

THE POST BANDWIDTH Era: A LABEL FOR INTERNET GOODNESS

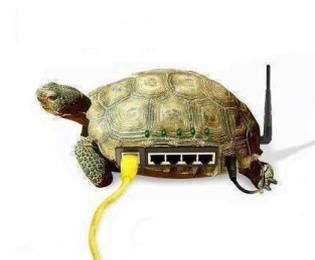
Mark Johnson, University of North Carolina
Anita Nikolich, Illinois Institute of Technology

Inspired by an “Inventory of Aspirations” (2015)

*Want Internet everywhere (**reach, ubiquity, uptake**), safe and law abiding (**trustworthiness and lawfulness**), **Interdisciplinary approach***

Missing:

- **Sufficient capacity and speed** for online work, learning and leisure
- Activities kept **private & free of censorship**
- **Choice** and flexibility of service
- Clarity and **Transparency** in carrier/content provider metrics and advertising



The Challenge, Obstacles and A Proposal

Challenge: Researchers, operators, government and consumers at odds about what constitutes a **good** Internet connection, how to measure it and how to visualize it.

Obstacles:

- Last mile offered bandwidth is a proxy often used, but its existence is rarely verified.
- End user experience is relative.
- Researchers, government and ISPs have a symbiotic relationship.
- Some topics are 'don't ask don't tell' in network community - ie privacy and surveillance.

Proposal: Create a better, yet measurable definition of “Good” that encompasses interdisciplinary work of network researchers, end user point of view, social scientists and economists. Converting it to a visual representation aids consumers and government in understanding metrics.

The Purpose

ISP Accountability

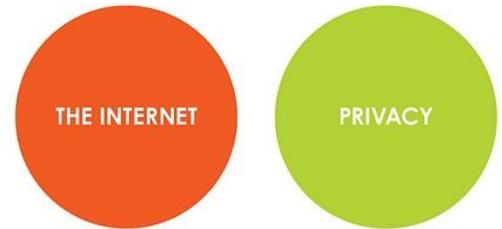
To consumers

To policymakers & funders

Stimulate R&D by exposing ground truth and places where investment needed

Economic Competitiveness

Reclaim Privacy - perhaps move to GDPR in US



A HELPFUL VENN DIAGRAM

Scoring “Goodness”

Weighted score based on several factors:

- Speed - Must be verified by independent auditors, not ISPs nor willing participants with software. Are consumers actually getting speeds reported by the carrier?
- Availability - Infrastructure and Form 477 data should be audited and validated by a 3rd party.
- Privacy Preservation/Trustworthiness - Are consumers allowed to opt-out of data collection?
- Anti-surveillance. Does the ISP follow the legal regulations only and no more.
- Research-friendly - Is the carrier willing to provide data sets to researchers?



NO Internet



SLOW Internet

Scoring “Goodness” (more)

- No Bandwidth Throttling. No data caps.
- Routing Policies. Does the carrier have accurate IRR data? Are they adhering to MANRS?
- Corporate Responsibility/Trustworthiness.
- Cost - Are the tiers of service reasonable, transparent and comparable in structure to other carriers?
- Consumer Transparency in Advertising - Understand offering.
- Security - Are best practices in place?
- Economic Impact - how many jobs were created as a direct result

Oversight - Watchdog Group Needed

Researchers in academia and at carriers produce results that are acceptable, not controversial. Can't risk funding!

FCC is not non-partisan

Alternatives to ensure more transparency and accountability:

- Empower FTC to levy penalties for false advertising
- An NTSB or NHTSA type function independently verifying measurement

Funding for this: Carriers and content providers should pay for it via a **special tax** levied by size of customer base.

Who's measuring Now



Sticks not Carrots

Providers should be penalized for :

Inaccurate last mile broadband maps

Throttling to force unnecessarily expensive data plans

Charging consumers to opt out of selling their data

False advertising

Privacy Nutrition Labels Have Been Suggested Since 2001



Mozilla - 2011 - icons: 3rd party use of your data for intended purposes only vs selling to data brokers

Bell Group

information we collect	ways we use your information				information sharing	
	to provide service and maintain site	marketing	telemarketing	profiling	other companies	public forums
contact information		opt in			opt out	
cookies						
demographic information		opt in			opt out	
financial information						
health information						
preferences						
purchasing information		opt in			opt out	

CMU/CyLab prototype 2009

Goal: Intentionally designed, common format

See: "Standardizing Privacy Notices: An Online Study of the Nutrition Label Approach", Kelley and Cranor

How Would We Make an Internet Nutrition Label?

Nutrition Facts

Serving Size 1 cup (228g)
Serving Per Container 2

Amount Per Serving
Calories 250 Calories from Fat 110
% Daily Value*

Total Fat	12g	18%
Saturated Fat	3g	15%
Cholesterol	30mg	10%
Sodium	470mg	20%
Total Carbohydrate	31g	10%
Dietary Fiber	0g	0%
Sugars	5g	
Protein	5g	

Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calorie	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300 mg	300mg
Sodium	Less than	2,400 mg	2,400 mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

LOW Fat 7.7g per serving

LOW Saturates 2.0g per serving

HIGH Sugars 42.2g per serving

MED Salt 2.0g per serving

WARNING:
CHOKING HAZARD
This toy is a small ball.
Not for children under 3 yrs.

Drug Facts

Active ingredient (in each tablet) Chlorpheniramine maleate 4 mg **Purpose** Antihistamine

Uses temporarily relieves these symptoms due to hay fever or other upper respiratory allergens: ■ sneezing ■ runny nose ■ itchy, watery eyes ■ itchy throat

Warnings
Ask a doctor before use if you have
■ glaucoma ■ a breathing problem such as emphysema or chronic bronchitis
■ trouble urinating due to an enlarged prostate gland

Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives

When using this product

WATER RATING

The more stars the more water efficient

Water Consumption: 54
Litres per wash with heated program

For more information and to compare appliances, visit www.waterrating.gov.au

Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
Without Through-the-Door Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator with Others before You Buy.

This Model Uses 776 kWh/year

Energy Use (kWh/year) range of all similar models

Uses Least Energy 742 Uses Most Energy 856

kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 to 24.4 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:

\$68

Based on a 1992 U.S. Government national average cost of 8.24¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Refrigerator Model of this class when tested performed to a standard of Energy Star 2.0 U.S.C. 1053.

Energy **Washing machine**

Manufacturer Model

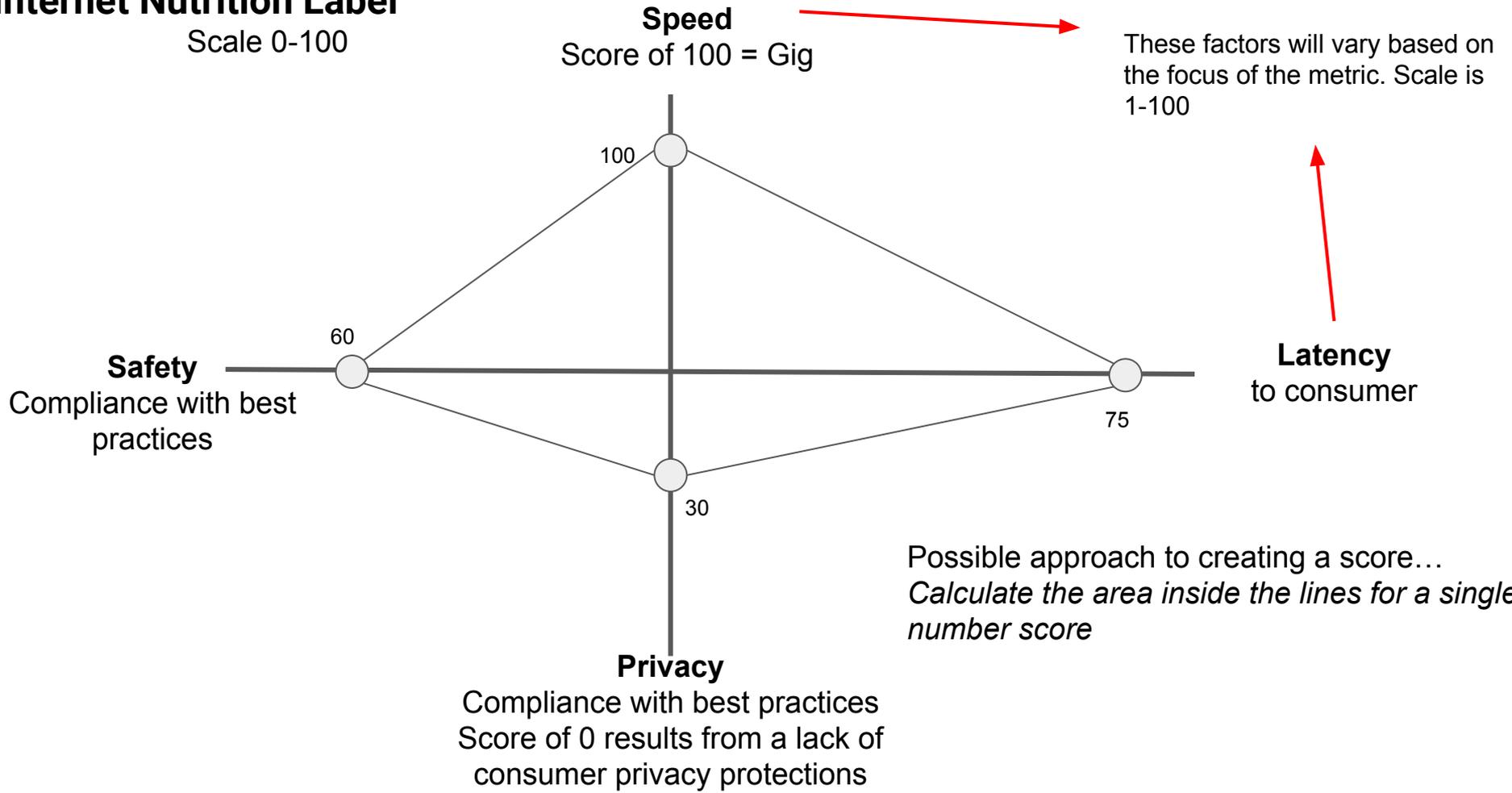
More efficient

A
B
C
D
E
F
G

B

Internet Nutrition Label

Scale 0-100

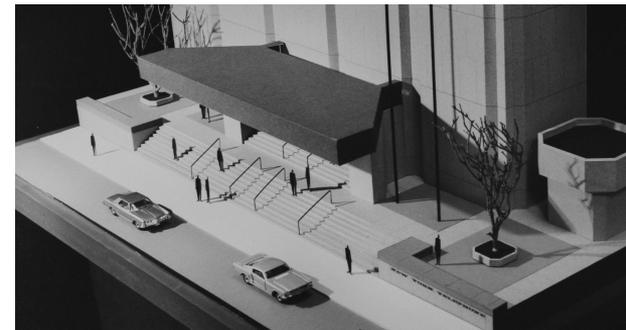


Scoring: Privacy Example

Don't sell consumer Data	100
Opt Out from Data Collection at No Additional Cost	100
Transparent cooperation with Federal data collection	100
No throttling of VPN	50
Easy to understand privacy policy telling users where data is kept and how its used	10

Weighted Score (1-100)

AT&T - NSA TITANPOINTE site in NYC <?>



Scoring: Physical Infrastructure Example

Accurate Mapping Data given to FCC	
Easy access to UNEs	
Building out accurately if in receipt of Federal funds	
Truthfully advertise infrastructure to consumers	



Fiber “available” per Form 477.
Score must be less than 50.

NY vs Spectrum/TWC (Case 450318/2017): Spectrum gets a 0 for false advertising of capabilities

Score (1-100)

Integrate Other Approaches



Crowdsourcing Measurement- ie Broadband Catalysts - data from FCC, open access fiber networks & citizens

Bug bounties Popular for discovery of security vulnerabilities. How about to those who prove carrier throttling or practices that violate those stated in carrier policy?

Non-academic conferences empower tech advocates and activists to make change.

hackerone

Open Questions

- Label design?
- Who'd run a watchdog group?
- Should policymakers just use the overall optimal score?
- What factors should be universally at a certain level?
- What does “underserved” mean?