Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of	)	
	)	
Reply Comments- NBP Public Notice #1	)	GN Docket Nos. 09-47, 09-51, 09-137
Comment Sought on Defining "Broadband"	)	
	)	

REPLY COMMENTS OF FIRSTMILE.US

Introduction

FirstMile.US[1] is 501c3 nonprofit organization headquartered in California. Since 2005, our mission has been to educate and advocate regarding the promise of big broadband in the United States. Our vision is that every member of the American public has access to big broadband, the 21st century pathway to a better overall quality of life.

Because the FCC sought targeted comments on technical aspects of the definition of broadband, FirstMile.US reached out informally to the technical network community to gather their comments and responses. FirstMile.US created a survey utilizing the SurveyMonkey.com toolset. Survey notification was done via email lists, direct email, Twitter, Facebook and LinkedIn. The survey was available online from August 31, 2009 through September 7, 2009.

The survey mechanism was informal (and, therefore, not scientifically valid) but provides a useful set of comments that are summarized below. FirstMile.US encourages the FCC to take these comments seriously as a reflection of the technical network community. 134 individuals responded with 105 individuals self-identifying as "super network tech" or "average network tech."

FirstMile.US leaves it to the FCC to determine draw their own conclusions based on the survey responses. The survey summary is included below. The survey encompassed 14 questions based on the FCC NBP Public Notice.

[1] FirstMile.US. <http://www.firstmile.us>

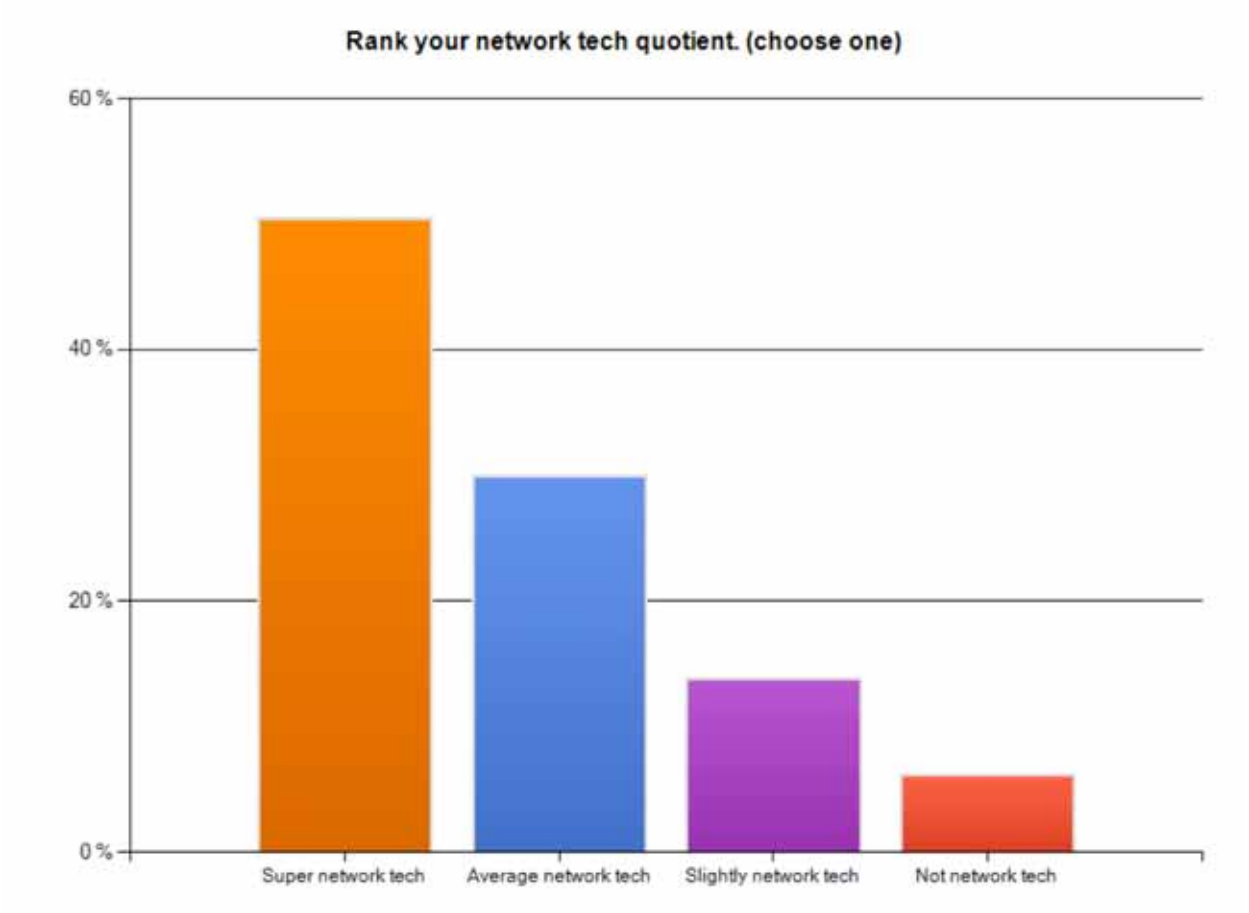
Survey Questions and Answers

1. Please enter your name and email. This will NOT be disclosed to any outside parties. It is only for use of FirstMile.US to follow-up with you regarding the submission (and get you a copy of the final results.)

131 answered question, 3 skipped question

2. Rank your network tech quotient. (choose one)

131 answered question, 3 skipped question

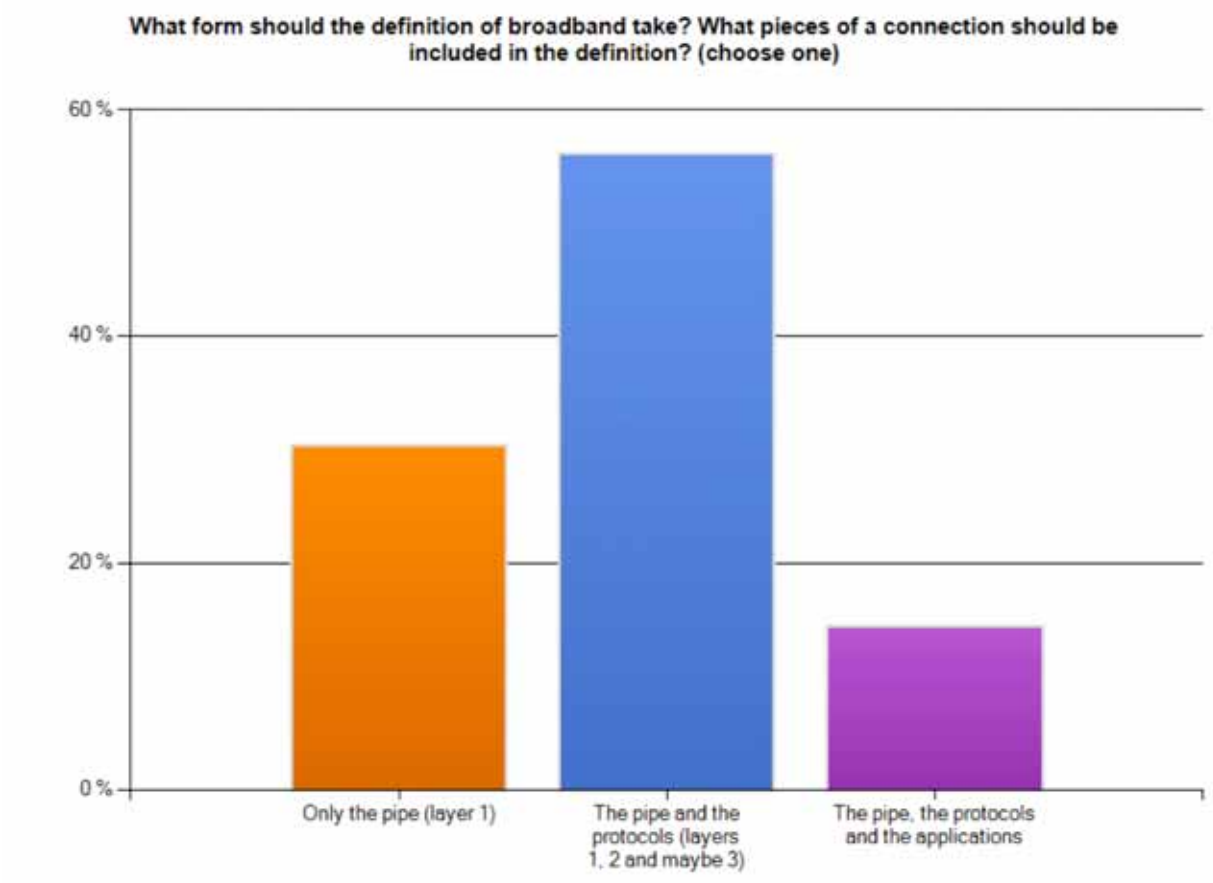


Answer choices were:

- Super network tech
- Average network tech
- Slightly network tech
- Not network tech

3. What form should the definition of broadband take? What pieces of a connection should be included in the definition? (choose one)

132 answered question, 2 skipped question

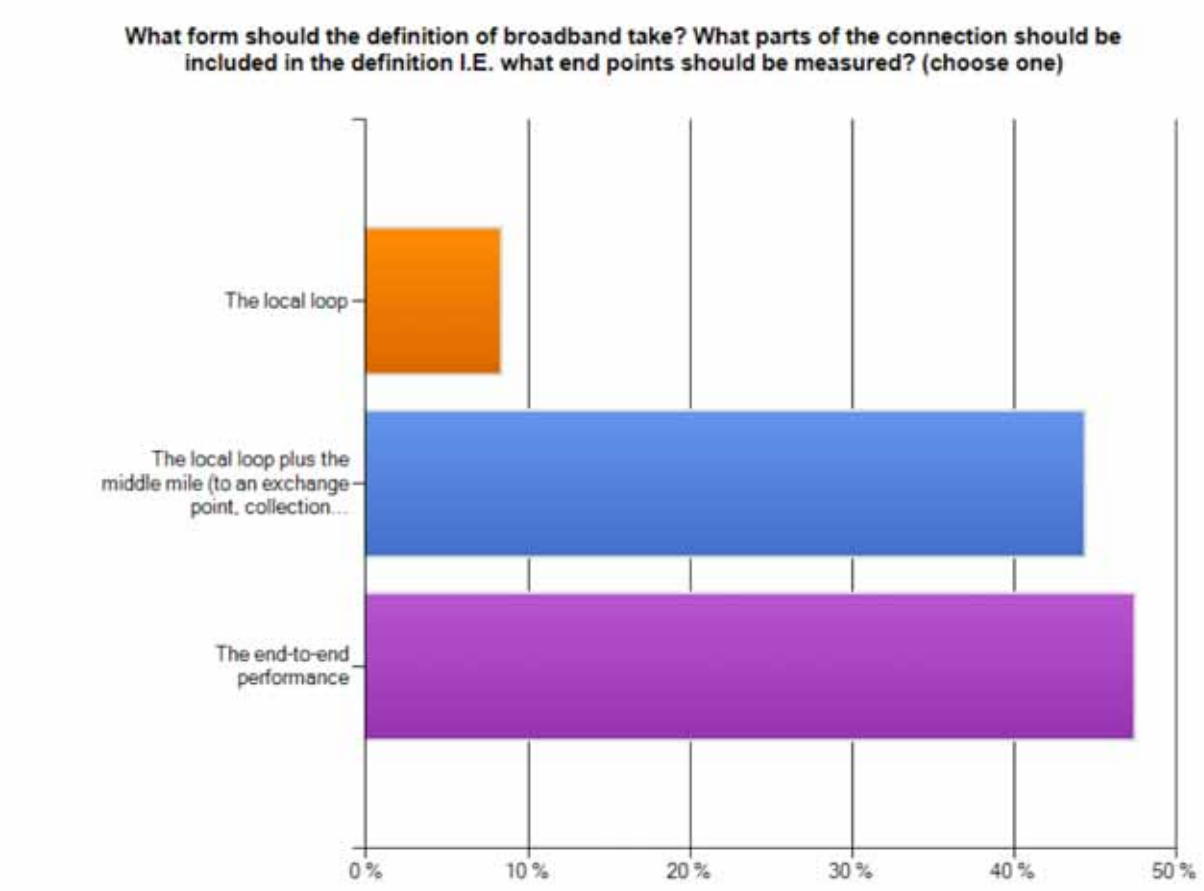


Answer choices were:

- Only the pipe (layer 1)
- The pipe and the protocols (layers 1, 2 and maybe 3)
- The pipe, the protocols and the applications

4. What form should the definition of broadband take? What parts of the connection should be included in the definition I.E. what end points should be measured? (choose one)

133 answered question, 1 skipped question

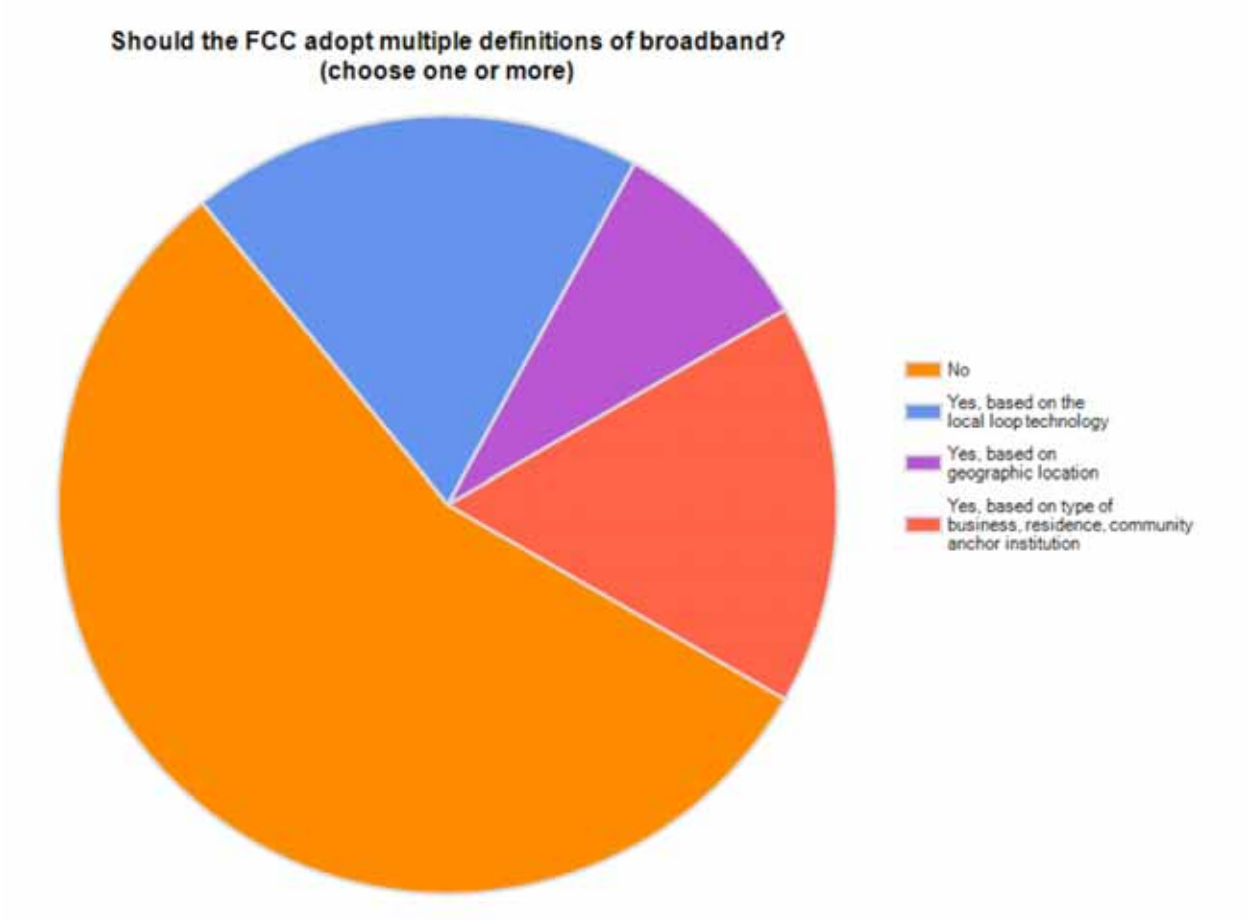


Answer choices were:

- The local loop
- The local loop plus the middle mile (to an exchange point, collection point, etc.)
- The end-to-end performance

5. Should the FCC adopt multiple definitions of broadband? (choose one or more)

125 answered question, 9 skipped question



Answer choices were:

- No
- Yes, based on the local loop technology
- Yes, based on geographic location
- Yes, based on type of business, residence, community anchor institution
- Other (see below)

Other (please specify)

1. One standard, minimum acceptable thresholds, based SOLELY on the performance characteristics indicated below, absolutely without regard to the underlying "loop" technology, such as twisted pair, coax, fiber, wifi, wireless telephony (cellular) or other. Must mandate an open-end interface with IPv4 and perhaps IPv6. Closed proprietary systems (such as most cell phones' so-called broadband apps are now) must not qualify for

stimulus.

2. FIXED (copper, coax, fiber, powerline, wireless...) and MOBILE (cellular, Wi-Fi/WiMax...)

3. Broadband is only IP over Fiber.

4. Not sure

5. The NTIA takes additional factors into consideration much better than the FCC does. Consider bandwidth speeds, technology types for delivery, susceptibility to local degradation due to usage demands, peak and nonpeak, AFFORDABILITY, etc.

6. Bandwidth alone is an inadequate characteristic; jitter, delay, path MTU, type of queue management disciplines (e.g. RED) in routers. I put together a rough draft on how one might measure this stuff, that could serve as a notion of some of the characteristics that might be of interest to one who is trying to come up with factors to differentiate:
http://www.cavebear.com/archive/fpcp/fpcp-sept-19-2000.html

7. FCC should get out of the way

8. Based on intended use of connection, ie VoIP, HD video, data only, etc.

9. Having answered "no," I think multiple definitions or standards are inevitable. For example, "Broadband" in a wireless connection is going to have a different definition from "broadband" in a hard-wired setting, I imagine.

10. Broadband should be defined as the thorough support of internet *protocols* and *principles*, not just the technical jive in #6 below. Otherwise it's just one more telecom or cablecom "service," which is the main problem to begin with.

11. Yes, based on the uses (sets of services and applications).

12. Multiple definitions will create confusion.

13. The definition should be based more on performance characteristics than specific technology.

14. It would be helpful if every category had an "Other (please specify)" field. ... The definition should set the bar rather than define the current state of networks. By having high level end-to-end performance specifications for layer 1 and layer 2 broadband connections, technologist can target applications that will work for specific environments. DO NOT allow the government to be in the application business, rather they should provide standard definitions and measure the utility in terms of layer 1 and layer 2 so Application Service Providers (ASPs) can create really cool applications for "standard defined" broadband markets.

15. But also based on the local loop technology

16. Per customer bandwidth, not aggregate of customers, too. Minimum latency parameter. Jitter floor/ceiling based on loop tech.

17. The definition should be the same for the national BB network. However, based on

specific geographic situations and otherwise exception can be made with alternatives added to it (typically less than 10% of the network will be effected by this)

18. Broadband is a technical term. It should be defined by the IEEE like all the others. I think the FCC wants to know how to describe it, not define it.

19. Ideally, there would be only a single definition for broadband. Certainly there will varying technologies deployed as part of building first mile transports.

20. Research that demands supercomputing performance capacity.

21. It should set a high minimum as a goal, and maybe something a little less as a requirement -- but NOT based on technology or location or other factors

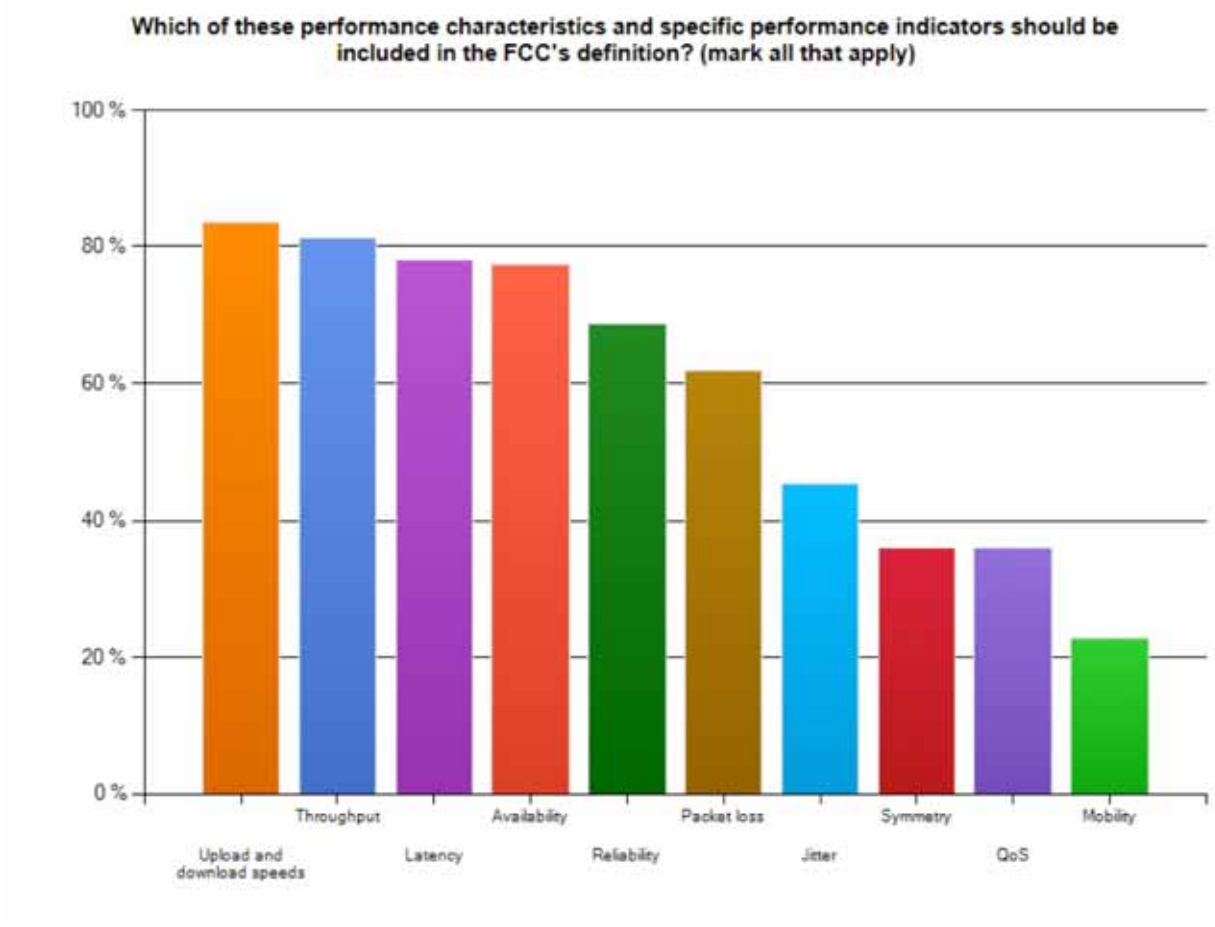
22. Based on the purpose of a regulation

23. All attempts to be consistent would be best

24. The definition should specify that these broadband connections are connections to the Internet [see http://itstheinternetstupid.com]

6. Which of these performance characteristics and specific performance indicators should be included in the FCC's definition? (mark all that apply)

128 answered question, 6 skipped question



Answer choices were:

- Upload and download speeds
- Throughput
- Latency
- Availability
- Reliability
- Packet loss
- Jitter
- Symmetry
- OoS
- Mobility
- Other (see below)

Other (please specify)

1. One standard, minimum acceptable thresholds, based SOLELY on these performance characteristics, absolutely without regard to the underlying "loop" technology, such as twisted pair, coax, fiber, wifi, wireless telephony (cellular) or other.

2. Avoid clutter. Focus on availability & speed.

3. No performance characteristics needed. Broadband is an IP Internet access connection over fiber, i.e. FTTH or FTTC.

4. Appropriate security and privacy protections

5. None

6. Throttling of service

7. Use a simple Scale which incorporates standards and performance levels, particularly if these can be used to identify "expect XXXX in this locate by YYYYY date. Simplify and make it clear.

8. Path MTU, queueing disciplines in switches/routers (e.g. RED, Fair queueing, etc), whether load balancing (multiple parallel links) or route differentiation (different flows take different paths), filtering (UDP or TCP ports, ICMP echo, etc.)

9.If qos is considered it should be considered a reason to be not called broadband. The definition should include unfiltered internet access in my opinion.

10. FCC regulations as well as other government divisions make it harder for small or new companies to enter the market, increase competition and deliver better service to end users.

11. Ubiquity

12. By QoS, I take it you mean reservation systems such as RSVP? Those are a Bad Thing. They can't create bandwidth out of thin air; all they can do is exclude applications. Graceful degradation is better.

13. Reachability via global tables, ACLs.

14. Support for advanced protocols such as IPv6 and IP multicast

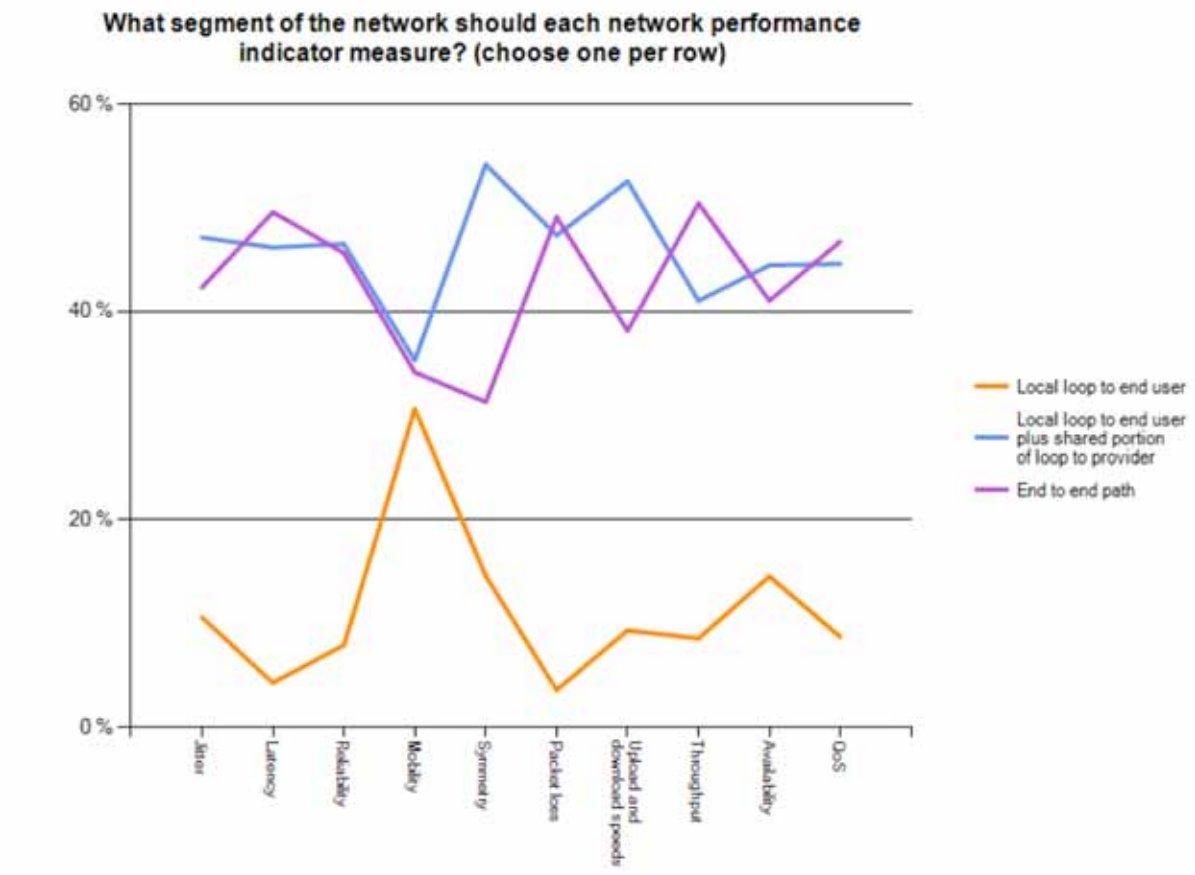
15. Application Sensitivity

16. Broadband should be defined as the thorough support of Internet *protocols* and *principles*, not just in-the-pipe technical jive. Framing broadband in those tech terms makes the Net just one more telecom or cablecom "service," which has been our main problem for 1.5 decades. Meanwhile people generally think broadband means speed. If it must, then I'd also rank symmetry as a matter of equal importance even though DOCSIS 1-3+ can't provide it, because it conceives connectivity as something run through TV channels -- another conceptual frame that limits what can be done with the Net.

17. These should be relevant to particular families of applications.
18. Affordability. Prices for residential in our area range from $40 (wire) to $100 (wireless broadand)---latter costs put it out of reach of many rural residents
19. Let the market/"loop providers" define Reliability, Mobility, Symmetry, Availability and QoS.
20. a=number of "pipes" into a location**,** b=number of ISPs allowed to use those pipes**.** If the product of a x b is maximized, the other indicators will not be needed.
21. Transparency - especially protocols, ports, content, destinations.
22. many of these metrics will not be fixed and stable.
23. neutrality
24. Assuming QoS specifies jitter, latency and packet loss. Therefore, I did not check these. Similarly upload and download speed and throughput would imply symmetry characteristics and performance indicators.
25. There is a reliable source for these definitions already.
26. The technology cocktail and service objectives of the transport(s) will drive which performance metrics are relevant.
27. Need not be symmetrical if UPload is high enough; mobile broadband ought to have its own plan/definition, etc.
28. Suspect there needs to be a technical definition as well as a lay-person's definition
29. Neutrality**.** Obligation to Interconnect

7. What segment of the network should each network performance indicator measure? (choose one per row)

125 answered question, 9 skipped question



Answer choices were a matrix where:

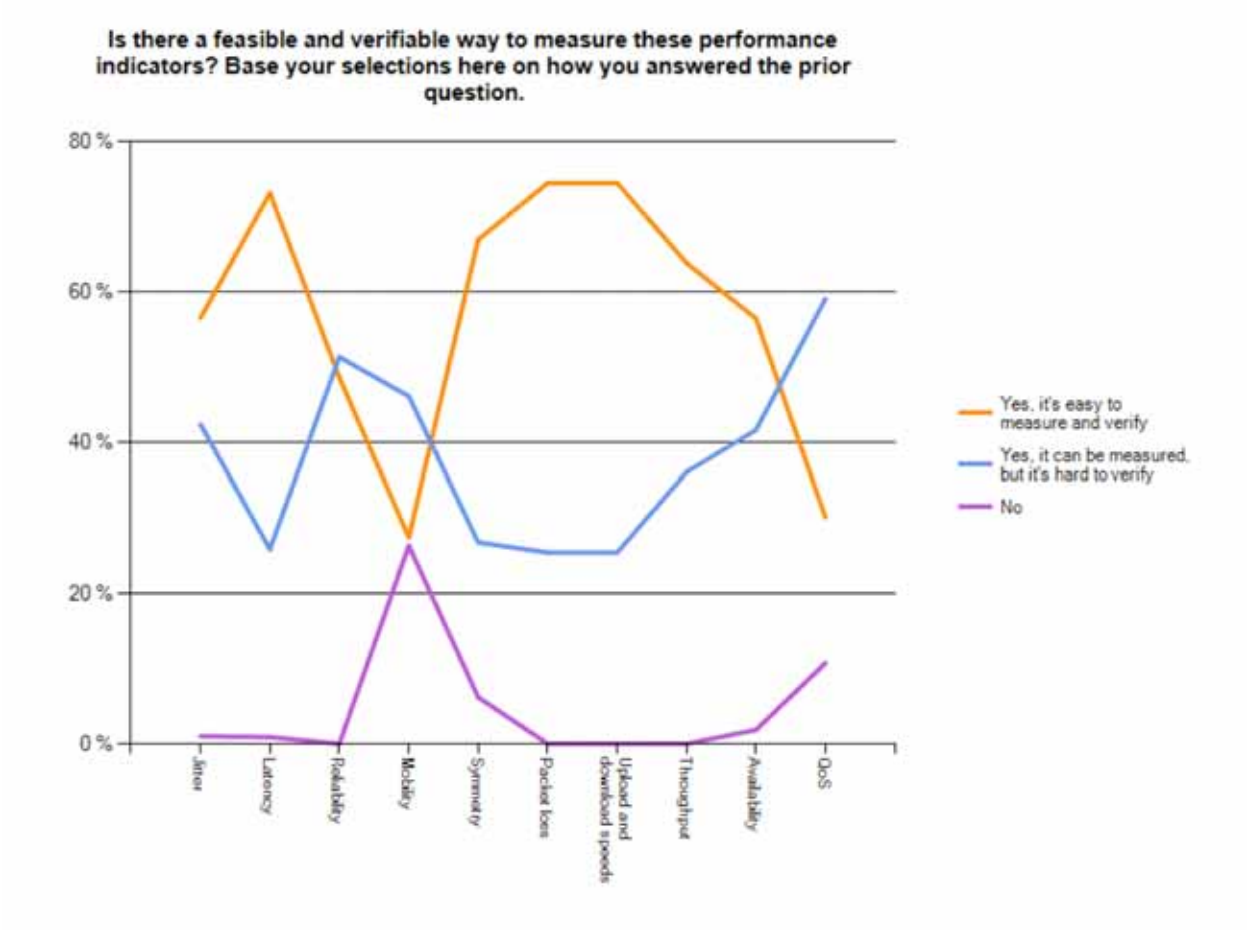
- Local loop to end user
- Local loop to end user plus shared portion of loop to provider
- End to end path

were matched with:

- Jitter
- Latency
- Reliability
- Symmetry
- Packet loss
- Upload and download speeds
- Throughput
- Availability
- QoS

8. Is there a feasible and verifiable way to measure these performance indicators? Base your selections here on how you answered the prior question.

116 answered question, 18 skipped question



Answer choices were a matrix where:

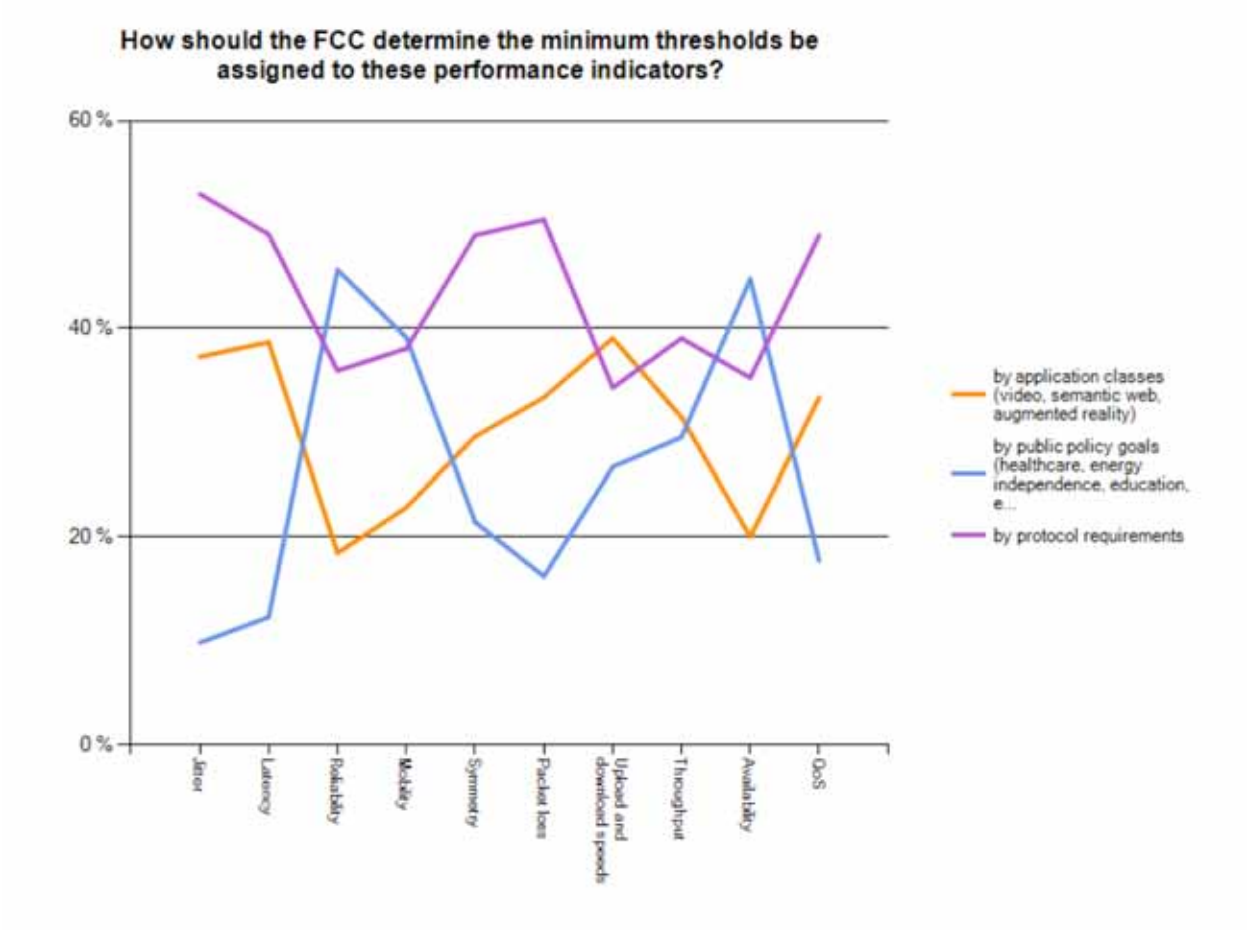
- Yes, it's easy to measure and verify
- Yes, it can be measured, but it's hard to verify
- No

were matched with:

- Jitter
- Latency
- Reliability
- Mobility
- Symmetry
- Packet loss
- Upload and download speeds
- Throughput
- Availability
- QoS

9. How should the FCC determine the minimum thresholds should be assigned to these performance indicators?

110 answered question, 24 skipped question



Answer choices were part of a matrix where:

- By application classes (vido, sematic web, augmented reality)
- By public policy goals (healthcare, energy independence, education, etc.)
- By protocol requirements

were matched with:

- Jitter
- Latency
- Reliability
- Mobility
- Symmetry
- Packet loss
- Upload and download speeds
- Throughput
- Availability
- QoS
- Other (see below)

Other (please specify)

1. Let the market deal with providers whose fiber is crippled in any way.

2. Some will depend on tools/resources available

3. None of the above. These measures should apply to all types of traffic.

4. You have not mentioned path security or the question of geographic diversity and amount of common-mode failures of physical links

5. FCC should not determine the minimum thresholds for any indicator.

6. Why does it have to be based on one of these 3?

7. The real answer is all three and more. But the biggest is the freedom to connect at all, and to create local solutions to problems. The Net should be home networking writ large, not a grace of telecom or cablecom.

8. Cost to end user

9. By using industry standards

10. Again let the market define application classes and the politicians/people define public policy goals

11. Maximizing the number of providers will fix *all* of the above

12. By DiffServ marking

13. Keep it objective!

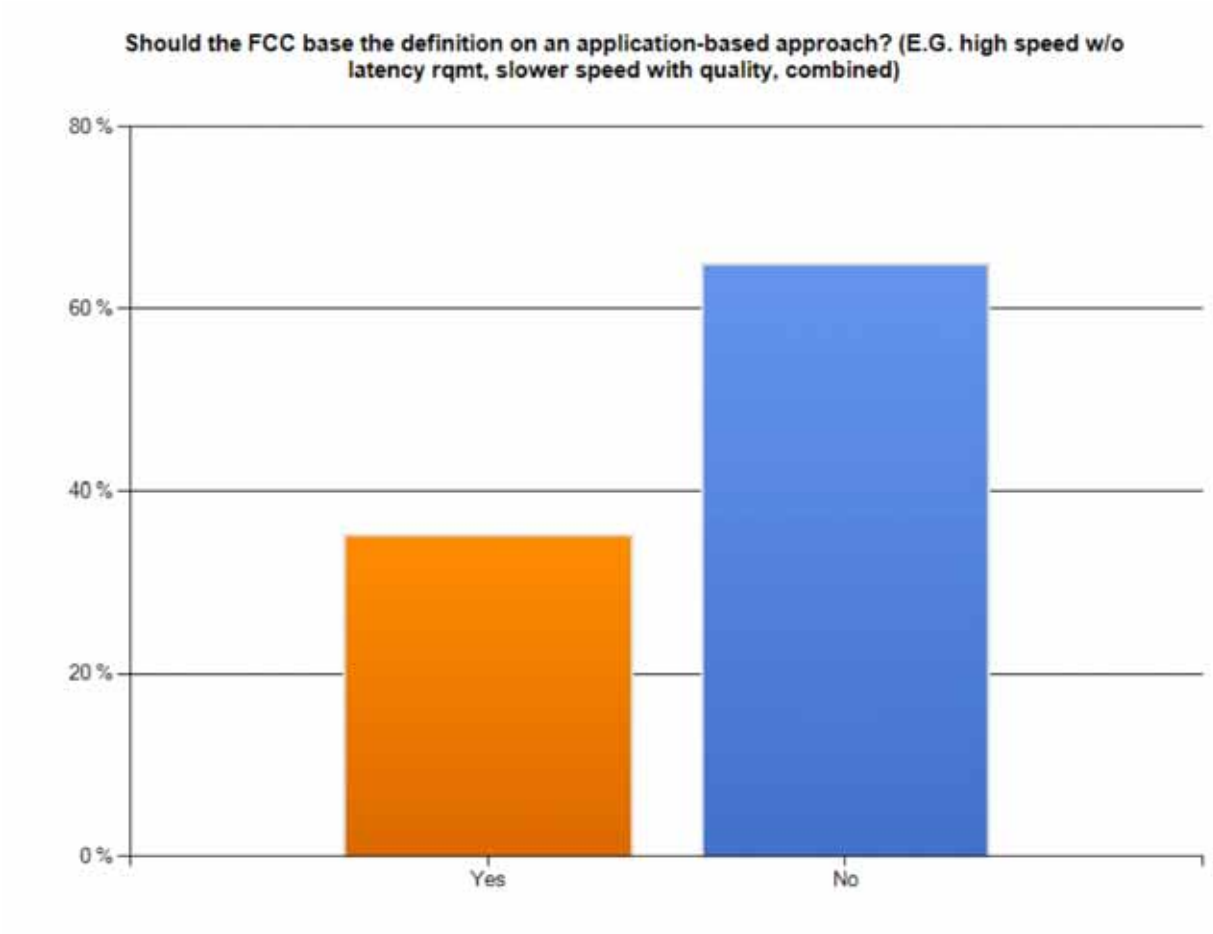
14. See above.

15. It should not determine any thresholds - let the market

16. Here again -- minimum & goal across all

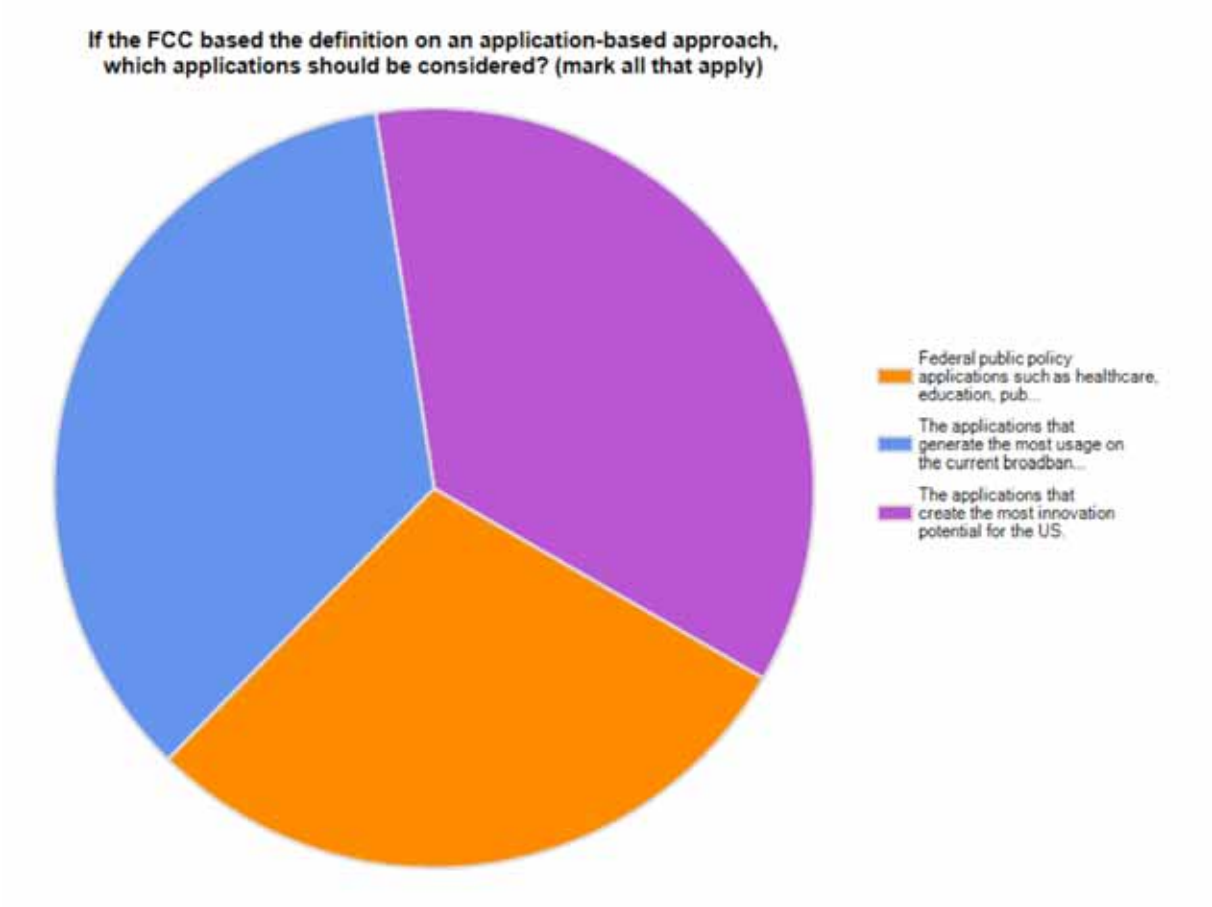
10. Should the FCC base the definition on an application-based approach? (E.G. high speed w/o latency rqmt, slower speed with quality, combined)

125 answered question, 9 skipped question



11. If the FCC based the definition on an application-based approach, which applications should be considered? (mark all that apply)

91 answered question, 43 skipped question



Answer choices were:

- Federal public policy applications such as healthcare, education, public safety, etc.
- The applications that generate the most usage on the current broadband connections
- The applications that create the most innovation potential for the US
- Other (see below)

Other (please specify)

1. Set objectives of regaining world leadership and measure success against other nations, NOT against our own history! Compare/rank results and measure progress toward goals.

2. All applications. It cannot be reasonably predicted what will turn out to be innovative

and/or what will support policy goals. The best one can be is to be neutral.

3. None

4. Resource planning and measurement will vary depending on overall demand patterns. There should be a primary focus on training, education and support so that early adapters/adopters are encouraged.

5. This seems like a slippery slope and should be avoided.

6. I think it is entirely illusory to base the definition on this approach.

7. I believe that there are certain groupings, such as conversational voice/video applications (as opposed to one-way audio or video), and bulk transfers for backups that will suggest perhaps a half-dozen sweet spots that can define the needs of applications today and, one hopes, for a short bit of the foreseeable future.

8. None - selecting applications is haphazard at best and will be outdated by new apps almost immediately.

9. Do not mingle applications with network

10. Applications-based approach is too vague, and likely to change drastically with time.

11. It should have room to grow, but forecasting for the needs of the next cycle of innovation is impossible.

12. How do you base the definition on applications when there is an infinite number of applications out there?

13. Any set of applications that is worth serving on the network.

14. Applications are problematic but should include everything. How many applications use the Net already? Millions? Meanwhile video, the most widely used bandwidth-intensive app, will drive the need for high upload as well as download speeds, because nearly everybody will be producing as well as consuming it.

15. Broadband is broadband no matter what the application is. Other wise you can define a 33kbps modem to be broadband for a telnet connection. No loopholes, please.

16. DO NOT let the government base the definition on an application approach. DO let the government define standard performance specifications that we can all use as a benchmark to design, create, innovate, market and deploy applications.

17. Commercial "innovation" lobbying may well cripple the whole nation's 'Net- IMCO

18. The simplest regulation is best. Layer 1 should be owned by a utility. Layer 2 providers should *NOT* have a monopoly on layer 3.

19. By the real-time characteristic of the application. That is, time critical applications such as interactive voice and video form one class, general applications (such as web browsing) form another, non-interactive latency-tolerant applications such as as email and critical bulk data-transfer form a third, and peer-to-peer non-critical bulk data transfer such as

BitTorrent forms a fourth tier.

20. Needs a technical group to manage requirements for this - similar to an ISOC/ICANN/IETF/IANA kind of thing.

21. Net neutrality should be the guide, but innovation should not be hindered, nor should it be monetized for carrier benefit

22. The FCC should consider applications based on the consumer's interest. Public policy applications will follow consumer availability.

23. The problem with application requirements is they evolve (HDTV requires far less than we thought 10 years ago) and they also don't allow for the next innovation....

24. How on earth can you future proof a network based on applications we don't what will be used in 5, 10 yrs time. The definition should be broad enough to allow for these future requirements.

25. Should not be based on applications which change quickly, but on common carriage precedents. This will much easier withstand legal challenges, which are inevitable

26. Technical classification of applications into classes that have common requirements, so that new heterogeneous applications can be developed without network intervention. (*This was done for B-ISDN 20+ years ago.*)

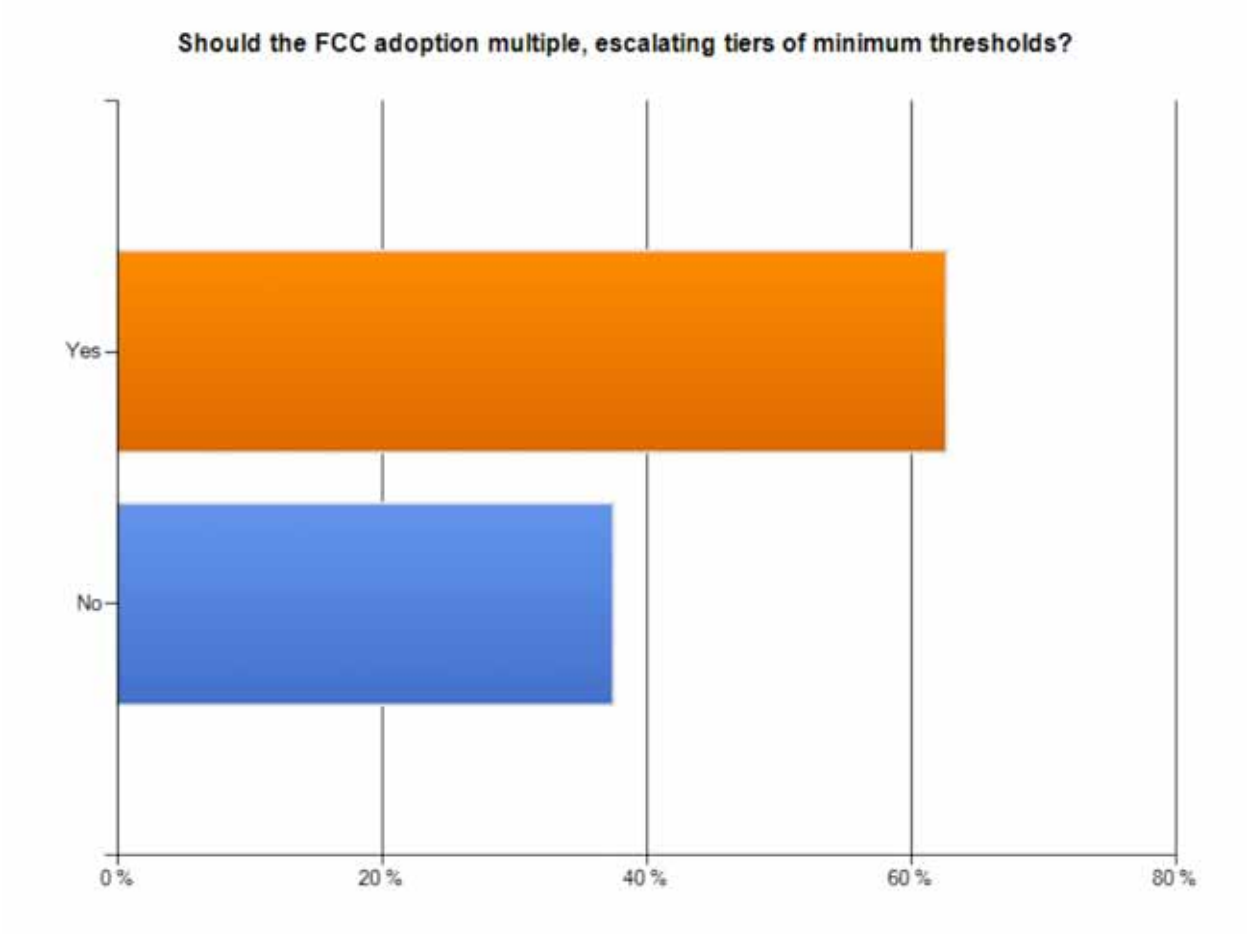
27. The FCC should let the market determine this.

28. NA -- should NOT be based on applications

29. It should not use an apps based approach.

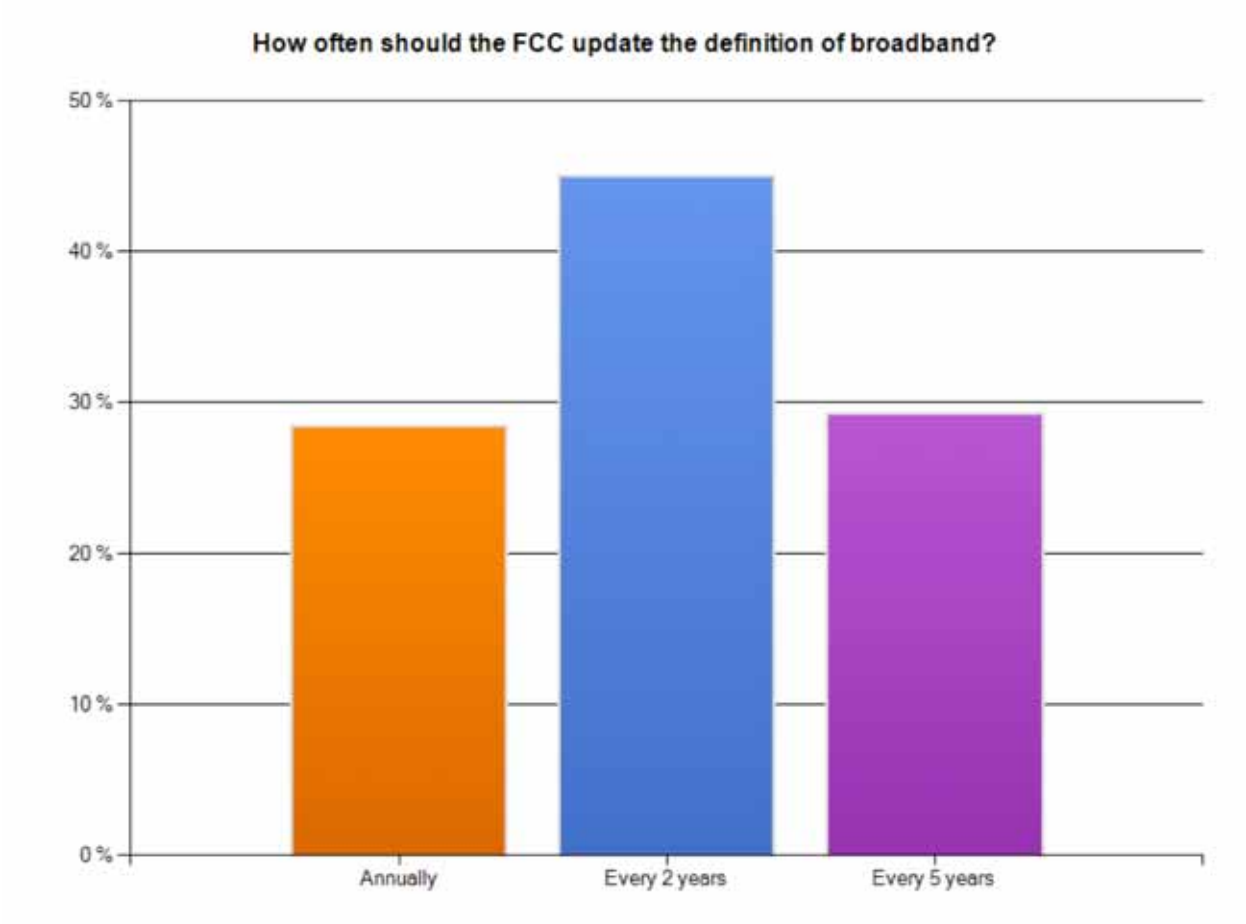
12. Should the FCC adopt multiple, escalating tiers of minimum thresholds?

123 answered question, 11 skipped question



13. How often should the FCC update the definition of broadband?

120 answered question, 14 skipped question



Other (please specify)

1. First in two years, then every five years.

2. The definition should not include numerical metrics, but rather guidelines

3. Should be demand/market driven - on-going.

4. Two years IF NECESSARY

5. I'm not sure that a metronome ticking every N years is the right method.

6. Really the definition should be broad enough to last a while

7. Depends on how much headroom the current definition has

8. Definitions should be left up to Webster.

9. I don't like the term "broadband", as it focuses more on throughput than ubiquitous reliable connectivity

10. Three years is the ideal refresh interval since that is the usual depreciation period for

technology assets.

11. Depends on the purpose

12. Based on a survey of metrics in a competitive environment

13. It's a bad word we can't help using. So as often as possible would be good.

14. Every 3 years

15. The term "broadband" is so corrupted it is irredeemable. Get another word and define it properly.

16. Technology at most large organizations is on a three (3) year cycle. By updating the definition every five (5) years we can make better organizational long-term decisions through 1 or 2 product life cycles.

17. Update upon review, mandatory 2 years, review 3 x annually, in publicly transparent fashion

18. 4 years - requires each political term to be proactive

19. Maybe longer, make the window economically stable

20. Whenever the IEEE does

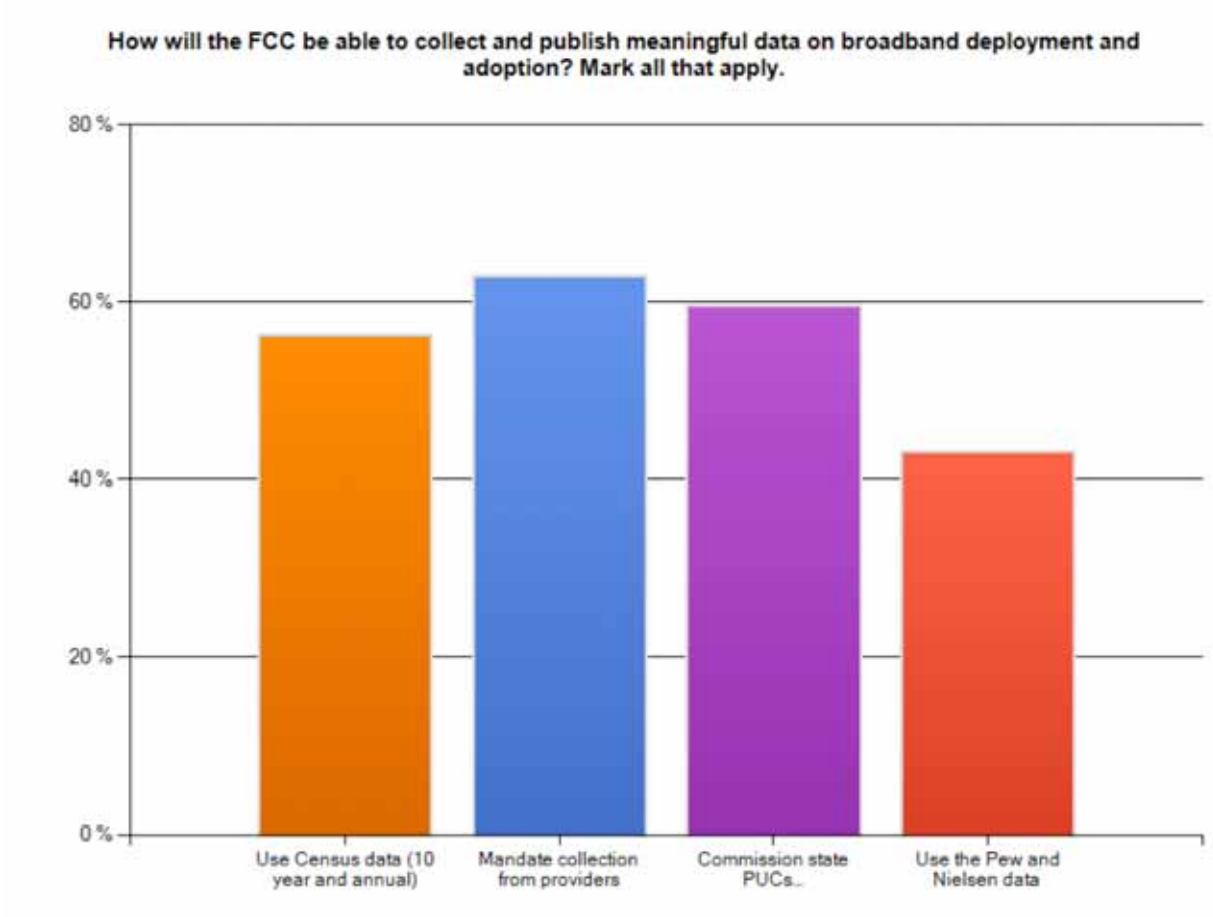
21. Never

22. Let the market determine the definition

23. Depends on what they define the definition to be.

14. How will the FCC be able to collect and publish meaningful data on broadband deployment and adoption? Mark all that apply.

121 answered question, 13 skipped question



Answer choices were:

- Use Census data (10 year and annual)
- Mandate collection from providers
- Commission state PUCs to survey annually
- Use the Pew and Nielsen data
- Other (see below)

Other (please specify)

1. Provide measurement tools to the end user.

2. Given availability, user-driven tools can check speed. Report lack of availability with phone/mail. Don't sugar-coat or pad measurements to make the administration or carriers look good (e.g. 200 Kbps in any one direction, deployed in xx% of 5-digit zip codes).

3. Also use anecdotal and interactive websites to generate interest and get constant feedback on innovations, suggestions and new trends in demand.
4. Cobble together a workable map by use of all meaningful data that is available
5. I have a feeling that we may soon be seeing a debate whether non-certified equipment may be required to attach to the net via a certified "safety" device, analogous to the old ISDN NT-1. If that were to occur we would have platforms that could allow measurements to be made.
6. We have learned that providers lie to get better slant on their political agenda. Having third party (unrelated to the telco's) research is important.
7. IF the FCC wants data collected it should do it on the FCC dime. Forcing data from providers increases costs that will then need to be passed on to consumers or slow innovation.
8. Offer users test software which they can run on their own connections, to see if they're getting what is advertised.
9. Crowdsourced. Write an application which measures these parameters, make it open source, and let us run it. Record and report the results.
10. Solicit (not mandate) data from providers.
11. Mandate collection but require demographic, not personally identifiable, data on use.
12. By measurements of broadband connections by FCC staff
13. Automate the process by having reporting devices on networks or computers generally.
14. There are lots of surveys (e.g. http://www.dslreports.com/) that rely on individual contributions, and -- while messy and opinionated -- have hard data and wide scope. By the way, the states are big sticks in the mud here. Many are captive to carriers and dumb about what the Net really is. Not sure how to fix that, but I am sure it needs to be flagged as a problem.
15. Independent testing and monitoring facilities.
16. Residential surveys undertaken by users, local government entities. Using survey data collected from users via Internet. see www.wiremorgan.com
17. Every 5 years commission state PUCs to survey
18. More data is better than less data. The USA will be number one in innovation and deployment if the organizations have good data from various albeit somewhat redundant sources.
19. Layer 1 data gives you an idea of what is *possible*. Layer 2 data lets you know what is in place and available to consumers. Layer 3 data is likely to be irrelevant if there are multiple providers available at each site, no matter the number of "pipes."
20. Active measurement to all US endpoints (and Canada too). Needs NSF sponsored

project for measurement. Publish results as well as inform FCC.

21. Let end-users submit data.

22. Leverage broadbandreports.com and other well known speedtest sites, and give end users the power with java based tools to self-report. Don't force providers to give this information.

23. Require that service providers provide adoption data.

24. Needs a far more intelligent approach towards data based on highly granular approach. Needs to be trans sectoral in nature taking many different sectors requirements into account (healthcare, etc, etc)

25. Random survey points representatives of the geographical area

26. Set up an independent/neutral Internet access measurement & benchmarking infrastructure (alternately, outsource to a competent academic or nonpartisan nonprofit institution with no conflicts of interest) -- something similar in function/scope to the sort of "performance measurement" (i.e., competitive benchmarking) departments that exist within every large Internet access provider. This would be relatively inexpensive but would require ongoing technical management

27. Some form of ongoing measurement is needed to form an accurate picture of deployment. It is likely that first mile transports will continue to be comprised of components owned by multiples entities. It is also likely that users and their service needs will be varied. Therefore, all current and some yet to be devised schemes of collecting and compiling deployment data will be necessary.

28. Most weight should be given to third party data sources, provider data should be collected but treated as suspect

29. Web crawlers and other automated surveillance approaches; not enough of the necessary hooks in place yet, requiring standards to achieve

30. Mandate collection from large providers; survey information for smaller providers.

31. Encourage/reward studies by others

32. "Internet census" by pinging IP addresses, measuring performance. Would require data to correlate IP addresses (and/or ranges with geographic location.

33. Hire Connected Nation???

Additional Comments

Two individuals sent email to FirstMile.US with these additional comments.

1. Rather than defining "broadband" based on a fixed speed or certain applications and their functional requirements, the definition should be dynamic calculation of speeds being sold in competitive markets. For example, if a third of the customers in the top 100 cities have 3 Mbps, another third have 5 Mbps, and another third have 10 Mbps, then 6 Mbps would be the weighted average and the working definition of broadband. Additionally, it doesn't have to be a fixed number, but could be a range +/- 25%. With some relatively simple mathematical projections based on past and current data, it would not be too hard to project with a certain level of certainty where the broadband numbers will be 1, 2, or 5 years from now. Any subsidies should include consideration of the applicant's ability to sustain service for both the current definition of broadband and one 3, 5, and 10 years from now.

This approach has several benefits. First, it removes the FCC choosing winning and losing applications that change so dynamically in nature and type on the internet. Second, it removes the FCC from choosing, based on the current debate, will appear to be arbitrary downstream and upstream speeds to something that is based in market reality. Third, it keeps the definition dynamic and in pace with the competitive markets.

One of the suggested approaches includes setting certain latency and jitter requirements. While the proponent's intentions are appreciated, it doesn't reflect how service providers sell their products today, even though they are definitely kept in mind when the network is built.

Finally, the very real differences between of wireless (cellular, BWA, and satellite) and wireline can't be ignored. But no need to shy away from that—the same approach of dynamically calculating the target numbers can be used to supply broadband numbers for each technology type. There's some concern by wireline operators that this favors the wireless modality, but the FCC has to trust that free market principles will function to allow the customer to choose the technology that best suits their needs.

2. I think that broadband should be defined as the BW needed to simultaneously carry:
    1. The lowest resolution, full power, broadcast television signal
    2. The lowest resolution, full-duplex, tariff-defined voice channel
    3. An additional amount of BW equal to one-half of item 1.

This gives us a living definition of Broadband that is technology-independent, relevant to usage, and automatically updated as common data elements are redefined.

If broadcast TV and the PSTN go away, then we'll have to revisit this definition, but it will hold up pretty well until that time.