, the Department of Justice,  
7 and the Federal Communications Commission. And  
8 there's little, if any reason I think, to believe that  
9 private antitrust action will shape the conduct of the  
10 industry.

11 So I think the FTC should both consider  
12 theories of harm based on the kinds of harms we see in  
13 the merger reviews and consider Commissioner Chopra's  
14 recommendation.

15 Finally, it's right that the Federal Trade  
16 Commission puts a great deal of emphasis on its role  
17 as a competition advocate. This has been very, very  
18 important. As I noted briefly above, it has advocated  
19 for the repeal of state laws that are unduly  
20 restrictive in the licensing of professions. But I  
21 think that it ought to also oppose and then seek the  
22 repeal of state laws that prevent municipal broadband  
23 -- municipalities from considering involvement in  
24 broadband.

25 I don't mean by that to say that every

1     municipal broadband -- every municipality should make  
2     the decision to go forward, merely that they should  
3     have the choice to do so. Because as we look at it,  
4     what we see is a variety of different models being  
5     used. Sometimes network economies coming up out of  
6     electric utilities, either as for example in  
7     Chattanooga or rural co-ops. Sometimes, as in Ammon,  
8     Idaho, an open access network that private companies  
9     can use to reach consumers, providing the service  
10    through the private companies.

11                 Sometimes on the Eastern Shore of Maryland,  
12    Kent County, Maryland, which has fiber built to  
13    government buildings but allows private-sector  
14    entities to build laterals off of that to decrease the  
15    cost of investment. And, again, it's the private  
16    entities providing the service.

17                 Just this month, the City of Tacoma,  
18    Washington, took a big step when it laid out plans to  
19    consider the use of two private entities to operate  
20    what has been its municipal broadband network, in  
21    which they commit to net neutrality, to provide  
22    substantially lower costs to low-income residents and  
23    to upgrade the system to gigabit speeds in three  
24    years.

25                 The point is, there's lots of different

1 things happening at the municipal level where there's  
2 that freedom. I think it's good for competition. I  
3 think it lowers prices, increases quality, speeds  
4 innovation when there is more competition.

5 So just one last point. The idea that the  
6 FTC should engage in this is not a new idea. In 2005,  
7 then-Commissioner Leibowitz gave a speech to local  
8 officials in which he said, "Local governments have  
9 long been laboratories of experimentation. If they  
10 want to give their residents affordable internet  
11 access, they should be allowed to try without being  
12 foreclosed by federal or state laws." I think that  
13 statement was right then; I think it's right now.  
14 Thank you.

15 MS. AMBROGI: Thanks.

16 Michael.

17 MR. KATZ: So I'd like to thank the FCC -- a  
18 slip -- you know where I used to work -- the FTC very  
19 much for inviting me today, although I may curse you  
20 for putting me last. I think I've been largely  
21 preempted by the early speakers.

22 So let me say one thing, actually, since Jon  
23 and I mentioned some of my past clients. I have  
24 worked on the issue of net neutrality for private  
25 clients, none of whom are retaining me to work on that

1 now, and what I have to say doesn't represent their  
2 views, and also, because I didn't fill out my  
3 financial disclosure, I should say the only entity or  
4 person paying for me to be here is I am and Jennifer  
5 Hobart is paying half of it. She happens to be my  
6 wife. And unlike Beto O'Rourke, she and I have a  
7 50/50 partnership, although admittedly that's because  
8 California is a community property state.

9 So I guess think of what I'm going to say as  
10 a summary or maybe a summary of what the first three  
11 speakers said, and as well I agree with a lot of what  
12 Jon said, just some I don't. So my topic is what's  
13 the point of today's hearing? It seems like there are  
14 two possibilities at a broad level. So one is to say,  
15 look, broadband markets have certain features that  
16 have to be taken into account when we're applying  
17 economy-wide antitrust policies. So understanding  
18 traffic management, for example, seems it's important,  
19 even if you're just going to try to apply plain old  
20 antitrust.

21 Another view is that broadband markets are  
22 so different that we need special policies, including  
23 different standards, different procedures. So, for  
24 example, really that's the approach, so trying to  
25 recreate net neutrality regulation as much as possible

1 through other means. And this is not going to  
2 surprise anybody who knows me, you can summarize my  
3 introductory remarks as follows: I think the first  
4 approach makes a lot of sense and the second one  
5 should be rejected.

6 Now, what are the sorts of features you  
7 could point to for either? Well, we've actually heard  
8 some debate on the panel, but I guess I come down on  
9 the markets are concentrated, at least to date. It's  
10 clear, though, people are getting more options -- have  
11 been getting more options as time has gone by on the  
12 fixed side and in rural areas satellite. And I think  
13 a really big question on this is what is going to  
14 happen with 5G, and there is really a chance that  
15 concentration will be reduced dramatically.

16 But in any event, it's a feature to take  
17 into account. It's a feature that lots of markets  
18 have. I mean, that's where we focus our antitrust  
19 attention.

20 It was already hinted at, the second one, is  
21 that technological issues are often at the fore. I  
22 mean, issues of if you're trying to get into  
23 something, discrimination or not, you may end up  
24 having to get a lot into the details of traffic  
25 management, measures of congestion, understanding cost



1 structure.

2 Third is that these markets or the services  
3 provider are very important, and, indeed, you know,  
4 core modern infrastructure. And then, fourth, is that  
5 there are examples broadband providers are an example  
6 of multisided platforms. They're connecting end-users  
7 with each other, but they're also connecting end-users  
8 with a bunch of innovative content providers or app  
9 providers, and I'll just use those terms very broadly.

10 Now, that last one, I think, raises a couple  
11 of issues potentially. One is what's known as the  
12 terminating access problem or terminating monopolist  
13 problem that if the end-user makes a choice of  
14 broadband provider and only has a single broadband  
15 provider, you have now made the de facto choice for  
16 all those content providers that want to get a hold of  
17 or, you know, exchange traffic with that person, and  
18 that can create some issues.

19 But, actually, I think what's gotten the  
20 most attention is that there's this whole question,  
21 but, wait, these are a bunch of innovative edge  
22 providers. Don't we have to worry then -- shouldn't  
23 we focus a lot on whether that innovation and entry  
24 and whatever is going to be harmed? And my own view  
25 is that actually more than sort of the economics of

1 the situation, are the consumer benefits of the  
2 situation reflects what I would say is maybe the  
3 dominant fifth feature of these markets, which is they  
4 have extremely powerful and very self-entitled users  
5 in the form of a lot of tech companies, which I think  
6 has shaped the debate I think in some ways in  
7 unhelpful ways.

8 So let's talk about the potential responses  
9 to these features. I would say there's sort of the  
10 type two approach, which is what I was saying, can we  
11 recreate net neutrality, which I might describe in a  
12 somewhat facetious but unfortunately not entirely  
13 facetious of let's protect in favor certain edge  
14 providers.

15 And that would have such components as we  
16 should ban charging content providers or app providers  
17 by this often defended under the rubric of we want to  
18 allow permissionless innovation, but I would say it's  
19 really something very different, saying you can't  
20 charge them at all, ban paid prioritization, possibly  
21 have blanket structural separations, something that  
22 Senator Warren has proposed, not necessarily for  
23 broadband providers -- I'm not sure they would meet  
24 her revenue targets -- but she has re-raised the issue  
25 of whether we should start having separation, such as

1 we had previously in telecom.

2 And I would note one thing on that. If you  
3 are going to think about a separations policy, I think  
4 one that should be very concerned about municipal  
5 broadband if you're going to have the same entity, and  
6 Jon talked about a variety of different arrangements,  
7 but if you're going to have one where it's literally  
8 the city providing it or having a financial interest  
9 in it, and they are also the ones who grant access to  
10 streets and everything else to their potential  
11 competitors, that's exactly the kind of problem that  
12 people normally worry about when they want to have  
13 separation. So I think that's -- if you're going to  
14 go that route, you would want to think about it there.

15 Now, I think those -- and I've written about  
16 this and I don't have time here -- these different  
17 things of banning charging the edge providers, banning  
18 paid prioritization, separations, all have problems  
19 for specific reasons. So, for example, the permission  
20 was innovation, that's not a reason not to charge. I  
21 mean, it's almost impossible to innovate without  
22 electricity, but nobody says, oh, you need to make  
23 sure that edge providers get their electricity for  
24 free. Right, what you would want to make sure is that  
25 someone didn't somehow discriminate against particular

1 providers and somehow try to use electricity pricing  
2 or access to it to harm them. But the mere fact that  
3 they have to pay for it is not saying they're required  
4 to get permission, and I think the same thing applies  
5 here.

6 But let me just summarize more general  
7 arguments. Okay, so one is if we think that the  
8 antitrust regime we have, the competition policy  
9 regime we have, generally works, what's the reason for  
10 abandoning those general principles? Now, what some  
11 people would say is, well, they don't work here, you  
12 know, like, we've got to go so much faster."

13 But I think as both Howard and Michelle  
14 touched on -- and actually I think Bill as well -- the  
15 effects of these practices, in fact, are very fact-  
16 specific. I mean -- and you really do need to look at  
17 them to know what's right. I think the general  
18 principles are correct, but those general principles  
19 don't give you a one-size-fits-all answer. And so I  
20 think this approach of essentially trying to build  
21 into the standards just say, okay, look, if you have  
22 paid prioritization, that must, by definition, be  
23 anticompetitive I think is a big mistake. I think you  
24 really have to -- if you're going to go that route and  
25 attack paid prioritization, you're going to need to

1 look at specific cases and explain why the particular  
2 case at issue is anticompetitive, because it's  
3 certainly not true in general.

4 I think the other problem with going down  
5 this road of trying to have special antitrust for  
6 particular firms is you're going to get into fights  
7 over what the labels are. And, also, you're going to  
8 get distortions in firm behavior as they try to avoid  
9 falling within the disfavored category. So, again,  
10 it's slightly different than what we're talking about,  
11 but say with Senator Warren's proposal that has a  
12 certain financial trigger, that if your revenues get  
13 over a certain size, then these obligations fall on  
14 you. That creates all sort of incentives to try to  
15 stay under that size, either by possibly raising your  
16 prices to actually drive down your profits or revenues  
17 because they're so high or by some sort of corporate  
18 restructuring. And I have no doubt that people would  
19 come up with very creative things.

20 Okay, the alternative approach it to say,  
21 okay, look, these are really important markets and it  
22 is a threat to innovation. And I certainly agree  
23 there can be problems and there can be -- you know,  
24 they could be quite serious for the economy, but that  
25 says we need to work hard to get it right, which I

1 think means initially to redouble our efforts on the  
2 traditional framework and we should focus on exclusion  
3 that represents true harm to competition.

4 Now, a problem with saying that is it's  
5 really not very well settled what it means to harm  
6 competition, at least my current thinking, and I guess  
7 in this I'll be a little sympathetic to Gigi about,  
8 well, who knows, maybe 10 years from now I'll have a  
9 different view, but my current thinking is that the  
10 "no economic sense" test is the best we have these  
11 days, which is to say you look at conduct by the firm  
12 -- say it's some sort of refusal to deal -- and you'd  
13 ask, well, did the broadband firm actually have a  
14 reason to refuse to deal, that was something other  
15 than, well, we don't want you competing against our  
16 subsidiary because we realize it would hurt our  
17 profits that way.

18 Okay, and so you're saying this is conduct  
19 that makes "no economic sense" but for harming a  
20 rival. Now, that test is not the same as trying to  
21 maximize welfare. There are times where if you  
22 thought the right thing to do was maximize consumer  
23 surplus or total surplus it gives you the wrong answer  
24 and it also can be extremely hard to apply in  
25 practice, but I think it turns out it looks better

1     than the alternatives.

2                 So my recommendation would be that we  
3     basically stick to what we've been doing, try to --  
4     you know, the FTC should educate itself as much as it  
5     can on these issues. I, actually, having worked at  
6     the DOJ and the FCC, both -- on the staff of both on  
7     telecom issues, think that the general agencies are  
8     actually quite capable of developing the industry-  
9     specific expertise necessary. And I think it's  
10    actually a really good thing that then they do that  
11    within the context of a broader economy-wide  
12    perspective because it actually, I think, leads to  
13    clearer thinking, because you don't get caught up in  
14    sort of -- sometimes there can be sort of industry  
15    fads.

16                So, finally, let me say that I'm really  
17    against what I might think of as sort of a type 1.5  
18    approach, which is where we try to use antitrust to  
19    recreate net neutrality. I was then quite concerned  
20    and would not want to see the Commission try to use  
21    Section 5 to say, okay, we can start coming up with a  
22    quasi-regulatory regime.

23                And very last, to be clear, and I think Bill  
24    and Michelle have already said this, but paid  
25    prioritization is not necessarily discrimination. It

1 may -- in fact, disallowing paid prioritization, while  
2 having some firms still get different priorities, that  
3 would be discrimination and certainly need not be  
4 exclusionary. And, again, banning paid prioritization  
5 can have the effect of excluding an entrant that would  
6 otherwise have wanted to have purchased a special  
7 quality of service as a way to differentiate itself as  
8 an entrant -- entering edge provider and get a  
9 foothold in the market.

10 And, in fact, banning paid prioritization,  
11 my own view is on balance, is actually something that  
12 favors incumbent edge providers, particularly the  
13 really large ones, because they already have  
14 workarounds and they can have their own networks,  
15 something I think we'll talk about later. And also  
16 because it prevents an entrant from coming up with a  
17 niche or unique strategy.

18 And, similarly, the notion that charging  
19 content providers for broadband access, that that must  
20 be anticompetitive I think is just flat out wrong.  
21 I'll stop there.

22 MS. MUNCK: Michael, you have landed on a  
23 number of issues that we're going to be discussing in  
24 our hypotheticals, so thank you for that. And thank  
25 you for everyone.



1           If we could move to the first hypothetical,  
2     please. So what we're going to do is we have a series  
3     of hypotheticals prepared, touching on different  
4     aspects, and the idea is to draw out how the FTC could  
5     be thinking about any of these fact patterns. Our  
6     first one is essentially an ISP supports or allows  
7     traffic from a videoconferencing application for two  
8     years until it discontinues the traffic or the  
9     support. As a result, the ISP's customers can no  
10    longer access the program. The ISP says that it  
11    discontinued the service because the program uses too  
12    much data. The press reports that the ISP is  
13    developing a competing videoconference service,  
14    although that service is not yet available to  
15    consumers.

16           And so I think for each of these  
17    hypotheticals we're going to ask, you know, three  
18    really broad questions. One is, is there anything  
19    here that you think would either be procompetitive,  
20    anticompetitive, or competitively neutral. The second  
21    is what would be the harm to consumers? And the third  
22    would be if there was a violation, how would we prove  
23    it, and as a corollary, what would we look at in terms  
24    of the relevant market?

25           So beginning with the first one, if I could

1 get everyone's sort of short analysis on what they  
2 think in terms of the procompetitive benefits,  
3 anticompetitive effects or completely neutral position  
4 here. I'm happy to start with whomever would like to  
5 go first.

6 MR. KATZ: I'll say something. I think -- I  
7 mean, it's really going to depend -- you're saying  
8 they discontinued it because it uses too much data. I  
9 mean, if you were going to start -- I'm not sure I  
10 would start looking even based on this, but if you did  
11 start looking, I think you'd start and want to ask,  
12 well, okay, what are the other services? What do they  
13 mean by "too much data?"

14 Are they saying that somehow it's because  
15 it's really uneven across their users and they want to  
16 -- they feel that that's what's causing the problem?  
17 Or are they saying that somehow it's so high and it's  
18 at such peaks that it's actually -- that by itself --  
19 which arguably Netflix has done -- that some broadband  
20 providers, it's forcing them to make additional  
21 investment.

22 I think you'd really want to know what it is  
23 they meant by that because it could mean a lot of  
24 things. And what I'd be -- I guess the worst fact  
25 pattern is you say, well, it turns out there are a

1 bunch of applications that put that sort of demand on  
2 the system, but they've just picked on this one.

3 MS. MUNCK: So you'd want to be asking how  
4 many other applications are using data at similar  
5 levels so that you'd be able to see what the entire  
6 ecosystem looks like? That's very helpful.

7 Does anyone else have anything?

8 MR. SHELANSKI: Yeah, I mean, there are two  
9 things I'd want to know right away, which is, you  
10 know, what do things look like in the relevant  
11 markets? So what alternatives are there to the ISP  
12 that is cutting off this videoconferencing service?  
13 Are there alternative pathways through which customers  
14 can get to videoconference service?

15 On the other hand, what are the alternatives  
16 to a videoconference service over an ISP? What are  
17 the alternative ways that kind of communication might  
18 take place? It's very possible that there's no harm  
19 to anybody from this conduct, that it's purely a  
20 network management issue. And if consumers can say,  
21 okay, we can't do videoconferencing over that ISP; we  
22 can go over an alternative network; or we don't need  
23 videoconferencing of that kind, we can do something  
24 else. If there are close alternatives, then that  
25 would say to me, this is not really something worth

1 investigating.

2 So I think the underlying market structures  
3 and the relevant markets are going to matter entirely  
4 to your questions about consumer welfare.

5 Now, were it the case, if you take the  
6 hard case, this is an ISP that has huge market share,  
7 and videoconferencing is something that people  
8 really need, and there's, you know, high elasticity  
9 of demand, and there are relatively few close  
10 alternatives, so relatively low cross-elasticity to  
11 alternatives. That would tell me, okay, then we'd  
12 have to know -- getting to Michael's point -- what  
13 really are the tradeoffs? You know, was this really a  
14 network management issue, and was it being managed in  
15 return for higher valued uses?

16 If there really was no scarcity and that was  
17 a pretense, then we fall into a competition question  
18 and we would be in the realm of asking an antitrust  
19 question.

20 MS. MUNCK: Anyone else have anything?

21 MR. BLUMENTHAL: Just a couple of other  
22 thoughts. The first is I think we'd want to know what  
23 do we mean by "support" or "discontinuation of  
24 support?" Those terms can mean a lot of different  
25 things in this context.

1 MS. MUNCK: Yeah, I think the hardest sort  
2 of fact pattern would be if they just blocked it.

3 MR. BLUMENTHAL: So just clearing and  
4 treating it as if it were totally undifferentiated,  
5 and then versus blocking. So, you know, in that case,  
6 I think we get down to Howard's analysis, but I think  
7 I would say two other things. The first, picking up  
8 on Mike's point, is that in terms of the legal  
9 standard here, this is the sort of hypothetical where  
10 a "no economic sense" test probably makes sense.

11 You know, the law hasn't completely alighted  
12 on that, but it's been sort of moving in that  
13 direction since, what, the late 1990s. And, you know,  
14 that's probably the standard that at least I would  
15 think of as being the one that you would bring to bear  
16 in thinking about these issues.

17 The other thing I would --

18 MS. MUNCK: Yeah, but how would you apply  
19 that here? How would you --

20 MR. BLUMENTHAL: Well, that's always the  
21 issue with the "no economic sense" test, and, you  
22 know, DOJ has been hung up on that for -- you know,  
23 since the 1990s. I mean, that was one of the big  
24 issues in the monopolization report and the back-and-  
25 forth on the monopolization report a decade ago.

1 MS. MUNCK: Yeah.

2 MR. BLUMENTHAL: The other thing I would  
3 observe is -- I mean, sort of linking this back to the  
4 issue of paid prioritization, right, I mean,  
5 videoconferencing isn't exactly telepresence. But,  
6 you know, telepresence is sort of the classic  
7 illustration of a circumstance where it's really  
8 expensive -- you know, expensive not for the consumer  
9 necessarily, but it's expensive to run over a well-  
10 defined network. And if you have -- if you have  
11 financing for it built in, then suddenly it alters the  
12 analysis of something like this completely.

13 I mean, to me, this hypothetical is the  
14 perfect illustration of why it is that banning  
15 differential pricing potentially is anticonsumer.

16 MS. MUNCK: Can you explain that a little  
17 bit more in terms of what you're thinking of with  
18 respect to differential pricing? Where would the  
19 differential pricing come in in this hypothetical?

20 MR. BLUMENTHAL: Well, it could come in in  
21 any of a number -- I mean, Michelle has been nodding  
22 her head up and down, so I'm glad to cede the floor to  
23 you, but, I mean, presumably -- I mean, ultimately,  
24 the incidence of it ultimately is going to depend on  
25 sort of elasticities just to run everything through.

1 But in the first instance, I would think that the  
2 pricing structure probably would involve some sort of  
3 payment by the app to the ISP seeking a -- in a sense,  
4 indemnifying the ISP for the extraordinary expenses  
5 they're facing in dealing with the data.

6 MS. MUNCK: Okay, so there would be -- there  
7 would be an assumption that the -- if I understand you  
8 correctly -- that the videoconferencing app was paying  
9 the ISP in exchange for the extra data usage.

10 MR. BLUMENTHAL: Yeah. Now, presumably,  
11 some of this is ultimately channeling through to the  
12 consumer as well.

13 MS. MUNCK: Right, right.

14 MR. BLUMENTHAL: So how it all ultimately  
15 sorts out could be any of a number of different ways,  
16 but that's how I think the flow of funds probably  
17 would work.

18 MR. KATZ: Just one thing on that. I mean,  
19 some of these issues are coming up is sort of  
20 fundamental question I think about how much ISPs rely  
21 on pricing versus network management and various sort  
22 of quantity restraints, because if the ISP were  
23 pricing to consumers on a traffic-sensitive basis,  
24 then arguably this issue wouldn't come up at all. You  
25 would just say, fine, if they want to do it, they can

1 pay for it.

2 So, I mean, I think that's -- I think -- may  
3 increasingly be an issue. And I think it's one thing  
4 also to put to the ISP. It says, okay, if you're  
5 offering everybody all-you-can-eat, unlimited service,  
6 then how are you at the same time telling us that you  
7 have all these capacity issues? And they may have  
8 explanations for that, but I think that is something  
9 you'd want to explore.

10 MS. MUNCK: Yeah. Jon.

11 MR. SALLET: Yeah, so, a couple of antitrust  
12 doctrines that come to mind here. One is -- and this  
13 may be how the hypothetical was created -- it has some  
14 resemblance to Aspen Skiing, right? Remind me if I  
15 get this right. But two ski operators, one with three  
16 slopes, one with one, they've worked together jointly  
17 for some period of time. The one with three says to  
18 the smaller one, no go, no more unified passes.  
19 Importantly to the court's decision, refuses to allow  
20 the joint pass, even if the smaller ski slope pays  
21 retail, right?

22 So that may be a "no economic sense" test,  
23 right? It's just, why would they give up the revenue,  
24 except for the predatory or exclusionary goal? But  
25 the other aspect of Aspen Skiing that people talk



1 about is some notion of reliance. In other words,  
2 that the business was engaged in this for some period  
3 of time. The two years is an interesting question,  
4 right? Because it's in the past, is it long enough?  
5 We don't really know. But it's a question that I  
6 think arises here.

7 The second theory question that I think  
8 arises has to do with the scope of Section 5, right?  
9 I mean, I think Howard is right. One looks at  
10 downstream harm to users -- let's just call them  
11 consumers just for the moment -- to consumers if it's  
12 a perfectly competitive market or if nobody actually  
13 cares about videoconferencing. But Howard ended with  
14 rightly saying imagine that the ISP has significant,  
15 big market share, and the consumers want it. And  
16 there's consumer harm because competition is being  
17 limited. A rival is being disabled in coming to the  
18 market.

19 Well, that poses a serious competition  
20 question. One might use the "no economic sense" test  
21 that the Justice Department has been advocating under  
22 the Sherman Act. One can look under Section 5, and  
23 there's scholarship that supports this notion to ask  
24 whether an entity with market power engaging in  
25 conduct that affects a different market but disabling

1 competition has acted with an unfair method of  
2 competition.

3 And if there's no real rationale for the  
4 conduct, and if there's going to be consumer harm,  
5 then that would seem that it might qualify under the  
6 Sherman Act. But if it didn't, it might be a fit  
7 place to apply Section 5.

8 MR. BLUMENTHAL: Yeah, but this isn't Aspen.  
9 This is Official Airline Guides, right? I mean, Aspen  
10 -- you know, Aspen had the character -- if the ISP  
11 itself was already in the space to a limited degree --

12 MS. MUNCK: Actually, maybe we should go to  
13 the next hypothetical.

14 MR. BLUMENTHAL: Okay.

15 MR. MUNCK: Right? Because I think -- the  
16 "what if?" So we have a hypothetical one and then we  
17 have a "what if?" So I want to get this on there.

18 Right, so the question is what if they had  
19 been supporting the videoconferencing application for  
20 two years, including their own service, now that their  
21 own service is more established, they discontinue  
22 support. So it's not exactly Aspen Skiing, but I  
23 think it kind of gets to what you were raising.

24 MR. BLUMENTHAL: So that's the key  
25 difference. I mean, the first one was OAG. This is

1 getting closer to Aspen. And, you know, I mean, you  
2 know -- I mean, Aspen, for that matter the sort of an  
3 overlay of Lorain Journal in this is certainly --  
4 there's certainly an Otter Tail aspect to this. So,  
5 you know, tougher case.

6 MR. SHELANSKI: Yeah, let me jump in on  
7 that. I mean, I think this is actually the case  
8 that is probably of most interest when we're thinking  
9 about network neutrality. We can talk about all the  
10 what-ifs but really what the concern is about is  
11 exactly this case. And maybe there weren't multiple  
12 videoconferencing applications for two years, but  
13 the -- you could tweak this a little bit. The ISP  
14 was the innovator.

15 MS. MUNCK: Right.

16 MR. SHELANSKI: And then you had superior  
17 alternatives, or at least alternatives coming in,  
18 asking for carriage and getting discriminated against,  
19 downgraded, or outright blocked. And I think these  
20 are really the hard questions. And I think that when  
21 we are talking about the institutional setting of  
22 enforcement in broadband, this is really -- this  
23 really pushes the issue of whether ex post authority  
24 can work. And I think there are two aspects to that  
25 question, okay?

1           One aspect of the ex post authority is can  
2 we identify the problems and remedy them quickly  
3 enough if we had the legal authority to intervene?  
4 Okay? So I think there, they're going to be people  
5 who differ on those views. We heard on the last panel  
6 Gigi being very concerned, for example, about time.  
7 And you can't -- you can't identify these problems and  
8 move quickly enough.

9           You know, if that's the case, that may be  
10 something that drives you more towards ex ante. I  
11 actually think that there's a pretty good track  
12 record, and I think, Suzanne, you were defending the  
13 agency on this. And as a former agency person I'm  
14 going to join you in defending. I do think that there  
15 is the ability to identify problems.

16           And then you've got injunctive relief going  
17 forward for all that kind of problem. Here is the  
18 question, though: Under what theory do you go after  
19 this? And I think Jon has really sort of hit on  
20 something that is tricky. Aspen today, as we sit  
21 here, is good law on its facts. Its facts very, very  
22 rarely come up. And its facts are up for  
23 consideration right now in the Seventh Circuit in the  
24 Comcast-Viamedia case.

25           So -- and if I were to look back to Trinko

1 and channel Justice Scalia -- and by the way,  
2 virtually the entire Court that sided with him in that  
3 case -- I would say, well, right now, I don't think  
4 Aspen really has much viability if it goes up to the  
5 Supreme Court. So refusal to deal as an antitrust  
6 theory under Section 2 is, I think, on very thin ice.

7 MR. SALLET: Of course, Howard, if Justice  
8 Scalia's dissent in Brand X had been adopted by the  
9 Court, we wouldn't have this problem.

10 MR. SHELANSKI: I think that's actually  
11 quite right. That's exactly right. Let me go back,  
12 though, to the Section 2 -- because then we would have  
13 the enforcement authority under the broader standard  
14 of the FCC --

15 MR. SALLET: Right, right.

16 MR. SHELANSKI: -- but we don't. So now  
17 we're back in FTC land. Section 2, this is going to  
18 be a very questionable kind of claim, I think, going  
19 forward. So I think there is a reasonable question to  
20 ask, what does Section 5 buy us? If refusal to deal  
21 under this what-if hypothetical is at the outer  
22 boundary of Section 2, as the Supreme Court said in  
23 Trinko, then I think we have a serious question about,  
24 okay, that boundary could shift. Does Section 5 buy a  
25 little bit more margin for that boundary, and is there

1 a theory that the FTC can articulate under Section 5?

2           There are advantages to doing that. You get  
3 more scope under Section 5 because there isn't a  
4 private right of action. The courts have held that  
5 you go beyond what is cognizable under Section 1 and  
6 Section 2, at least the authority does. So you could  
7 conceivably -- and there's not fining authority, okay,  
8 at least for these kinds of actions. So you -- you  
9 actually are in a perhaps lower harm realm for  
10 innovation in what constitutes harm, where you can  
11 have injunctive relief going forward -- don't do this  
12 -- that doesn't lead to follow-on private actions.

13           So I guess there is a question of whether  
14 Section 5 can get at this in a way that is undergirded  
15 by a meaningful competition theory, a deceptive or  
16 unfair action that is well articulated and that  
17 doesn't open up the floodgates for, let's say, a less-  
18 well-considered set of actions every time somebody  
19 doesn't want to deal with a competitor because there's  
20 a lot of, I think, value in what the courts have said  
21 about the hazards of mandatory dealing with rivals.

22           MS. MUNCK: And, actually, I think that --  
23 I'm glad that you guys are digging in so much on this  
24 hypothetical. We have another hypothetical that isn't  
25 in the blocking context but more is in the throttling

1 context, and maybe this is a good time to move on to  
2 that one.

3 MR. KATZ: Can I just say one thing about  
4 Section 5, though? If what happens to you in the end  
5 is you're told to stop what you were doing and that's  
6 all that happens to you, I have to say, then, I do  
7 have sympathy for the people who start advocating for  
8 net neutrality because if you're talking about these  
9 things, about trying to kill off entrants, why not  
10 try, right? I mean, and if it takes several years to  
11 do it -- I mean, the one thing about treble damages  
12 and follow-on private suits is it can make it  
13 extremely expensive, even though you may kill off the  
14 entrant, you may be living with the consequences for a  
15 long time. Here, if we win, they're gone. If we  
16 lose, okay, they're here.

17 MR. SHELANSKI: Yeah, I guess my answer to  
18 that would be there's nothing that requires the  
19 entrant to be dead, right? I mean, the point is, you  
20 would come in and say, hey, we're suddenly getting cut  
21 off, and the FTC can say, all right, let's find out  
22 what's going on. And you go in. You get an  
23 injunction against -- you know, against -- while you  
24 figure that out --

25 MR. KATZ: But that's the thing, you need to

1 get the injunction early on. I guess that's --

2 MR. SHELANSKI: Oh, absolutely.

3 MR. KATZ: You need to get it up front.

4 MS. AMBROGI: And I just have a quick  
5 question on the Section 5 authority because it's  
6 something that we have heard mentioned several times  
7 today in the antitrust sphere, as well as in the  
8 consumer protection sphere, and that is something that  
9 Howard alluded to. Is there -- for those who are  
10 advocating for its use, is there a limited category of  
11 conduct that those who are advocating for would say  
12 that it should apply to, in light of the Commission's  
13 2015 statement on Section 5, and in light of the  
14 Commission's recent standalone actions only applying  
15 to invitations to collude?

16 MR. SALLET: So I think the 2015 statement  
17 is a good way to think about it, right, because as I  
18 understood the Commission statement, it was basically  
19 endorsing a rule-of-reason approach. And I think the  
20 question of Section 5 in this context, assuming the  
21 market structure plays out in a way that there's a  
22 meaningful competition question is just that. Is  
23 there harm being done to competition through an  
24 intentional act by the ISP that has little or no  
25 procompetitive benefit?



1           In other words, there might not be monopoly  
2   power under Section 2. There might not be the basis  
3   for an attempted monopolization claim under Section 2.  
4   But what we're looking for here is harm to  
5   competition. And if there is harm to competition,  
6   then I think it's a serious question for the FTC, and  
7   I think consistent with the 2015 statement that --  
8   that Section 5 be considered.

9           I mean, after all, invitation to collude, to  
10   just open it up slightly, is unfair under Section 5  
11   despite the absence of the kind of agreement that  
12   Section 1 of the Sherman Act requires. So it's an  
13   extension because the threat of competitive harm is so  
14   close to what would be accomplished were there an  
15   agreement.

16           Well, here, one would be saying if the same  
17   kind of competitive harm results, even if some of the  
18   criteria -- and the significant market power and  
19   limited competition -- then the strictures of Section  
20   2 shouldn't limit Section 5 any more than the  
21   strictures of Section 1 would preclude enforcement  
22   against invitations to collude.

23           MS. AMBROGI: Great. Let's move on to the  
24   second hypothetical. An ISP has 60 percent market  
25   share in the relevant market. It does not provide a

1 voice over internet protocol service but several  
2 providers offer over the top available via the ISP.  
3 The ISP enters into a contract with a VOIP provider  
4 who pays a fee to the ISP in exchange for preferred  
5 network management. A public interest group files a  
6 complaint with the FTC that customers of the over-the-  
7 top VOIP services are experiencing service  
8 disruptions.

9 So similar kickoff to Hypothetical 1, is  
10 this conduct that generally the antitrust laws should  
11 be concerned about?

12 MR. BLUMENTHAL: Well, if I were thinking of  
13 defending this, I think the first thing I would want  
14 to be talking about would be that 60 percent share and  
15 what you have in the denominator, because if it's  
16 voice service you're talking about, it's not clear to  
17 me that, you know, that these things don't compete.  
18 You know, the fact that somebody has -- you know, even  
19 if -- even if it's a well-defined 60 percent of last  
20 mile to the home, for purposes of voice service, I  
21 think we would want to think pretty hard about what  
22 the right -- the right market is.

23 MR. KATZ: And I also say if you get past  
24 the issue of the market power screen, I think a  
25 central question would be do they offer these contract

1 terms to everybody? Because I don't think you want to  
2 look in terms of discrimination being defined as you  
3 get unequal outcomes. It's usually you want to look  
4 at with discrimination unequal opportunities.

5 MR. SHELANSKI: I would want to know what --  
6 this is phrased very passively. OTT VOIP services are  
7 experiencing service disruptions. Mistakes were made.  
8 The question is why? Are they experiencing it because  
9 of network congestion? In which case, it's perfectly  
10 logical for a VOIP provider to pay for some assurance  
11 that there won't be disruptions because VOIP service  
12 isn't terribly useful if you get a lot of disruptions.

13 So is this something that is happening just  
14 because of traffic jams rather passively? Or is the  
15 network creating service disruptions for those VOIP  
16 providers in a discriminatory way? I think those are  
17 two very different things from -- in terms of their  
18 relevance for the competition.

19 MS. AMBROGI: Well, as in a lot of these,  
20 the cases that we look at, there's often a benign  
21 explanation and then, you know, you have to dig deeper  
22 to see whether that explanation is actually borne out  
23 by the facts or whether there's a -- it's a pretext  
24 for something else. And that's another question that  
25 I would say, you know, for folks, you know, who are

1 familiar with the technology or the industry, and how  
2 is that something that, you know, a fact finder would  
3 get to the bottom of?

4 MR. SALLET: You know, I think -- so Bill's  
5 point about product market is an excellent one.  
6 That's the one to start. But let's just assume that  
7 there's some limited product market here, just to make  
8 the conversation more interesting. I think one of the  
9 questions one would want to know is what does it mean  
10 to have preferred network management? I think I'm  
11 picking up on something that Howard said. If not, I  
12 apologize to Howard.

13 But the question is sort of what is  
14 happening on the network? Is there -- so, look, I  
15 know everybody doesn't like this phrase, everybody  
16 else on the panel, but when the FCC adopted its rule  
17 on paid prioritization, its underlying logic was that  
18 if there was value to be given through paid  
19 prioritization, it's because there was congestion on  
20 the network. Therefore, there was something that was  
21 worth paying to avoid.

22 And, by the way, the avoidance was going to  
23 make the congestion for everybody else worse. That  
24 was the theory, okay? The theory could be examined  
25 here. And I do think the underlying nature of what's

1   happening on the network would be important to  
2   understanding what's being offered, what's the value  
3   that's being conveyed? What's the purpose for which  
4   the preference is being given?

5           The second aspect to it is there is  
6   something here of the FTC's consumer protection  
7   jurisdiction, right, because the notion here is that a  
8   public interest group files a complaint saying that  
9   service disruptions are occurring. I don't think we  
10   should spend a lot of time on it, because it's a  
11   competition panel, but I think it's important to note  
12   that the FTC, with both pieces of jurisdiction, may  
13   find that there are instances where they both apply,  
14   and this hypothetical could be one.

15           MS. CONNOLLY: I just want to kind of  
16   reiterate that notice both of these hypotheticals get  
17   back to some notion of paid prioritization and the  
18   idea that if the problem is congestion, paid  
19   prioritization can be an optimal way for the services  
20   who find it necessary for their business model to  
21   achieve a certain outcome.

22           And I certainly agree with Michael that this  
23   would be an issue more that, you know, are they  
24   offering that option to everyone. But in a market,  
25   the idea is you should be allowed to offer different

1 products or different services at different prices.  
2 That's not inherently wrong. And when there's an  
3 assumption that you're inherently harming others,  
4 you're also making an implicit assumption that there's  
5 no endogeneity in terms of your investment, that this  
6 -- that profitability may not change how much capacity  
7 you invest in.

8 So the idea that you can't allow a market to  
9 create success on one side because that inherently  
10 implies failure in another, that's not accurate.

11 MR. SALLET: Can I say, Michelle if I can,  
12 that wasn't the theory that the FCC acted on. It  
13 acted on the notion that there was a factual record.  
14 And people -- one can debate the fact.

15 MS. CONNOLLY: I would argue that the 2015  
16 Open Internet Order was not based on a factual record.  
17 I, in fact, read through it very closely, and I can  
18 tell you that there were very few facts.

19 MR. SALLET: I read it a little myself, and  
20 I saw a lot of facts.

21 MS. CONNOLLY: Yeah, a lot of time on this.

22 MS. AMBROGI: And I hate to cut people off,  
23 but mindful of the fact that we only have 15 minutes  
24 left.

25 MR. KATZ: Holding aside the order, just let

1 me agree with Michelle on that, but let's suppose the  
2 facts were that there's just, you know, a fixed number  
3 of bits they're going to be able to to send over in  
4 some time period, using the price system to allocate  
5 them and then saying the people who pay more get more  
6 is the virtue of the price system and that's how it  
7 works to get efficient allocations.

8 Now that's not to say there couldn't be a  
9 problem. And I think if one thought about applying  
10 the "no economic sense" test you might look and ask,  
11 okay, why are they experiencing service disruptions,  
12 and if they're doing it just because there really is a  
13 scarce capacity and it's being reallocated, I don't  
14 see that as a problem.

15 On the other hand, I think what some people  
16 have worried about is that the ISP would actually take  
17 actions where they would spend money to degrade the  
18 service. And the only reason you would be doing that  
19 is because it would be harming competition in a way  
20 that the other VOIP provider would pay for it and that  
21 would be a problem. So I think we also want to -- we  
22 need to unpack some of what's in the FCC's theory,  
23 when is just sort of what I would think is efficient  
24 resource allocation, but some people don't like that,  
25 versus when is it that they really are taking actions.

1                   And that's where I think we see that in the  
2   investment debate, too, as Michelle brings up, the one  
3   that says, look, you can invest in more capacity.  
4   There are people who have gone on and said, well, we  
5   think actually you are supporting the view Jon has  
6   that we think they're going to invest less in capacity  
7   in order to disadvantage the other VOIP providers.

8                   MS. AMBROGI: So if we continue on to our  
9   tweak to this hypothetical, which is what if the ISP  
10  prevents customers from using the over-the-top VOIP  
11  services all together, does that change folks'  
12  thoughts?

13                  MR. KATZ: Do you mean other than the one  
14  that paid them?

15                  MS. CONNOLLY: There are several.

16                  MR. KATZ: Just to be clear.

17                  MS. AMBROGI: Right, the alternative ones.  
18  So now they have an arrangement with one VOIP provider  
19  but no other VOIP providers. It's not simply that  
20  it's degraded but that they're not permitted on the  
21  network.

22                  Well, let may ask another question.

23                  MR. KATZ: Well, I mean, if you want -- I  
24  was going to let somebody else go, but on the -- I  
25  mean, that one, I think you'd have to -- I mean, it



1 seems suspicious on its face, but you'd want to  
2 understand what's the reason for having an exclusive  
3 relationship. And again to be a bit of a broken  
4 record, have you thought about doing this under the  
5 "no economic sense" test, you'd say, well, wait, why  
6 does it make sense not to have your customers have  
7 access to a whole bunch of VOIP providers? Wouldn't  
8 that make them more willing to pay for broadband  
9 service?

10 So either they're going to have to say,  
11 well, it turns out all the other ones have some  
12 incredibly inefficient technology that unduly  
13 burdens us and we'd be happy for them to be on if  
14 they could meet these standards, which I think is  
15 unlikely to be the case here, or they could say,  
16 well, it turns out -- I mean, this one, I think it's  
17 hard to say. If you could come up with something,  
18 some sort of specialized investment maybe, but I  
19 think this one seems pretty suspicious.

20 MS. AMBROGI: So to ask a legal question,  
21 assuming that the ISP here clearly had market power in  
22 an appropriately defined relevant market and this was  
23 an exclusive deal, assuming there was a cognizable  
24 basis for antitrust concern, what are the merits of  
25 bringing this as a Section 2 versus a Section 1 case?

1 Is there any approach to one versus the other that  
2 folks would comment on?

3 MR. SALLET: Well, just -- right, I assume  
4 that you picked 60 percent because the case law under  
5 Section 2 is uncertain as to whether that constitutes  
6 a monopoly share under Section 2, right? I mean, just  
7 to give the case law, a general understanding is 70,  
8 75 percent is sufficient. The cases don't say it  
9 can't be lower, right? So one could assert that.  
10 And, right, and market power can exist at lower shares  
11 of the market as exemplified by Michael's excellent  
12 testimony in the American Express case, which the  
13 Supreme Court sadly failed to give due regard to.

14 But so the advantage of Section 1, just  
15 axiomatic for antitrust lawyers, is all it requires  
16 is an agreement in order to invoke the, let's say,  
17 rule-of-reason test. And it avoids the need to debate  
18 the monopoly share. Now, that's a reason why many  
19 people -- many plaintiffs prefer Section 1 as a way to  
20 go forward. It doesn't mean that there isn't rigor in  
21 Section 1, but it does mean this particular question  
22 doesn't have to be answered.

23 MS. MUNCK: Terrific. Well, let's move on  
24 to our third hypothetical, which I will -- also has a  
25 60 percent share, but if you want to take it in terms

1 of a 70, 75, please go ahead.

2 So here we have an ISP and a content  
3 delivery network, who each, as I say, have 60 percent  
4 share of the relevant markets. The ISP and the CDN  
5 enter into a merger agreement. There is no direct  
6 overlap between the services offered by the merging  
7 parties. However, the ISP plans to integrate the CDN  
8 service into its network and only offer the CDN  
9 content to its customers.

10 MR. SHELANSKI: Well, I don't think the 60  
11 percent hurdle is as significant in Section 7 as it is  
12 Section 2, so we're in the merger context here. And I  
13 think we're in a fairly conventional, you know,  
14 vertical merger context. You know, looking at these  
15 facts on on its face, this would be enough for me to  
16 have some concern.

17 And so then we go to the typical kind of  
18 balance one does, I think in a -- you know, there's a  
19 lot more we're going to need to know here about what  
20 else is out there in the market, you know, what are  
21 the other CDNs. But I think we'd go into -- I think  
22 there'd be enough here to say let's not just presume  
23 the efficiencies of, you know, eliminating double  
24 margins, et cetera, and other kinds of technological  
25 efficiencies that might emerge and walk away from

1     this.

2                   I think you'd say, look, 60 percent, that's  
3     pretty significant, on both ends of this. What kind  
4     of competitive effects are we potentially having at  
5     both levels of the market? Are we not going to let  
6     other ISPs have access to this highly -- presumably  
7     highly desirable content?

8                   MS. MUNCK: Yeah.

9                   MR. SHELANSKI: On the other side of it, are  
10    we not going to let other CDNs have access to our  
11    clearly highly desirable content? So I think here you  
12    have some -- enough facts to say there's some real  
13    concern about the horizontal effects of both levels of  
14    the market that are at issue here. And you'd  
15    investigate those tradeoffs, obviously with less  
16    suspicion than you typically do in a horizontal merger  
17    because there is probably a stronger efficiencies  
18    case. But we want to look at that hard.

19                  And then I think we'd want to look at all of  
20    the I think more sophisticated ways we have been  
21    developing over the past 20 years, to start looking at  
22    vertical mergers and the economic tools that you bring  
23    to bear there. You do the vertical arithmetic, you'd  
24    look at the bargaining, and you'd see where that takes  
25    us. And Judge Leon and you know, notwithstanding, I

1 think the bargaining theory, has good economic  
2 foundations and is something that I would want to  
3 bring in and at least see how it played out here.

4 MR. BLUMENTHAL: So I'd like to see the  
5 routing diagram, please, because I don't understand  
6 why an ISP on these facts would offer only the CDN  
7 content to its customers. I mean presumably the CDN  
8 has -- you know, it may be an important CDN, but there  
9 are a lot of others out there, and the ISP, I think,  
10 would be highly disadvantaged.

11 MS. MUNCK: I think it's -- yes.

12 MR. SHELANSKI: But that goes to the  
13 incentive question.

14 MR. BLUMENTHAL: That gets to the incentive  
15 question.

16 MR. SHELANSKI: But you're already  
17 investigating that.

18 MR. BLUMENTHAL: Yeah. But I mean, you  
19 know, in a sense I'm -- I guess I'm suggesting that,  
20 as phrased, I'm not sure that the hypothetical makes  
21 complete sense. I mean, you know, the next thing I'd  
22 want to know is when we talk about the 60 percent  
23 share for the ISP, what are we looking at there? Is  
24 it -- you know, is it because, you know, for an awful  
25 lot of the households there are two lines running in,

1 it can go with this ISP or they can go with somebody  
2 else, in which case it's easy enough if you start  
3 saying, well, you know, I'll give you, you know, the  
4 content that's cached with this CDN. You know, it's  
5 easy enough for them just to route to a different ISP.

6 MS. MUNCK: If you went to the other ISP,  
7 you wouldn't have access to the CDN's content.

8 MR. SALLET: I have to do this because  
9 everybody who's ever worked with me knows I'm  
10 obsessed with the misuse of "only," and I'm afraid  
11 this is an example. Does this mean offer the CDN  
12 content to customers only --

13 MS. MUNCK: Yes.

14 MR. SALLET: -- or does this mean offer its  
15 customers only the CDN content?

16 MS. MUNCK: No, it means offer the CDN  
17 content to its customers only.

18 MR. SALLET: Okay. But -- so then the  
19 question is what that means because the whole thing of  
20 CDNs is they're running mirrors and caches, so are you  
21 saying that it would not offer the CDN services to  
22 other -- I mean, it's not that you're going to block  
23 the content; it's you're blocking the CDN service to  
24 other ISPs.

25 MR. BLUMENTHAL: And why wouldn't the

1 service -- you know, why wouldn't the content provider  
2 that's hosting on the CDN simply flip to a different  
3 CDN?

4 MS. MUNCK: These are all questions that we  
5 want you to -- when we circulated this, yeah, a couple  
6 of weeks ago, this is what we were wanting to get  
7 into.

8 MR. KATZ: I think one of the things you're  
9 probably hearing is this is a market where we might  
10 think the market -- you'd really want to know where  
11 the market shares are coming from, and it would be  
12 pretty -- there is reason to think they would mean  
13 less here than in most markets because you'd think  
14 things would just switch so quickly, given the nature  
15 of the customers.

16 MR. SALLET: Well, could I just suggest, so  
17 these all great questions, but just take for a moment  
18 that we are investigating harm. This hypothetical has  
19 some overlap with the kind of analysis that the  
20 Department of Justice did in the Comcast-Time Warner  
21 cable merger. It's not exactly the case because here  
22 there are two entities and two different markets.

23 In that case there were two ISPs that at  
24 least from a local customer's perspective were never  
25 in the same market, but they were in the same line of

1 business. But what I think was important about the  
2 DOJ analysis there, and Howard mentioned it so I just  
3 want to draw it out, is that what one would be  
4 investigating, assuming there were a theory of harm,  
5 is whether there's an increase in bargaining leverage,  
6 right?

7 And Michael will tell me if I get the  
8 terminology wrong, but I mean by bargaining leverage  
9 not efficiencies in bargaining, bargaining power,  
10 which there can be -- a bigger buyer might be able to  
11 get volume discounts, that too smaller buyers don't  
12 get -- but is there some increase in the ability to  
13 gain an outcome that comes as a result of the  
14 combination that isn't because of some increased  
15 inefficiencies in the bargaining?

16 I think the merger cases that I mentioned at  
17 the beginning which found, looked -- yeah, generally  
18 concluded either to staff or principals level that  
19 there'd be a substantial lessening of competition,  
20 were generally bargaining cases. And there is a lot  
21 of discussion about bargaining theory and about terms  
22 that I don't understand like concavity, which I've  
23 always thought was one of the cats in the T.S. Eliot  
24 book of poems, but it is really an important topic for  
25 conversation.



1           So I just mean to flag that I think were the  
2   hypothetical to be followed all the way through, we  
3   would find ourselves into interesting conversation  
4   about when and how combinations lead to greater  
5   bargaining leverage, and therefore can diminish  
6   competition by harming the competitive process.

7           MS. MUNCK: That's great. So we have about  
8   two minutes left. I think instead of moving on to the  
9   next hypothetical it's probably better to ask each of  
10   you if you have closing thoughts or statements of  
11   things that the FTC should be thinking about as we are  
12   exploring antitrust cases in broadband markets.

13          MR. SHELANSKI: My only recommendation would  
14   be to assume the hard cases are the ones that are  
15   going to come to you and think in advance about what  
16   the theoretical underpinnings would be of the theories  
17   of harm and the extent to which you can line those up  
18   with current antitrust doctrines or a principled kind  
19   of cabined limited Section 5 theory.

20          All the other cases that come up are going  
21   to be relatively conventional, I think, kinds of  
22   antitrust analyses. It's the harder versions of all  
23   of these that are the ones that are just going to test  
24   authority, but test whether there is something in  
25   existing doctrine that can get at those, and also to

1 help to understand, you know, what is the analysis you  
2 would use, what is the market analysis you would do in  
3 deciding if there is a problem and then what is the  
4 theory on which you would remedy it. And I would  
5 start with the hard cases.

6 MS. MUNCK: We can go in order, I guess.

7 MR. BLUMENTHAL: I'd be careful about using  
8 Section 5. It's not a holy grail. I mean, a lot of  
9 people talk about it as if it's, you know, pretty  
10 open-ended. And but even the 2015 statement has not  
11 been well tested in the courts. And I would be trying  
12 to fit things into 1-2-7. If you can't fit it in  
13 there, the boundaries of Section 5, I think, are  
14 pretty limited.

15 The one other thought I would offer, you  
16 know, there have been a few suggestions today about  
17 regulations. Good regulations are really tough to  
18 write. I mean they're really tough to write. And I  
19 suspect that in the time it would take to get  
20 sensible, thoughtful regulations in this sector, 5G's  
21 going to roll out. And I would kind of be waiting to  
22 see what happens with that before I start a regulatory  
23 regime.

24 MR. SALLET: I just know one thing, we've  
25 been talking about broadband, but we ought to note

1     that for the very large broadband providers, they tend  
2     to be delivering what we could call cable TV video  
3     packages. And that's important in understanding the  
4     incentives and abilities of the companies.

5             I think the DOJ consent decree in the  
6     Charter-Time Warner cable merger was very important  
7     because it looks at programming contract terms --  
8     MFNs, so called ADMs -- to see whether there's a  
9     disabling of an online rival through a programming  
10    agreement that affects what can come over the  
11    broadband pipe as a rival to the incumbent video  
12    services.

13            So I think having an understanding of the  
14    full nature of the business model and thinking about  
15    these kinds of contractual terms would be very useful.

16            MR. KATZ: All right, so I will keep it  
17    really short and mention the Hypothetical 4, which is  
18    the two IP platforms that have their own private  
19    networks and then think about going to the public. I  
20    think to echo the last thing Jon said, it's really  
21    important to look at these issues very broadly, to  
22    look at the entire ecosystem and its, you know,  
23    platforms interacting with platforms with platforms.

24            And we heard this come up at various points  
25    about, well, wait a minute, in relevant markets, it's

1     going to be -- you've got to think really carefully  
2     across the products that could be substitutes. And so  
3     I would just say I think it's important to try to get  
4     a really broad picture of what's going on because of  
5     the way these different pieces interact, and to avoid  
6     letting labels then drive outcomes as opposed to  
7     looking at the actual economic and business functions.

8                 MS. MUNCK: Wonderful. Well, thank you very  
9     much for your time today. Please join me in thanking  
10    the panel and thanking all of our panel speakers.

11                (Applause.)

12                MS. MUNCK: This concludes the end of  
13    Hearing Number 10. Our next hearing will be March  
14    25th and 26th, where we will look at the FTC's role in  
15    a changing world. And that hearing will take place at  
16    the FTC headquarters. Thank you very much.

17                (Hearing concluded at 5:47 p.m.)

18

19

20

21

22

23

24

25

## 1 CERTIFICATE OF REPORTER

2

3 I, Linda Metcalf, do hereby certify that the  
4 foregoing proceedings were digitally recorded by me  
5 and reduced to typewriting under my supervision; that  
6 I am neither counsel for, related to, nor employed by  
7 any of the parties to the action in which these  
8 proceedings were transcribed; that I am not a relative  
9 or employee of any attorney or counsel employed by the  
10 parties hereto, not financially or otherwise  
11 interested in the outcome in the action.

12

13

14

15



16

LINDA METCALF, CER

17

Court Reporter

18

19

20

21

22

23

24

25