Making Broadband Internet Labels Useful and Usable: Preliminary Report on Consumer-Driven Broadband Label Design

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Lorrie Faith Cranor, Jon Peha, Christopher Choy, Ellie Young, and Megan Li

Executive Summary

In January 2022, the Federal Communications Commission (FCC) issued Notice of Proposed Rulemaking (NPRM) 22-7, which proposed requiring internet service providers to display broadband consumer disclosure labels prominently at the point of sale. In response to the FCC's request for comment in their NPRM, the CyLab Usable Privacy and Security Laboratory at Carnegie Mellon University conducted a large-scale user study to gain insight into what information is most important to US consumers when shopping for broadband internet services as well as what terminology and presentation formats make this information most understandable and useful to consumers. In addition, we examined the FCC's proposed 2016 broadband consumer label formats and proposed our own broadband consumer disclosure label formats.

We surveyed broadband internet consumers in a two-phase online study, recruiting from a diverse pool of 32,000 consumers who had previously participated in Consumer Report's consumer initiatives related to broadband internet. Across both survey phases we received a combined total of over 2,500 completed surveys. In the first phase we evaluated the 2016 labels to gain insights into what information was most important to consumers and what information caused confusion. We then created new label designs based on our results from the first phase. In the second phase, we compared the effectiveness of our new label designs with the 2016 labels. After analyzing our survey results, we made further revisions to our new label designs. This is a preliminary report of our findings and recommendations.

Phase 1 key findings

- Participants strongly supported the idea of broadband labels.
- Participants generally cared most about cost, speed, and reliability (a factor not included on the 2016 label) when considering a broadband plan for purchase.
- Participants were interested in metrics for both "normal" broadband performance and for times when performance is much worse than normal.
- Many participants were interested in seeing a score or grade for their plan's performance, but did not want it to replace the reporting of raw numbers.
- Participants expressed interest in using details about providers' network management practices to avoid providers with certain practices.
- Participants struggled to compute total service cost over the span of 2, 3, or 4 years using the information on the 2016 proposed label.
- Participants generally lacked knowledge of more technical terms and performance benchmarks–such as latency, packet loss, network management practices, performance percentiles, and network congestion–but when these terms were briefly explained to them, they often showed some understanding of the concepts.
- Across all comprehension questions, non-technical participants tended to perform worse than those who self-identified as having a technical background.

Broadband Facts

Fixed broadband consumer disclosure

Choose Your Service Data Plan for 50Mbps Service Tier

Monthly charge for month-to-month plan	$60.00
Monthly charge for 2 year contract plan	$55.00

Click here for other pricing options including promotions and options bundled with other services, like cable television and wireless services.

Other Charges and Terms

Data included with monthly charge	300GB
Charges for additional data usage – each additional 50GB	$10.00
Optional modem or gateway lease – Customers may use their own modem or gateway; click here for our policy	$10.00/month
Other monthly fees	Not Applicable
One-time fees	
Activation fee	$50.00
Deposit	$50.00
Installation fee	$25.00
Early termination fee	$240.00

Government Taxes and Other Government-Related Fees May Apply: Varies by location

Other services on network

Performance - Individual experience may vary

Typical speed downstream	53 Mbps
Typical speed upstream	6 Mbps
Typical latency	35 milliseconds
Typical packet loss	0.08%

Network Management

Application-specific network management practices?	Yes
Subscriber-triggered network management practices?	Yes

More details on network management

Privacy	See our privacy policy
Complaints or Inquiries	To contact us: online/(123)456-7890; To submit complaints to the FCC: online/(888)225-5322

Learn more about the terms used on this form and other relevant information at the FCC's website.

Broadband Plan A

Fixed broadband consumer disclosure available to residents of **15213**

Tfin&T - Choose Your Service Data Plan 300GB @ 50Mbps • Last updated August 2, 2022

Base monthly cost	During 1-year promotional contract period	Month-to-month (no contract or after contract expiration)
	$55.00	**$65.00**

Includes 300GB of data per month plus provider fees and government taxes.
*Click here for **other pricing options** including promotions and bundled options such as cable television and mobile phone services.*

Optional monthly charges		
Equipment lease + tax	Included	$11.00
Bundled streaming services: Hulu, Spotify	$15.00	$15.00

Activation	Total Estimate:	With 1-year contract	No contract
		$75.00	**$123.00**
New subscriber fee		$50.00	$50.00
Deposit		n/a	$48.00
Installation fee		$25.00	$25.00

Other fees		
Fee for additional data usage: each 50GB over 300GB limit	$12.00	$12.00
Early termination fee	$240.00	n/a

Performance

Individual experience may vary. Listed measurements reflect the typical range of these performance fluctuations.

Government Performance Ratings (fcc.gov/broadband) — What do these mean?

Web browsing	Good	Streaming audio	Good	Videoconferencing	Acceptable
Gaming	Poor	Streaming video	Acceptable	Online backups	Marginal

	When performance is poor (10th percentile)	When performance is normal (median)
Speed (downstream)	4 Mbps	53 Mbps
Speed (upstream)	0.4 Mbps	6 Mbps
Latency	250 ms	35 ms
Packet loss	3.98%	0.08%

Reliability *Individual experience may vary* What do these mean?

Average monthly downtime per customer	2 hours 4 minutes
Total number of outages, last 3 years	105

Network management practices What do these mean?

Traffic management	Effect
Lower priority than Super Internet plan	decreased speed during congestion
Heavy data users (>300GB in a month) are deprioritized	decreased speed during congestion
Throttled video downloads and video streaming	download speed for video limited to 40 Mbps
Paid prioritization	**Effect**
speedtest.net traffic is prioritized	performance may be increased
Zero-rating/Data allowance exceptions	**Effect**
thisprovider.com traffic	does not count against premium data allowance

Privacy	See our privacy policy
Complaints or Inquiries	To contact us: online/(123)456-7890 To submit complaints to the FCC: online/(888)225-5322

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The FCC's 2016 fixed broadband label (left) evaluated in Phase 1 and our New fixed broadband label (right) tested in Phase 2. See Appendix C for enlarged versions.

Phase 2 key findings

- Our proposed (New) labels generally performed better than the 2016 labels in enabling consumer comprehension of the represented broadband plan (including performance and service costs). In addition, consumers found them easier to use and preferred their format.
- Participants wanted to know the total cost of their internet plan and disliked any ambiguity; participants also expressed a desire for in-depth cost explanations, for taxes to be included as part of the label, and for some sense of plan service area.
- Participants requested information about network reliability, when and by how much the listed performance metrics could drop during peak times, and explanations for technical terms.
- Participants expressed interest in having both performance numbers and suitability ratings included on a label.
- Participants generally wanted to see a lot of information on the label, but also wanted a label that would be simple to understand and compare across plans.

- Generally, we saw slightly lower comprehension among non-technical participants than those who self-identified as having a technical background, and non-technical participants were slightly less likely to find the labels easy to use. These modest differences showed up in both the 2016 and New labels.

Recommendations

- Broadband labels should include a range of information valued by consumers but should highlight the information they value most, including information on cost, speed, and reliability.
- Broadband labels should balance the needs of consumers who value simplicity and conciseness with those who value detailed information. This can be achieved with a standardized label design with links to definitions of terms maintained by the FCC in a format conducive to comparing multiple plans. A layered label design with a summary and full version may help address the needs of a wider range of consumers.
- Broadband service providers should be required to deposit detailed plan information in a standardized computer-readable form in a publicly accessible database to enable third-parties to generate customized labels for consumers and offer comparison shopping tools, quality of experience or suitability ratings, and other value-added services.
- Non-optional costs should be bundled into a total cost where possible, including taxes, to make it easy for consumers to determine how much they will need to pay.
- Performance metrics should be included for downstream speed, upstream speed, latency, and packet loss in both normal and poor performance times.
- Broadband labels should include some measure of reliability, addressing consumer interest in information about outages and downtime.
- All data rate units be kept consistent (e.g. all broadband providers would express throughputs in Mbps and latencies in ms).
- Network management practices should be enumerated on the label in standard groups and accompanied by a standardized glossary with definitions and examples that explain these terms for consumers.
- Labels and accompanying data should be localized so that consumers can readily compare plan details–including total costs, performance at both normal and busy times, reliability, and network management practices– for a particular geographic location.

Our study concludes with a proposal for a broadband label design that takes into account participant feedback on both the 2016 and New label designs we tested. To help balance the need for both simplicity and detail, we propose a layered label design with both summary and detailed views, shown below.

Broadband Facts

Fiber One Gigabit

Fixed broadband consumer disclosure available to residents of **15213**
Last updated August 31, 2022

Scan for more info
http://cups.cs.cmu.edu/broadband/

Base monthly cost $99.99

Unlimited data at speeds up to 940/880 Mbps per month. Includes provider fees and government taxes.

Optional monthly charges/discounts

| Router lease + tax | **Included** | | Auto Pay and Paper-Free discount | -$10.00 |

Other optional services and discounts can be found by scanning the QR code at the top of this page.

Activation fees

| Fios Setup | **Included** |

Performance & Reliability

Government Performance Ratings (fcc.gov/broadband)   *Typical performance ranges; individual experience may vary.*

| **Web browsing** | **Good** | **Streaming audio** | **Good** | **Streaming video** | **Acceptable** |
| **Videoconferencing** | **Marginal** | **Gaming** | **Poor** | **Online backups** | **Good** |

| Median download speed | 903.5 Mbps | | Median upload speed | 811.8 Mbps |

| Average monthly downtime per customer | 1 hour 14 minutes |

The summary layer of our prototype layered design for a consumer broadband label.

Broadband Facts

Fiber One Gigabit

Fixed broadband consumer disclosure
available to residents of **15213**
Last updated August 31, 2022

Base monthly cost $99.99

Unlimited data at speeds up to 940/880 Mbps per month. Includes provider fees and government taxes.
Click here for more pricing options including promotions and bundled options such as cable television.

Optional monthly charges/discounts

College student discount	$-20.00
Military and veteran discount	$-15.00
Auto Pay + Paper-Free discount	$-10.00
Router lease + tax	Included
2 TB cloud storage	Included
Unlimited cloud storage	$5.00
Inside Wire Maintenance	$15.00
Home Device Protect	$25.00

Activation

Setup and installation	Included

Performance
What do these mean?

Individual experience may vary. Listed measurements reflect the typical range of these performance fluctuations.

Government Performance Ratings (**fcc.gov/broadband**)

Web browsing	**Good**	Streaming audio	**Good**	Streaming video	**Acceptable**
Videoconferencing	**Marginal**	Gaming	**Poor**	Online backups	**Good**

	When performance is **poor** (10th percentile)	When performance is **normal** (median)
Speed (downstream)	308 Mbps	929.5 Mbps
Speed (upstream)	311 Mbps	912.22 Mbps
Latency	380ms	86ms
Packet loss	5.25%	0.4%

Reliability
What do these mean?

Individual experience may vary.

Average monthly downtime per customer	1 hour 14 minutes
Total number of outages, last 3 years	105

Network management practices
What do these mean?

Traffic management	Effect
Fiber One does not affirmatively manage congestion on the network through mechanisms such as real-time throttling, blocking, or dropping of specific end user traffic based on source or content.	
Paid prioritization	Effect
None	
Zero-rating/Data allowance exceptions	Effect
Free Fortnite!	Traffic to Epic Games servers does not count against usage caps on any of Fiber One's applicable plans.

Privacy	**See our privacy policy** at cups.cs.cmu.edu/broadband
Complaints or Inquiries	To contact us: **online** / 1 (800) 837-4966 To submit complaints to the FCC: **online** / 1 (888) 225-5322

The detailed layer of our prototype layered design for a consumer broadband label.

About the Authors

The CyLab Usable Privacy and Security Laboratory at Carnegie Mellon University (cups.cs.cmu.edu) has done extensive research on consumer labels for website privacy policies, mobile app privacy, and IoT devices. This research was directed by Dr. Lorrie Cranor and Dr. Jon Peha. Dr. Cranor is a professor of computer science and of engineering & public policy at Carnegie Mellon University (CMU) and former chief technologist at the Federal Trade Commission (FTC). Dr. Peha is a professor of electrical & computer engineering and of engineering & public policy at CMU, and former chief technologist at the Federal Communications Commission (FCC). This study was conducted by independent researchers from CMU and is not funded by any external source. Consumer Reports collaborated with CMU to provide access to participants who had previously expressed interest in broadband internet options but had no role in experiment design, data analysis, or formulation of conclusions. For the latest updates on our broadband label research, see
https://cups.cs.cmu.edu/broadband/